

OPERATING AND MAINTENANCE MANUAL

ICE MODEL 44-30

VIBRATORY PILE DRIVER/EXTRACTOR

WITH MODEL 325 POWER PACK

Serial Numbers: 186501 & Above



INTERNATIONAL
CONSTRUCTION
EQUIPMENT, INC

SPECIALIZING IN PILE DRIVING EQUIPMENT

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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 sections.

The first contains routine OPERATING INSTRUCTIONS for the unit and includes a GENERAL DESCRIPTION section, which presents a basic explanation of the driver/extractor and 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 the same care and maintenance as other high quality construction equipment.

The second section contains information for ordering spare parts and 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 to 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 judgment 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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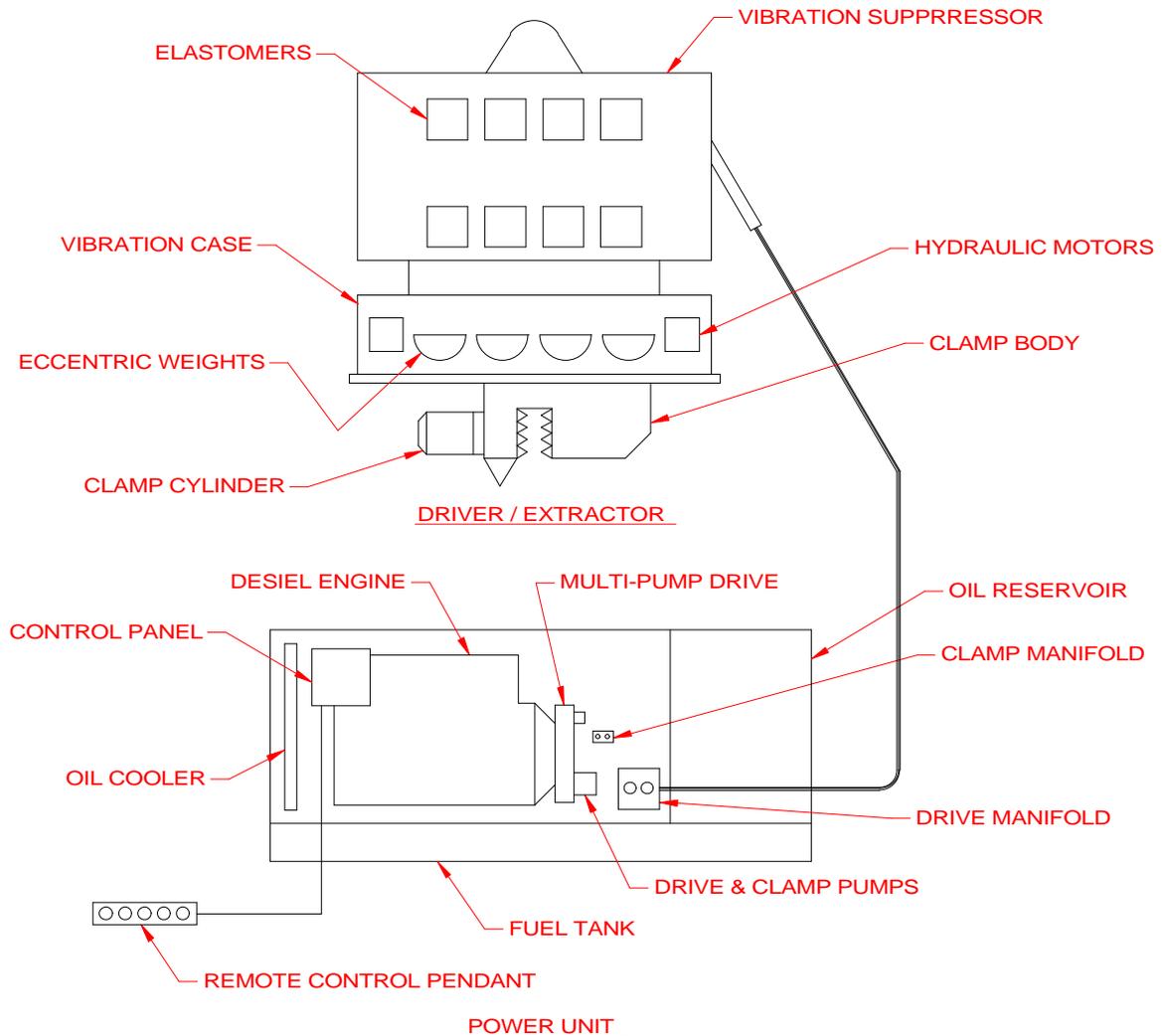
I. GENERAL DESCRIPTION

A. GENERAL

The ICE Model 44 is a variable-frequency vibratory pile driver/extractor designed to drive and extract sheet, pipe, timber and concrete piles, caissons, H-beams, I-beams and wide-flange beams.

The Model 44 operates in a frequency range of 600 to 1200 vibrations per minute to provide maximum pile penetration rates in a wide variety of soils. The unit has an eccentric moment of 4400 inch-pounds (50.7kg-M) and produces a maximum amplitude of 1.2 inch (30mm).

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; The vibration case and 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. The vibration suppressor contains 16 rubber elastomers (20 or 24 optional) to isolate the vibration case from the crane line. The suppressor is designed for a maximum line pull of 80 tons (712kN) during extraction.

C. HYDRAULIC CLAMP

The hydraulic clamp attaches the vibrator to the pile. Five types of hydraulic clamps are available for the Model 44 vibrator. The Model 126 universal clamp will drive and extract most types of sheet piling, 14" (355mm) H-beams, and wide flange beams. The Model 127 Z-pile clamp is designed to drive and extract single Z-sheets and can also be used on Z-pile doubles. The Model 80 caisson clamps are used in pairs with either the 7-foot (2.13m) or 11-foot (3.35m) caisson beam to drive and extract pipe from 15" (381mm)ID to 132" (3353mm)OD. The Model 25 & 50 wood pile clamps are designed to drive and extract wood piles from 8" (203mm) OD to 18" (457mm)OD. The model 165 concrete pile clamp will extract square concrete piles from 18" (457mm) to 24" (610mm).

D. POWER UNIT

The Model 44 vibrator is powered by the ICE Model 325 power pack. The 325 power pack is powered by a Caterpillar 3306TA diesel engine. The engine develops 325 horsepower (242kW) at 2100 RPM, and is mounted on a tubular sub-base which serves as a fuel tank. The Power Unit and Vibrator are operated from the control panel or remote control pendant. Hydraulic oil is stored in a the reservoir. Oil cooling is accomplished by a air to oil heat exchanger mounted in front of the engine radiator. All of the above components are contained in a sheet metal enclosure with lockable doors and a central lifting bale.

E. HOSES

Three hydraulic hoses, 100 feet (30.5m) 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.

F. REMOTE-CONTROL PENDANT

The vibrator is operated by the hand-held remote control pendant. The pendant has 1 palm button, 3 switches and 1 light. The red palm button (EMERGENCY STOP) shuts down diesel engine instantly in the event of an emergency. The (OPEN CLOSE) switch opens and closes the hydraulic clamp. The light indicates that adequate clamping pressure exists. The (REVERSE-FORWARD) switch starts and stops vibration. The (THROTTLE) switch raises and lowers the diesel engine speed. Note: Controls are duplicated on the control panel for use if the pendant becomes damaged. (See pg.III-6, Section E-g) Radio Remote Controls are available for additional flexibility.

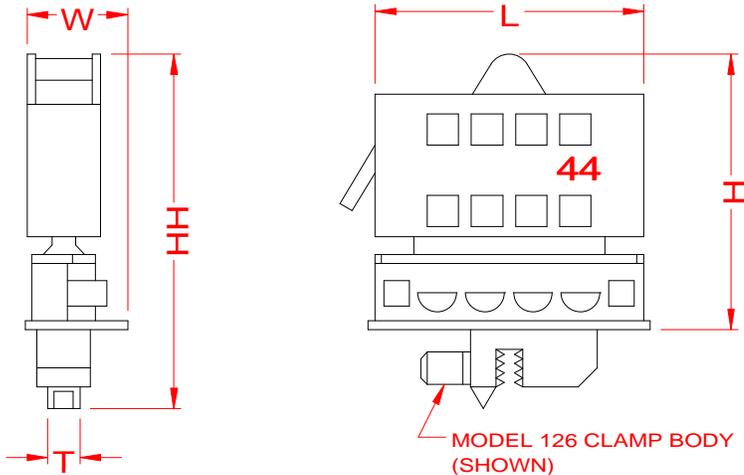
I. GENERAL DESCRIPTION

G. SPECIFICATIONS

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

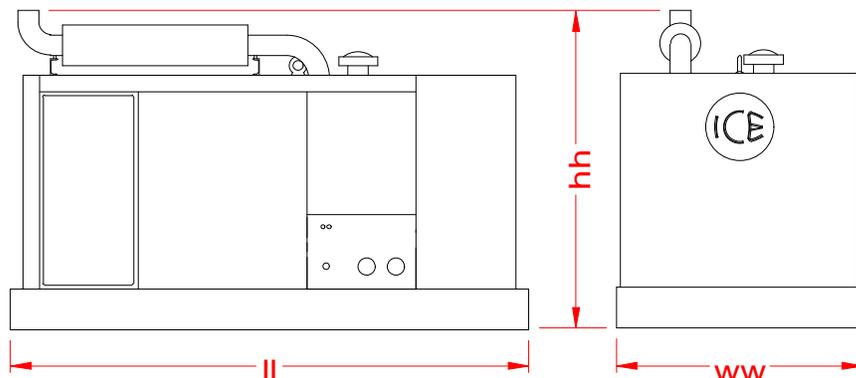
2. MODEL 44-30 VIBRATOR
(with hydraulic clamp)

Type	Hydraulic
Eccentric Moment.....	4400 In-lbs (50.7kg-M)
Frequency.....	600-1200 VPM
Amplitude	1.2in.(13-30mm)
Pile Clamping Force	125 Tons(1112kN)
Max. Line Pull for	
Extraction	80 Tons (712kN)
Weight with 126 Clamp.....	15,125 lbs.(7031kg)
Length [L]	97 in. (246cm)
Width [W]	21.63 in. (55cm)
Throat Width [T]	14.25 in. (36cm)
Height with Clamp [HH]	121 in. (307cm)
Height without clamp [H]	83 in. (211cm)



3. MODEL 325 POWER UNIT

Type.....	Diesel
Engine.....	CAT 3306TA
Horsepower (2100 RPM).....	325 (242kW)
Weight.....	10485 lbs. (4756kg)
Length [ll]	126 in. (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 cannot 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. When operating in a closed area, pipe exhaust fumes outside. Continued breathing of exhaust fumes may be fatal.
2. When servicing batteries, do not smoke or use an open flame in the vicinity. Batteries generate explosive gas during charging. There must be proper ventilation when charging batteries.
3. When filling fuel tank, do not smoke or use open flame in the vicinity.
4. Never adjust or repair the unit while it is in operation.
5. Never operate diesel engine with governor linkage disconnected.
6. Remove all tools and electrical cords before starting engine.
7. Store oily rags in containers.
8. Never store flammable liquids near the engine.

REMEMBER SAFETY IS EVERYONE'S BUSINESS.

II. PREPARATION FOR OPERATION

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, (5 x 80 ton). Several turns of a smaller diameter cable will usually last longer than one turn of a larger diameter cable. Inspect daily for damage to sling or clamps.

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 at which the hose chute is mounted. All (1.5-6UNCx5.00) bolts must be in place and torqued to approximately 2800 ft-lbs. (387 Kg-M)

For caisson work, the caisson beam must be attached to the bottom of the vibrator and tightened as above. The 7 foot caisson beam uses (1.5-6UNCx8.00) bolts. After attaching the beam, slide the clamps into position and lock in place.

II. PREPARATION FOR OPERATION

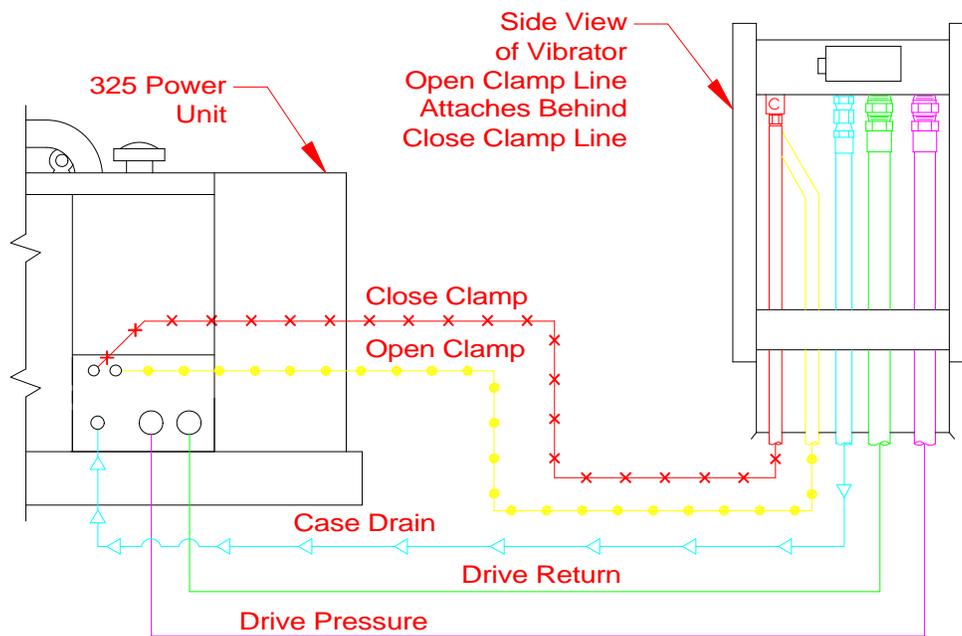
E. CONNECTION OF HYDRAULIC HOSES

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).

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. The hose couplers are arranged to insure correct connections at the power unit. See the diagram (Fig. 1) below 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.
- e. Tighten the set screws on the two large couplers.



(Fig. 1)

II. PREPARATION FOR OPERATION

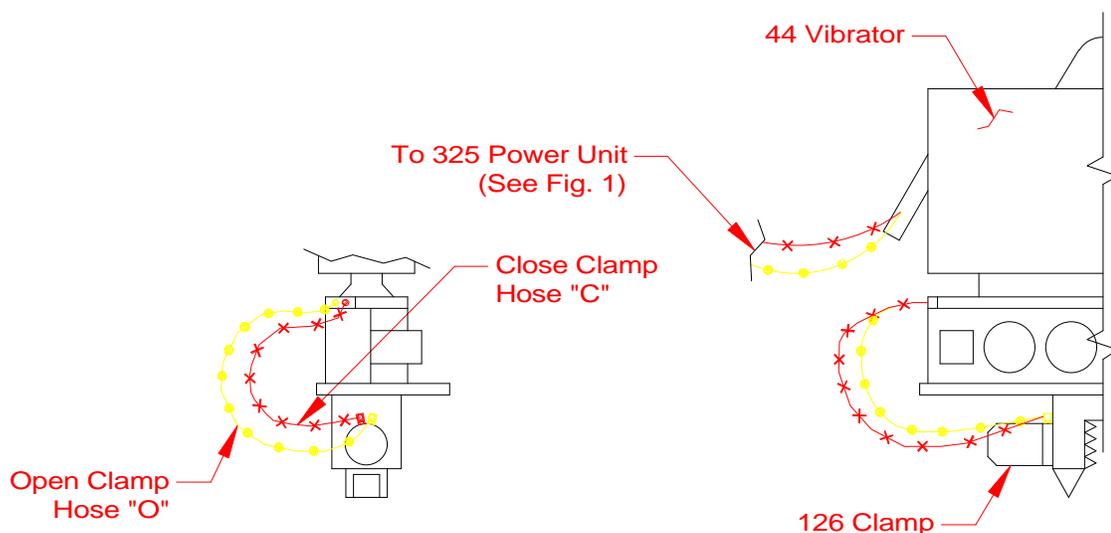
E. CONNECTION OF HYDRAULIC HOSES (CONTINUED)

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 on the previous page shows the correct arrangement of the 5 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 shows the correct arrangement of these hoses. For caisson clamps, four hoses must be connected. The two connections on the opposite end of the vibrator are reversed from the positions shown on the drawing below. Both ends of the vibrator are stamped with an "O" and a "C" to insure correct connection. Clamp connections are also stamped.



(Fig. 2)

II. PREPARATION FOR OPERATION

F. BLEEDING HYDRAULIC CLAMP HOSES

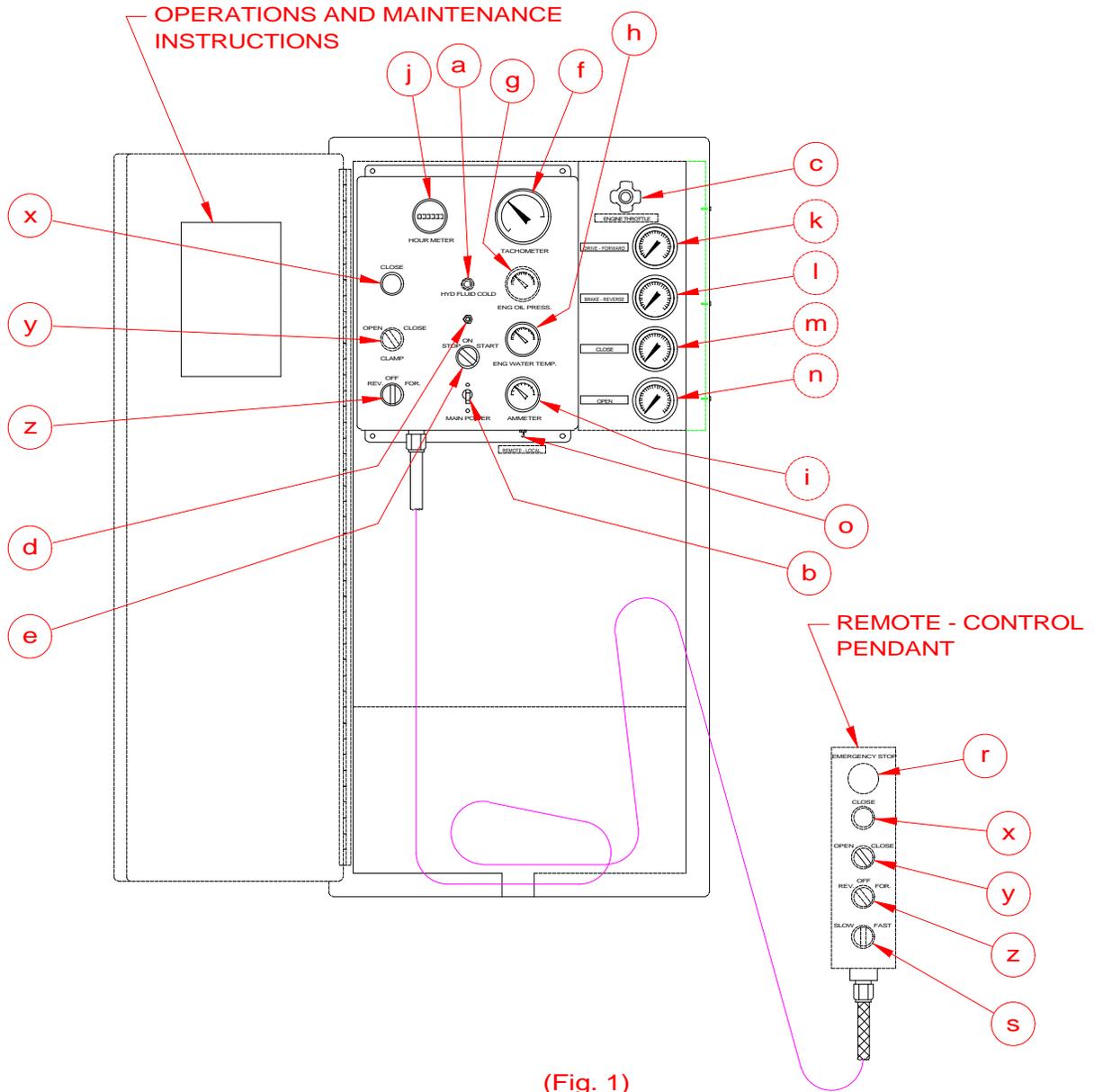
1. When the vibrator and hydraulic clamp are shipped with all hoses attached (between vibrator and clamp and five main hoses connected to the vibrator), the hoses are usually full of oil and may be used immediately. However, if any of the clamp hoses are connected at the job site or if air is present 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 1200 RPM, loosen the close-clamp line at the hydraulic clamp. Turn the clamp switch on the remote-control pendant to CLOSE. Wait until oil flows from the connection at the hydraulic clamp. When oil 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 oil 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 oil prior to fullspeed 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. Turn the VIBRO-AUGER switch (inside Control Box) to the AUGER position.
5. With the diesel engine running at 1800 RPM, hold the CLAMP switch in the OPEN-REV position for 5 minutes. The Vibrator hoses will fill with oil.
6. Return the VIBRO-AUGER switch to the VIBRO position before proceeding.

