



MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

OPERATING AND MAINTENANCE MANUAL

ICE MODEL 1412

VIBRATORY PILE DRIVER/EXTRACTOR

WITH MODEL 780 POWER PACK



**INTERNATIONAL
CONSTRUCTION
EQUIPMENT, INC.**

SPECIALIZING IN PILE DRIVING EQUIPMENT

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**MODEL
VIBRATORY
DRIVER/EXTRACTOR**

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14
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91
92
93
94
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97
98
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100



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

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 three major categories.

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

The second category is for parts reordering and it includes both PARTS LISTS and pictorial drawings of the assemblies for simplified part distinction. Refer to the ORDERING PARTS section for more specific parts ordering information.

The third category is for TROUBLE SHOOTING minor defects whenever the need arises. Although the majority of difficulties can be prevented by good, periodic lubricating, inspection and preventive maintenance as outlined in the MAINTENANCE & ADJUSTMENT section of this manual, malfunctions do occur. The charts were developed in a sequential manner so that the majority of work can be done in the field. Adherence of the listed procedures in the order presented may lead to the location and correction of any existing system defects.



**MODEL
VIBRATORY
DRIVER/EXTRACTOR**

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**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

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 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 OF FITNESS FOR ANY PARTICULAR PURPOSE.

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

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



**MODEL
VIBRATORY
DRIVER/EXTRACTOR**





MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

TABLE OF CONTENTS
OPERATING INSTRUCTIONS

<u>I. GENERAL DESCRIPTION</u>	<u>PAGE</u>
A. GENERAL	I-1
B. VIBRATOR	I-2
C. HYDRAULIC CLAMP	I-2
D. POWER PACK	I-2
E. REMOTE-CONTROL PENDANT	I-3
F. SPECIFICATIONS	I-3
<u>II. PREPARATION FOR OPERATION</u>	
A. GENERAL	II-1
B. SAFETY PRECAUTIONS	II-1
C. RIGGING OF VIBRATOR	II-2
D. CONNECTION OF HYDRAULIC CLAMP	II-2
E. CONNECTION OF HYDRAULIC HOSES	II-3
F. BLEEDING HYDRAULIC CLAMP HOSE LINES	II-5
G. FILLING VIBRATOR PRESSURE HOSE	II-5
<u>III. OPERATING INSTRUCTIONS</u>	
A. COMPLETION OF SET-UP AND MAINTENANCE	III-1
B. CONTROL PANEL	III-1
C. STARTING AND WARMING UP ENGINE	III-4
D. WARMING HYDRAULIC FLUID	III-5
E. OPERATION OF REMOTE-CONTROL PENDANT	III-5
F. CHANGING FREQUENCY	III-7
G. SHUTDOWN	III-7
<u>IV. MAINTENANCE AND ADJUSTMENTS</u>	
A. GENERAL	IV-1
B. DAILY	IV-1
C. 125 HOURS (SERVICE METER UNITS)	IV-3
D. 250, 500 HOURS AND OTHER	IV-3
E. ANNUALLY	IV-3
F. SEVERE CONDITIONS	IV-3
G. LUBRICATION	IV-4
H. DRAINING AND FILLING HYDRAULIC FLUID RESERVOIR	IV-5
I. CAPACITIES	IV-5
J. CLEANING HYDRAULIC PICK-UP FILTER	IV-6
K. CHANGING HYDRAULIC RETURN FILTER ELEMENTS	IV-6
L. CHANGING VIBRATOR HYDRAULIC FILTER ELEMENT	IV-7
M. SETTING HYDRAULIC FLUID MONITOR	IV-7
N. AIR COMPRESSOR	IV-7
O. BOLT TORQUE INFORMATION	IV-8



MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

TABLE OF CONTENTS

OPERATING INSTRUCTIONS (CONTINUED)

	<u>PAGE</u>
V. <u>HYDRAULIC CIRCUITRY</u>	
HYDRAULIC SCHEMATIC	V-1
HYDRAULIC COMPONENTS LIST	V-2
A. HYDRAULIC CLAMP	V-3
B. VIBRATOR DRIVE	V-3
C. OTHER	V-4
VI. <u>ELECTRICAL CIRCUITRY</u>	
A. STARTING DIESEL ENGINE	VI-1
B. STOPPING DIESEL ENGINE	VI-1
C. CLOSING HYDRAULIC CLAMP	VI-1
D. OPENING HYDRAULIC CLAMP	VI-1
ELECTRICAL SCHEMATIC	VI-2
ELECTRICAL COMPONENTS LIST	VI-3
E. STARTING VIBRATOR	VI-4
F. STOPPING VIBRATOR	VI-4
G. SAFETY CONTROL SYSTEM	VI-4
H. OTHER	VI-6
	<u>PARTS LIST</u>
VII. <u>GENERAL DATA</u>	
A. ABBREVIATIONS	VII-1
B. SCREWS AND BOLTS	VII-1
C. SERIAL NUMBER LOCATIONS	VII-2
VIII. <u>ORDERING PARTS</u>	
A. PROCEDURE	VIII- 1
B. HOSE DESCRIPTION CODE	VIII- 2
C. PARTS IDENTIFICATION	VIII- 3
PARTS LISTS AND DRAWINGS	VIII-36
D. MISCELLANEOUS ACCESSORIES	VIII-37
E. RECOMMENDED SPARE PARTS	VIII-39
	<u>TROUBLE SHOOTING</u>
IX. <u>TROUBLE SHOOTING</u>	
A. GENERAL	IX- 1
ELECTRICAL DIAGRAM DRAWING	IX- 2
B. TROUBLE SHOOTING CHARTS	IX-22
C. PRESSURE SWITCH ADJUSTMENT PROCEDURES (PS2)	IX-23
D. TIME DELAY RELAY (TDR)	IX-24



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

I. GENERAL DESCRIPTION

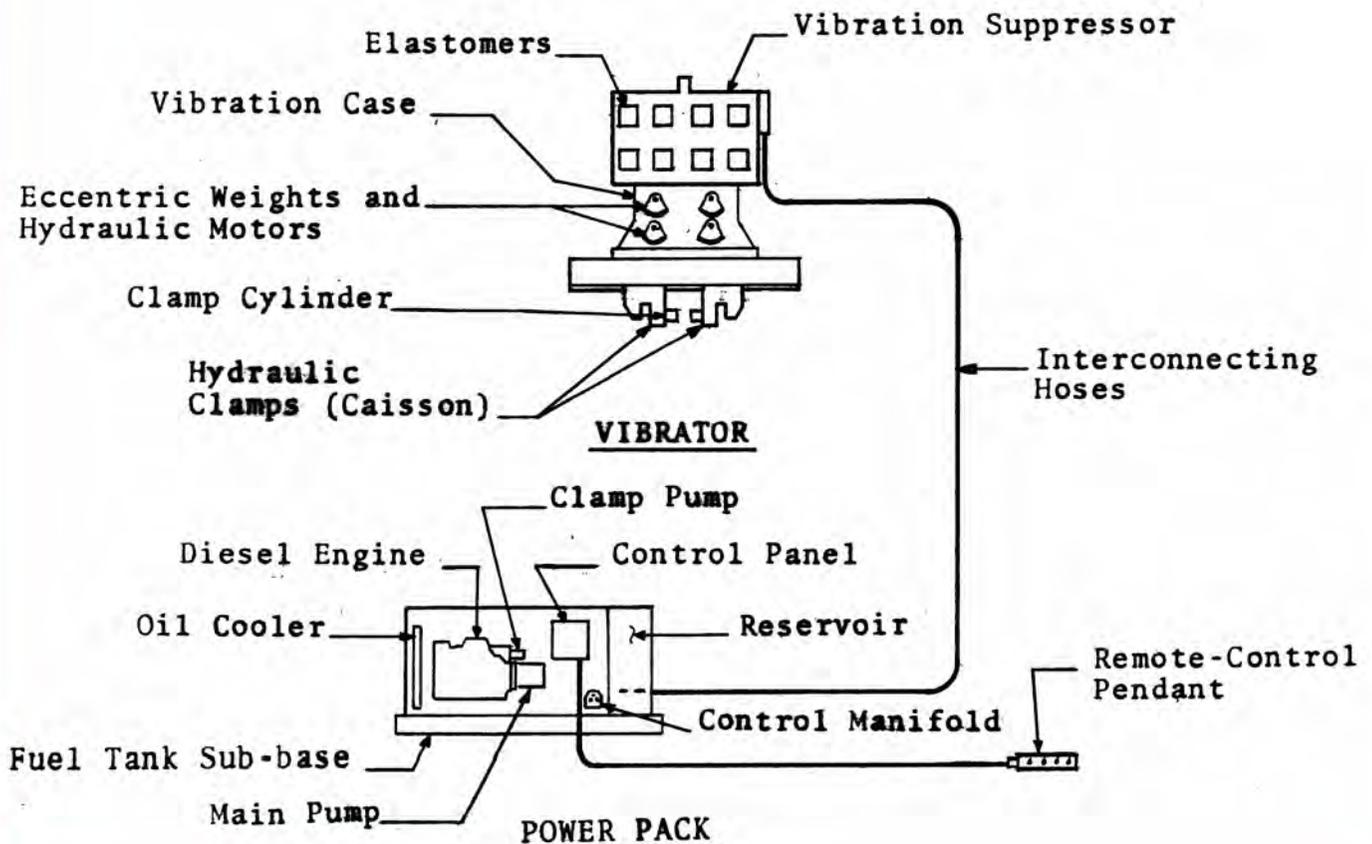
A. GENERAL

The ICE Model 1412 is a variable-frequency vibratory pile driver/extractor primarily designed to drive and extract larger caisson pipes up to 10 feet in diameter. With the use of other special hydraulic clamps, it may also be used to drive or extract other heavy sections, including sheet piling and wide flange beams.

The Model 1412 operates in a frequency range of 400 to 1200 vibrations per minute to provide maximum pile penetration rates in a wide variety of soils. The unit has an eccentric moment of 10,000 inch-pounds and operates with an amplitude of 1" to 1-1/2".

The vibratory driver unit consists of two major components:

- (1) The VIBRATOR with attached hydraulic clamps and
- (2) the POWER PACK with remote-control pendant.





**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

I. GENERAL DESCRIPTION

B. VIBRATOR

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

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

The vibration suppressor contains 16 rubber elastomers to isolate the vibration case from the crane line. The suppressor is designed for a maximum line pull of 80 tons during extractions.

C. HYDRAULIC CLAMP

The Model 122 Caisson Clamps available for use with the 1412 Vibratory Driver/Extractor are used in pairs with either a 10' Caisson Beam to drive and extract pipe ranging from 22-1/4" min. I. D. to 129-1/4" max. O. D. or with a 4' Caisson Beam which has a range of 22-1/4" min. I. D. to 54-1/2" max. O. D.

Although primarily intended to drive and extract large diameter caisson pipes, the 1412 unit, with the use of special hydraulic clamps, may be used in driving applications with various other heavy piling sections.

D. POWER PACK

The Model 1412 vibrator is driven by the ICE Model 780 power pack. The 780 power pack is powered by a Caterpillar 3412 engine. The engine develops 650 HP at 2100 RPM.

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

Three hydraulic hoses, 150 feet long, connect the power pack to the hydraulic motors in the vibrator. Two other hydraulic lines run from the power pack to the hydraulic clamp.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

**OPERATING
INSTRUCTIONS**

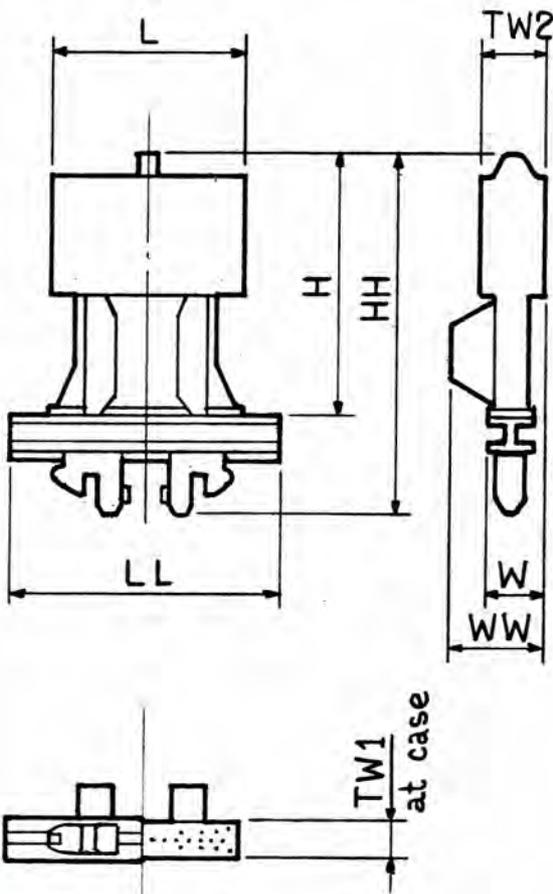
I. GENERAL DESCRIPTION

E. REMOTE-CONTROL PENDANT

The vibrator is operated by a hand-held, remote control pendant. The pendant has two push buttons, a two-way switch and an indicator light. The buttons start and stop vibration. The switch closes and opens the hydraulic clamp. The light indicates that adequate clamping pressure exists for vibration to begin.

F. SPECIFICATIONS

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



2. VIBRATOR

- Type.....Hydraulic
- Eccentric Moment.....10,000 in/lbs.
- Frequency.....400-1200 VPM
- Amplitude.....1 - 1-1/2 inch
- Horsepower.....550
- Pile Clamping Force...250 Tons
- Max. Line Pull for
 - Extraction....80 Tons
- Suspended Weight.....21,900 lbs.*
- Suspended Weight
 - (Operational).....36,300 lbs.**
- Length (L) Vibrator...96 inches
- (LL) Caisson Beam...150 inches
- Width (W).....25 inches
- (WW).....41 inches
- Throat Width (TW1)...16 inches
- (TW2)...32 inches
- Height (HH) w/Clamp ..168 inches
- Height (H) without
 - Clamp....118-1/2 inches

3. POWER PACK

- Type.....Hydraulic
- Engine.....Caterpillar
- Weight
 - with oil - no fuel
 - incl. 1/2 of hoses...21,700 lbs.
- Length.....180 inches
- Width.....60 inches
- Height.....82 inches

2115 pm

Weights include 80 ton max. extraction set-up.

*Vibrator with 1/2 of hoses.

**Operational weight includes caisson beam with clamps and 1/2 of all hoses.

For specifications regarding liquid capacities, see SECTION IV-CAPACITIES.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

II. PREPARATION FOR OPERATION

A. GENERAL

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

B. SAFETY PRECAUTIONS

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

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

1. 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. Be extremely careful when using a carbon tetrachloride fire extinguisher in a closed area as it produces toxic vapor. Provide adequate ventilation before entering a closed area where carbon tetrachloride has been used.
5. Never adjust or repair the unit while it is in operation.
6. Never operate the diesel engine with the governor linkage disconnected. Human reactions are not fast enough to control the fuel rack.
7. Remove all tools and electrical cords before starting or operating unit.



MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

OPERATING INSTRUCTIONS

II. PREPARATION FOR OPERATION

B. SAFETY PRECAUTIONS (CONTINUED)

8. Store oily rags in metal containers.
9. Never store flammable liquids near the engine.

REMEMBER, SAFETY IS EVERYONE'S BUSINESS.

C. RIGGING OF VIBRATOR

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

D. CONNECTION OF HYDRAULIC CLAMP

Ordinarily the 1412 is used with the caisson clamps, which are mounted in pairs. The clamps, when used in conjunction with the 10 foot caisson beam must be installed after the caisson beam is connected to the bottom of the vibrator. The caisson beam should be bolted to the underside of the vibrator using (22) 1-1/2 inch socket head bolts and lock-washers. If the beam T-bar is not pre-mounted, it must be mounted to the caisson beam using (25) 1-1/2 inch socket head bolts (Page VIII-32, PARTS LISTS AND DRAWINGS). After bolts are in place, torque all bolts 2500 to 2800 Ft/Lbs. (In the absence of a torque wrench, slide a pipe over the end of the Allen wrench to provide a six foot lever arm. Have two men tighten each bolt. Do not hammer on pipe to tighten).

The caisson clamps may then be mounted by sliding them onto the caisson beam and positioning equidistant from the vibrator centerline to suit the caisson pipe which will be in use. Inserting a one inch eye bolt in the tapped hold provided in the clamp will facilitate mounting the clamps to the beam.

When using the 4 foot caisson beam, it can be mounted directly to the underside of the vibrator using the appropriate quantity of 1-1/2 inch socket head bolts. Securing of the bolts and mounting of the caisson heads is performed similar to the procedure mentioned for the ten foot caisson beam.

For other special hydraulic clamps, contact ICE for proper procedure.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

II. PREPARATION FOR OPERATION

E. CONNECTION OF HYDRAULIC HOSES

1. Connection of hoses at power pack.

- a. The vibrator and hydraulic clamps are connected to the power pack by five hydraulic hose lines (Fig. 1).

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

- b. The hoses connect to the power pack with quick-disconnect couplers. The hose couplers are arranged to insure correct connection at the power pack.
- 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.
- e. Tighten the set screws on the three large couplers.

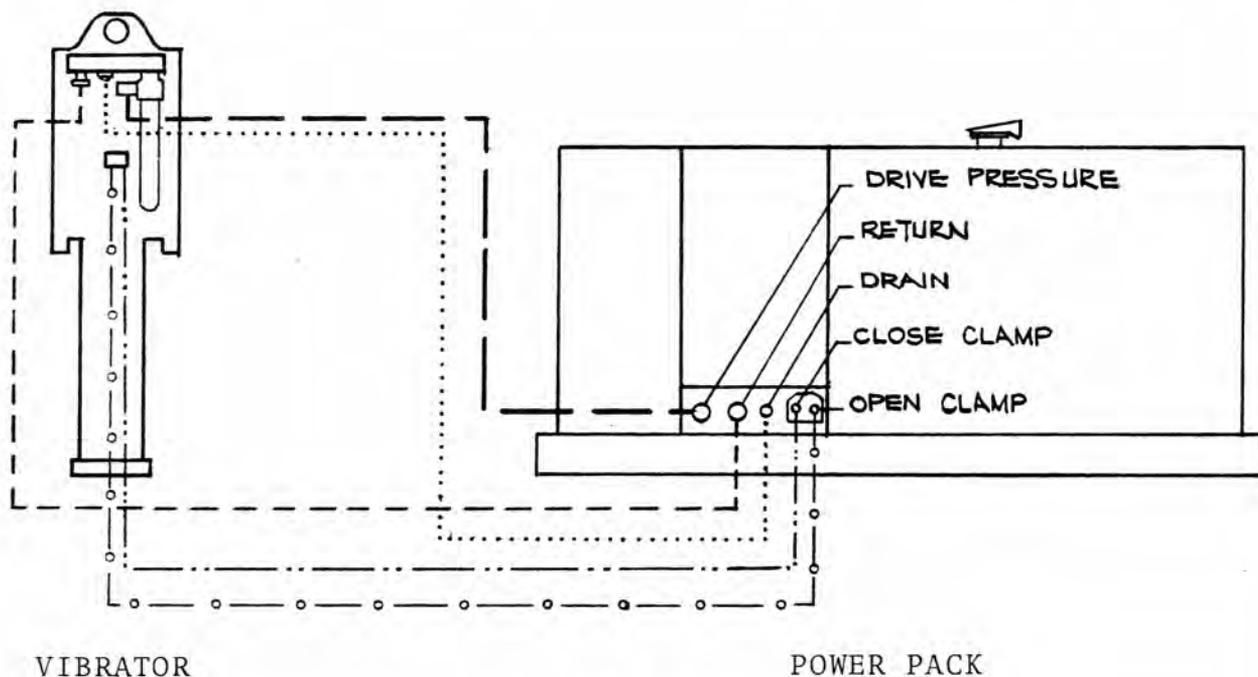


Fig. 1



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

II. PREPARATION FOR OPERATION

E. CONNECTION OF HYDRAULIC HOSES (CONTINUED)

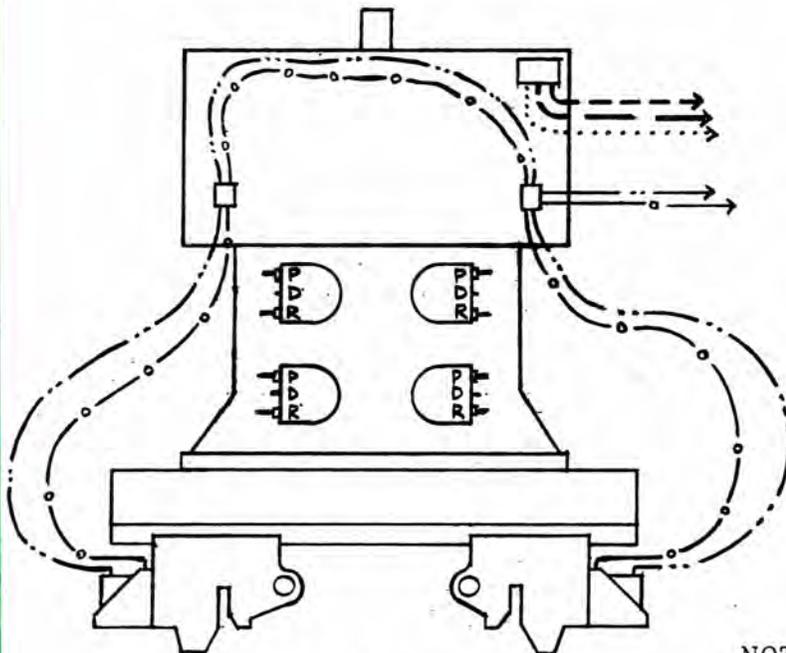
2. Connection of hoses at vibrator.

- 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 page II-3 shows the correct arrangement of the five hose lines connecting the power pack to the vibrator.

CAUTION: Starting the vibrator with the hoses reversed will most likely result in ruptured hoses.

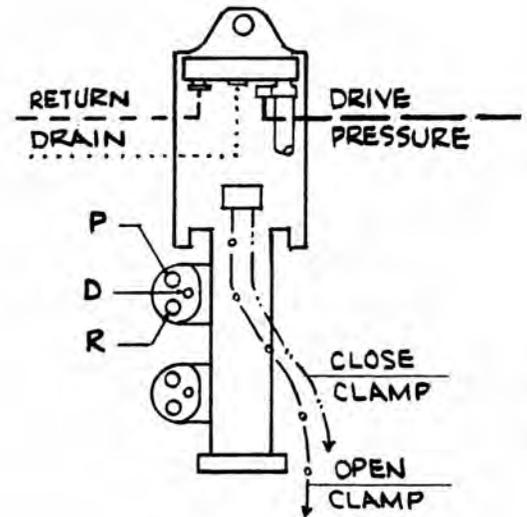
- b. For the clamp hose connections, refer to Fig. 2, this sheet, as well as Fig. 1 on page II-3 for the correct arrangement. The caisson clamps, which are most commonly used with the 1412, should be connected using these illustrations as a guide. Hose blocks are normally stamped "O" for open and "C" for close so that lines may be routed to the proper terminals.

For other special clamps, contact ICE for the correct hose arrangement.



VIBRATOR

Fig. 2



End View

NOTE: Vibrator shown with 10' caisson beam and caisson clamps attached. For 4' caisson beam connection, mounting is similar.



II. PREPARATION FOR OPERATION

F. BLEEDING HYDRAULIC CLAMP HOSE LINES

1. If the vibrator and clamp head are shipped with all hoses attached (five main hoses connected to the vibrator and hose lines between vibrator and clamps), the hoses are usually full of fluid and may be used immediately. However, when unconnected or if any of the hydraulic clamp hoses are connected at the jobsite, or if air is present in hose lines, 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 - STARTING AND WARMING-UP ENGINE.
4. With the engine warmed-up and running at 1500 RPM, loosen the close-clamp line at the hydraulic clamps. Turn the clamp switch on the remote-control pendant to CLOSE. Wait until fluid flows from the connection at the hydraulic clamps. When fluid flows without air, tighten the connection.
5. After the lines have been bled, alternately turn the clamp switch to CLOSE and OPEN to insure that the clamps are working properly. It may be necessary to bleed the lines more than once. When the switch has been turned to OPEN, a 10 second wait is required to allow the clamp to open before the clamp may be closed again. The open-clamp line may also require bleeding.

G. FILLING VIBRATOR PRESSURE HOSE

1. The vibrator is usually shipped with the vibrator hydraulic hoses full of fluid so the unit may be used immediately. However, if the pressure hose has been removed from the vibrator, the hose should be filled with hydraulic fluid.
2. Read SECTION III - OPERATING INSTRUCTIONS.
3. Start and warm-up diesel engine in accordance with SECTION III - STARTING AND WARMING-UP ENGINE.
4. With the engine warmed-up and running at 1800 RPM, the pressure hose will fill with hydraulic fluid in about ten minutes. Wait ten minutes for this to occur. Do not press the START button on the control pendant.



MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

OPERATING INSTRUCTIONS

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. For operator convenience, a brief list of operating and maintenance instructions (Fig. 3) are attached inside the control panel door. These instructions are there as reminders only. They are not complete and not intended to substitute for a thorough understanding of the Operators Manual.

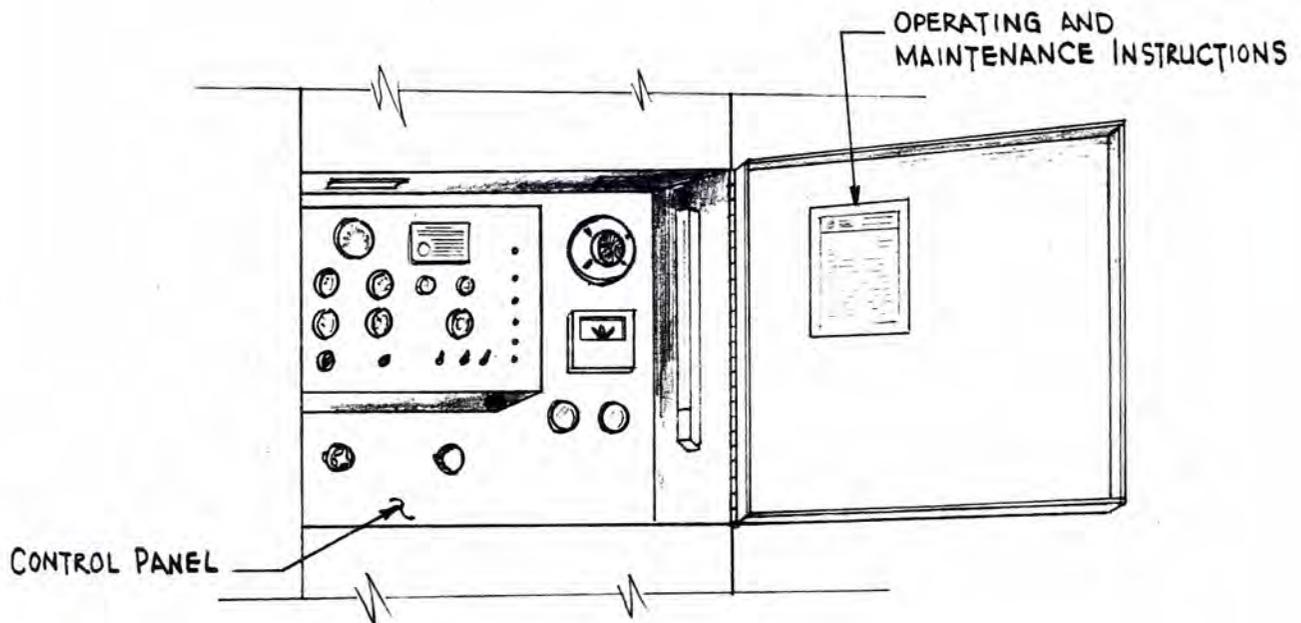


Fig. 3

2. The control panel (Fig. 3) at the side of the power pack contains the operating controls and gages. It also includes a series of six indicator lights which informs the operator which of six safety features has caused the engine to shut down. This directs the attention immediately to a potential problem area which may be resolved before operation can continue.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

III. OPERATING INSTRUCTIONS

B. CONTROL PANEL (CONTINUED)

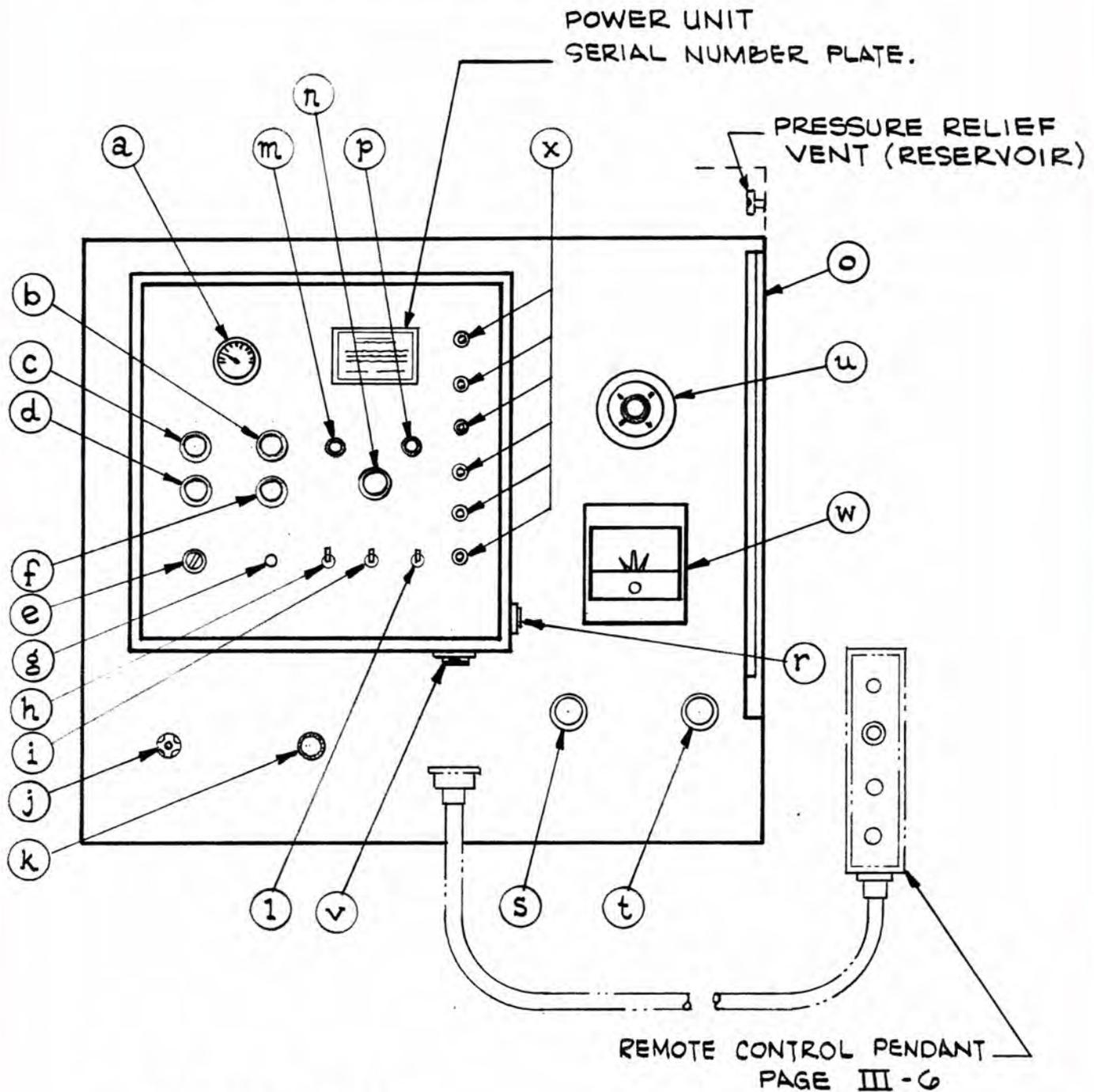


Fig. 4



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

III. OPERATING INSTRUCTIONS

B. CONTROL PANEL (CONTINUED)

The following controls and gages are located in the control panel as shown in Fig. 4, on page III-2.

- a. Tachometer - Indicates diesel engine speed.
 - b. Engine Water Temperature Gage.
 - c. Engine Oil Pressure Gage.
 - d. Engine Ammeter.
 - e. Engine Start Switch.
 - f. Fuel Level Gage.
 - g. Shutdown Reset Button - Over-ride button for engine shutdown switch. It must be held in on start-up until engine oil pressure exceeds 30 PSI.
 - h. 10A Circuit Breaker.
 - i. 30A Circuit Breaker.
 - j. Engine Throttle - Fine control of engine speed.
 - k. Emergency Stop Knob.
 - l. Panel Lights Switch.
 - m. Ready Light - Indicates vibration may begin.
 - n. Engine Hourmeter.
 - o. Fluid Level Gage.
 - p. Warm-up Light - Will go out when proper conditions of reservoir pressure and oil temperature are met.
 - r. Intake/Exhaust Door Panel Switch.
 - s. Gage - Main Pump Inlet Pressure.
 - t. Gage - Reservoir Air Pressure.
 - u. Multigage - Four-Way Pressure Gage.
 1. OPEN - pressure to OPEN CLAMP line
 2. CLOSE - pressure to CLOSE CLAMP line.
 3. DRIVE - pressure in line to vibrator motors.
 4. BRAKE - pressure in line from vibrator motors.
 - v. Receptacle for Remote Pendant Cable.
3. SAFETY FEATURES included in the control panel are as follows:
- w. Hydraulic Fluid Monitor - Black needle indicates temperature of hydraulic fluid. Gage directs fluid through the heat exchanger (cooler) if fluid temperature exceeds 100°F (green needle). Diesel engine is automatically shut down if fluid temperature exceeds 160°F (red needle).



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

III. OPERATING INSTRUCTIONS

B. CONTROL PANEL (CONTINUED)

x. Shutdown Indicator Lights -

1. Engine Oil Pressure Low - Comes on if diesel engine has been shut down automatically due to engine oil pressure being low.
2. Engine Water Temperature High - Comes on if diesel engine has been shut down automatically due to engine water overheating.
3. Engine Overspeed - Comes on if diesel engine has been shut down automatically due to the engine running at excessively high RPM's.
4. Return Filter Clogged - Comes on if diesel engine has been shut down automatically due to the hydraulic fluid return filter being clogged.
5. Hydraulic Fluid Level Low - Comes on if diesel engine has been shut down automatically due to low hydraulic fluid level in the reservoir.
6. Hydraulic Fluid Temperature High - Comes on if diesel engine has been shut down automatically due to high hydraulic fluid temperature.

C. STARTING AND WARMING-UP ENGINE

1. Before starting the engine, read the CATERPILLAR OPERATION GUIDE carefully. Follow the engine starting, operating and maintenance procedures in that manual.
2. The diesel engine should not be started if the temperature of the hydraulic fluid is below 0°F. The temperature may be read on the HYDRAULIC FLUID MONITOR (black needle) on the control panel.

If ambient temperatures below 0°F are anticipated, an immersion heater for the hydraulic fluid is available. Contact ICE for details.

3. Turn INTAKE/EXHAUST switch on side of control box to UP position and hold until exhaust door is fully open (check that intake louvers have also opened).
4. Make sure manual EMERGENCY STOP KNOB is pushed fully in.
5. Check CIRCUIT BREAKER switches - they should be in ON position.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

III. OPERATING INSTRUCTIONS

C. STARTING AND WARMING-UP ENGINE (CONTINUED)

6. Turn the clamp switch on the pendant to CLOSE position. CAUTION: Be sure all personnel are clear of clamp jaws.
7. Hold the SHUTDOWN RESET button while turning ENGINE START switch to START position until engine turns over. Continue holding the SHUTDOWN RESET button until engine oil pressure exceeds 30 PSI. Release button after oil pressure gage shows pressure in excess of 30 PSI.
8. Pull out the ENGINE THROTTLE about half way. (Pressing the button at the end of the throttle allows rapid throttle adjustment. Turning the throttle knob allows fine adjustment). Adjust the throttle until the engine is running at 1500 RPM.
9. Allow power unit to warm-up (the blue WARM-UP light on the panel will be lit). When the unit is warmed-up, the blue WARM-UP light will go out and the green READY light should be lit. The lighting of the green light indicates that the vibrator may then be operated.
10. Turning clamp switch on pendant to OPEN will automatically return engine to idle speed.

D. WARMING HYDRAULIC FLUID

1. The vibrator should not be operated at full speed if the temperature of the hydraulic fluid is below 60°F. Check the HYDRAULIC FLUID MONITOR (black needle) for temperature.
2. If temperature is below 60°F, do not operate the vibrator at engine speeds in excess of 1500 RPM.
3. When fluid temperature exceeds 60°F, full speed operation of the vibrator may begin.
4. The hydraulic fluid temperature is maintained within acceptable limits by the HYDRAULIC FLUID MONITOR. Fluid temperature should never exceed 160°F. The engine will automatically shut down if fluid temperature exceeds 160°F.

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

E. OPERATION OF REMOTE-CONTROL PENDANT

1. The operation of the vibrator is controlled by the remote-control pendant. The pendant is connected to the control cabinet with 50 feet of electrical cable to permit operation from any advantageous position near the vibrator. An optional extension cable in 50 foot increments is also available for more distant operation.