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 and vibrator and the OPERATION AND MAINTENANCE INSTRUCTIONS.
2. Control panel contains the following controls, gages and shutdown indicators.
 - a. Hydraulic Oil cold light - comes on if hydraulic oil is below 60°F (16°C).
 - b. Main Power Switch - ON-OFF Switch & Circuit Breaker
 - c. Engine Throttle (Manual)
 - d. Engine Shutdown Reset Button - over ride button for engine shutdown switch. 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 Switch Gage
 - h. Engine Water Temp Switch Gage
 - i. Engine Ammeter
 - j. Engine Hour Meter
 - k. Pressure Gage - (Drive -Forward)
 - l. Pressure Gage - (Brake - Reverse)
 - m. Pressure Gage - (Close Clamp)
 - n. Pressure Gage - (Open Clamp)
 - o. Remote - Local Switch
 - r. Emergency Stop - push to stop engine.
 - s. Electric Throttle
 - x. Clamp light.
 - y. Clamp Switch - open - close.
 - z. Vibrator Switch
3. The Operating & Maintenance Instructions, on the control box door, are there as reminders only. They are not intended to substitute for a thorough understanding of the Operators 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 oil is below 0°F (-18°C). If ambient temperatures below 0°F (-18°C) are anticipated, an immersion heater for the hydraulic oil is available. Consult ICE for details.
3. Turn the MAIN POWER switch on the control panel to on.
4. Pull out the ENGINE THROTTLE about half way. Pressing the button on the end of the throttle allows rapid throttle adjustment. Turning the throttle allows fine adjustment.
5. Press and hold the SHUTDOWN RESET. Turn the ENGINE START switch to START. Hold SHUTDOWN RESET in until engine oil pressure exceeds 30 PSI (2 BAR).
6. Adjust the throttle until the engine is running at 1500 RPM and allow engine to warm up for five minutes. After the engine is warmed up, adjust throttle so engine runs at 2300 RPM's under no load. The engine should hold 2100 RPM's under load.
7. Allow the temperature of the hydraulic oil to come up to at least 30°F (-1°C) before starting the vibrator.

D. WARMING HYDRAULIC OIL

1. The vibrator should not be operated at full speed if the temperature of the hydraulic oil is below 60°F (16°C).
2. If temperature is below 60°F (16°C), set the engine at 1500 RPM and press the START button on the control pendant to start the vibrator. Allow the vibrator to run until the temperature of the hydraulic oil exceeds 60°F (16°C).

III. OPERATING INSTRUCTIONS

D. WARMING HYDRAULIC OIL (CONTINUED)

3. When the engine is warmed up and hydraulic oil temperature is at least 60°F (16°C), full speed operation may begin.
4. The hydraulic oil temperature should be monitored with the Hydraulic Temperature Thermometer, mounted on the Oil reservoir. Oil temperature should never exceed 160°F (71°C).

CAUTION: Do not operate the vibrator if hydraulic oil temperature exceeds 160°F (71°C) 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 (15m) of electrical cable to permit operation from any advantageous position near the vibrator.
2. The pendant has an Emergency Stop palm button, three control switches and one indicator light.

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 illuminate 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.

III. OPERATING INSTRUCTIONS

E. OPERATION OF REMOTE-CONTROL PENDANT (CONTINUED)

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.

d. To unclamp from pile.

Turn the CLAMP switch to OPEN to release the hydraulic clamp so that the vibrator can be removed from the pile. Hold the CLAMP switch in the OPEN position for approximately 10 seconds or until a visual check shows the jaws to be fully open.

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

e. Remote Electric Throttle

Momentarily turning the electric throttle switch to the FAST position will increase engine speed (RPM). Turning this switch to the SLOW position will reduce engine speed.

f. Emergency Stop Palm Button

Momentarily pressing the EMERGENCY STOP button will stop the diesel engine and all vibrator functions will cease.

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). To activate these switches, find the toggle switch on the bottom of the control panel, labeled "REMOTE-LOCAL" (item O). Turn the switch to LOCAL and the switches on the control panel will be functional, and the remote control pendant will be disabled.

(NOTE: The EMERGENCY STOP button on the pendant is not disabled during "LOCAL" operation)

h. Radio Remote Control: A Radio frequency Remote Control Unit is available from ICE for the Model 44-30. This unit allows the operator flexibility to control the Vibrator at greater distances from the Power Unit without the inconvenience of the electrical cable. Contact ICE for information and operating instructions.

III. OPERATING INSTRUCTIONS

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 600 to 1200 vibrations per minute by changing engine speed. Engine speed is changed with the ENGINE THROTTLE on the control panel or with the remote electric throttle (FAST / SLOW) switch on the pendant. Vibration frequency corresponds approximately to engine speed according to the table shown below.

ENGINE RPM VIBRATOR VPM

2100	1200
2000	1100
1700	950
1400	800
1100	600

G. SHUT DOWN

1. Stop the vibrator.
2. Allow the diesel engine to run for five minutes at 1100 RPM.
3. Reduce engine speed to 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.)
5. Turn MAIN POWER switch to OFF.
6. Check engine crankcase oil level while power unit is setting level and engine off.
7. 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 preventative 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 oil level in the hydraulic reservoir and add if necessary.

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

IV. MAINTENANCE AND ADJUSTMENTS

B. DAILY (CONTINUED)

- f. Check oil level, with dipstick, in the multi-pump drive.
- g. 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.
- h. Visually inspect all suppressor elastomers and elastomer mounting bolts.
- i. Electrical components need no maintenance except periodic wiping with a clean, dry, lint-free cloth to remove dust.
- j. Perform all daily (10 Service Meter Units) maintenance checks and lubrication in the CATERPILLAR OPERATION GUIDE. For the ICE Model 325 power unit, the HOUR METER on the control panel may be considered to read Caterpillar's "Service Meter Units".

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 both pumps and all hydraulic manifolds for leaks.
- c. Check the filter indicators. The filter indicators on the power unit must be checked with the diesel engine running at full speed.

C. 100 HOURS (100 Service Meter Units)

1. Every 100 hours drain and refill the vibration case with new lubricant.
2. Perform all maintenance checks and lubrication indicated in the Caterpillar OPERATION GUIDE.
3. After the first 100 hours, drain and replace the lubricant in the multi-pump drive, thereafter change every six months or 2000 hours, whichever ever comes first.

D. 250, 500 HOURS and Other

1. See Caterpillar OPERATION GUIDE.

E. ANNUALLY

1. Have the hydraulic oil tested by a local hydraulic service center. Replace if required.
2. See Caterpillar OPERATION GUIDE.

IV. MAINTENANCE AND ADJUSTMENTS

F. SEVERE CONDITIONS

1. The service intervals specified are based on normal operating conditions. Operation under unusual conditions require some adjustments in servicing intervals.
2. When the average temperature is above 80°F (26°C) or below -10°F (-23°C), reduce service intervals to one- half of those specified in Sections C through E.
3. When operating in the presence of dust or sand, reduce service time intervals by one-half of those specified.
4. When operating in excess of twelve hours per day, reduce service time intervals by one-half of those specified.
5. 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 oil tested quarterly.
6. During stand-by or inactive period, the servicing intervals may be twice those specified above. The unit should be exercised every week. Also, refer to the Caterpillar OPERATION GUIDE.

IV. MAINTENANCE AND ADJUSTMENTS

G. 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 and 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).

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. (CAT bulletin #SEBU5898-06)

2. Vibration Case

The oil 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.

IV. MAINTENANCE AND ADJUSTMENTS

G. LUBRICATION (CONTINUED)

3. Multi-Pump Drive Adapter

The oil level is easily checked by removing the dipstick 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 deg. street ell located on the top center of the Multi-pump Drive Adapter. Draining the lubricating oil may be done by removing the 1/2 socket head pipe plug on the bottom of the Multi-pump Drive Adapter.

4. The preferred lubricating oil for ICE vibration cases and multi-pump drive adapters is a "High Moly Oil" (Schaeffer 268). Longer intervals between oil changes and fewer maintenance hours spent on mechanical service can generally be realized with this oil.

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

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

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

FIRST Preference Group :
SCHAEFFER268

SECOND Preference Group:
MOBILSHC-634
BORONGearep 140
CHEVRONGear Comp. NL460
CITGO Premium MP 85W-140
CITGO Standard MP 85W-140
GULFLub 85W-140 Lub 85W-140
PHILLIPSSMP 85W-140
SHELLOmala 460 Omala 460
SUNSunep 1110

IV. MAINTENANCE AND ADJUSTMENTS

G. LUBRICATION (CONTINUED)

THIRD Preference Group (Natural Petroleum Base):

AMOCOPerma Gear EP140
ARCOPennant NL 460
CONOCOEP 460
EXXONspartan EP 460
PHILLIPSAP 140
TEXACOMeropa 460
UNIONMP 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

5. 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 the 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 oil 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.

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

IV. MAINTENANCE AND ADJUSTMENTS

G. LUBRICATION (CONTINUED)

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 that follows, 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 oil in the hydraulic system. (See page IV-6)

FIRST Preference Group:

CHEVRONClarity AW46
MOBILDTE-15
SUN2105

SECOND Preference Group:

ARCODuro AW46
CHEVRONHydraulic AW46
PHILLIPSMagnus A46
SHELLTellus 46

THIRD Preference Group:

BORONergol HLP46
CITGOAll-Temp HD
CONOCOSuper 46
EXXONNuto H46
GULFHarmony 46AW
SUNSunvis 805 MG
TEXACORando HD AZ46
UNIONUnax AW46

Whenever oils 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 oils from the third preference group requires even a more discerning inspection than use of oils from the second group. Third Group oils may be used when temperature variations are less than those listed below.

The recommended oils 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

G. 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 oil is available from ICE in five gallon cans. See SECTION VIII - ORDERING PARTS, page VIII-54.

H. CAPACITIES

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

I. DRAINING AND FILLING HYDRAULIC OIL 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 oil is pumped to the reservoir through the return filter (F2) to insure no dirt enters the hydraulic system.

J. CHANGING HYDRAULIC RETURN FILTER ELEMENT

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.

IV. MAINTENANCE AND ADJUSTMENTS

J. CHANGING HYDRAULIC RETURN FILTER ELEMENT (CONTINUED)

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

K. BOLT TORQUE INFORMATION

The only way to actually tighten high strength bolts is with a torque wrench. 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 component 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 8	3/8"-16	48 Ft-Lbs (6.6 Kg-M)
Item 17, 29, 36	1/2"-13	119 Ft-Lbs (16.4 Kg-M)
Item 14	5/8"-11	233 Ft-Lbs (32.2 Kg-M)
Item 12, 43, 44	3/4"-10	417 Ft-Lbs (57.6 Kg-M)
Item 38, 40	1"-8	1009 Ft-Lbs (139.4 Kg-M)
<u>VIBRATION CASE</u>		<u>Page VIII-10</u>
Item 16	1/2"-13	119 Ft-Lbs (16.4 Kg-M)
Item 17	3/4"-10	417 Ft-Lbs (57.6 Kg-M)
<u>CLAMP BODY</u>		<u>Page VIII-38</u>
Item 3, 7	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 oil 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.

Turning the clamp switch on the control pendant to CLOSE activates the CLAMP CONTROL VALVE (V1). Hydraulic oil 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 4800 PSI (331 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 4500 PSI (310 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 oil is directed to the OPEN CLAMP side of the hydraulic cylinder. The pressure in the OPEN CLAMP line opens the CLAMP CHECK VALVE (CV5) and CV7. 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 (331 Bar) by the CLAMP RELIEF VALVE (RV2). The quick-disconnect couplers (QD3 & QD4) permit decoupling of the clamp hoses at the power unit. The Clamp Circuit on all ICE power units can be configured to operate auxiliary equipment, such as spotters, pile gates, etc. Contact ICE for instructions.

B. VIBRATOR DRIVE

With the diesel engine running, hydraulic oil is taken from the reservoir by the DRIVE PUMPS (P1). Oil pressure opens the cartridges CA1, CB1 and vents the hydraulic oil back to the reservoir through the RETURN FILTERS (F2), if the vibrator switch (START) has not been moved.

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 cartridges CB1 and CA2, the CONTROL VALVE (V2) causes these cartridges to close, thus directing pump flow to the VIBRATOR MOTORS (M).

V. HYDRAULIC CIRCUITRY

B. VIBRATOR DRIVE (CONTINUED)

Full motor speed is reached within a few seconds and the motor drive pressure is indicated by GAGE (GA1). Maximum drive pressure is limited to approximately 5000 PSI (345 Bar) 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. Oil exiting VIBRATOR MOTORS (M) open cartridge BV and returns to the power unit. Cartridge BV opens easily because its pilot flow is "vented" by BRAKE VALVE (RV5). BRAKE VALVE (RV5) is held open by pressure coming from the motor drive FORWARD system. Case drain oil from the motors returns to the reservoir. Case drain pressure is limited to 50 PSI (3.4 Bar) by the CASE DRAIN RELIEF VALVE (RV3). Oil returning to the power unit opens cartridge CB2 and returns to the reservoir through COOLER VALVE (V3), HEAT EXCHANGER (HE) and RETURN FILTERS (F2). Cartridge CB2 opens easily because its pilot flow is "vented" by CONTROL VALVE (V2).

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. When the Model 325 Power pack is used with the 44-30 Vibrator the RELIEF VALVE (RV4) is set at 0 PSI. When pressure is removed from the drive FORWARD system, the BRAKE VALVE RELIEF (RV5) closes and blocks the pilot flow BRAKE VALVE (BV) cartridge and causing it to close. Maximum brake pressure generated by BRAKE VALVE (BV) is limited by BRAKE VALVE RELIEF (RV5) to 2000 PSI (138 Bar). This 2000 PSI (138 Bar) back pressure rapidly brakes the motors (M) to a stop.

Hydraulic oil temperature is regulated by the COOLER VALVE (V3). When oil temperature is below 100°F (38°C), V3 directs the flow directly to the reservoir through FILTER (F2). When oil temperature exceeds 100°F (38°C), 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 (CV3), which bypasses excess flow and limits pressure to 65 PSI (4.5 Bar).

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 the two speed signal pressure specified.

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 (turn CCW) VIBRO-AUGER valve (V4) fully. Readjust RELIEF VALVE (RV1) to specified pressure, and reset RELIEF VALVE (RV2) for the two stroke signal pressure specified.

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

E. OTHER

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

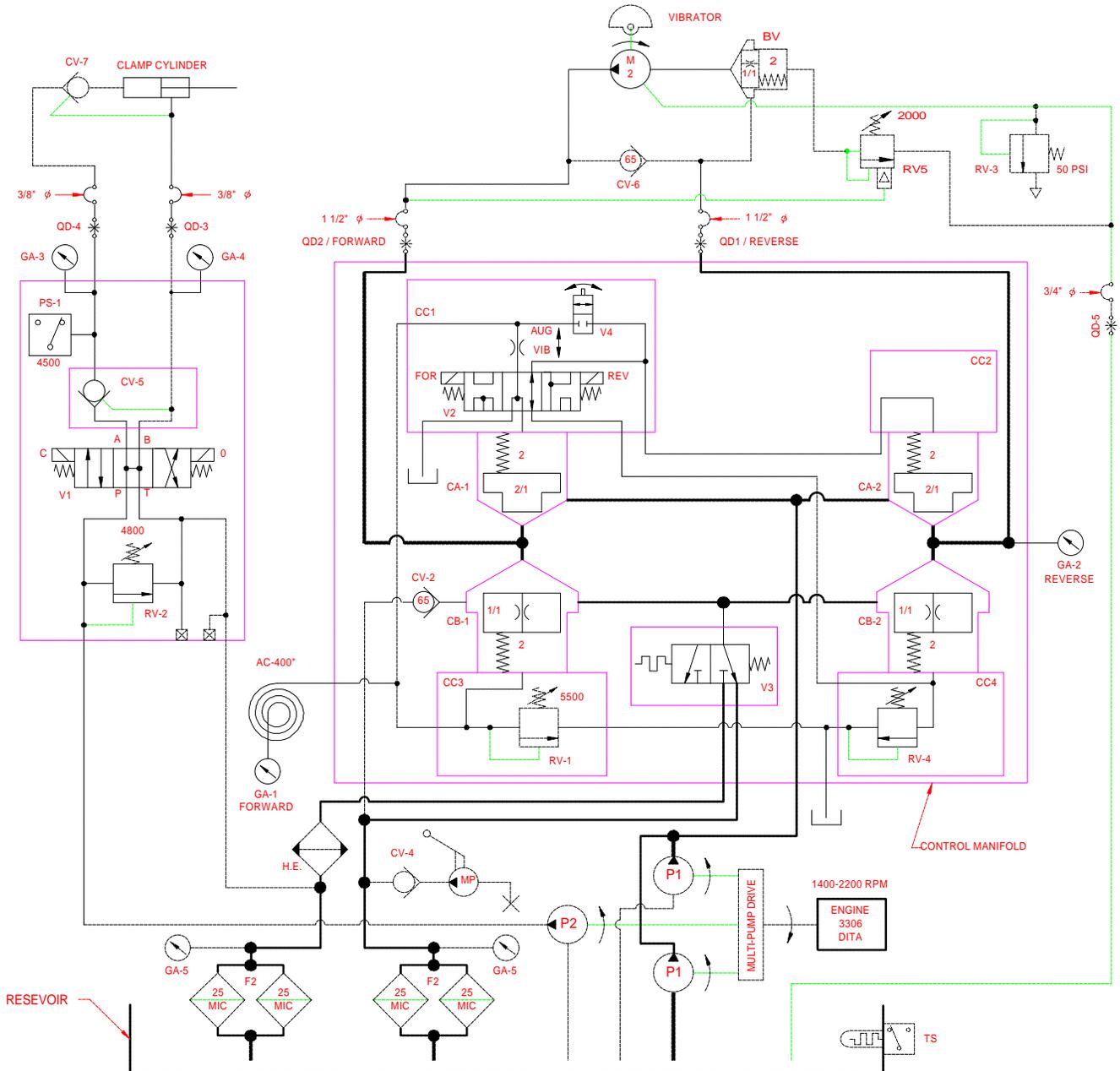
A manual PUMP (MP) is provided to fill the hydraulic reservoir. A CHECK VALVE (CV4) prevents loss of returning hydraulic oil back through this pump.

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 the closing cartridges CB1 and CA2 to produce a smooth acceleration of the VIBRATOR MOTOR (M).

V. HYDRAULIC CIRCUITRY

HYDRAULIC SCHEMATIC



V. HYDRAULIC CIRCUITRY

F. HYDRAULIC COMPONENTS LIST

<u>Notation</u>	<u>Description</u>	<u>Part Number</u>	<u>Page Number</u>
AC	Accumulator Hose	110680	VIII-21
BV	Brake Valve Cartridge	110622	VIII-13 & 15
CA1 & 2	Cartridge A (2)	110624	VIII-35
CB1 & 2	Cartridge B (2)	110622	VIII-35
CC1	Cartridge Cover	110530	VIII-35
CC2	Cartridge Cover	110606	VIII-35
CC3	Cartridge Cover	110546	VIII-35
CC4	Cartridge Cover	110544	VIII-35
CV2	Check Valve -Bypass	130339	VIII-35
CV4	Manual Pump Check Valve	100451	VIII-29
CV5	Clamp Check Valve	110149	VIII-37
CV6	Check Valve - Vibrator	110296	VIII-13 & 15
CV7	Check Valve - Clamp Cyl	120629	VIII-39
CYL	Hydraulic Clamp Cylinder		
E	Diesel Engine	100508	VIII-28
F2	Return Filter (4)	100518	VIII-28
GA1-4	Pressure Gage	110600	VIII-23
GA5	Filter Indicator Gage (2)	100436	VIII-31
HE	Heat Exchange	400099	VIII-28
M	Motor (2)	110534	VIII-11
MP	Manual Pump	100447	VIII-29
P1	Drive Pump (4)	100406	VIII-28
P2	Clamp Pump	100684	VIII-28
PS1	Clamp Pressure Switch	810033	VIII-37
QD1	Vibrator Reverse Disconnect	110690	VIII-28
QD2	Vibrator Forward Disconnect	110692	VIII-38
QD3	Clamp Open Disconnect	100777	VIII-30
QD4	Clamp Close Disconnect	100245	VIII-30
QD5	Case Drain Disconnect	400095	VIII-30
RV1	Forward Relief Valve	100632	VIII-35
RV2	Clamp Relief Valve	100898	VIII-37
RV3	Case Drain Relief Valve	100032	VIII-13 & 15
RV4	Reverse Relief Valve	100630	VIII-35
RV5	Brake Valve Relief	110310	VIII-13 & 15
TS1	Temperature Switch	400115	VIII-30
V1	Clamp Control Valve	110147	VIII-37
V2	Control Valve	810519	VIII-35
V3	Cooler Valve	110628	VIII-35
V4	Valve (Auger-Vibro)	100654	VIII-35

VI. ELECTRIC CIRCUITRY (Reference:Electrical Schematic Pg VI-5)

A. STARTING DIESEL ENGINE

The engine batteries (EB1, EB2) provide 24-volt current to start the diesel engine. With the MAIN POWER (CB2) switch ON, and the vibrator switch (REV-FOR) on the remote control pendant in the OFF position, and holding the SHUTDOWN RESET button in, turning the ENGINE START switch to START energizes the start motor solenoid (SOL) and turns over the diesel engine. If fuel is available, the diesel engine will start.