III. OPERATING INSTRUCTIONS

E. OPERATION OF REMOTE-CONTROL PENDANT (CONTINUED)

2. The pendant (Fig. 5) has two control buttons, a two-way switch and an 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 come on when the hydraulic clamp has achieved adequate pressure to permit vibration to begin. The light should normally come on in a few seconds. Hydraulic throttle will bring engine to pre-selected RPM.

b. To start vibration

Press the START button.

CAUTION: Do not press the START button until the CLAMP light in the pendant comes on indicating adequate clamping pressure exists.

c. To stop vibration

Press the STOP button.

The vibrator will stop vibration in a few seconds. If the STOP button does not stop the vibration, pull EMERGENCY STOP knob on the control panel.

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. It is not necessary to hold the switch to OPEN. Hydraulic throttle will return engine to low idle.

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

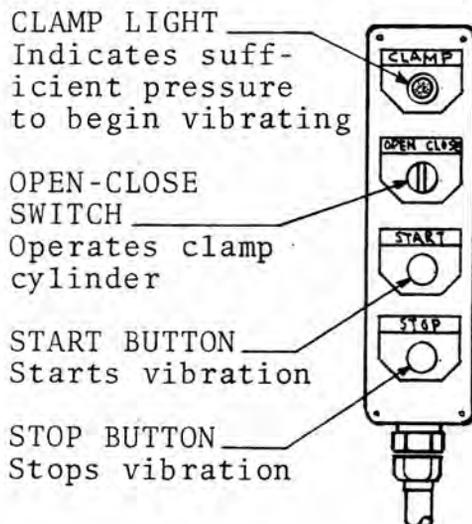


Fig.5



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

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 400 to 1200 vibrations per minute by changing engine speed. Engine speed is changed by the ENGINE THROTTLE on the control panel. Vibrator frequency corresponds approximately to engine speed according to the table shown below.

<u>ENGINE RPM</u>	<u>VIBRATION VPM</u>
2100	1200
1750	1000
1400	800
1050	600
700	400

G. SHUTDOWN

1. Stop the vibrator and open clamp.
2. Reduce engine speed to low idle and run for five minutes. to cool engine.
3. Turn the ENGINE START switch to OFF. (Engine may also be stopped by pulling the EMERGENCY STOP knob).
4. Turn INTAKE/EXHAUST SWITCH on side of control box to DOWN position.

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



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

IV. MAINTENANCE AND ADJUSTMENTS

A. GENERAL

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

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

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

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

B. DAILY

1. Check the entire unit prior to and during start-up each day or at the beginning of each shift.
2. Prior to starting the diesel engine at each shift, check the following items:
 - a. Visibly inspect all bolts, screws and nuts including the bolts securing the caisson beam or adapter to the vibration case to insure they are tight.
 - b. Tighten bolts holding gripping jaw in hydraulic clamp(s).
 - c. Grease plunger in hydraulic clamp with any good multi-purpose grease.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

IV. MAINTENANCE AND ADJUSTMENTS

B. DAILY (CONTINUED)

- d. Check the oil level in the vibration case and fill if required. The oil level should be in the middle of the gage. Change oil if milky or black.
- e. Check the fluid level in the hydraulic reservoir and refill if necessary.

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

- f. Visually check all hoses for signs of damage or cuts that might cause hose failure during operation. Be sure all connections are tight, especially the quick-disconnect couplers.
 - g. Visually inspect all suppressor elastomers.
 - h. Electrical components need no maintenance except periodic wiping with a clean, dry, lint-free cloth to remove dust.
 - i. Perform all daily (10 Service Meter Units) maintenance checks and lubrication indicated in the CATERPILLAR OPERATIONS GUIDE (page 26). For the ICE Model 780 power unit, the hour meter on the control panel may be considered to read Caterpillar's "Service Meter Units".
3. After 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 on the vibrator may be checked at any time. The return filters on the power pack must be checked with the diesel engine running.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

IV. MAINTENANCE AND ADJUSTMENTS

C. 125 HOURS (125 Service Meter Units)

1. Drain and refill the vibration case.
2. Perform all maintenance checks and lubrication indicated in the CATERPILLAR OPERATION GUIDE (page 26).

D. 250, 500 HOURS AND OTHER

See CATERPILLAR OPERATION GUIDE.

E. ANNUALLY

1. Have the hydraulic fluid tested by a local hydraulic service center. Replace if required.
NOTE: The frequency with which hydraulic fluid requires changing depends both on the condition of the fluid and the operating conditions involved. The most accurate method for determining when or how often fluid should be changed is to have a laboratory fluid analysis done periodically.

2. See CATERPILLAR OPERATION GUIDE.

F. SEVERE CONDITIONS

1. The servicing 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 or below -10°F, reduce service time intervals by 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-third of those specified above.
4. When operating in excess of twelve hours per day, reduce service time intervals by one-half of those specified above.
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 might be required.
6. During stand-by or inactive periods, the service time intervals may be twice those specified above. The unit should be operated weekly. Also, refer to the CATERPILLAR OPERATION GUIDE (page 58).



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

IV. MAINTENANCE AND ADJUSTMENTS

G. LUBRICATION

1. Diesel Engine

- a. Follow the engine manufacturer's operating and maintenance instructions. Refer to CATERPILLAR OPERATION GUIDE, page 23 . Recommended crankcase oils for normal operation between 10°F and 90°F are as follows:

AMOCO	300
ARCO	Fleet S3 Plus
CITIES SERVICE	C500
EXXON	HDX Plus
GULF	Super Duty
LUBRIPLATE	Super GPO
MOBIL	Delvac Super 15W40
PHILLIPS	Super HD
SHELL	Rimula
SUN	Sunfleet Dieselube or Sunfleet Super C
TEXACO	URSA Super 3
UNION	Guardol

- b. New units are shipped with MOBIL Delvac Super 15W40.

2. Vibrator Case

- a. When adding or changing oil in the vibration case, the preferred oil is MOBIL SHC-634, a synthetic lubricant which provides a longer service life than petroleum lubricants. MOBIL SHC-634 is available from ICE in five gallon cans, SECTION VIII-MISCELLANEOUS ACCESSORIES.
- b. If MOBIL SHC-634 is unavailable, the following may be used:

ARCO	Pennant NL1000 or Pennant NL1500
GULF	EP Lubricant 5100 or EP Lubricant 5120
MOBIL	Gear 630 or Gear 632
PHILLIPS	All Purpose Gear 90
SHELL	Omala 75
UNION	MP Gear Lube 90 or MP Gear Lube 140

- c. New units are shipped with MOBIL SHC-634.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

IV. MAINTENANCE AND ADJUSTMENTS

G. LUBRICATION (CONTINUED)

3. Hydraulic Fluid

- a. When adding or changing hydraulic fluid, use any of the following fluids:

EXXON	Univis P-32
MOBIL	DTE-15
TEXACO	RANDO HD-AZ

- b. New units are shipped with MOBIL DTE-15.

Hydraulic fluid is available from ICE in five gallon cans (SECTION VIII - MISCELLANEOUS ACCESSORIES).

CAUTION: When replacing or adding fluid, be extremely careful to keep foreign material from entering the system. Dirt will drastically shorten the life and operation of hydraulic components.

- c. Mixing different manufacturer's hydraulic fluid is not recommended. However, it can be done if they miscible (have the same base and additives). Check with ICE or oil suppliers.

H. DRAINING AND FILLING HYDRAULIC FLUID RESERVOIR

1. The hydraulic reservoir is drained by removing a plug on the bottom of the reservoir.
2. The hydraulic reservoir is filled by the manual pump mounted on the back (engine side) of the reservoir. All fluid is pumped to the reservoir through the return filter (F2) to insure no dirt enters the hydraulic system.
3. It is recommended that the reservoir be depressurized prior to performing any maintenance to it. This can be accomplished by opening the Pressure Relief Vent which is located in the control panel, above the Fluid Level Gage. See Fig. 4, page III-2 (CONTROL PANEL) for location of vent.

I. CAPACITIES

1. Diesel Engine Oil	72	Quarts
2. Vibrator Case Oil	4	Gallons
3. Hydraulic Fluid (Reservoir)	498	Gallons
4. Diesel Engine Fuel	250	Gallons
5. Engine Cooling System	30.5	Gallons



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

IV. MAINTENANCE AND ADJUSTMENTS

J. CLEANING HYDRAULIC PICK-UP FILTER

1. Drain hydraulic reservoir (See SECTION H).
2. Remove the reservoir cover plate inside power unit.

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

3. The pick-up filter is connected to the input pipe for the hydraulic pump. Remove the entire filter assembly by unscrewing from input pipe.
4. Disassemble and clean entire filter in clean solvent or diesel fuel.
5. Replace filter. Replace reservoir cover plate. Refill reservoir.

K. CHANGING HYDRAULIC RETURN FILTER ELEMENTS

1. The return filters are located in the hydraulic reservoir below the hand pump.
2. To remove elements, remove the four hex-head screws and remove the cover assembly. Screw driver slots are provided at the bottom to aid in removing the cover.
3. Remove the bypass valve and spring assembly. Remove the two filter elements.
4. Clean filter interior and all parts with a lint-free rag.
5. Check o-ring for damage. Lubricate with multi-purpose grease.
6. Install a new filter element (P/N 140403).
7. Replace bypass valve and spring assembly.
8. Replace cover and tighten four hex screws.
9. Repeat for second filter.

CAUTION: Failure to install support springs in new filter element may result in element collapse and serious power unit damage.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

IV. MAINTENANCE AND ADJUSTMENTS

L. CHANGING VIBRATOR HYDRAULIC FILTER ELEMENT

1. The vibrator filter is located at the end of the vibration suppressor mounted to the terminal manifold block.
2. Unscrew the filter can. It should be firmly hand tight.
3. Remove the old filter element and insert the new element
4. Remove the O-ring and check it for cuts and knicks. Replace if damaged. Lubricate with multi-purpose grease.
5. Screw in the filter can with the new element until it is firmly hand tight.

M. SETTING HYDRAULIC FLUID MONITOR

1. The Hydraulic Fluid Monitor in the control panel has three needles. The black needle indicates the actual temperature of the hydraulic fluid in the reservoir. The green and red needles are set at the factory and should not be moved. The green needle should always be set at 100°. The red needle should be set at 160°F.
2. The green needle controls electrical contacts which cause the following to occur:
 - a. Hydraulic fluid bypasses the heat exchanger until the temperature of the fluid exceeds the green needle setting. Above the green needle, fluid passes through the heat exchanger to be cooled.
 - b. The return filter-clogged shutdown switch is inoperative if fluid temperature is below the green needle. This prevents invalid shutdown due to cold fluid
3. The red needle controls electrical contacts to shutdown diesel engine if fluid temperature exceeds the setting of the red needle.

N. AIR COMPRESSOR

The compressor, mounted to the hydraulic oil reservoir, is equipped with an intake air filter. To clean this filter, unscrew it from the compressor and wash in solvent or diesel fuel. Dry filter by blowing compressed air through element from reverse direction.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

IV. MAINTENANCE AND ADJUSTMENTS

O. BOLT TORQUE INFORMATION

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

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

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

VIBRATOR ASSEMBLY

Page VIII-5 & 7

Item 64	5/16"-18	27 Ft/Lbs
Item 63	3/8"-16	41 Ft/Lbs
Item 24, 31, 33, 51 52, 53, 54, 55	1/2"-13	119 Ft/Lbs
Item 16, 18, 20, 58 72	5/8"-11	233 Ft/Lbs
Item 4	3/4"-10	417 Ft/Lbs
Item 10	1"- 8	1008 Ft/Lbs

VIBRATION CASE

Page VIII-9 & 11

Item 34	1/2"-13	119 Ft/Lbs
Item 7, 52, 57	3/4"-10	417 Ft/Lbs

CAISSON BEAM - 10 FOOT

Page VIII-33

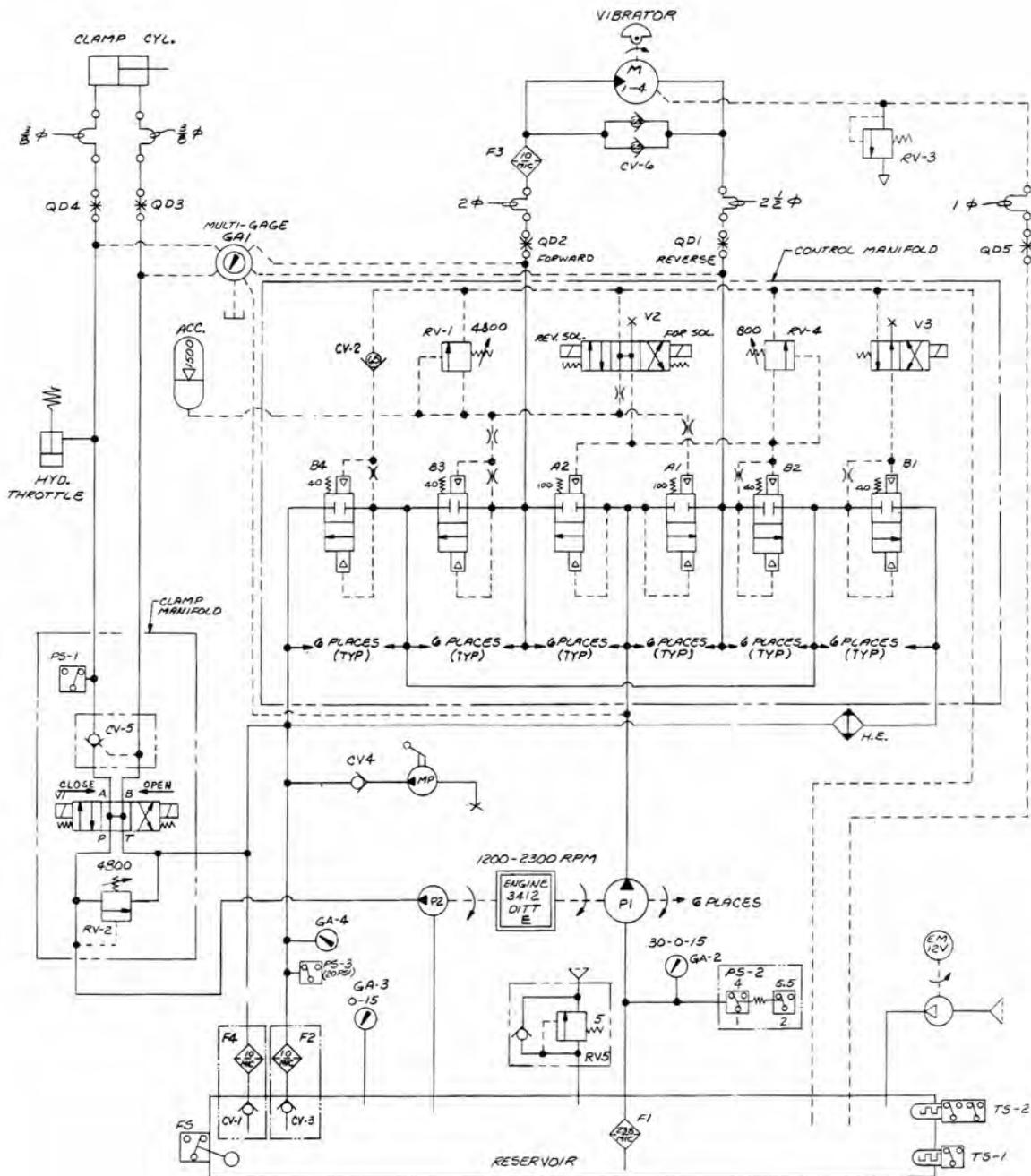
Item 5	1-1/2"-6	2800 Ft/Lbs
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**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

**OPERATING
INSTRUCTIONS**

**V. HYDRAULIC CIRCUITRY
HYDRAULIC SCHEMATIC**





MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

OPERATING INSTRUCTIONS

V. HYDRAULIC CIRCUITRY

HYDRAULIC COMPONENTS LIST

Drawing Notation	Description	P/N	Parts List Ref. Page	Item Number
A1 - A2	Piloted Cartridge - A	140251	VIII-27	7
ACC	Accumulator	810295	-23	303
B1 - 4	Piloted Cartridge - B	140249	-27	8
CV-2	Check Valve	140135	-27	6
CV-4	Manual Pump Check Valve	100451	-18	76
CV-5	Clamp Check Valve	110149	-29	3
CV-6	Check Valve - Vibrator	110731	- 5	23
CYL	Clamp Cylinder	810187	-31	2
E	Diesel Engine	140067	-17	1
EM	Air Compressor	140425	-19	112
F1	Pick-Up Filter	140191	-18	54
F2, F4	Return Filters	140179	-18	87
CV3, CV1	Return Filter Check Valve			
F3	Vibrator Pressure Filter	140107	- 5	35
FS	Fluid Level Switch	100314	-19	109
GA-1	Pressure Multi-Gage	100925	-17	38
GA-2	Gage - Inlet Pressure	140275	-17	35
GA-3	Gage - Reservoir Pressure	140317	-17	34
GA-4	Indicator Gage	100775	-17	28
HE	Heat Exchanger	140237	-17	4
M1-4	Motors - Drive	140023	- 9	2
MP	Manual Pump	100447	-18	73
P1	Vibrator Drive Pump	140057	-21	195
P2	Clamp Pump	110401	-21	186
PS-1	Clamp Pressure Switch	810033	-29	13
PS-2	Pressure Switch	140503	-25	43
PS-3	Filter Pressure Switch	140413	-23	324
QD1	Vibrator Return Disconnect	140037	-18	62
QD2	Vibrator Pressure Disconnect	140035	-18	60
QD3	Clamp Open Disconnect	100777	-19	140
QD4	Clamp Close Disconnect	100245	-19	136
QD5	Case Drain Disconnect	120025	-18	67
RV-1	Start Relief Valve-Vibrator	140131	-27	9
RV-2	Clamp Relief Valve	110145	-29	1
RV-3	Case Drain Relief Valve	100032	- 5	28
RV-4	Brake Relief Valve	140133	-27	10
RV-5	Breather/Relief	140105	-19	100
TS-1	Temperature Switch	810031	-19	94
TS-2	Hydraulic Fluid Monitor	100316	-17	36
V1	Clamp Control Valve	110147	-29	2
V2	Control Valve (FOR/REV)	110147	-27	21
V3	Cooler Solenoid Valve	140259	-27	23



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

V. HYDRAULIC CIRCUITRY

A. HYDRAULIC CLAMP

With the diesel engine running, hydraulic fluid is taken from the reservoir by the CLAMP PUMP (P2) and delivered to clamp control valve (V1). The clamp pump flow returns to the reservoir if the clamp switch has not been moved.

Turning the clamp switch on the control pendant to CLOSE activates the CLAMP CONTROL VALVE (V1). Hydraulic fluid is directed to the CLOSE CLAMP side of the hydraulic CYLINDER (CYL) in the hydraulic clamp. The clamp closes. Clamping pressure is indicated by the PRESSURE MULTI-GAGE (GA1) in the CLOSE position. When clamp pressure reaches approximately 4500 PSI, the CLAMP PRESSURE SWITCH (PS-1) de-activates the CLAMP CONTROL VALVE which then 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, the CLAMP PRESSURE SWITCH activates the CLAMP CONTROL VALVE to restore pressure.

Turning the clamp switch on the control pendant to OPEN activates the CLAMP CONTROL VALVE (V1). Hydraulic fluid is directed to the OPEN CLAMP side of the hydraulic cylinder. The pressure in the OPEN-CLAMP line opens the CLAMP CHECK VALVE (CV5). The clamp opens. After a time delay to permit the clamp to open, the CLAMP CONTROL VALVE is de-activated. Pressure in the OPEN CLAMP line is indicated by the PRESSURE MULTI-GAGE (GA1) in the OPEN position.

Pressure in the clamping circuit is limited to 4800 PSI by the CLAMP RELIEF VALVE (RV2). The quick-disconnect couplers (QD3 and QD4) permit decoupling of the clamp hoses at the power pack.

B. VIBRATOR DRIVE

With the diesel engine running, hydraulic fluid is taken from the reservoir by the DRIVE PUMP (P1). Prior to entering the drive pump, the fluid is filtered by the PICK-UP FILTER (F1). Pressure opens all the cartridges (A1, A2, B1 - B4) and vents the hydraulic fluid back to the reservoir through the RETURN FILTERS (F2, F4).

Pressing the START button on the control pendant activates the FORWARD SOLENOID on the CONTROL VALVE (V2). By blocking the pilot flow from cartridges (A1 and B3), the CONTROL VALVE (V2) causes these cartridges to close, thus directing pump flow to the VIBRATOR MOTORS (M1 - 4).



MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

OPERATING INSTRUCTIONS

V. HYDRAULIC CIRCUITRY

B. VIBRATOR DRIVE (CONTINUED)

The drive flow ACCUMULATOR (ACC) limits initial pressure to the motors providing a regulated increase in motor speed. Full motor speed is reached within a few seconds. Motor drive pressure is indicated by the PRESSURE MULTI-GAGE (GA1) in the DRIVE position. Maximum drive pressure is limited to approximately 4800 PSI by the START RELIEF VALVE (RV1). The START RELIEF VALVE (RV1), when opened by pressure, permits a small pilot flow from cartridges (A1 and B3). This pilot flow causes cartridges (A1 and B3) to partially open and allows some or all of the pump flow to return to the reservoir. Flow to the motors is filtered by the vibrator FILTER (F3). Case drain fluid from the motors returns to the reservoir. Case drain pressure is limited to 50 PSI by the case drain RELIEF VALVE (RV3).

Pressing the stop button on the control pendant activates the REVERSE SOLENOID on the CONTROL VALVE (V2) which releases cartridges (A1 and B3) and then closes cartridges A2 and B2 by blocking their pilot flow. Cartridges A2 and B2 direct pump flow toward the reverse side of the hydraulic motors (M1 - 4) causing the motors to stop within a few seconds. Reverse pressure is limited to 500 PSI by the BRAKE RELIEF VALVE (RV4) by limiting the pressure of pilot flow from cartridges A2 and B2. Brake pressure is indicated by the PRESSURE MULTI-GAGE (GA1) in the BRAKE position.

Hydraulic fluid returns to the reservoir by one of two paths. When the fluid temperature is below 100°F the COOLER SOLENOID VALVE (V3) closes cartridges (B1) by blocking its pilot flow. Return fluid is then forced through cartridges B4, which opens at 65 PSI; and goes directly to the reservoir through filters F2 and F4. The opening pressure of cartridge B4 is controlled by CHECK VALVE (CV2). When fluid temperature exceeds 100°F, the COOLER SOLENOID VALVE (V3) opens cartridge B1, permitting fluid to return to the reservoir through the HEAT EXCHANGER (HE) and FILTERS (F2 and F4) without pressure loss. If the HEAT EXCHANGER (HE) would become clogged, excessive pressure would be prevented by cartridge B4, bypassing excess flow and limiting pressure to 65 PSI.

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

C. OTHER

Returning fluid is filtered by the RETURN FILTERS (F2, F4). The return FILTER CHECK VALVES (CV1, CV3) prevent fluid loss from the reservoir when the filter elements are removed.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

V. HYDRAULIC CIRCUITRY

C. OTHER (CONTINUED)

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

A TEMPERATURE SWITCH (TS-1) located in the reservoir operates the blue WARM-UP light in the control panel, which indicates cold hydraulic fluid and prevents vibrator operation.

The HEAT EXCHANGER (HE) cools the hydraulic fluid returning from the vibrator.

A Filter SWITCH (PS-3) located on the return filter indicates that the filter element is clogged and should be replaced. Indicator light (L4) in the control panel is turned on, should this occur.

A FLUID LEVEL SWITCH (FS) located in the reservoir indicates that hydraulic fluid level is low by turning on indicator light (L5) in the control panel.

AIR COMPRESSOR (EM) is powered by an electric motor and applies air pressure to the hydraulic reservoir to insure proper suction conditions for the DRIVE PUMP (P1).

A PRESSURE SWITCH (PS-2) maintains proper air pressure in the hydraulic fluid reservoir by activating the AIR COMPRESSOR (EM). The BREATHER/RELIEF (RV-5) limits maximum pressure in the reservoir and prevents vacuums.

The HYDRAULIC FLUID MONITOR (TS-2) indicates hydraulic oil temperature and redirects oil through the heat exchanger when required. It will also shut down the unit when the temperature reaches a critical temperature.

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



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

VI. ELECTRICAL CIRCUITRY

A. STARTING DIESEL ENGINE

The engine BATTERIES (EB1, EB2) provide 24 volt current to start the diesel engine and power all control functions. Check CIRCUIT BREAKER switches (CB1, CB2) in control box to make sure they are ON. Turning the ENGINE START switch to START position energizes the starter 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 TIME DELAY RELAY (TDR2). When de-energized, TDR2 applies power to the fuel injector RACK SOLENOID which stops the diesel engine by shutting off its fuel supply. TDR2 energizes the RACK SOLENOID for a time period (10 sec.) sufficient for the engine to fully stop and then de-energizes it to prevent further battery drain. All safety shutdown features trip out the SHUTDOWN RESET BUTTON which, similarly, de-energizes TDR2 and stops the diesel engine as described above.