B. STOPPING DIESEL ENGINE

Turning the ENGINE START switch to OFF de-energizes the fuel pump RACK SOLENOID which shuts off the fuel supply to the diesel engine. The engine stops.

C. SAFETY CONTROL SYSTEM

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 pressure is below 15 PSI (1 Bar), the contacts of the gage will be closed providing current to energize the coil. On start-up, the button on the SHUTDOWN RESET (on the control panel) must be held in until the oil pressure exceeds 30 PSI (2 Bar).
2. ENGINE WATER TEMPERATURE GAGE - If water temperature exceeds 210° F (99°C), the contacts of the gage will close energizing the coil.
3. Emergency Stop - When the diesel engine is running, pressing the EMERGENCY STOP button on the pendant, energize the coil on the SHUTDOWN RESET. The Shutdown Reset opens and the engine and vibrator are stopped.

VI. ELECTRICAL CIRCUITRY

D. CLOSING 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 (331 Bar), the pressure switch (PS1) 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 (310 Bar), 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 (331 Bar), the pressure switch opens de-energizing the close-clamp solenoid and turns on the CLAMP LIGHTS.

E. OPENING HYDRAULIC CLAMP

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

F. STARTING THE 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.

G. STOPPING THE VIBRATOR

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.

VI. ELECTRICAL CIRCUITRY

H. OTHER

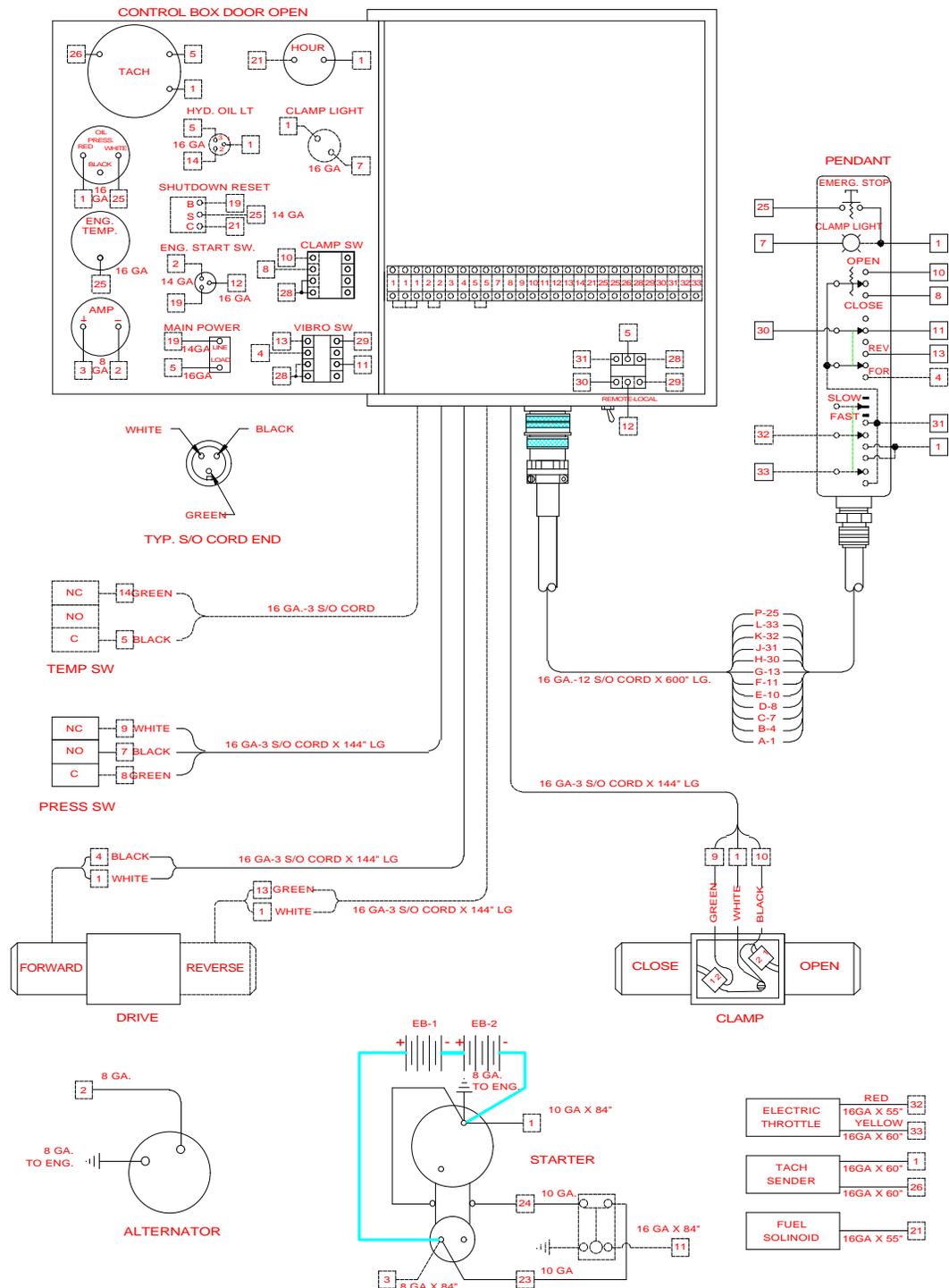
The ammeter (AM) indicates charging amperes. The tachometer generator (TACH GEN) powers the tachometer (TACH) to indicate engine speed. The Hour meter(M1) indicates the engine operating hours. The hydraulic fluid cold light indicates fluid temperature is below 70°F (21°C), this is sensed by the temp. switch (T.S.) located on front of reservoir. Pushing the button tests the bulb and power to complete circuit.

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. The EMERGENCY STOP button on the pendant is functional at all times.

Turning the Throttle switch to the FAST position will retract the electric throttle actuator (M) and increase engine speed (RPM). Turning the Throttle switch to the SLOW position will extend the electric throttle actuator (M) and decrease engine speed.

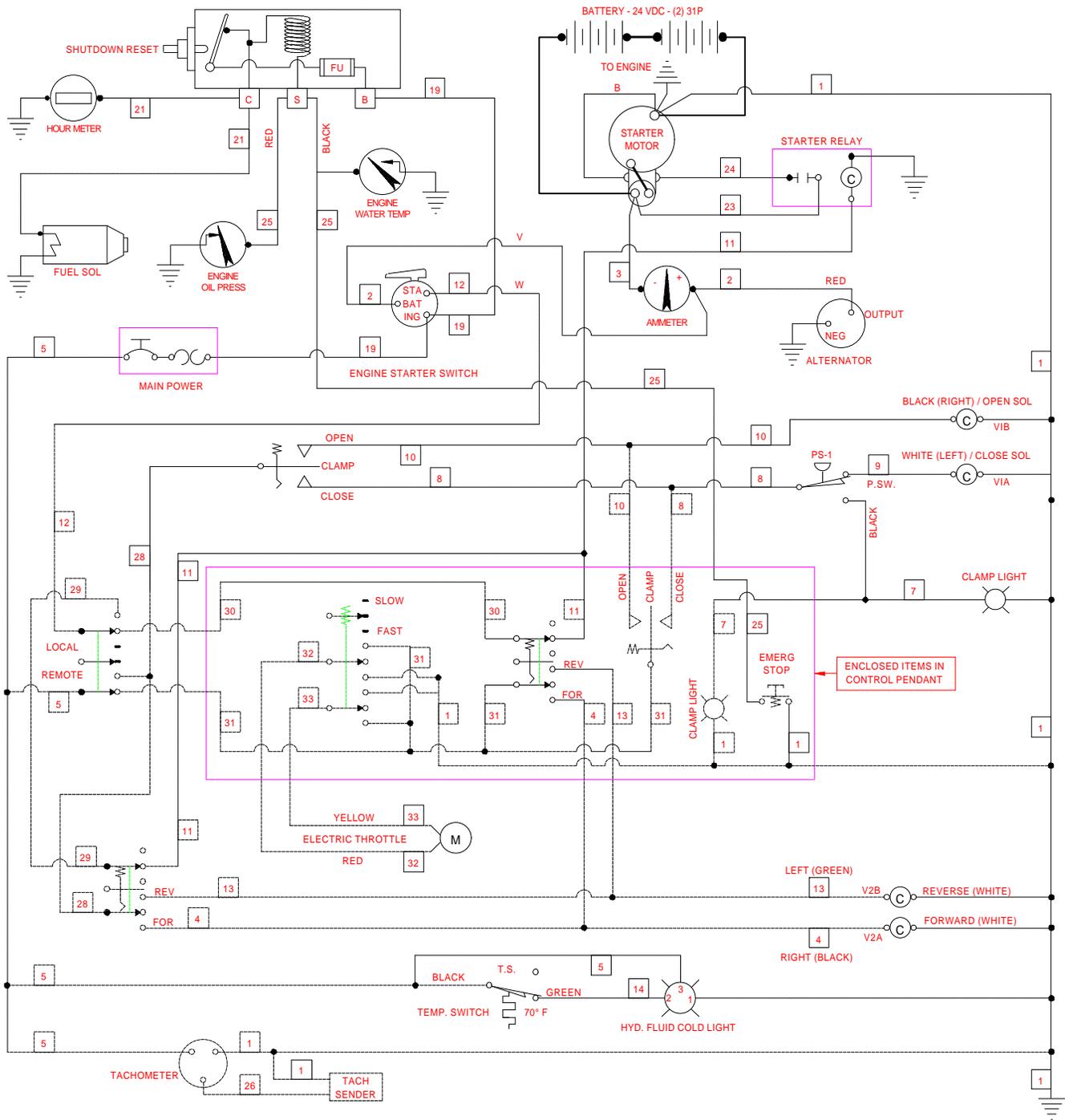
VI. ELECTRICAL CIRCUITRY

ELECTRICAL LAYOUT



VI. ELECTRICAL CIRCUITRY

ELECTRICAL SCHEMATIC



VI. ELECTRICAL CIRCUITRY

I. ELECTRICAL COMPONENTS LIST

<u>Notation</u>	<u>Reference</u>	<u>Part Number</u>	<u>Page Ref.</u>
ALTERNATOR	Alternator	See Cat.	Parts Book
AMMETER	Ammeter	110371	VIII-21
BATTERY	24V Battery	400890	VIII-28
CLAMP LIGHT (2)	Clamp Light	130305	VIII-21 & 25
EMERG STOP	Emergency Stop Button	130507	VIII-25
ENG. OIL PRESS.	Engine Oil Pressure Gage and Switch	100329	VIII-21
ENG. START	Engine Starter Switch	130259	VIII-21
ENG. WATER TEMP.	Engine Water Temperature Gage and Switch	130251	VIII-21
FOR / REV(2)	Vibrator Switch (FWD / REV)	130155	VIII-21 & 25
FUEL SOL.	Fuel Solenoid Valve	See Cat.	Parts Book
HOURMETER	Hour Meter	100343	VIII-21
HYD. FLUID COLD	Hyd Fluid Warning Light	100355	VIII-21
M	Electric Throtle	110460	VIII-31
MAIN POWER	Main Power Switch	400141	VIII-21
OPEN/CLOSE (2)	Clamp Switch (OPEN/CLOSE)	130155	VIII-21 & 25
PS1	Pressure Switch	810033	VIII-37
REMOTE-LOCAL	Remote-Local Switch	140361	VIII-23
SHUTDOWN RESET	Engine Safety Shutdown	130257	VIII-21
SLOW-FAST	Engine Throttle Switch	100566	VIII-25
STARTER	Engine Starter Motor	See Cat.	Parts Book
STARTER RELAY	Engine Start Relay Switch	See Cat.	Parts Book
TACH	Tachometer	See Cat.	Parts Book
TACH SENDER	Engine Tach Generator	See Cat.	Parts Book
TS	Hyd Oil Temp. Switch	400115	VIII-30
V1A	Close-Clamp Solenoid (Valve)	110147	VIII-37
V1B	Open-Clamp Solenoid (Valve)	110147	VIII-37
V2A	Forward Solenoid (Valve)	810519	VIII-35
V2B	Reverse Solenoid (Valve)	810519	VIII-35

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
HHP	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 (Allen)
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: .50 - 13 UNC x 1.50 Lg SHCS

.50 = 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 IV-10.

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 the cylinder and pile guide, once above the grease fitting, and once on the flange of the cylinder housing.
 - d. Model 127 Z-Pile clamp 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; Specify shipping address, phone number, billing address and method of shipment. UPS and air express shipments must have street address for delivery. All shipments will be made freight collect unless instructed otherwise.
4. SHORTAGES; Claims for shortages, damage 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 fifteen 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

FITT	2	L	-	16	M	12	J	00	0	-	00L	0	0	0	1
<u>SELECTOR INDEX</u>											<u>MATERIAL</u>				
2 - INCH FITTING											1 - CARBON STEEL				
9 - METRIC FITTING											2 - BRASS				
<u>CONFIGURATION OR SHAPE OF FITTING</u>											4 - STAINLESS STL				
S - STRAIGHT FITTING											5 - AAR MAL IRON				
L - 90 Deg. ELBOW											6 - MALEABLE IRON				
V - 45 Deg. ELBOW											8 - FORGED STEEL				
T - TEE											<u>SPECIAL NOTATIONS</u>				
C - CAP											<u>PRESSURE RATING</u>				
P - PLUG											0 - NONE				
U - UNION											1 - 125 LB.				
X - CROSS											3 - SCH 40				
(FOURTH END FITT'G REQ'D.)											4 - SCH 80				
<u>FIRST END SIZE</u>											<u>INSTALLATION AID OR STYLE OF HEAD</u>				
* IN 1/16THS OF AN INCH											0 - NOT APPLICABLE				
(INDEX 2)											H - REGULAR HEX				
IN MILLIMETERS (INDEX 9)											Q - SQUARE HEAD (EXT.)				
SEE GENERAL SPECIFICATION SHEET FOR SEQUENCE OF ORDER											R - SQUARE HEAD (INT.)				
<u>FIRST END FITTING STYLE</u>											S - HEX HEAD (INT SOCKET)				
SEE FITTING STYLE SELECTOR CHART SC-1											T - HEX HEAD (EXT.)				
<u>SECOND END SIZE</u>											<u>LENGTH CODE</u>				
IF APPLICABLE - SEE FIRST END SIZE											(ELBOWS & NIPPLES)				
<u>SECOND END FITTING STYLE</u>											__L - LONG (ELBOW)				
IF APPLICABLE - SEE FIRST END FITTING STYLE											__X - EXTRA LONG (ELBOW)				
<u>THIRD END SIZE</u>											__C - CLOSE (NIPPLE)				
IF APPLICABLE - SEE FIRST END SIZE											PIPE NIPPLES (LONG) ONLY				
<u>THIRD END FITTING STYLE</u>											IN DEC. INCHES FOR INDEX 2				
IF APPLICABLE - SEE FIRST END SIZE											050 = 5.0 INCHES				
											105 = 10.5 INCHES				
											IN MILLIMETERS FOR INDEX 9				
											120 = 12.0 MILLIMETERS				
											084 = 8.4 MILLIMETERS				
											<u>FOURTH END SIZE & FITTING STYLE</u>				
											(CROSSES ONLY)				
											SEE FIRST END FITTING SIZE OR END STYLE				
* EXCEPTIONS															
90 = 10"				96 = 6"											
92 = 12"				98 = 8"											
94 = 14"				99 = NON CODE SIZE											

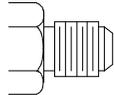
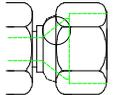
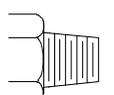
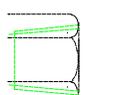
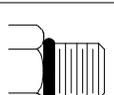
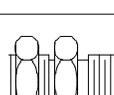
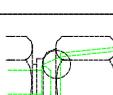
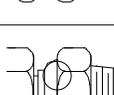
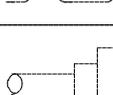
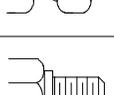
VIII. ORDERING PARTS

B. FITTING DESCRIPTION KEY (CONTINUED)

FITTING STYLE SELECTOR CHART

SC-1

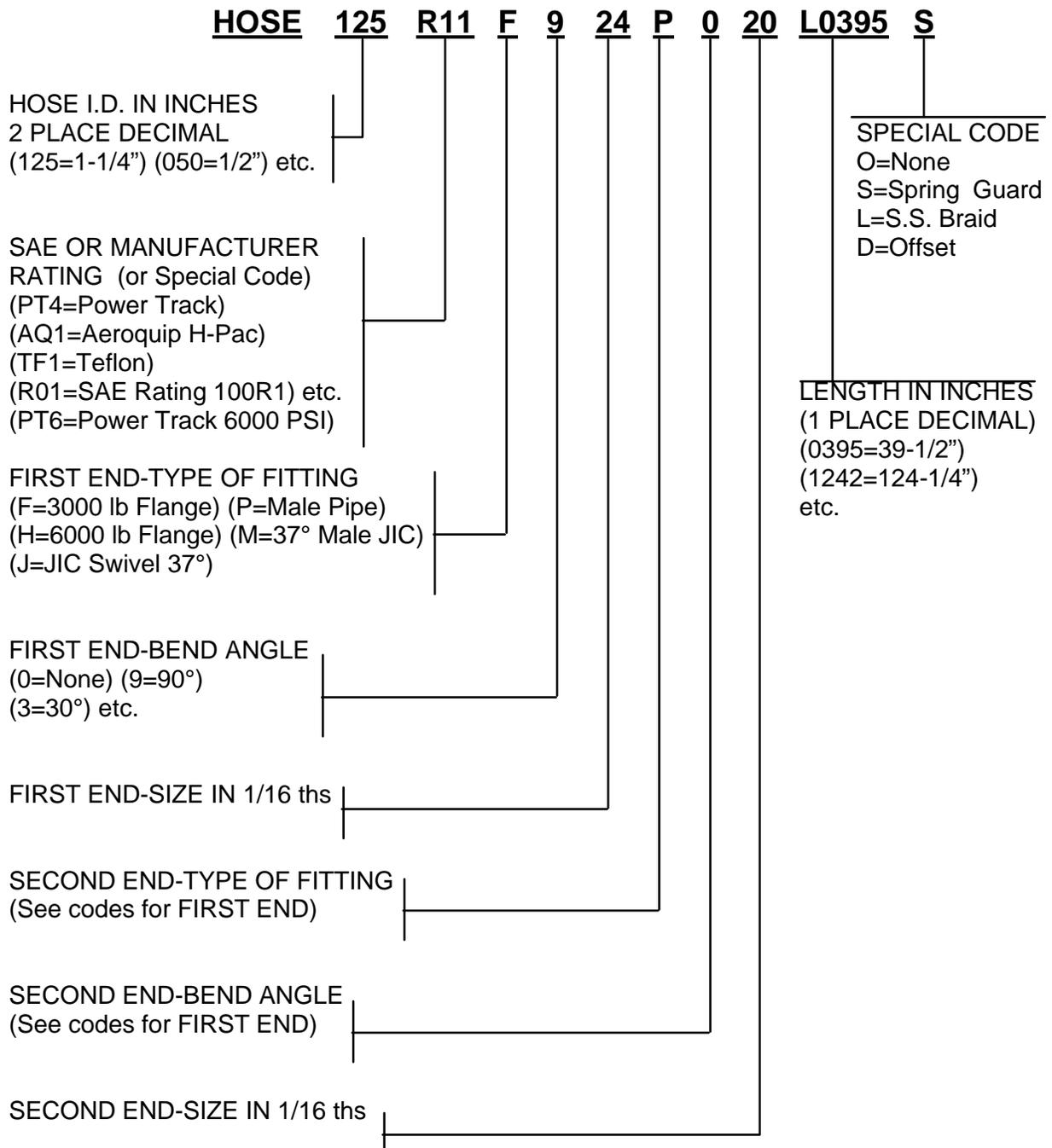
FOR END FITTING STYLE SELECTION

M		JIC MALE 37 Deg. FLARE	J		JIC FEMALE 37 Deg. FLARE (& SWIVEL)
P		MALE PIPE NPT	Q		FEMALE PIPE NPTF
R		S.A.E. MALE O-RING (& ADJUSTABLE)	K		S.A.E. FEMALE O-RING
B		JIC MALE 37 Deg. FLARE BULKHEAD	N		FEMALE PIPE NPSM-SWIVEL
D		MALE PIPE NPT SWIVEL	F		SPLIT FLANGE 3000 PSI. CODE 61
S		B.S.P. MALE PIPE	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:

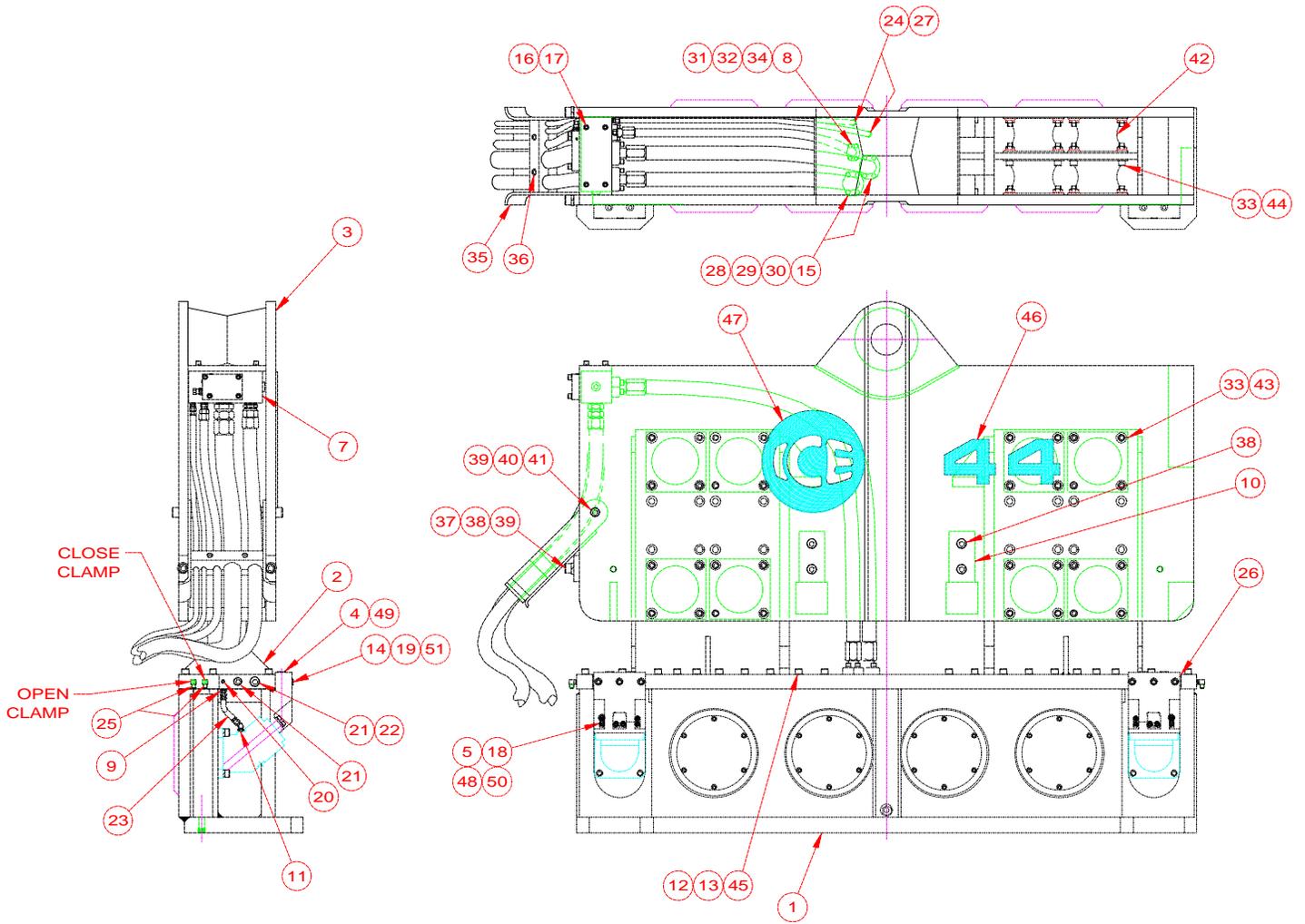
a. VIBRATION SUPPRESSOR	800485VIII-6
b. VIBRATION CASE	810695VIII-10
c. DISTRIBUTION BLOCK	810705VIII-12
d. HOSE ASSEMBLIES-INTERCONNECTING	800029VIII-16
e. POWER UNIT - ENCLOSURE	800379VIII-18
f. CONTROL BOX	810585VIII-20
g. PENDANT ASM	800393VIII-24
h. POWER UNIT - INTERNAL	800377VIII-26
i. CONTROL MANIFOLD	810571VIII-34
j. CLAMP MANIFOLD	810035VIII-36
k. MODEL 126 UNIVERSAL CLAMP	800327VIII-38
l. CLAMP EXTENSION-10FT.	800423VIII-40
m. 90 DEG. ADAPTER	800049VIII-41
n. CAISSON BEAM-7 FT.	800477VIII-42
o. CAISSON BEAM-11 FT.	800479VIII-42
p. MODEL 80 CAISSON CLAMP w/ WEDGE LOCK	800047VIII-44
q. MODEL 80 CAISSON CLAMP w/ HYDRO LOCK	800413VIII-46
r. HYDRO LOCK ASM	800399VIII-48
s. MODEL 127 Z PILE CLAMP	800041VIII-50
t. PENDANT EXTENSION CABLE	800059VIII-53

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.

VIBRATION SUPPRESSOR

800485



VIBRATION SUPPRESSOR

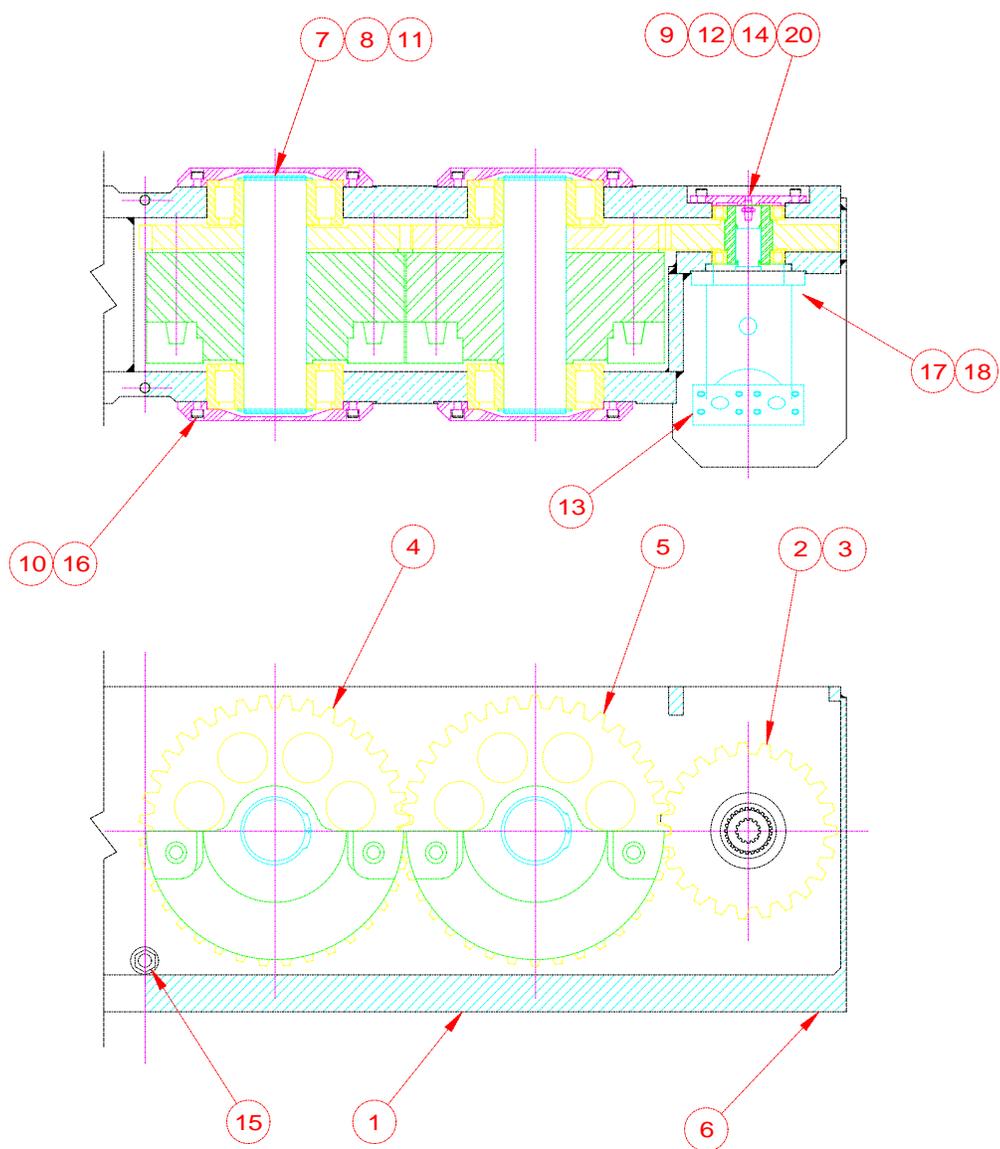
800485

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
1	810695	1	44-30 Transmission Assembly
2	110362	1	44 Transmission Adapter
3	110360	1	44 Suppressor Housing
4	110320	2	44-30 Motor Manifold
5	110318	6	Mounting Plate
6	100814	1	Sealant
7	810705	1	Terminal Manifold
8	100051	4	.375-16 X 1.0 Lg SHCS Locwel
9	110630	2	FITT2S-08M06P000-000H001
10	110358	2	Stop Bars
11	300099	2	FITT2S-10R08M000-000H001
12	140111	44	.75-10 X 4.0 Lg SHCS Lock Washer
13	100069	44	.75 Lock Washer Medium
14	130135	6	.625-11UNC X 3.50 Lg SHCS
15	140907	2	HOSE150PT6F024F024L0835C
16	100121	16	.5 Lock Washer Medium
17	100011	4	.5-13 X 2.0 Lg SHCS
18	100443	12	.437 Lock Washer
19	100007	6	.625 Lock Washer-Medium
20	400213	2	FITT2P-06P000000-000S007
21	100063	4	FITT2P-16P000000-000S007
22	110055	2	FITT2P-20P000000-000S007
23	100486	2	HOSE050R01J008J008L01450
24	400203	2	FITT2S-06M06P000-000H001
25	400227	4	FITT2L-06M06P000-0000001
26	100423	2	FITT2P-08P000000-000S007
27	140905	2	HOSE038R02J006J006L0835C
28	100596	4	#24 Split Flange Half
29	100119	8	.5-13 X 1.25 Lg SHCS Locwel
30	110119	2	2-225 O-Ring
31	100049	2	#12 Split Flange Half
32	140903	1	HOSE075PT4F012FO12L0835C
33	100782	96	.75-10 Flange Nut
34	100097	1	2-214 O-Ring 70 DURO
35	110256	1	44-30 Hose Chute And Clamp
36	400043	14	.5-13 X 2.25 Lg SHCS
37	110354	1	Hose Chute Support
38	100213	10	1.0-8 X 2.5 Lg SHCS Locwel
39	100209	4	1.0 Lock Washer Medium
40	140145	2	1.0-8 X 3.5 Lg SHCS

VIBRATION SUPPRESSOR (Continued)

800485

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
41	400051	2	1.0-8 Hex Nut
42	100796	16	Elastomer
43	400069	64	.75-10 X 2.0 Lg SHCS
44	100067	32	.75-10 X 2.5 Lg SHCS Locwel
45	100814	1	Sealant
46	110745	2	4 Logo
47	400277	1	ICE Logo Plate
48	110250	12	.44-14UNC X 2.00 Lg SHCS
49	110248	4	FITT2P-12R000000-0000001
50	100091	4	219 O-Ring
51	100037	4	222 O-Ring



VIBRATION CASE

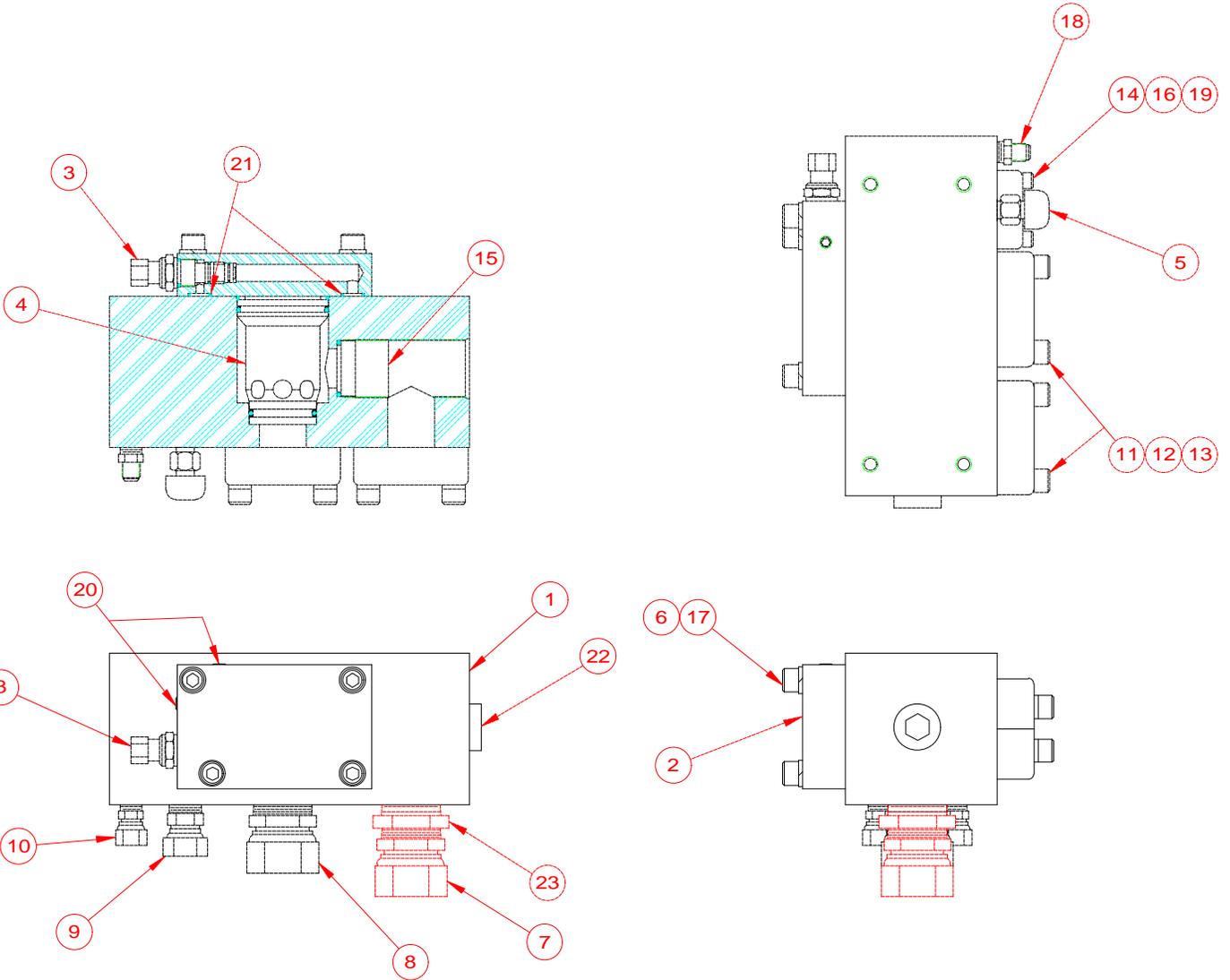
810695

<u>Item</u>			<u>Part Number</u>	<u>Q t y . Description</u>
1	810647	1	44	Transmission Case Frame
2	110370	2		Pinion Shaft (46)
3	110376	2		Pinion Gear
4	810673	2	44	Eccentric Gear Assembly
5	810675	2	44	Eccentric Gear Assembly
6	100187	2		FITT2P-12P000000-000S0M7
7	110316	8		Retaining Ring
8	110372	4		Eccentric Shaft
9	110366	2		Bearing Housing
10	110368	8		Bearing Cover
11	110314	8		Eccentric Bearing
12	110312	4		Motor Bearing
13	110534	2		612 Drive Motor (M)
14	100822	2		Breather
15	100185	1		Sight Gauge
16	100119	56		.5-13 X 1.25 Lg SHCS Locwel
17	100067	8		.75-10 X 2.5 Lg SHCS Locwel
18	400727	8		.75 Hi-Collar Lock Washer
19	110444	3		Transmission Oil / Gal.
20	100662	2		Filter

TERMINAL BLOCK

810705

TO S/N 186521



TERMINAL BLOCK

810705

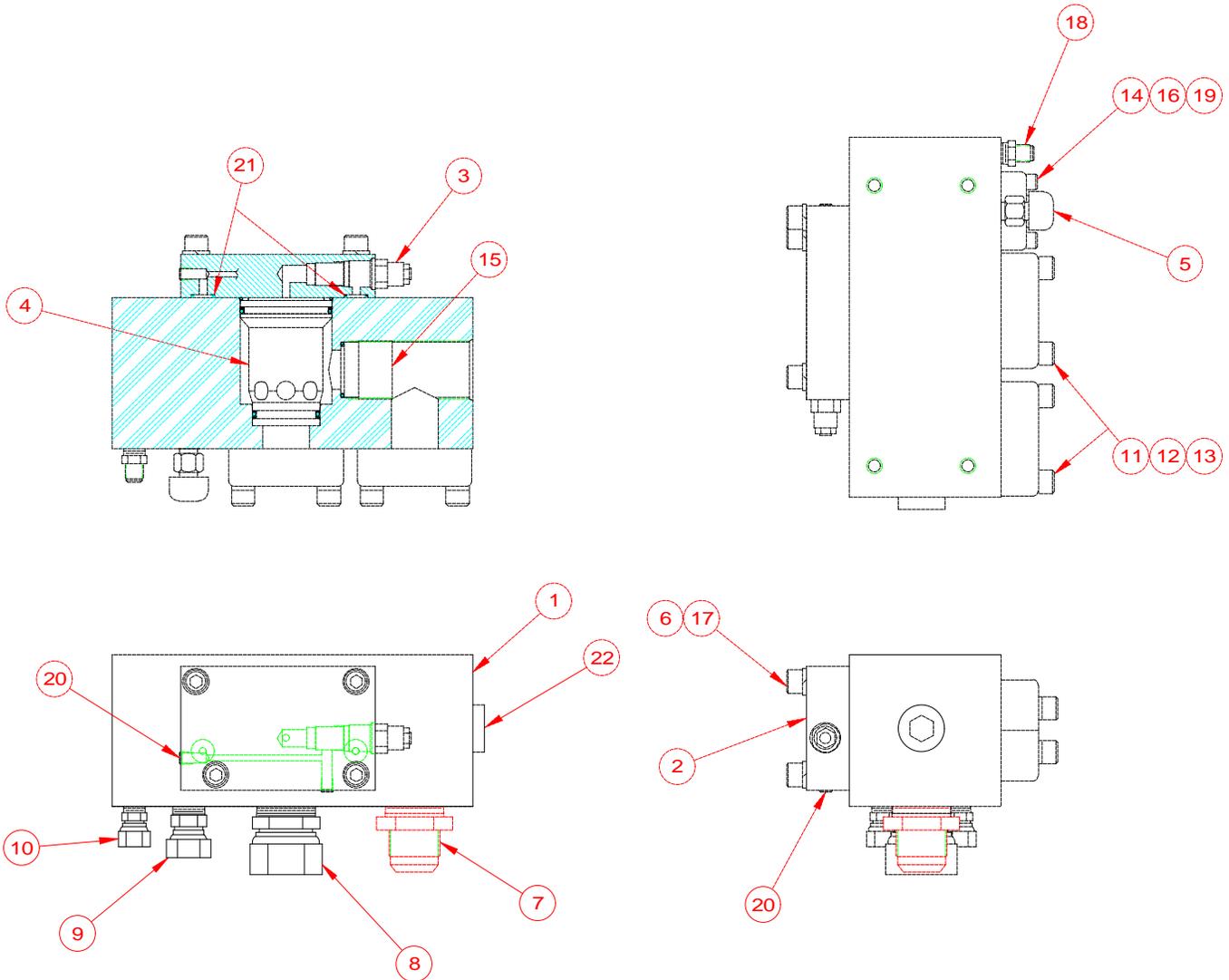
TO S/N 186521

Item	Part Number	Qty.	Description
1	110352	1	Terminal Manifold
2	110340	1	Manifold Cap
3	110310	1	Brake Valve Relief (RV5)
4	110622	1	Cartridge B (BV)
5	100032	1	Relief Valve (RV3)
6	100121	4	.5 Lock Washer Medium
7	100039	1	FITT2S-20P20N000-000H001
8	110115	1	FITT2S-24P24N000-000H001
9	100043	1	FITT2S-12P12N000-000H001
10	100041	2	FITT2S-06PO6N000-000H001
11	100596	4	#24 Split Flange Half
12	100119	8	.5-13 X 1.25 Lg SHCS Locwel
13	110119	2	2-225 O-Ring
14	100049	2	#12 Split Flange Half
15	110296	1	Check Valve (CV6)
16	100097	1	2-214 O-Ring 70 DURO
17	400043	4	.5-13 x 2.25 Lg SHCS
18	400203	2	FITT2S-06M06P000-000H001
19	100051	4	.375-16 X 1.0 Lg SHCS Locwel
20	100646	2	FITT2P-02P000000-000S007
21	140255	2	2-113 O-Ring
22	110298	1	FITT2P-24R000000-000S001
23	400159	1	FITT2P-24P20Q000-000H001