C. CLOSING HYDRAULIC CLAMP

With the diesel engine running, turning the CLAMP SWITCH (OPEN/CLOSE) in the pendant to CLOSE energizes the CLOSE-CLAMP SOLENOID (CLOSE-SOLENOID). This operates the clamp hydraulic control valve and closes the clamp. When the pressure in the close-clamp hydraulic circuit reaches 4500 PSI, the PRESSURE SWITCH (PS-1) moves to de-energize the CLOSE-CLAMP SOLENOID and turn on the CLAMP light (C) in the control pendant. If close-clamp pressure falls below 4500 PSI, the pressure switch moves to re-energize the CLOSE-CLAMP SOLENOID to rebuild pressure. The CLAMP light on the pendant goes out. When pressure returns to 4500 PSI, the pressure switch moves to de-energize the CLOSE-CLAMP SOLENOID and turn on the CLAMP light.

D. OPENING HYDRAULIC CLAMP

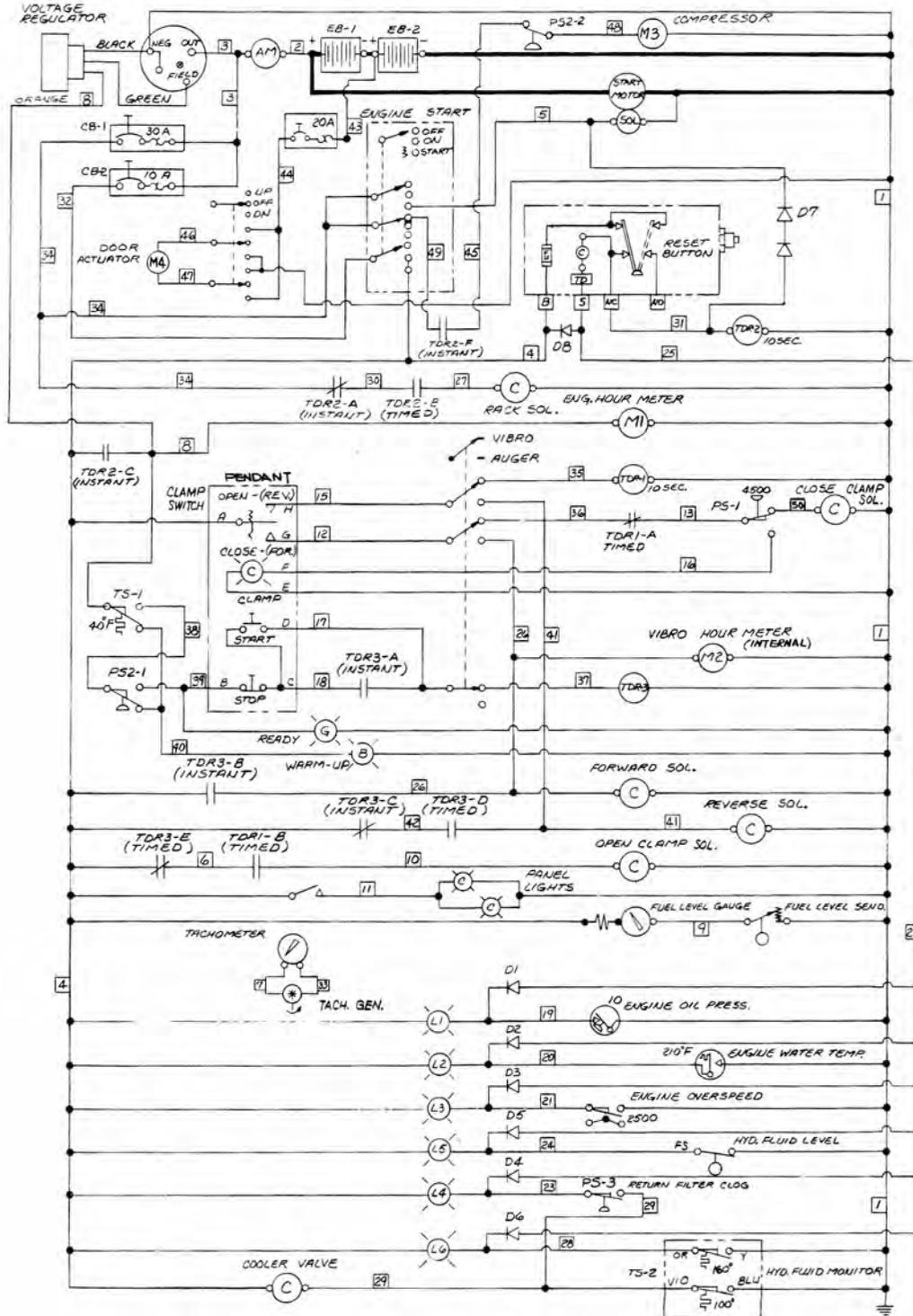
With the diesel engine running, turning the CLAMP SWITCH (OPEN-CLOSE) in the pendant to OPEN energizes the OPEN-CLAMP TIME DELAY RELAY (TDR1) closing its contacts (TDR1-B) thereby energizing the OPEN SOLENOID of the clamp valve. The open-clamp time delay relay holds the valve energized for about ten seconds to allow the clamp to open fully. During this time, a second set of contacts (TDR1-A) remain open to prevent the CLOSE-CLAMP SOLENOID from being energized. After ten seconds, the relay contacts (TDR1-B) open and de-energize the OPEN SOLENOID which centers the clamp valve. The other contacts (TDR1-A) close to allow the CLOSE-CLAMP SOLENOID to be energized.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

**OPERATING
INSTRUCTIONS**

**VI. ELECTRICAL CIRCUITRY
ELECTRICAL SCHEMATIC**





MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

OPERATING INSTRUCTIONS

VI. ELECTRICAL CIRCUITRY

ELECTRICAL COMPONENTS LIST

Drawing Notation	Description	P/N	Ref. Page
AM	Engine Ammeter	110371	VIII-25
CB-1	Circuit Breaker 10A	400141	-25
CB-2	Circuit Breaker 30A	140239	-25
CLAMP (C)	Clear - Clamp Light	100359	-35
	CLAMP CONTROL VALVE (V1)	110147	-29
	Close Clamp Solenoid		
CLOSE CLAMP SOL.	Open Clamp Solenoid		
OPEN CLAMP SOL.	Open-Close Clamp Switch	130155	-35
CLAMP SWITCH	Air Compressor	140425	-19
COMPRESSOR (M3)	CONTROL VALVE (V2)	110147	-27
	Forward Solenoid		
FORWARD SOL.	Reverse Solenoid		
REVERSE SOL.	Diodes	100413	-25
D1 - D6	Up-Off-Down Switch	140353	-25
DOOR ACTUATOR (M4)	Engine Batteries	100529	-17
EB-1, EB-2	Engine Hourmeter	100343	-25
ENG. HOURMETER (M1)	Engine Oil Pressure Gage	100329	-25
ENGINE OIL PRESS.	Engine Overspeed Shutdown		
ENGINE OVERSPEED	Switch	110972	-23
	Off-On-Start Engine Switch	110615	-25
ENGINE START	Engine Water Temperature		
ENGINE WATER TEMP.	Gage	110697	-25
	Hydraulic Fluid Level		
HYD. FLUID LEVEL	Switch	100314	-19
	Hydraulic Fluid Monitor	100316	-17
HYD. FLUID MONITOR (TS-2)	Shutdown Indicator Lights	100355	-25
L1 - L6	Clamp Pressure Switch	810033	-29
PS-1	PRESSURE SWITCH	140503	-25
PS-2	Pressure Switch (PS2-1)		
	Pressure Switch (PS2-2)		
RACK SOL.	Fuel Pump Rack Solenoid	Cat. Parts Book	
READY (G)	Green - Ready Light	100359	-25
RESET BUTTON	Shutdown Reset Button	110387	-25
	Time Delay Coil (TD)		
RETURN FILTER CLOG (PS-3)	Filter Clog Switch	140413	-23
SOL.	Starter Motor Solenoid	Cat. Parts Book	
START	Vibrator Start Button	100363	-35
STOP	Vibrator Stop Button	100363	-35
TACHOMETER	Engine Tachometer	110974	-25
TACH. GEN.	Tachometer Drive Adapter	110447	-17
TDR-1	Clamp-Time Delay Relay	140319	-25
TDR-2	Fuel-Time Delay Relay	140319	-25
TDR-3	Start Relay Coil	140319	-25
TS-1	Temperature Switch	810031	-19
WARM-UP (B)	Blue - Warm-Up Light	100359	-25



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

VI. ELECTRICAL CIRCUITRY

E. STARTING VIBRATOR

With the diesel engine running, pressing the START button on the control pendant energizes the START RELAY COIL (TDR3). START RELAY CONTACTS (TDR3-A) close and keep the relay coil energized until the STOP button is pressed. A second set of START RELAY CONTACTS (TDR3-B) closes and energizes the FORWARD SOLENOID on the start valve. The FORWARD START VALVE sends hydraulic fluid to the vibrator motors. The motors start. A third set of START RELAY CONTACTS (TDR3-E) open to prevent the OPEN SOLENOID from being energized, which would open the hydraulic clamp head while the vibrator is running.

F. STOPPING VIBRATOR

With the vibrator running, pressing the STOP button on the pendant de-energizes the START RELAY COIL (TDR3). The START RELAY CONTACTS (TDR3-B) open and de-energize the FORWARD SOLENOID. Contacts TDR3-C close and TDR3-D remain closed for a short time enabling the REVERSE SOLENOID to energize, which shifts the START VALVE to the reverse position long enough to bring the vibrator to a rapid stop. The flow of hydraulic fluid to the vibrator motors cease. The START RELAY CONTACTS (TDR3-E) close to allow the OPEN CLAMP SOLENOID to be energized.

G. SAFETY CONTROL SYSTEM

A system of safety controls shuts off the fuel supply, thereby stopping the diesel engine in the event that any one of six malfunctions occur. The heart of the safety system is the SHUTDOWN RESET, which is closed during normal operation (button in), thereby providing current to the FUEL RELAY (TDR2). With the fuel relay energized, a set of contacts (TDR2-A) open to prevent current from energizing the RACK SOLENOID and shutting off the fuel. Energizing the fuel relay also closes a second set of contacts (TDR2-C) which provides power to the vibrator start circuitry.

As mentioned above, the SHUTDOWN RESET is closed during normal operation. If the SHUTDOWN RESET is opened, the FUEL RELAY (TDR2) is de-energized, contacts TDR2-A close, contacts TDR2-B remain closed temporarily resulting in the RACK SOLENOID being energized, thereby shutting off fuel and stopping the engine. The SHUTDOWN RESET opens when its TIME DELAY COIL (TD) is energized.



MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

OPERATING INSTRUCTIONS

VI. ELECTRICAL CIRCUITRY.

G. SAFETY CONTROL SYSTEM (CONTINUED)

The TIME DELAY COIL (TD) may be energized by any of the following devices:

1. Engine Oil Pressure Gage - If pressure is below 10 PSI, the contacts of the gage will be closed providing current to energize the TIME DELAY COIL (TD) and to turn on the indicator light (L1). On start-up, the button on the SHUTDOWN RESET (on the control panel) must be held until pressure exceeds 30 PSI.
2. Engine Water Temperature Gage - If water temperature exceeds 210°F, the contacts of the gage will close energizing the TIME DELAY COIL (TD) and turning on the indicator light (L2).
3. Engine Overspeed Switch - If the engine overspeeds, the overspeed switch will close energizing the TIME DELAY COIL (TD) turning on the indicator light (L3). The overspeed switch at the front of the engine has an automatic reset.
4. Return Filter Switch - If the hydraulic return filter is clogged, the return FILTER SWITCH (PS-3) will close energizing the TIME DELAY COIL (TD) turning on the indicator light (L4).
5. Hydraulic Fluid Level Switch - If the hydraulic fluid is low, the hydraulic fluid level switch will close energizing the TIME DELAY COIL (TD) turning on the indicator light (L5).
6. Hydraulic Fluid Monitor - If the temperature of the hydraulic fluid exceeds 160°F, the hydraulic fluid level monitor will energize the TIME DELAY COIL (TD) and turn on the indicator light (L6).

A diode (D1 - D6) on each malfunction switch limits the flow of direct current to prevent multiple lights coming on. Another diode prevents arcing in the malfunction switches.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

OPERATING INSTRUCTIONS

VI. ELECTRICAL CIRCUITRY

H. OTHER

Pressurized Hydraulic Fluid Reservoir - Pressure is maintained in the reservoir by an AIR COMPRESSOR (M3) which is activated whenever tank pressure falls below 4 PSI. With the diesel running, low pressure causes the PRESSURE SWITCH (PS2-2) to close which in turn activates the AIR COMPRESSOR which replenishes air pressure to the reservoir.

The DOOR ACTUATOR SWITCH (M4) located on the side of the control box operates the exhaust door on the roof of the power pack and the louvers at the front of the unit.

The AMMETER (AM) indicates charging amperes. The TACHOMETER GENERATOR (TACH GEN) powers the TACHOMETER (TACH) to indicate engine speed. The HOURMETER (M1) indicates the engine operating hours.

The fuel level in the fuel tank is measured by the FUEL LEVEL SENDER which powers the FUEL LEVEL GAGE.

The control panel may be lighted by a manual switch which turns on the PANEL LIGHTS.

A green READY light on the control panel will light when the proper conditions of fluid temperature and reservoir pressure exist, as measured by TEMPERATURE SWITCH (TS-1) and PRESSURE SWITCH (PS-2). The READY LIGHT (G) indicates vibration may begin. If one or both of these conditions is not correct, a blue WARM-UP LIGHT (B) on the panel will light and vibration will be prevented.



MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

VII. GENERAL DATA

A. ABBREVIATIONS

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

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

B. SCREWS AND BOLTS

1. Practically all connections on the unit are made with socket head (Allen head) cap screws. These high-strength screws are available at most industrial supply houses.
2. Screws and bolts are designated in the PARTS LIST in an abbreviated form. (Refer to sub-section A, above for specific abbreviations). The information, in parenthesis, immediately following the bolt or screw designation shows the size as follows:

(1/2 - 13 x 1-1/2) 1/2" Diameter
 13 Threads Per Inch
 1-1/2" Length

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 SECTION IV - BOLT TORQUE INFORMATION.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

VII. GENERAL DATA

C. SERIAL NUMBER LOCATIONS

1. The following ICE vibratory units are serial numbered separately:
 - a. vibrator
 - b. power pack
 - c. hydraulic clamps
 - d. caisson beams

2. In addition to the serial number plate itself (on vibrators, power packs 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 pack stamped twice - once on control panel side of unit at right corner of reservoir, once on subbase inside door below hex-key rack.
 - c. Model 122 caisson clamp stamped twice - once on side of body at the jaw opening nearest the fixed jaw side, and once on the underside of the body under the pile guide on the cylinder side.
 - d. Caisson beams stamped twice - once on top center, once in center of both sides of flange.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

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



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

VIII. ORDERING PARTS

B. 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.

HOSE 125 R11 F 9 24 P 0 20 L0395 S

HOSE I.D. IN INCHES
2 PLACE DECIMAL
(125=1-1/4") (050=1/2") etc.

SAE OR MANUFACTURER
RATING (or Special Code)
(PT4=Power Track)
(AQ1=Aeroquip H-Pac)
(TF1=Teflon)
(RO1=SAE Rating 100R1) etc.

FIRST END-TYPE OF FITTING
(F=3000 lb Flange) (P=Male Pipe)
(H=6000 lb Flange) (M=37° Male JIC)
(J=JIC Swivel 37°)

FIRST END-BEND ANGLE
(0=None) (9=90°)
(3=30°) etc.

FIRST END-SIZE IN 1/16ths

SECOND END-TYPE OF FITTING
(See codes for FIRST END)

SECOND END-BEND ANGLE
(See codes for FIRST END)

SECOND END-SIZE IN 1/16ths

SPECIAL CODE
O=None
S=Spring Guard
L=S.S. Braid
D=Offset

LENGTH
IN INCHES
(1 PLACE
DECIMAL)
(0395=39-1/2")
(1242=124-1/4")
etc.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

VIII. ORDERING PARTS

C. PARTS IDENTIFICATION

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

a. Vibrator Assembly	800129
b. Vibration Case	810203
c. Hose Assemblies - Interconnecting	800133
d. Power Pack - Enclosure	810207
e. Power Pack - Internal	800137
f. Control Box	810209
g. Drive Control Manifold	810001
h. Clamp Manifold	810205
i. 122 Caisson Clamp	800153
j. Caisson Beam - 10 Foot	800165
k. Caisson Beam - 4 Foot	800135
l. 50 Foot Pendant Assembly	810093
m. Pendant Extension Cable	800059
n. Pigtail Kit - 1412	850029

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

These parts may be ordered beforehand, individually or as a package.

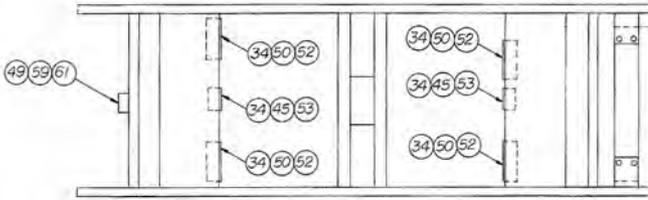


**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

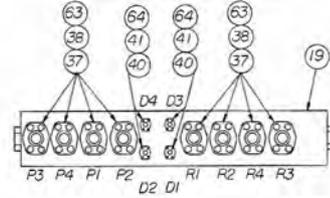
PARTS LIST

VIBRATOR ASSEMBLY

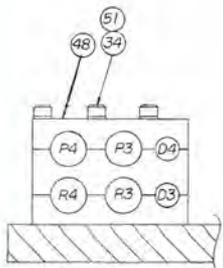
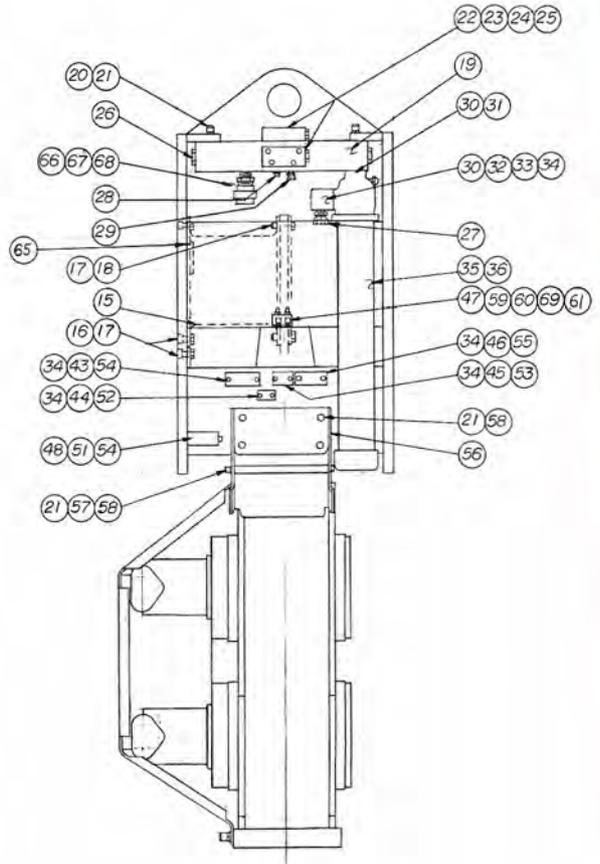
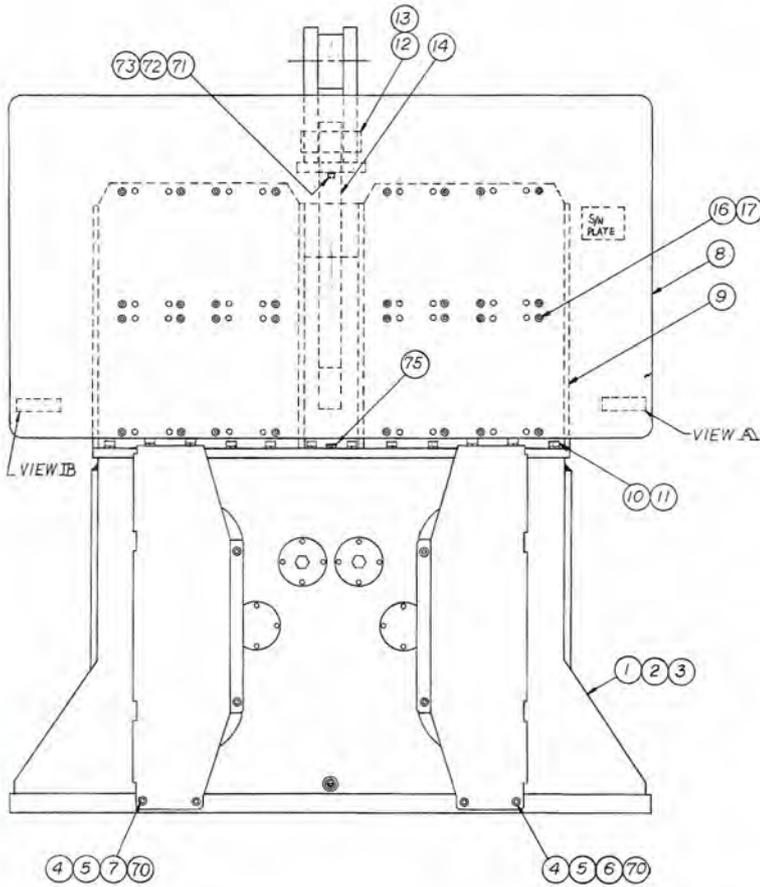
800129



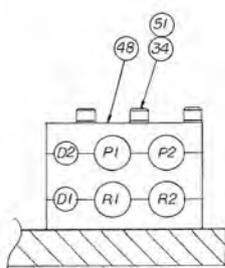
SUPPRESSOR TOP VIEW



TERMINAL BACK VIEW



*TOP VIEW B
(2 PLACES)*



TOP VIEW A



MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

VIBRATOR ASSEMBLY

800129

Item	P/N	Qty.	Description
1	810203	1	Vibration Case
4	400275	4	SHCS 3/4 - 10 x 1-1/2
5	100069	4	Lockwasher 3/4"
6	140089	1	Right Motor Guard
7	140087	1	Left Motor Guard
8	140055	1	Suppressor Housing
9	140051	1	Vibration Case Adapter
10	140145	28	SHCS 1 - 8 x 3-1/2
11	100209	28	Lockwasher 1"
12	140059	2	Stop Pin
13	140103	4	Retaining Ring
14	140065	1	Stop Hook
15	100003	16	Elastomer
16	100085	64	SHCS 5/8 - 11 x 2-1/4
17	100086	96	Hex Nut 5/8 - 11
18	130135	32	SHCS 5/8 - 11 x 3-1/2
19	140053	1	Terminal Manifold
20	140227	4	SHCS 5/8 - 11 x 2
21	100007	10	Lockwasher 5/8"
22	110723	2	Check Body
23	110731	2	Check Valve (CV-6)
24	110735	8	SHCS 1/2 - 13 x 2-1/2
25	100097	4	O-Ring (#214)
26	140149	2	HHPP 1-1/2 NPT
27	140229	1	Straight Adapter
28	100032	1	Relief Valve (RV-3)
29	140231	1	Straight Adapter
30	140233	2	O-Ring (#228)
31	140235	4	SHCS 1/2 - 13 x 4-3/4
32	140085	1	Filter Adapter Block
33	100025	4	SHCS 1/2 - 13 x 4-1/2
34	100121	37	Lockwasher 1/2"
35	140107	1	Pressure Filter (F 3)
36	140109	1	Filter Element
37	100089	16	Split Flange Half (#16)
38	100091	8	O-Ring (#219)
40	100103	8	Split Flange Half (#8)
41	100107	4	O-Ring (#210)



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST



MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

VIBRATOR ASSEMBLY

800129

Item	P/N	Qty.	Description
43	140081	1	Hose Clamp
44	140083	1	Hose Clamp
45	140095	3	Hose Clamp
46	140079	1	Hose Clamp
47	140091	1	Right Terminal Block
48	140075	3	Gang Hose Clamp
49	140093	1	Left Terminal Block
50	140077	4	Gang Hose Clamp
51	100079	9	SHCS 1/2 - 13 x 4
52	100011	16	SHCS 1/2 - 13 x 2
53	100513	4	SHCS 1/2 - 13 x 1-1/2
54	100829	2	SHCS 1/2 - 13 x 3-1/2
55	130235	2	SHCS 1/2 - 13 x 3
56	140449	1	Hose Guide
57	140451	1	Hose Guide Rod
58	100575	6	SHCS 5/8 - 11 x 1-1/4
59	100053	6	Straight Adapter
60	130057	2	Adapter 90°
61	140287	4	O-Ring Plug (#6)
63	140453	32	HHCS 3/8 - 16 x 1
64	140455	16	HHCS 5/16 - 18 x 1
65	140207	1	Label Group
66	140393	1	Close Nipple 2"
67	400233	1	Reducer Bushing
68	140377	1	Female Pipe Union 2-1/2"
69	140375	2	HOSE038R02J006J006L11800
70	100589	4	Flatwasher 3/4"
71	140279	2	Stop Hook Hold Down
72	400157	2	SHCS 5/8 - 11 x 2-3/4
73	130261	2	Lockwasher 5/8" (HC)
75	100063	1	SHPP 1 - 11-1/2 NPT (Note 2)
	100032	1	Relief Valve (Note 1)

Note 1 - Required on all units up to and including S/N 185006.