TERMINAL BLOCK

810705

FROM S/N 186522



TERMINAL BLOCK

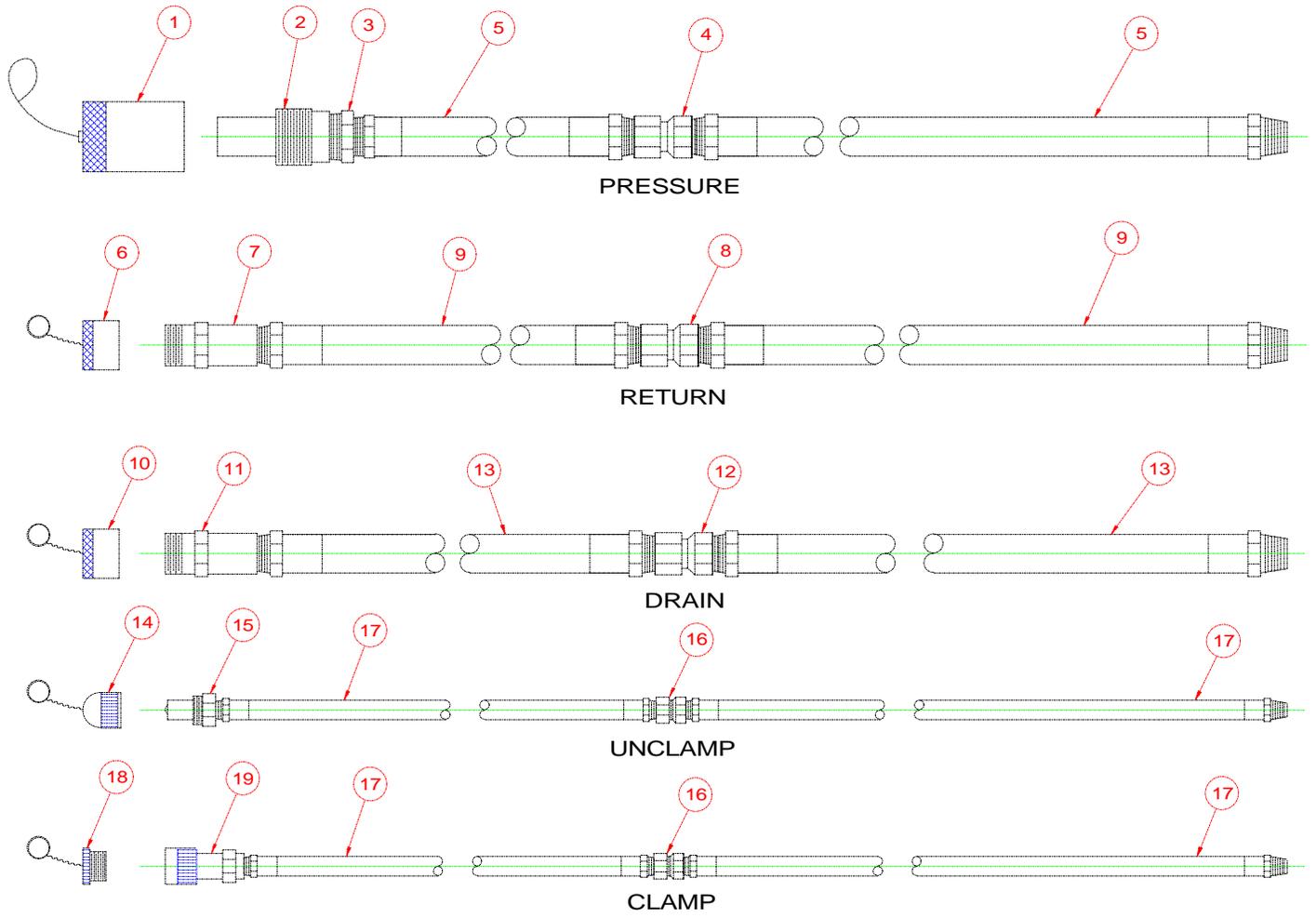
810705

FROM S/N 186522

Item	Part Number	Qty.	Description
1	110352	1	Terminal Manifold
2	110252	1	Manifold Cap
3	110242	1	Brake Valve Relief (RV5)
4	110622	1	Cartridge B (BV)
5	100032	1	Relief Valve (RV3)
6	100121	4	.5 Lock Washer Medium
7	400183	1	FITT2S-24P20M000-000H001
8	110115	1	FITT2S-24P24N000-000H001
9	100043	1	FITT2S-12P12N000-000H001
10	100041	2	FITT2S-06PO6N000-000H001
11	100596	4	#24 Split Flange Half
12	100119	8	.5-13 X 1.25 Lg SHCS Locwel
13	110119	2	2-225 O-Ring
14	100049	2	#12 Split Flange Half
15	110296	1	Check Valve (CV6)
16	100097	1	2-214 O-Ring 70 DURO
17	400043	4	.5-13 x 2.25 Lg SHCS
18	400203	2	FITT2S-06M06P000-000H001
19	100051	4	.375-16 X 1.0 Lg SHCS Locwel
20	100646	2	FITT2P-02P000000-000S007
21	140255	2	2-113 O-Ring
22	110298	1	FITT2P-24R000000-000S001

HOSE ASSEMBLIES - INTERCONNECTING

800029



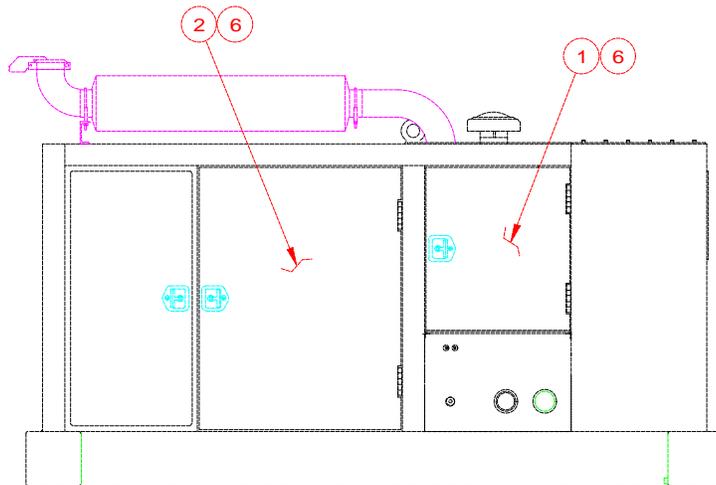
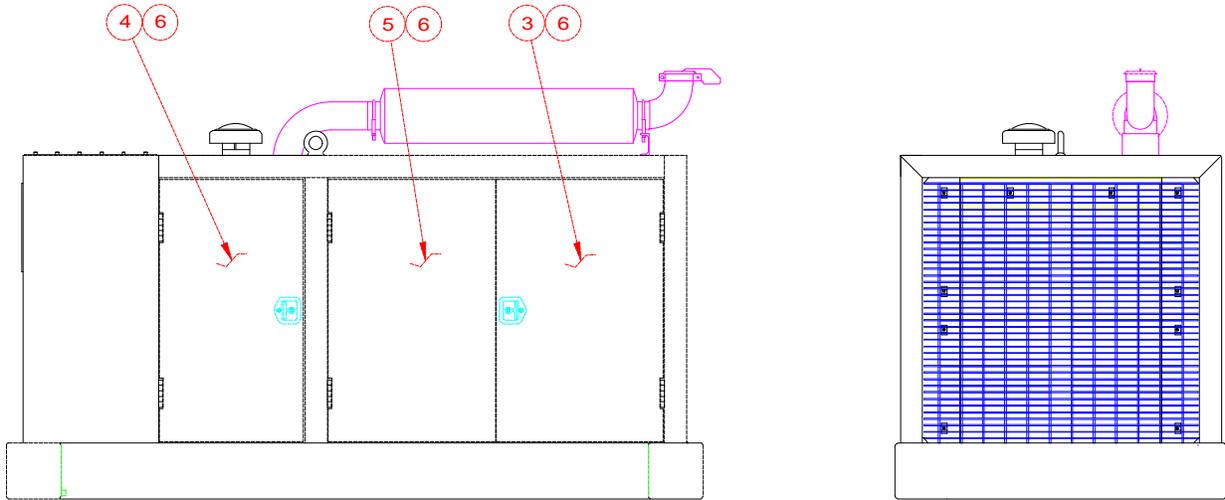
HOSE ASSEMBLIES - INTERCONNECTING

800029

<u>Item</u>			<u>Part</u>
		<u>Number</u>	<u>Quantity</u>
			<u>Description</u>
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	110692	1	Female Disconnect (1 - 1/2)
7	110957	1	Dust Plug (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

800379



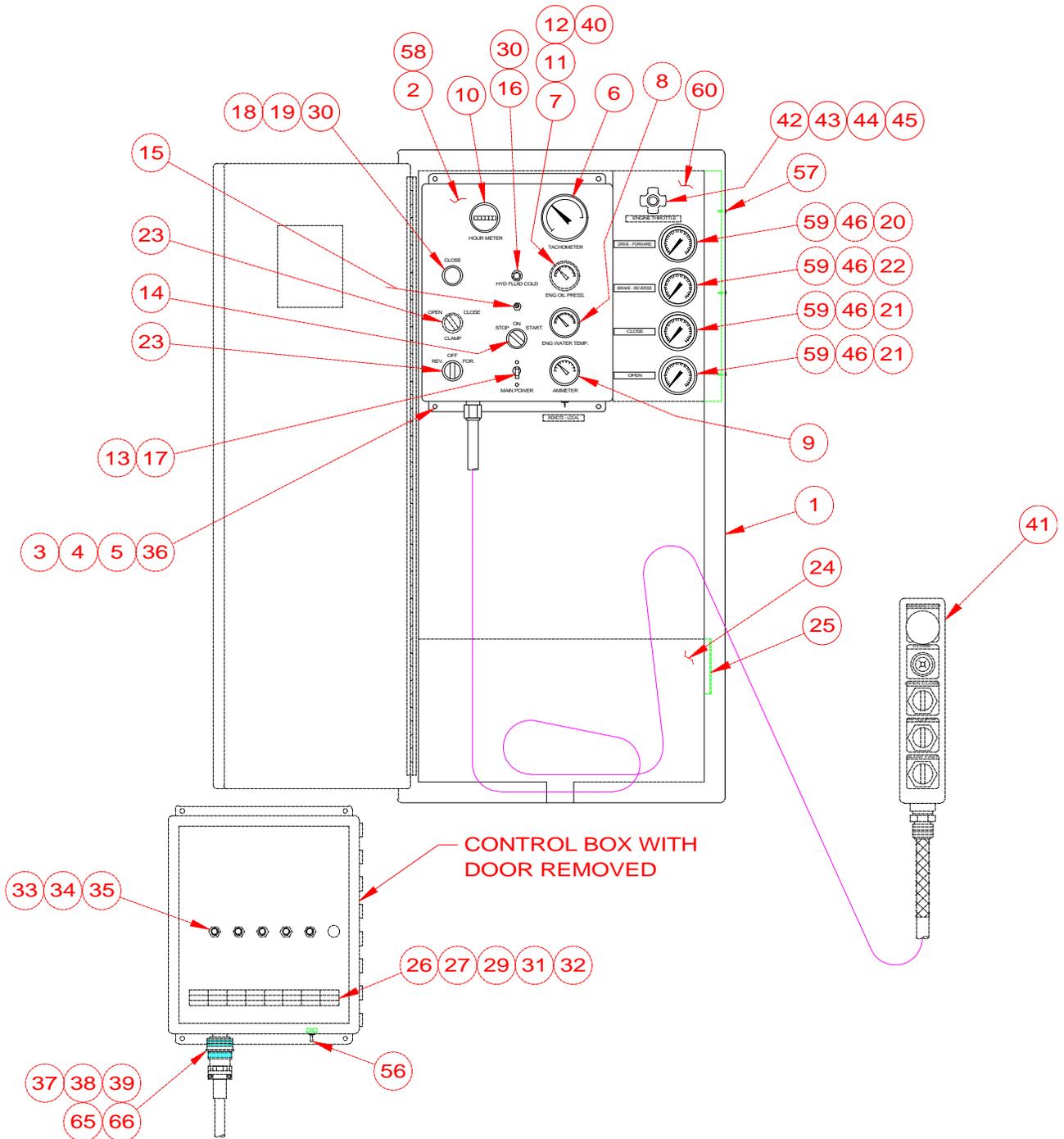
POWER UNIT ENCLOSURE

800379

<u>Item</u>			<u>Part</u>
			<u>NumberQty.</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

CONTROL BOX ASSEMBLY

810585



CONTROL BOX ASSEMBLY

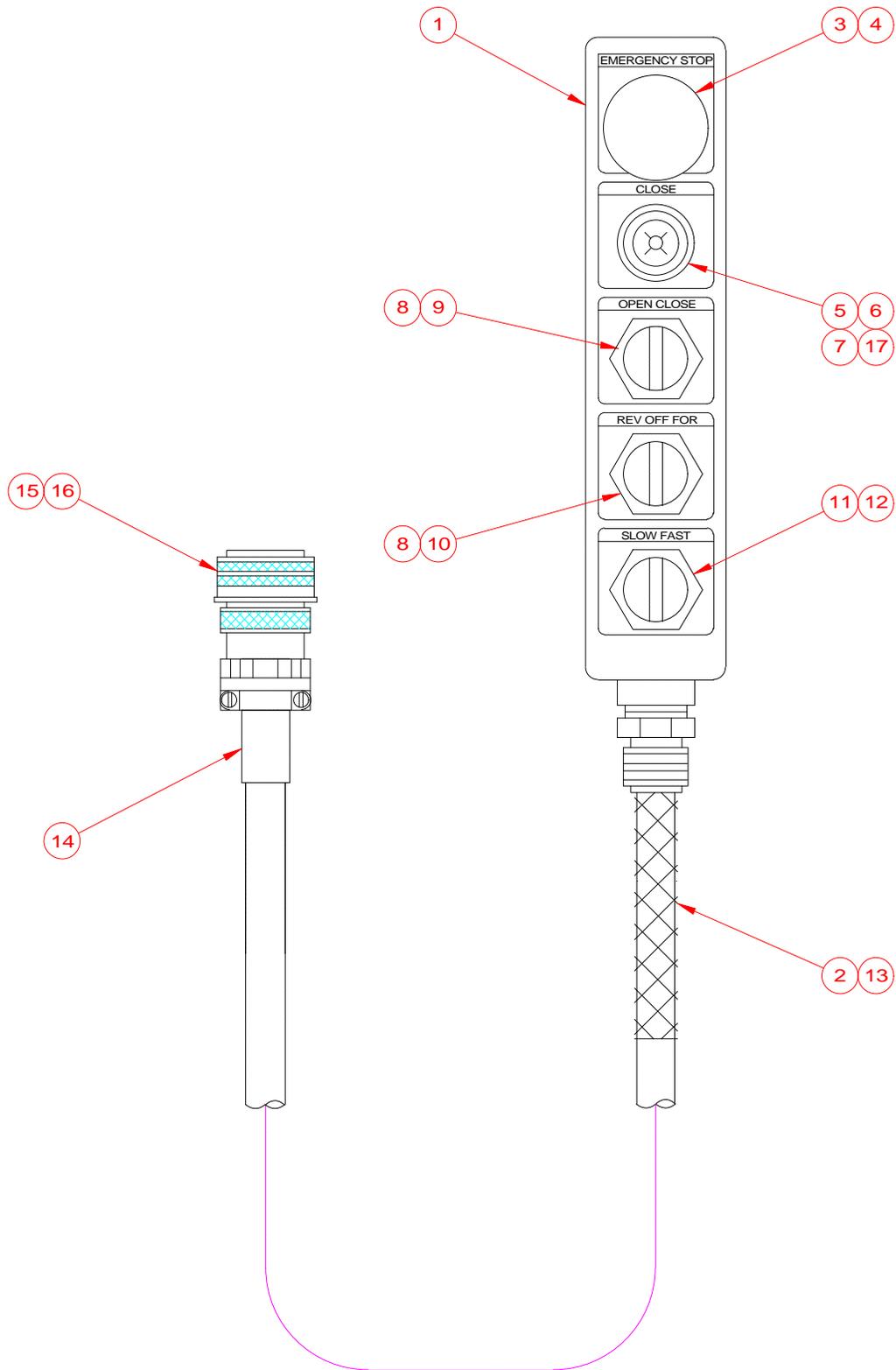
810585

<u>Item</u>			<u>Part</u>
			<u>NumberQty.</u>
			<u>Description</u>
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 (Bayonet)
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	300611	1	FITT2S-02P04E000-000H002

CONTROL BOX ASSEMBLY

810585

<u>Item</u>			<u>Part NumberQty. Description</u>
41	800393	1	175-300 Pendant Asm.
42	130255	1	Engine Throttle
43	100429	1	Throttle Cable Seal
44	100431	1	Throttle Cable Pivot
45	100577	1	Stop Cable Clamp
46	100321	4	FITT2L-04M04Q000-0000001
52	100361	1	Lens, Clear-Pilot Lite
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



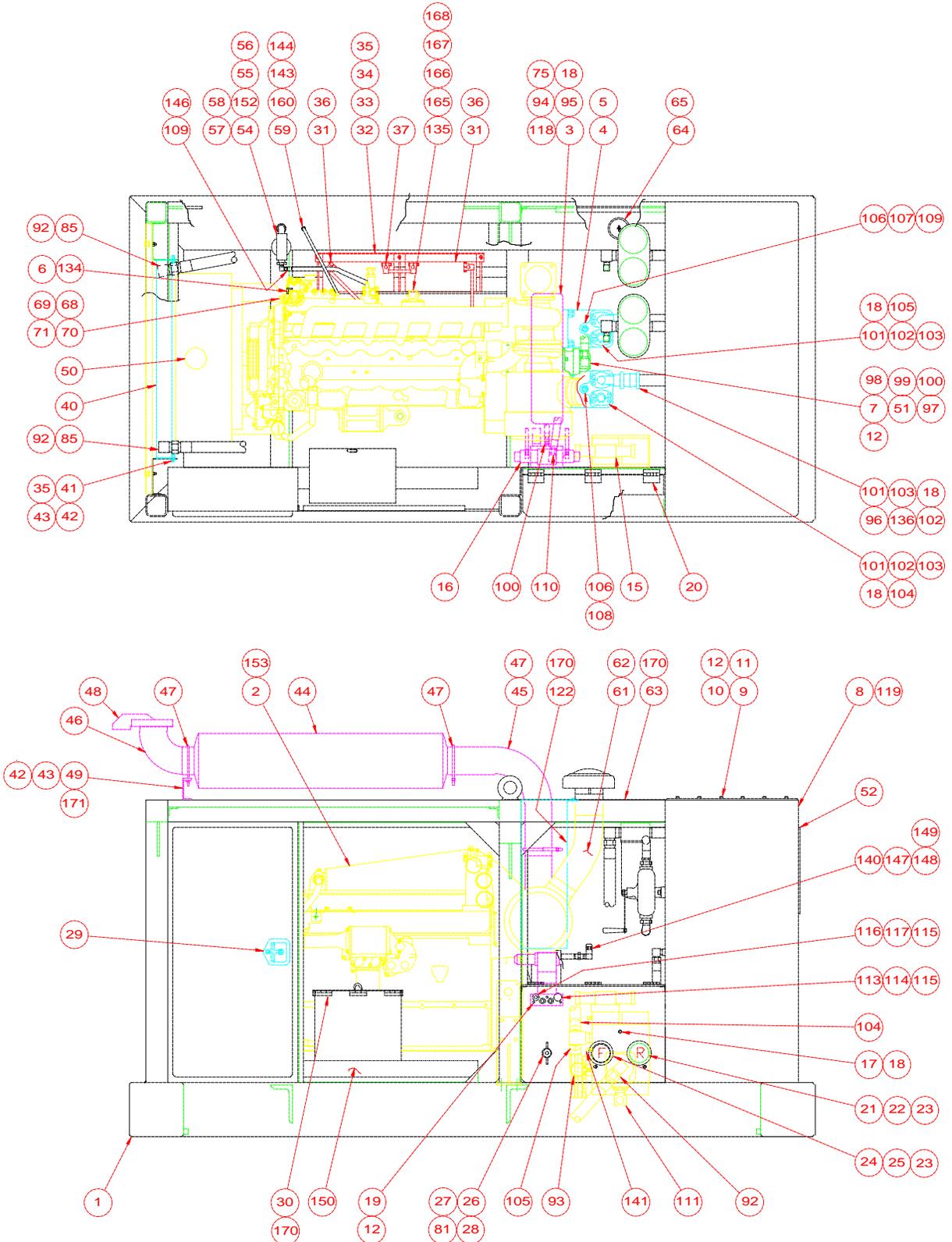
175-325 PENDANT ASSEMBLY

800393

<u>Item</u>			<u>Part</u>
			<u>NumberQty.</u>
			<u>Description</u>
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 (Bayonet)

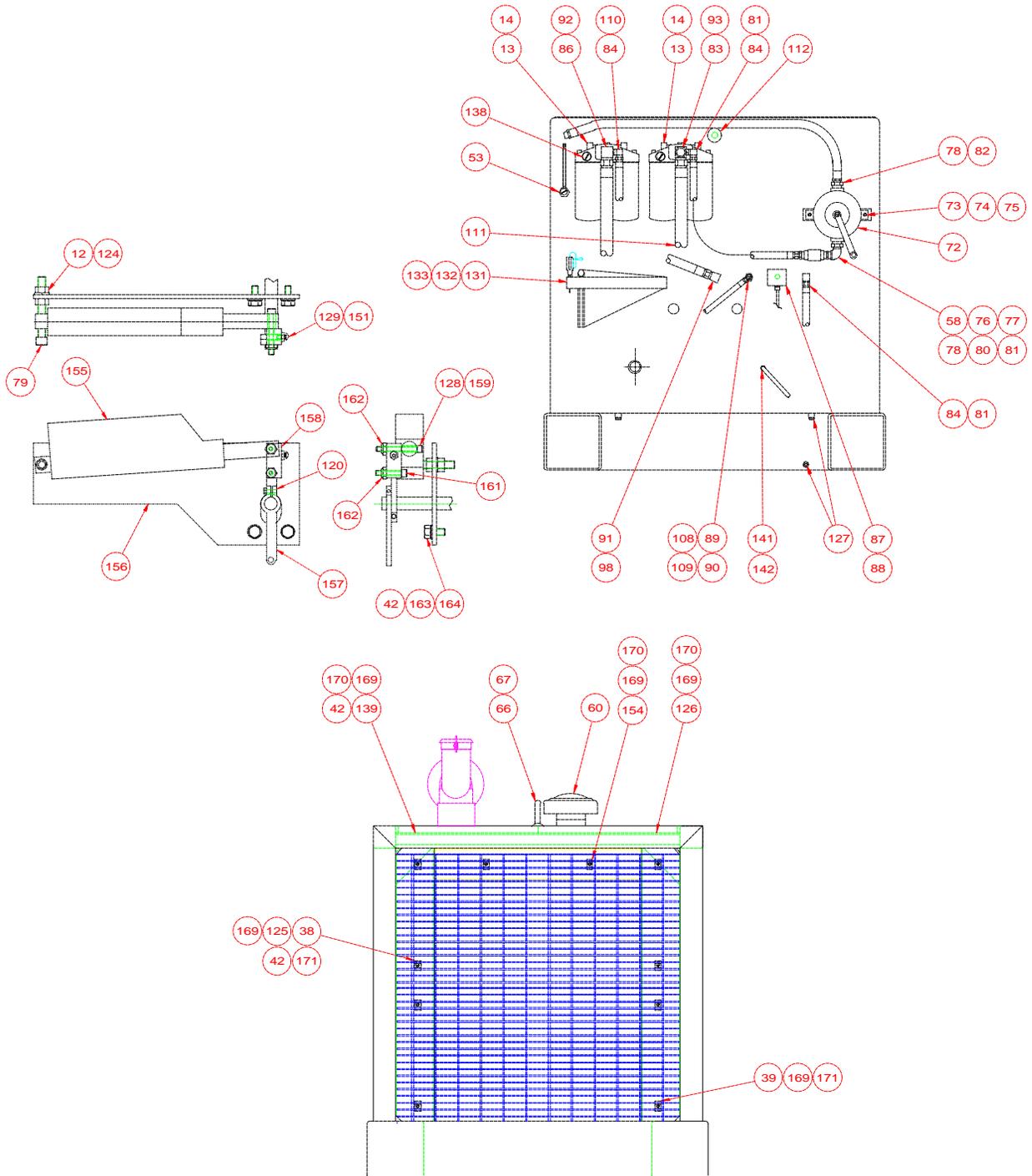
POWER UNIT-INTERNAL (side and top views)

800377



POWER UNIT-INTERNAL

800377



POWER UNIT-INTERNAL

800377

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
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	Cable Bracket
6	100577	1	Stop Cable Clamp
7	100684	1	Clamp Pump (P2)
8	100552	1	Reservoir (300)
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
20	100534	1	Coupler Panel (300)
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	19	.312 Flat Washer
36	100537	2	Battery Cable-24"
37	110653	1	Battery Cable-6
38	100873	1	Right Heat Exchange Bkt
39	100871	1	Left Heat Exchange Bkt
40	400099	1	Heat Exchanger (HE)

POWER UNIT-INTERNAL

800377

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
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	HOSE038R02J006J006L0370S
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
66	100460	1	1.25-7 X12 Lg Eye Bolt
67	100722	1	Roll Pin .25 X 3.5
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

POWER UNIT-INTERNAL800377

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
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	100498	1	HOSE150R02J924J024L07200
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	HOSE050R09J008J008L04000
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	1	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	100735	2	Transmission Oil/Gal
119	140415	275	Hydraulic Fluid/Gal
120	810617	1	Modified Throttle Arm

POWER UNIT - INTERNAL

800377

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
122	100536	1	Exhaust Shield
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	100244	1	Tube
129	110827	1	10-32 X .75 BHCS S.S.
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
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
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

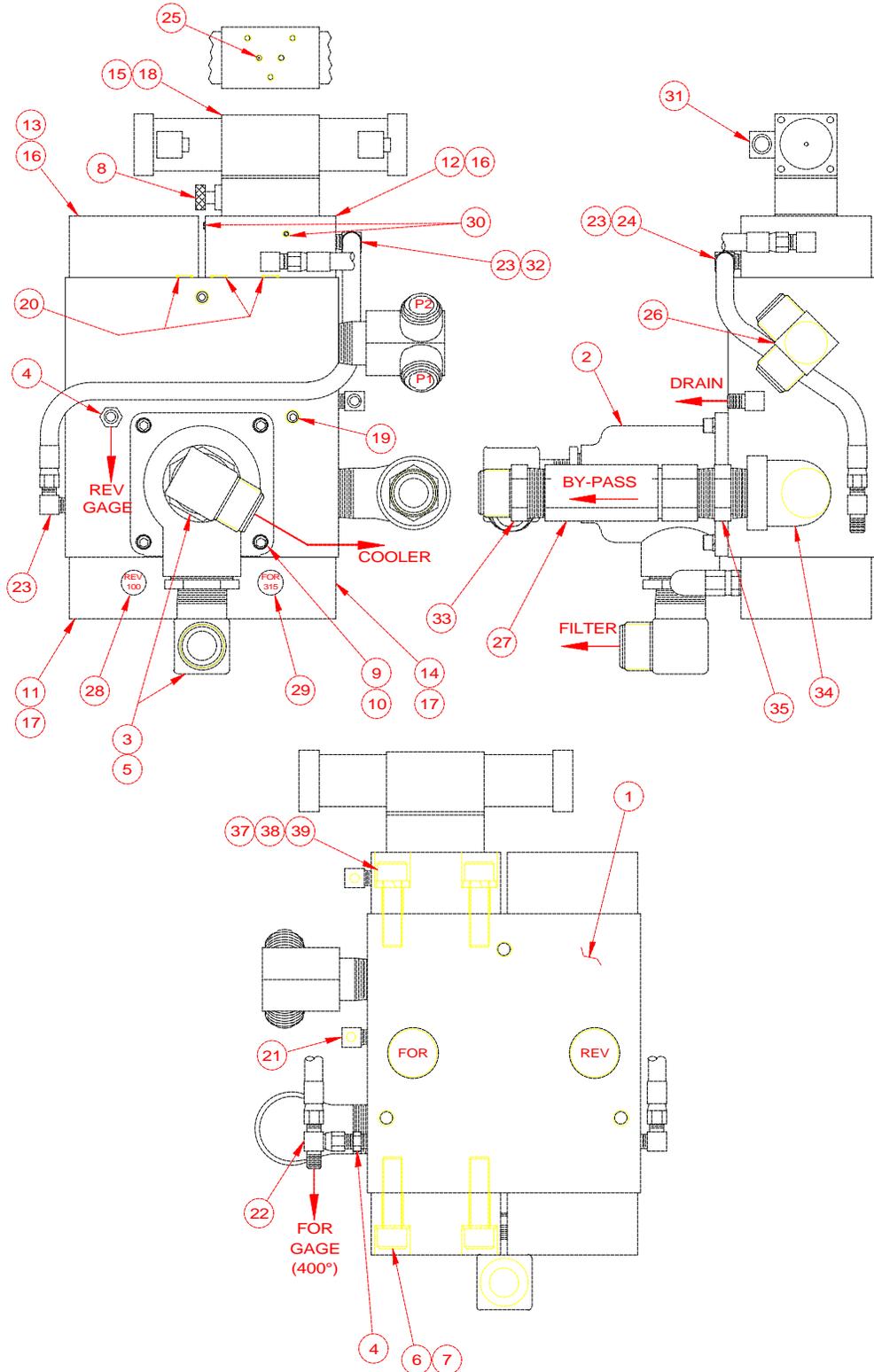
POWER UNIT - INTERNAL

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
164	100293	2	.312 Flat Washer
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



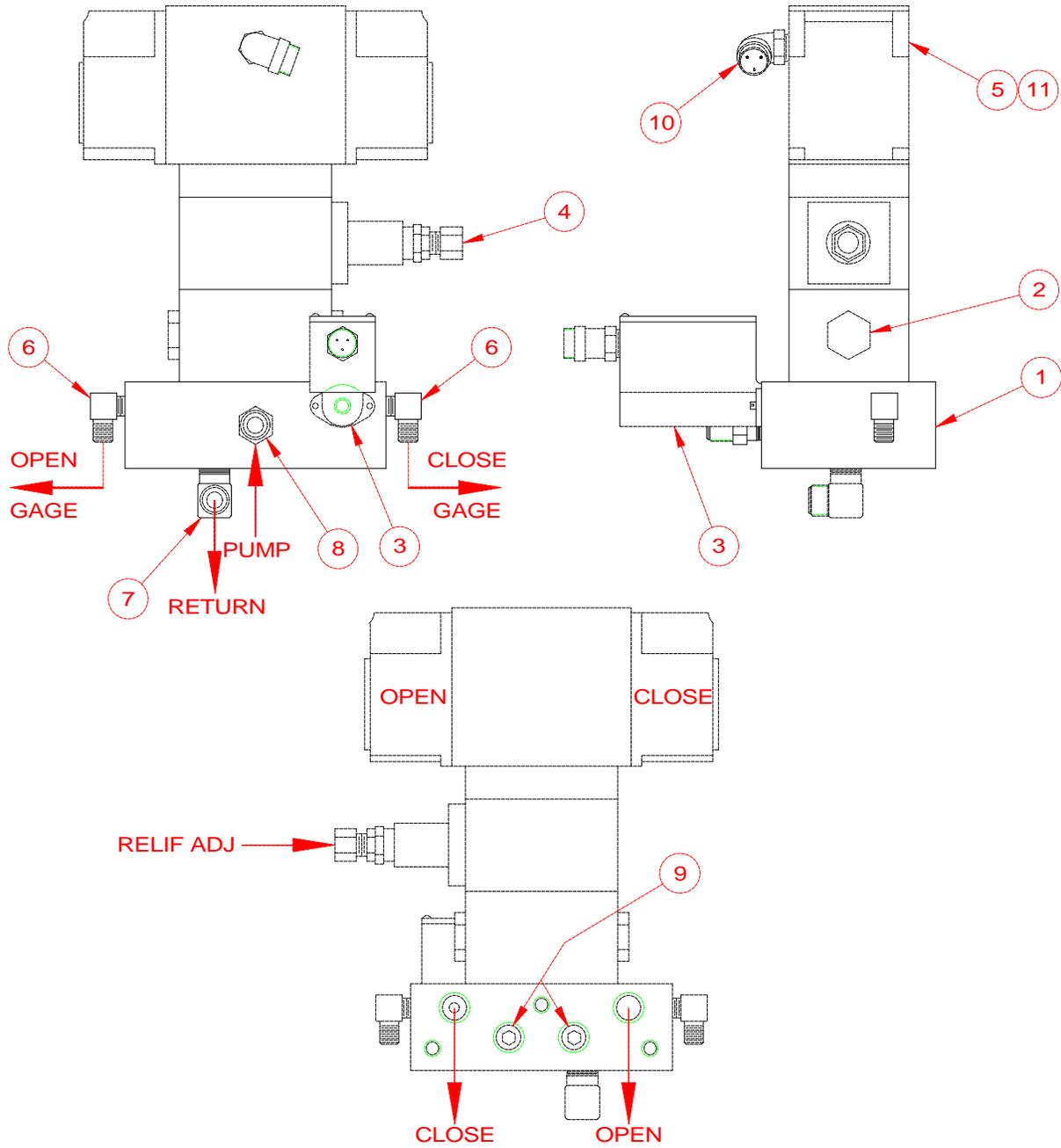
CONTROL MANIFOLD ASSEMBLY

810571

<u>Item</u>			<u>Part</u>
			<u>NumberQty.</u>
			<u>Description</u>
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 ASSEMBLY

810035



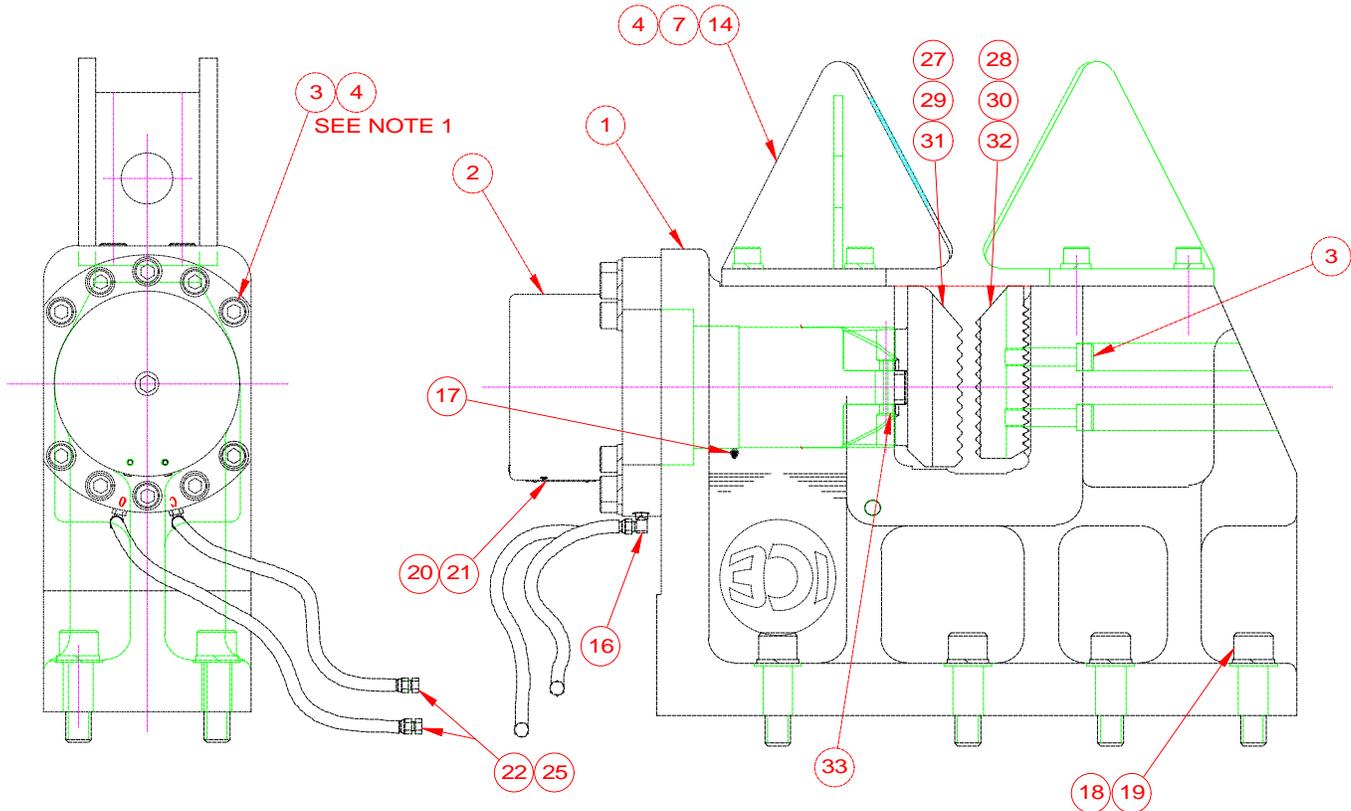
CLAMP MANIFOLD ASSEMBLY

810035

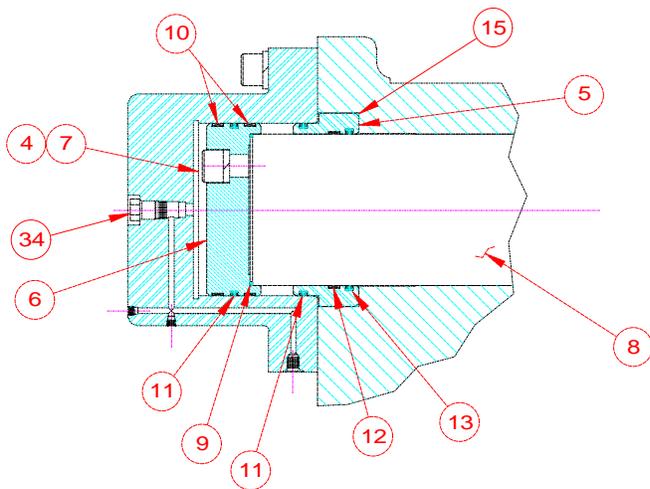
<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
1	110642	1	Clamp Manifold Block
2	110149	1	Check Valve (CV5)
3	810033	1	Pressure Switch Assembly (PS1)
4	100898	1	Sandwich Relief (RV2)
5	110147	1	Control Valve (V1)
6	140539	2	FITT2L-04M02P000-0000001
7	110632	1	FITT2L-12M06P000-000H001
8	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

126 CLAMP ASSEMBLY (OPTIONAL)

800327



SEE NOTE 1



CYLINDER DETAIL

NOTE:

1. TORQUE 1.00 SOCKET HEAD
CAP SCREWS TO 540 FT/LB.

126 CLAMP ASSEMBLY (OPTIONAL)

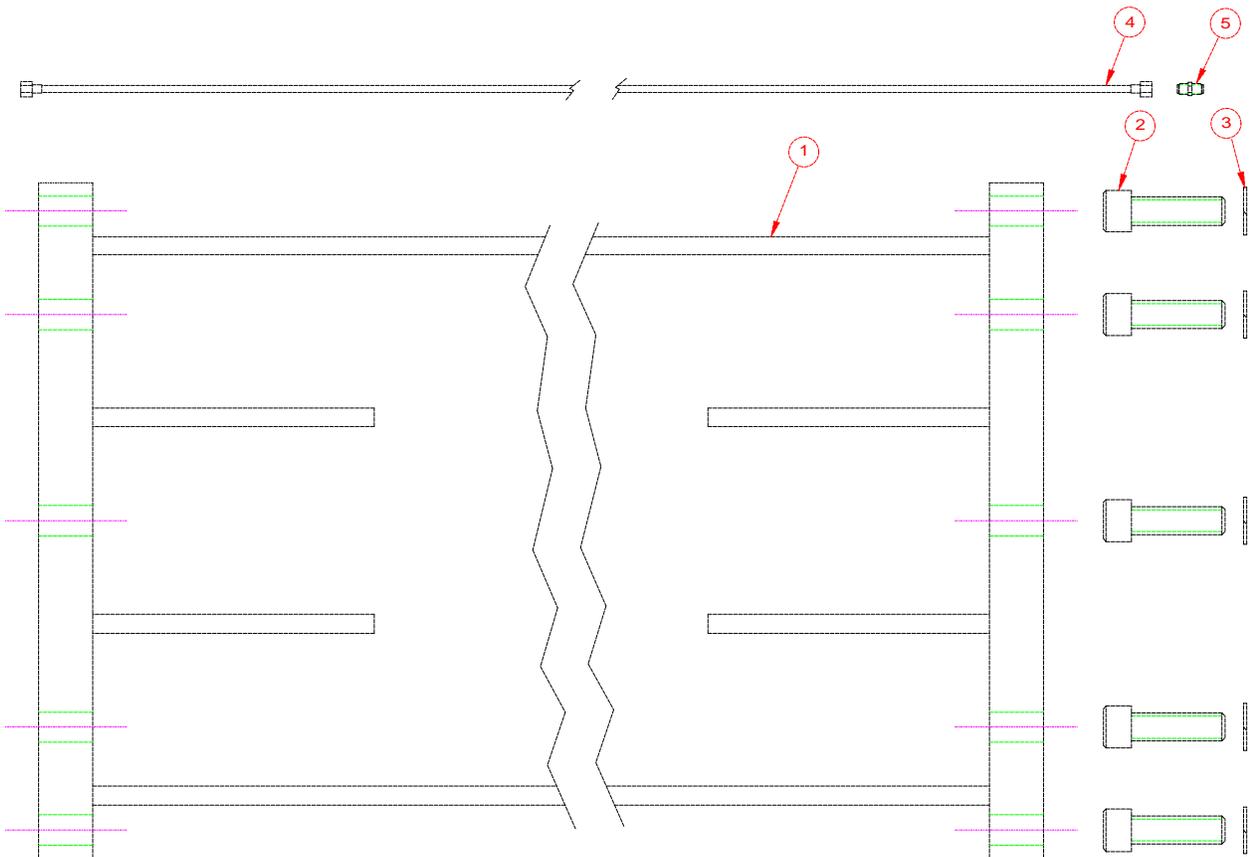
800327

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
1	810493	1	126 Clamp Body Asm.
2	810491	1	Welded Cylinder
3	100212	1	21-8UNC x 4.0 Lg SHCS
4	100209	1	191" 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

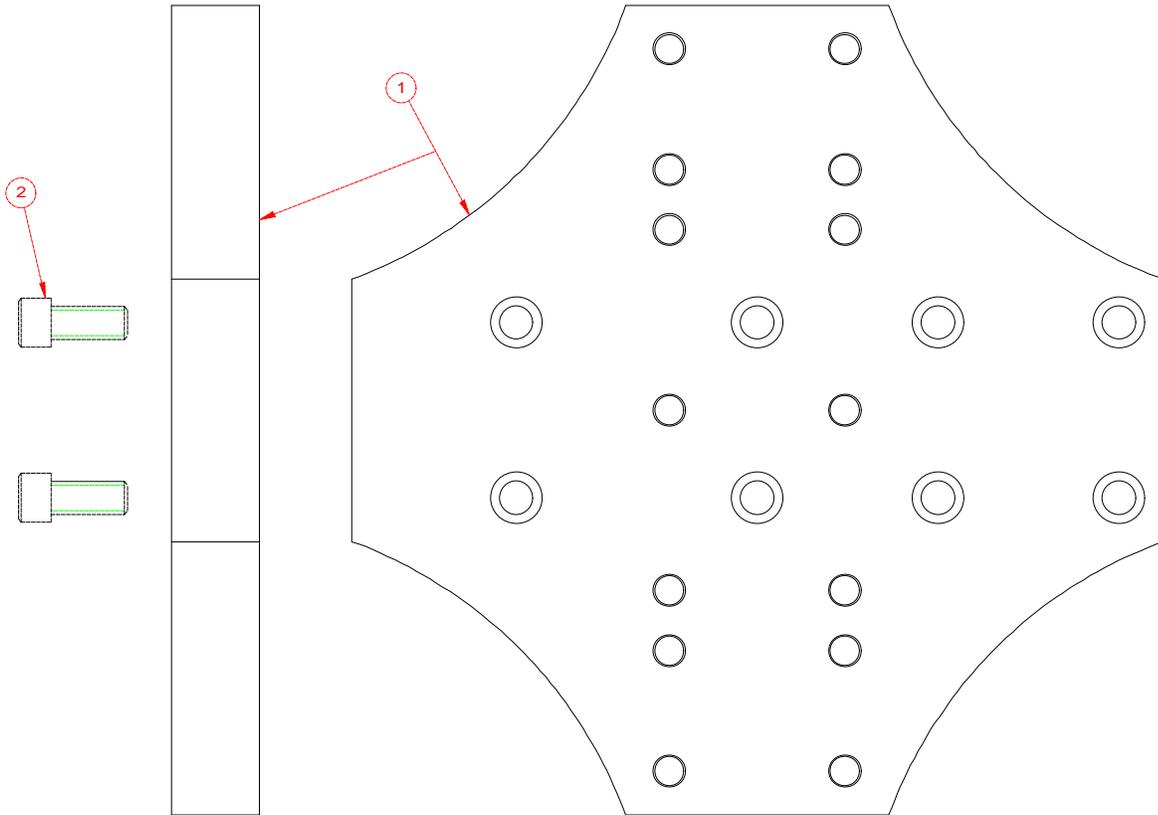
CLAMP EXTENSION - 10 FOOT (OPTIONAL)

800423



Item	Number	Qty.	Description	Part
1	810655	1	10' Extension	
2	100193	10	1.50-6UNC x 5.00 Lg SHCS	
3	100195	10	1.50 Lock Washer	
4	120193	2	HOSE038R02J006J006L1320S	
5	120081	2	FITT2S-06M06M000-000H001	

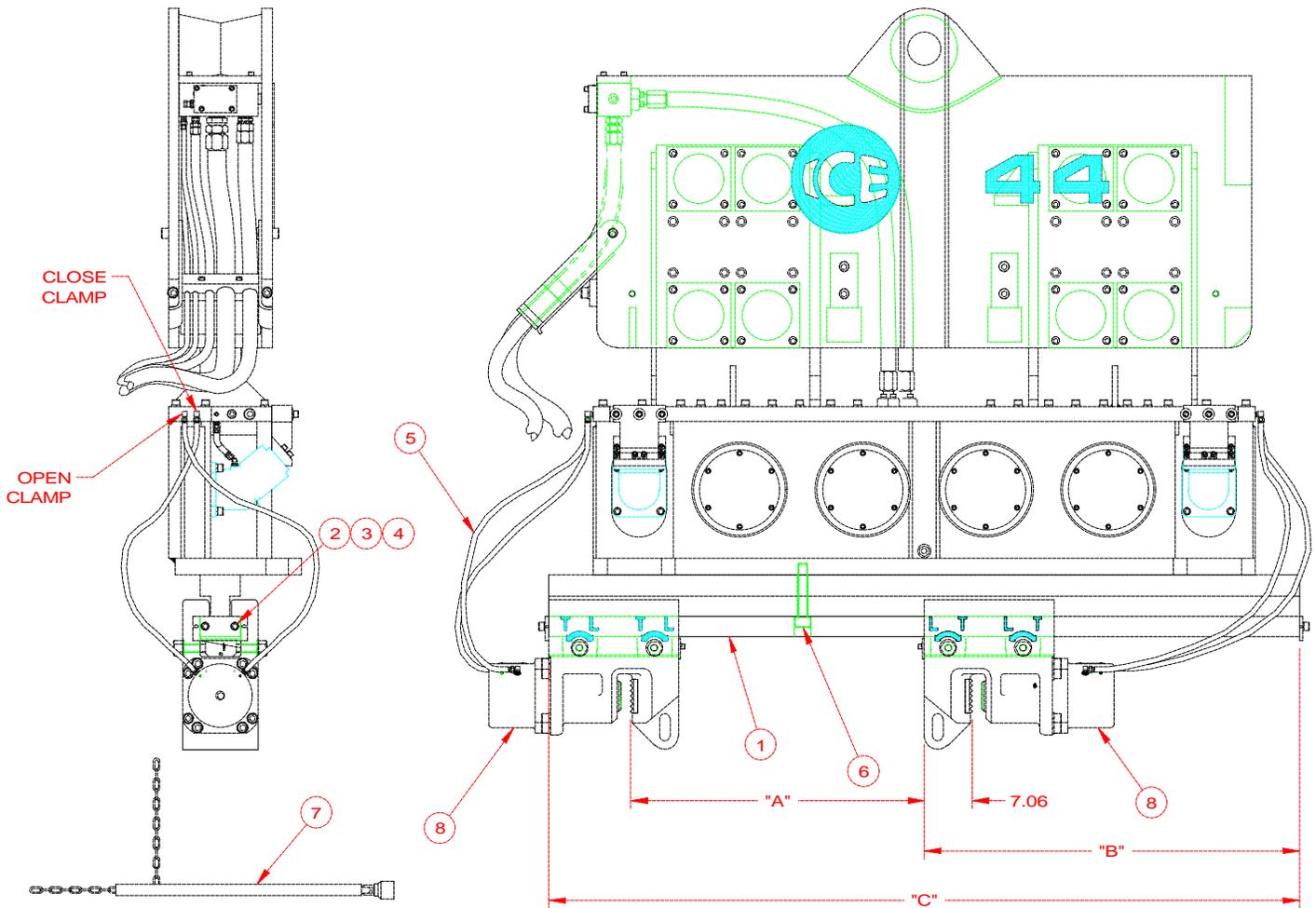
90 Deg. CLAMP ADAPTER (OPTIONAL)800049



Item	Part Number	Qty.	Description
1	120083	1	90 deg. Clamp Adapter
2	120077	8	1.50-6UNC x 3.50 Lg SHCS

CAISSON BEAM - 7 FOOT (OPTIONAL)
11 FOOT (OPTIONAL) 800479

800477



7' Caisson Beam (800477) - Shown
11' Caisson Beam (800479) - Similar

	A	B	C
7' Beam	42.00	55.00	110.00
11' Beam	63.00	75.00	150.00

CAISSON BEAM - 7 FOOT (OPTIONAL)

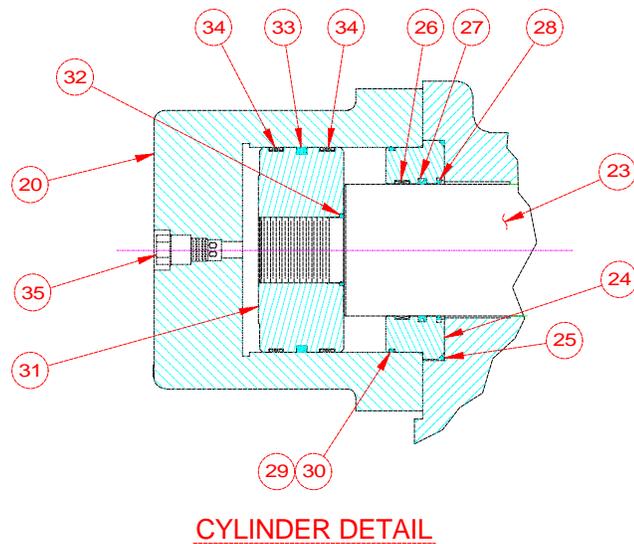
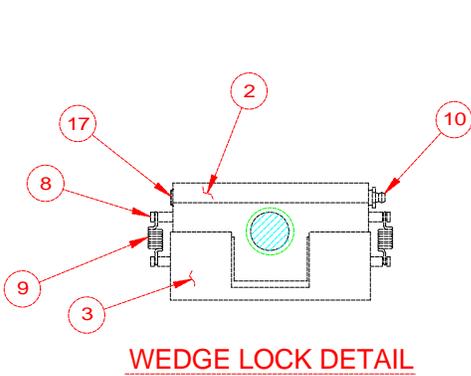
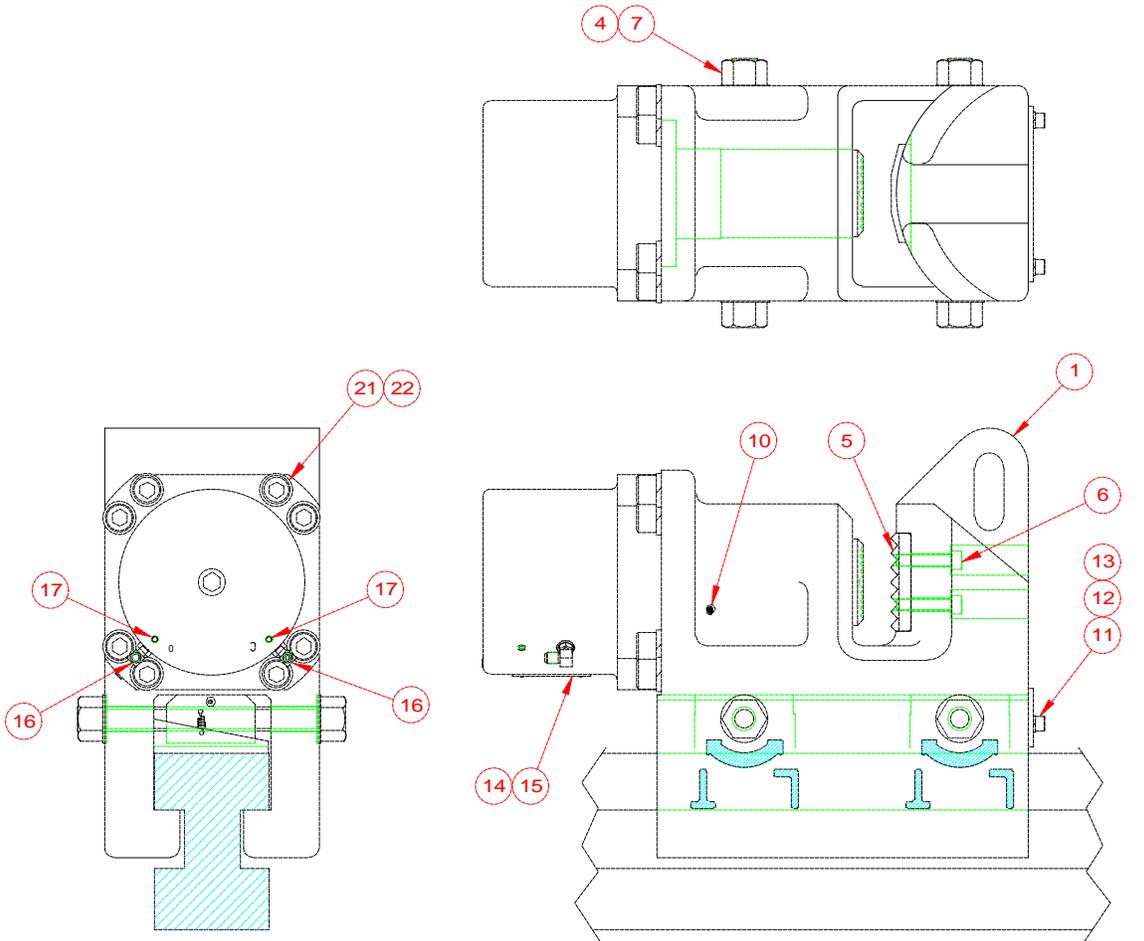
800477

<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	.75-10UNC x 2.00 Lg SHCS
4	100069	4	.75 Lock Washer
5	100228	4	HOSE038R02J006J006L0610S
6	120007	15	1.50-6UNC x 8.00 Lg SHCS
7	810173	1	Adjustment Tool
8	800047	2	#80 Caisson Clamp Asm. (Note)
11	100230	4	FITT2P-06M000000-000T001

CAISSON BEAM - 11 FOOT (OPTIONAL)800479

<u>Item</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
1	810251	1	11' Caisson Beam
2	120011	2	Clamp Stop
3	400069	4	.75-10UNC x 2.00 Lg SHCS
4	100069	1	.75 Lock Washer
5	120009	4	HOSE038R02J006J006L0960S
6	100193	14	1.50-6UNC x 5.00 Lg SHCS
7	810173	1	Adjustment Tool
8	800047	2	#80 Caisson Clamp Asm. (Note)
11	130219	14	1.50 Lock Washer Hi-Collar
12	100230	4	FITT2P-06M000000-000T001

Note: Not part of Caisson Beam Asm.



MODEL 80 CAISSON CLAMP (OPTIONAL) w/ WEDGE LOCK

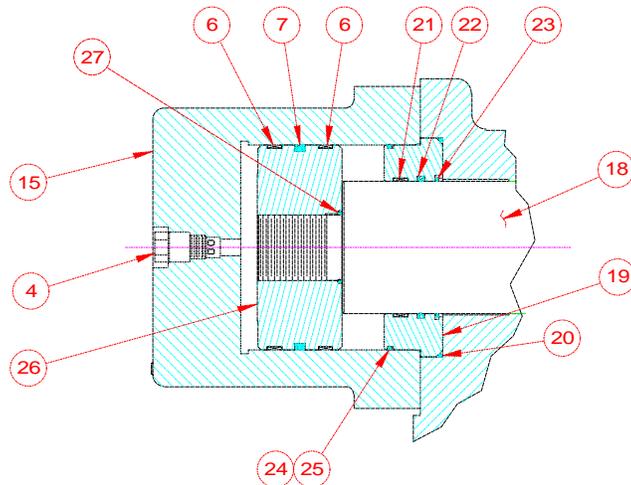
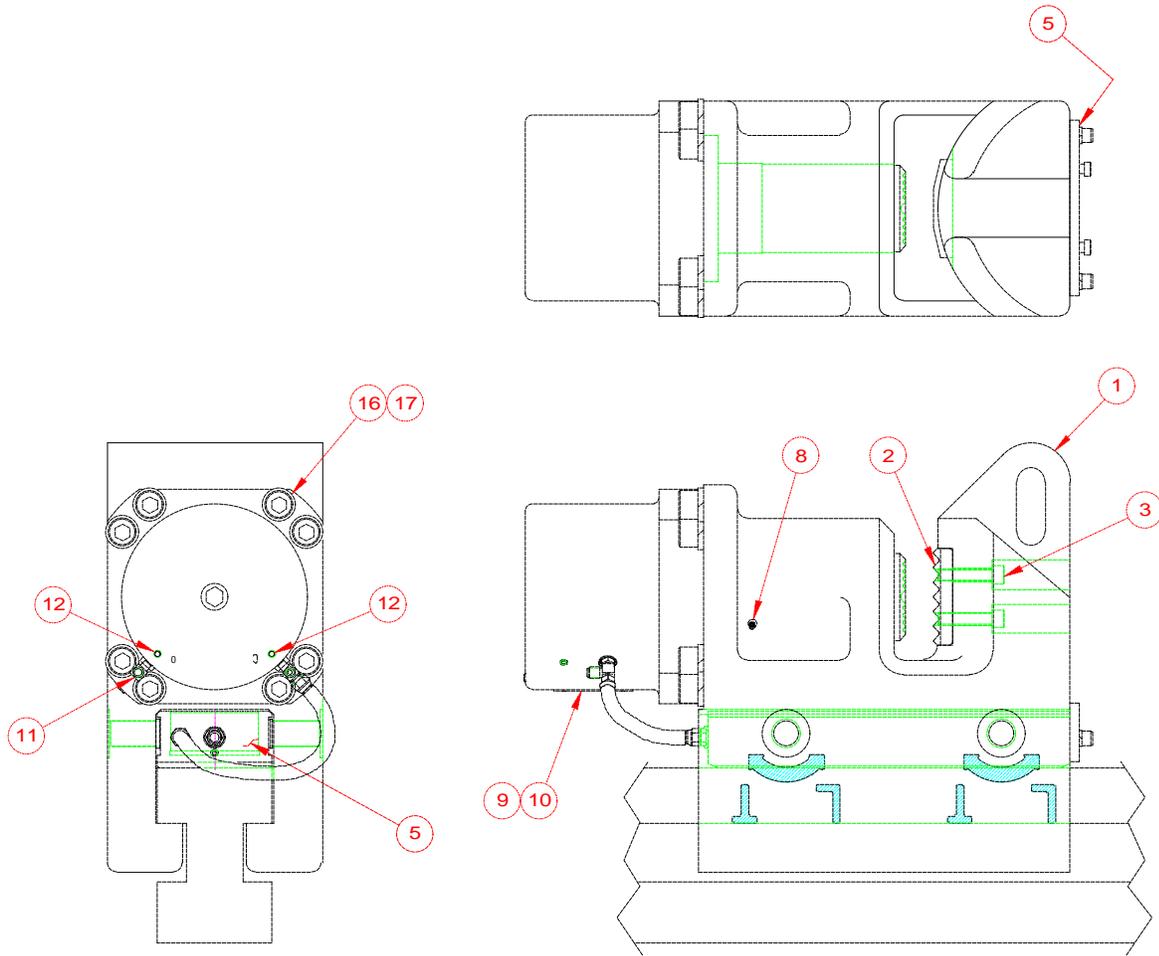
800047

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 80 Seal Kit.

MODEL 80 CAISSON CLAMP (OPTIONAL) w/ HYDRO LOCK

800413



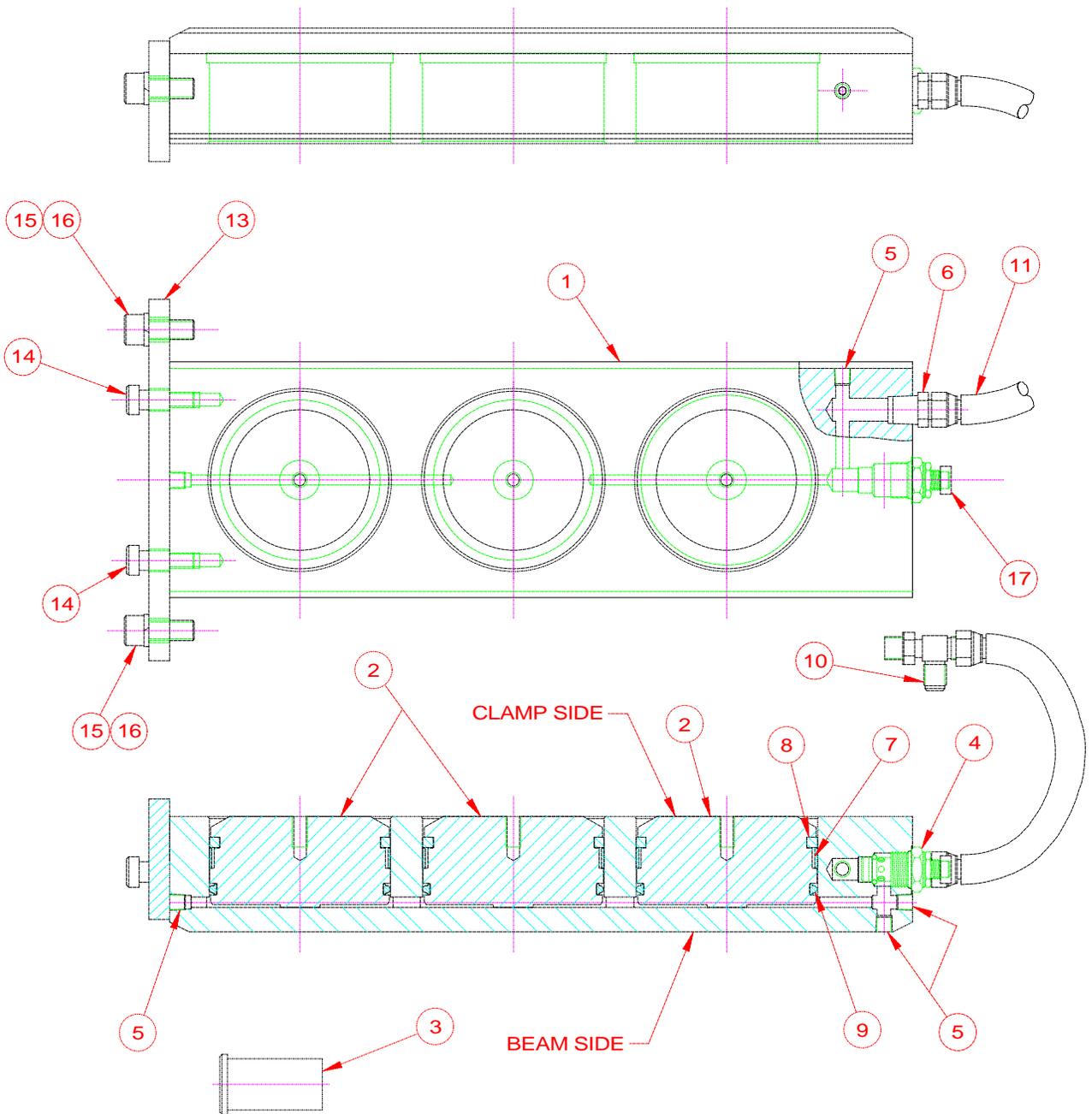
CYLINDER DETAIL

MODEL 80 CAISSON CLAMP (OPTIONAL) w/HYDRO LOCK

800413

<u>Item</u>	<u>Number</u>	<u>Qty.</u>	<u>Description</u>
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	#80 Seal Kit

Note: Included in Model 80 Seal Kit.



HYDRO LOCK (OPTIONAL)

800399

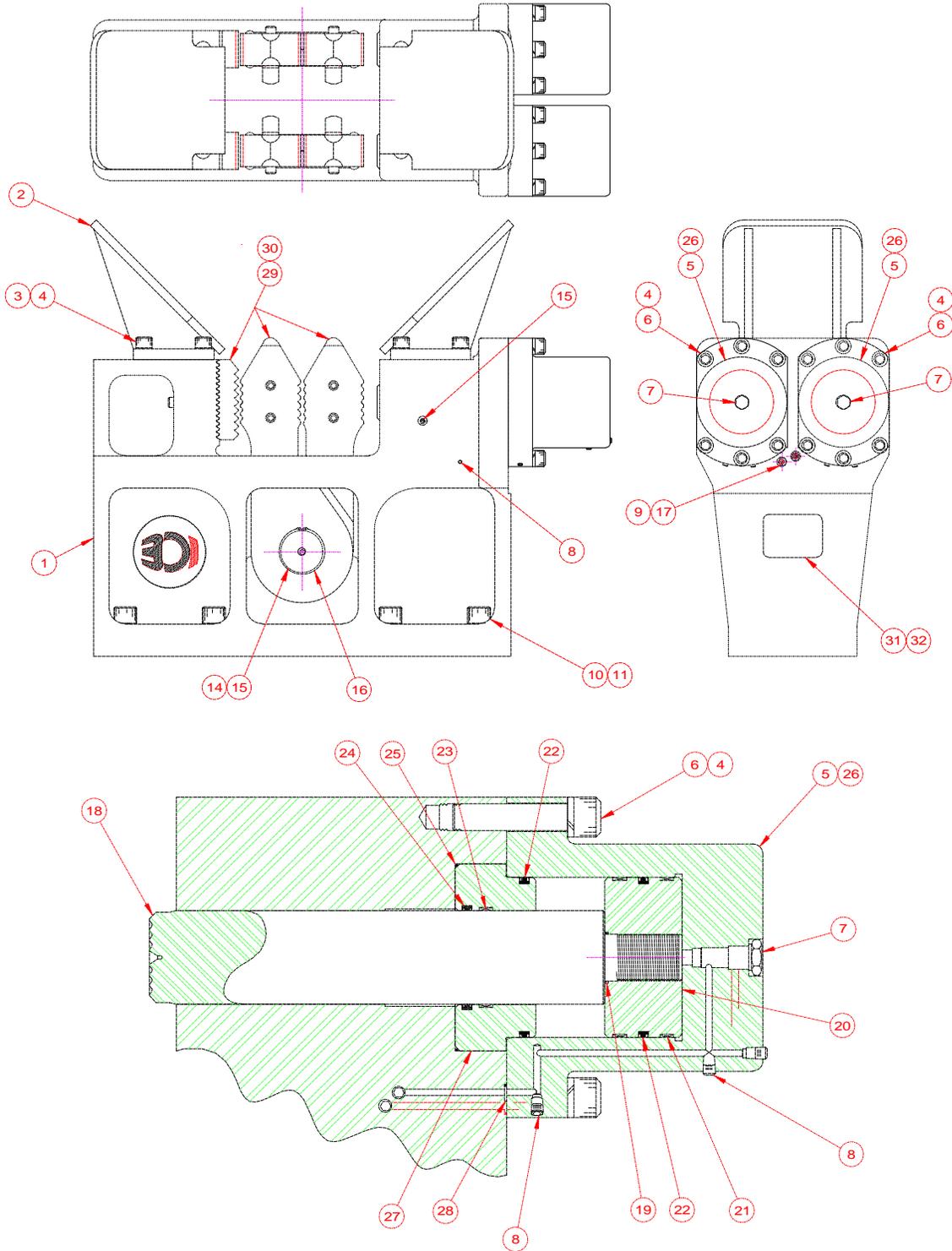
<u>Item</u>	<u>Number</u>	<u>Qty.</u>	<u>Description</u>
1	120639	1	Lock Body
2	120641	3	Piston
3	120643	4	Button
4	120651	1	Lock Body Holding Valve
5	100646	4	FITT2P-02P000000-000S007
6	400203	1	FITT2S-06M06P000-000H001
7	120645	3	Piston Bearing
8	120649	3	Piston Wiper
9	120647	3	Piston Seal
10	120655	1	FITT2T-06R06M06M-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 Locwel
16	100121	2	.5 Lock Washer Medium
17	120731	1	Support Ring

INSTALLATION PROCEDURE

Remove Elbow on CLOSE side of the Cylinder and replace with Tee. Connect hose from Lock Body to 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.

MODEL 127 Z-PILE CLAMP (OPTIONAL)

800041



CYLINDER ASSEMBLY DETAIL

MODEL 127 Z-PILE CLAMP (OPTIONAL)

800041

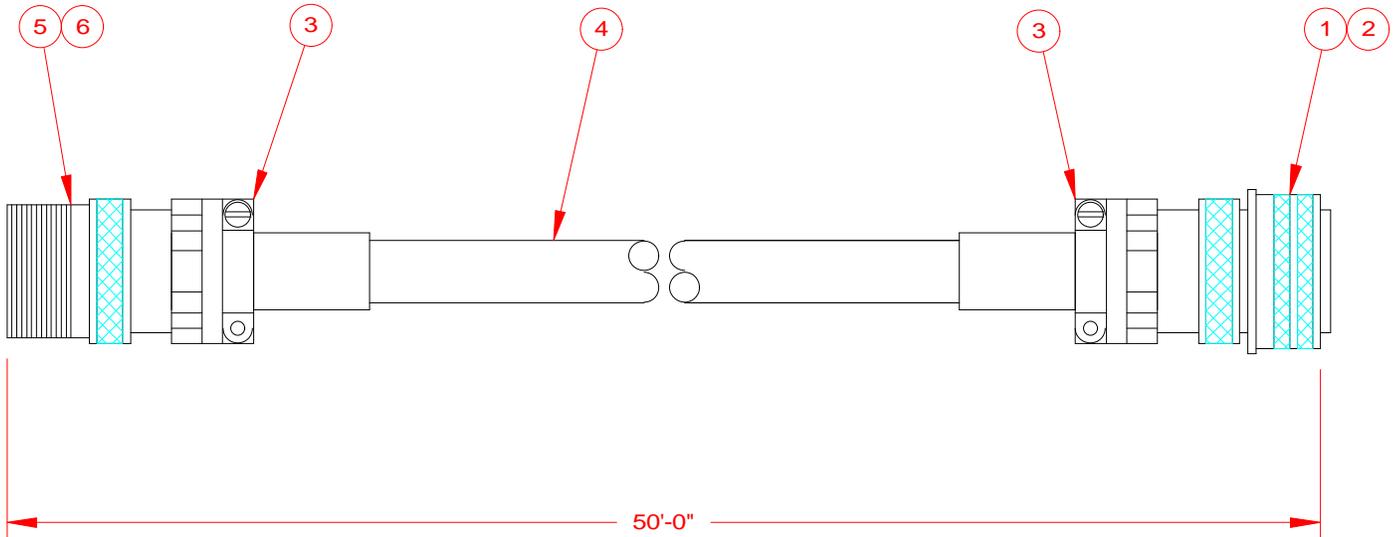
Item	Part Number	Qty.	Description
1	810059	1	127 Z CLAMP BODY CASTING
2	120677	2	PILE GUIDE
3	100213	8	1.0-8 X 2.5 Lg SHCS LOCWEL
4	100209	20	1.0 Lock Washer Medium
5	120659	2	127 CYLINDER
6	100212	12	1.0-8 X 4 Lg SHCS LOCWEL
7	120629	2	HOLDING VALVE CARTRIDGE
8	100646	10	FITT2P-02P000000-000S007
9	100053	2	FITT2S-06MO6R000-000H001
10	100193	8	1.5-6 X 5.0 Lg SHCS
11	100195	8	1.5 Lock Washer EXTRA HEAVY
14	120155	1	SHAFT
15	100229	4	GREASE FITTING
16	120191	2	RETAINER RING
17	100111	2	HOSE038R02J006J006L0875S
18	120663	2	CYLINDER ROD(127)
19	120239	2	2-132 O-RING (Note 1)
20	120241	2	PISTON-127
21	120243	4	PISTON BEARING (Note 1)
22	120245	4	PISTON SEAL (Note 1)
23	120665	2	ROD BEARING (Note 1)
24	120667	2	ROD SEAL (Note 1)
25	120347	2	2-261 O-RING 90 DURO (Note 1)
26	810629	2	127 Z SEAL KIT
27	120661	2	ROD END CAP(127)
28	110602	4	111 O-RING (Note 1)
29	800419	1	12" MULTI-GRIP JAW SET(Note 2)
30	800417	1	13" MULTI-GRIP JAW SET(Note 2)
31	120181	1	127 S/N PLATE
32	130381	4	RIVET

Note 1 : Included in Model 127 Seal Kit.

Note 2 : Not part of Final Assembly.

PENDANT EXTENSION CABLE - 50' (OPTIONAL)

800059



Item	Part Number	Qty.	Description
1	120169	1	Amphenol Cable Jack
2	110763	1	Female Amphenol Insert
3	100375	2	Strain Relief - Amphenol
4	100560	50	Pendant Cable / Ft
5	100395	1	Amphenol Plug
6	110761	1	Male Amphenol Insert-Plug

VIII.ORDERING PARTS

E. MISCELLANEOUS ACCESSORIES

1. TOOLS

Part Number	Qty.	Description
100651	1	24-Volt Test Light
100653	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) 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

Part Number	Qty.	Description
810013	5 GAL	Hydraulic Oil
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. 44 HOSE GROUP KIT-INTERNAL850127

Item	P/N	Qty.	Description	Page Ref.
15	140907	2	HOSE150PT6F024F024L0835C	VIII-6
23	100486	2	HOSE050R01J008J008L01450	VIII-6
27	140905	2	HOSE038R02J006J006L0835C	VIII-6
32	140903	1	HOSE075PT4F012FO12L0835C	VIII-6

4. 325 HOSE GROUP KIT-INTERNAL850105

Item	P/N	Qty.	Description	Page Ref.
20	110680	1	HOSE019AQ1J004J004L40000	VIII-20
21	130205	2	HOSE019AQ1J004J004L09000	VIII-20
22	130393	1	HOSE019AQ1J004J004L11000	VIII-20
59	110633	1	HOSE038R02J006J006L0370S	VIII-26
81	130201	2	HOSE075R01J012J012L04000	VIII-27
82	400215	1	HOSE100R01P016P016L08400	VIII-27
92	100500	2	HOSE150R01J024J024L11800	VIII-26
93	100498	1	HOSE150R02J924J024L07200	VIII-26
98	100862	1	HOSE100R01J016J016L03300	VIII-26
100	110461	1	HOSE050R09J008J008L04000	VIII-26
104	100492	1	HOSE100PT6J020H020L04000	VIII-26
105	100490	1	HOSE100PT6J020H920L06500	VIII-26
108	100486	1	HOSE050R01J008J008L01450	VIII-26
109	110265	2	HOSE050R01J008J008L02300	VIII-26
110	100484	1	HOSE075R01J012J012L08400	VIII-27
111	100482	1	HOSE150R02J024J024L07200	VIII-27
141	100478	1	HOSE038R01J006J006L02000	VIII-26
24	100149	1	HOSE025R02J004J004L01900	VIII-34
32	100719	1	HOSE025R02J004J004L03000	VIII-34

VIII. ORDERING PARTS

E. MISCELLANEOUS ACCESSORIES (CONTINUED)

5. 44-30 / 325 O-RING KIT 850141

<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
140255	2#	113-O-Ring
100097	2#	214-O-Ring
100091	4	#219 O-Ring
100037	8#	222-O-Ring
110119	4#	225-O-Ring

6. CYLINDER SEAL KITS

MODEL 126 CLAMP CYLINDER 800327 Refer to page VIII-38

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

MODEL 80 CLAMP CYLINDER 800047 Refer to page VIII-44

<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 800427 Refer to page VIII-6

<u>Item</u>	<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
41	100796	2	Elastomer
30	110119	2	#225 O-Ring
34	100097	1	#214 O-Ring

VIBRATION CASE 810649 Refer to page VIII-10

<u>Item</u>	<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
6	100187	2	FITT2P-12P000000-000S0M7
15	100185	1	Sight Gage

HOSE ASSEMBLIES-INTERCONNECTING 800029 Refer to page VIII-16

<u>Item</u>	<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
5	100233	2	HOSE125R10P020P020L60000
9	100911	2	HOSE150R02P024P024L60000
13	100241	1	HOSE075R02P012P012L62000
17	100247	2	HOSE038RO2P006P006L62000

POWER UNIT - INTERNAL 800377 Refer to page VIII-26

<u>Item</u>	<u>P/N</u>	<u>Qty</u>	<u>Description</u>
--	100233	1	Engine Oil Filter
14	100518	4	Return Filter Element
---	100450	1	Fuel Filter Element
---	100448	1	Air Cleaner Element
---	120613	1	Water Separator Element
100	110461	1	HOSE050R09J008J008L04000
104	100492	1	HOSE100PT6J020H020L04000
105	100490	1	HOSE100PT6J020H920L06500

VIII. ORDERING PARTS

F. RECOMMENDED SPARE PARTS (CONTINUED)

TERMINAL MANIFOLD

810019 Refer to page VIII-12

<u>Item</u>	<u>P/N</u>	<u>Qty</u>	<u>Description</u>
5	100032		1 Relief Valve
13	110119		2#225 O-Ring
16	100097		1#214 O-Ring
21	140255		2#113 O-Ring

MODEL 126 CLAMP

800327 Refer to page VIII-38

<u>Item</u>	<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
16	130057		1 FTT2L-06M06R000-0000001
18	100193		8 1.5-6UNC x 5.00 Lg SHCS
19	100195		8 1.5 Lock Washer
22	100111		2 HOSE038R02J006J00620875S
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

MODEL 127 Z-PILE CLAMP

800041 Refer to page VIII-50

<u>Item</u>	<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
9	100193		8 1.50-6UNC x 5.00 Lg SHCS
10	100195		8 1.50 Lock Washer
17	100111		1 HOSE038R02J006J006L0875S
26	810629		1 127 Seal Kit

VIII. ORDERING PARTS

F. RECOMMENDED SPARE PARTS (CONTINUED)

MODEL 80 CAISSON CLAMP w/WEDGE LOCK 800047 Refer to page VIII-44

Item	P/N	Qty.	Description
4	810109		1 Screw Assembly
5	120107		1 Fixed Jaw
6	400157		2.625-10UNC x 2.75 Lg SHCS
16	130057		2 FITT2L-06M06R000-000H001
35	120629		1 Holding Valve
36	810611		1 Model 80 Seal Kit

MODEL 80 CAISSON CLAMP w/HYDRO LOCK 800413 Refer to page VIII-46

Item	P/N	Qty.	Description
2	120107		1 Jaw
3	400157		2.625-10UNC x 2.75 Lg SHCS
4	120629		1 Holding Valve
11	130057		2 FITT2L-06M06R000-000H001
28	810611		1 Model 80 Seal Kit

HYDRO LOCK 800399 Refer to page VIII-48

Item	P/N	Qty.	Description
3	120643		4 Button
4	120651		1 Holding Valve
6	400203		1 FITT2S-06M06P000-000H001
7	120645		3 Piston Bearing
8	120649		3 Piston Wiper
9	120647		3 Piston Seal
10	120655		1 FITT2T-06R06M06M-0000001
11	120657		1 HOSE038R02J006J006L0090C
14	140143		2.5 x .75 Lg SHCS Shoulder
15	100119		2.5-13 x 1.25 Lg SHCS Locwel
17	120731		1 Support Ring

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.