Note 2 - Required on units S/N 185007 and up.

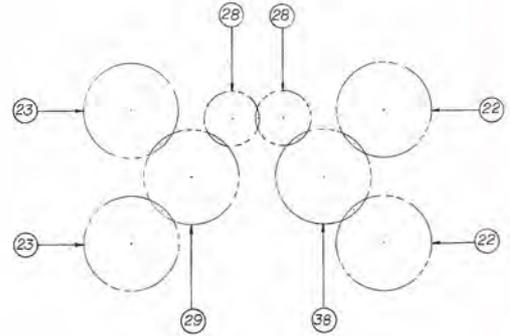


MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

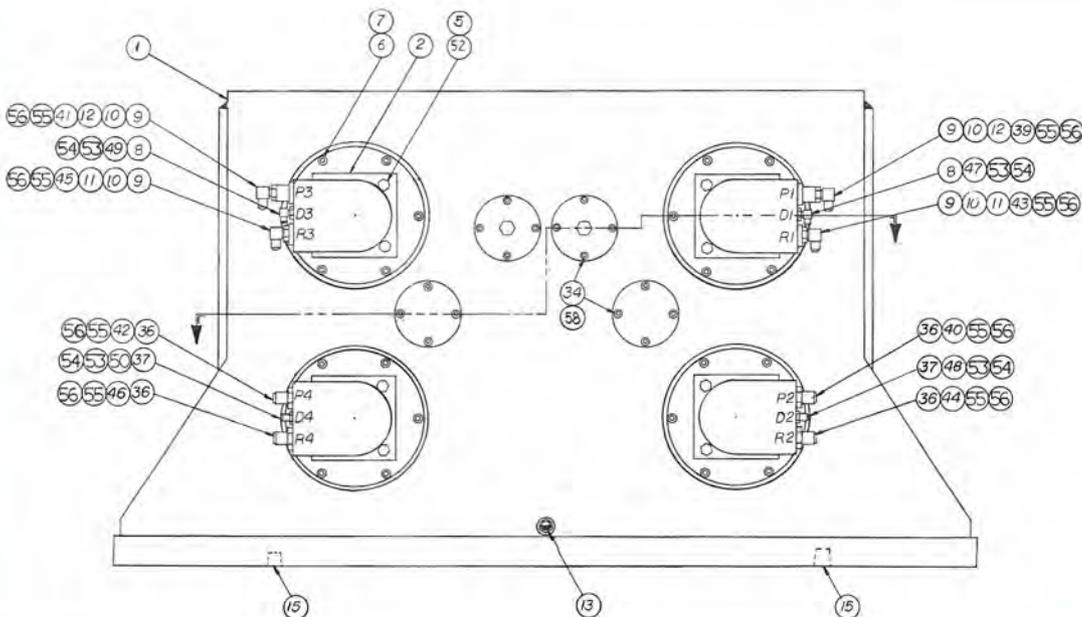
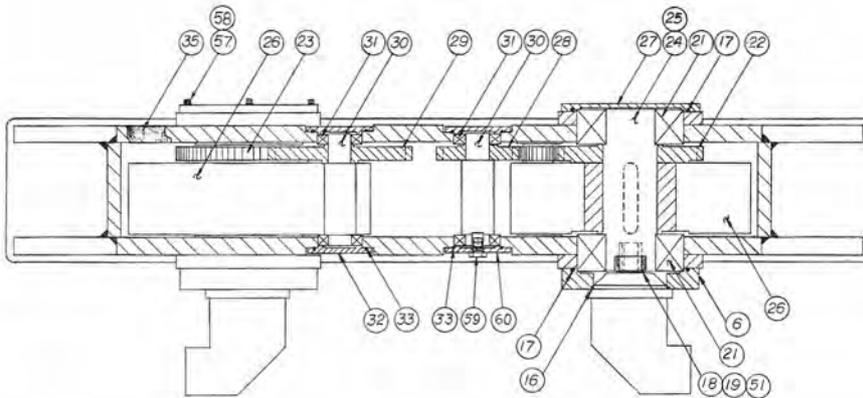
PARTS LIST

VIBRATION CASE

810203



GEAR ARRANGEMENT





MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

VIBRATION CASE

810203

Item	P/N	Qty.	Description
1	810201	1	Vibration Case
2	140023	4	Drive Motor (M1-4)
5	100589	16	Flatwasher - 3/4"
6	140029	4	Motor Mounting Plate
7	140111	24	SHCS 3/4 - 10 x 4 (L.W.)
8	110211	2	Adapter - 90°
9	100783	4	Adapter - 90°
10	140211	4	O-Ring (#3-924)
11	140165	2	Adapter
12	140167	2	Adapter
13	100185	1	Sight Gauge
15	100187	2	Magnetic Pipe Plug - 3/4"
16	140031	4	O-Ring (#170)
17	140033	8	O-Ring (#454)
18	140003	4	Drive Hub
19	140005	24	Drive Pad
21	140007	8	Roller Bearing
22	140015	2	Eccentric Gear
23	140017	2	Eccentric Gear
24	140001	4	Eccentric Shaft
25	140021	4	Key
26	140009	4	Eccentric
27	140027	4	Bearing Cover
28	140019	2	Idler Gear
29	100741	1	Gear
30	140025	4	Idler Shaft
31	110191	8	Roller Bearing
32	110189	6	Bearing Housing Cap (Note 2)
	110189	8	Bearing Housing Cap (Note 1)
33	110197	8	O-Ring (#159)
34	100119	32	SHCS 1/2 - 13 x 1-1/4 (L.W.)
35	140063	1	Transmission Gasket



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST





**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

VIBRATION CASE

810203

Item	P/N	Qty.	Description
36	110323	4	Straight Adapter
37	110325	2	Straight Adapter
38	100759	1	Gear
39	140295	1	HOSE100R10J016F916L12100 (P1)
40	140297	1	HOSE100R10J016F916L11800 (P2)
41	140299	1	HOSE100R10J016F016L20700 (P3)
42	140301	1	HOSE100R10J016F016L20300 (P4)
43	140303	1	HOSE100R01J016F916L11700 (R1)
44	140305	1	HOSE100R01J016F916L11400 (R2)
45	140307	1	HOSE100R01J016F016L20100 (R3)
46	140309	1	HOSE100R01J016F016L19900 (R4)
47	140311	1	HOSE050R01J008F908L12400 (D1)
48	140313	1	HOSE050R01J008F908L11600 (D2)
49	140315	1	HOSE050R01J008F008L20600 (D3)
50	140445	1	HOSE050R01J008F008L20600 (D4)
51	120191	4	Retaining Ring
52	140501	16	FLCS 3/4 - 10 x 2-1/2 (12 pt.)
53	140527	4	Cap (#8)
54	140531	4	Plug (#8)
55	140525	8	Cap (#16)
56	140529	8	Plug (#16)
57	100067	24	SHCS 3/4 - 10 x 2-1/2
58	100069	48	Lockwasher 3/4"
59	810229	2	Centrifugal Breather
60	110855	2	Bearing Housing Cap (Note 2)
	110855	0	Bearing Housing Cap (Note 1)

Note 1: Required on all units up to and including S/N 185006

Note 2: Required on units S/N 185007 and up.

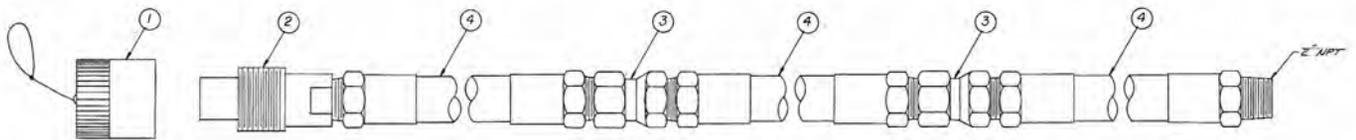


MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

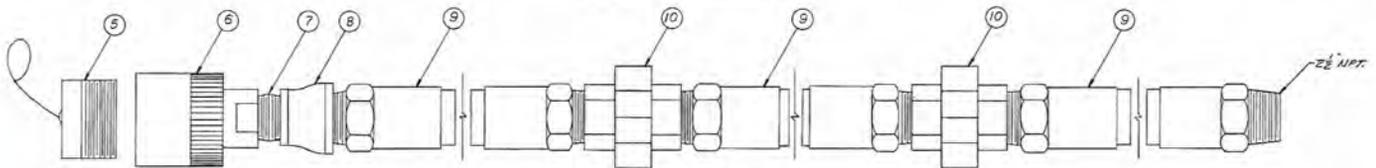
PARTS LIST

HOSE ASSEMBLIES - INTERCONNECTING

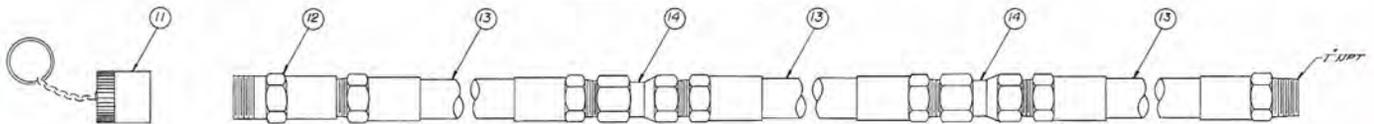
800133



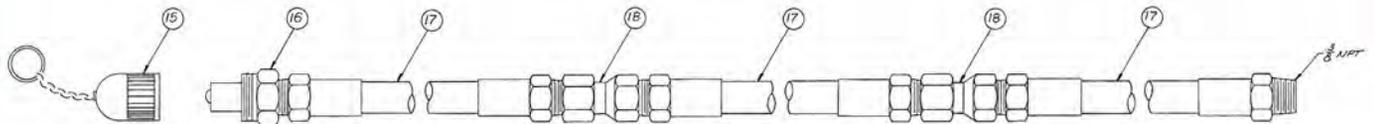
ONE-PRESSURE HOSE ASM.



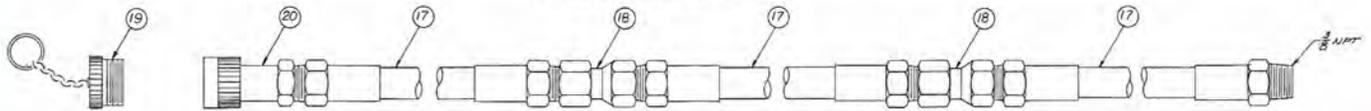
ONE-RETURN HOSE ASM.



ONE-DRAIN HOSE ASM.



ONE-UNCLAMP HOSE ASM.



ONE-CLAMP HOSE ASM.



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

HOSE ASSEMBLIES - INTERCONNECTING

800133

<u>Item</u>	<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
1	140041	1	Dust Cap (2")
2	140037	1	Male Disconnect (2")
3	140391	2	Straight Adapter
4	140069	3	HOSE200PT4032P032L60000
5	140039	1	Dust Plug (2")
6	140035	1	Female Disconnect (2")
7	140393	1	Close Nipple (2")
8	140395	1	Bell Reducer
9	140071	3	HOSE250R02P040P040L60000
10	140277	2	Coupling 2-1/2 NPT
11	120029	1	Dust Cap (1")
12	120023	1	Male Disconnect (1")
13	120057	3	HOSE100R02P016P016L62000
14	140357	2	Straight Adapter
15	100257	1	Dust Cap (3/8")
16	100245	1	Male Disconnect (3/8")
17	100247	6	HOSE038R02P006P006L62000
18	100249	4	Straight Adapter
19	100737	1	Dust Plug (3/8")
20	100777	1	Female Disconnect (3/8")

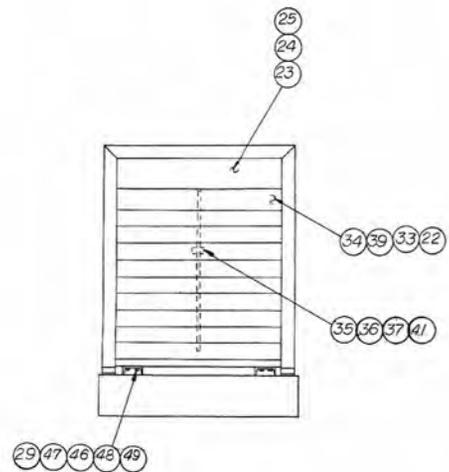
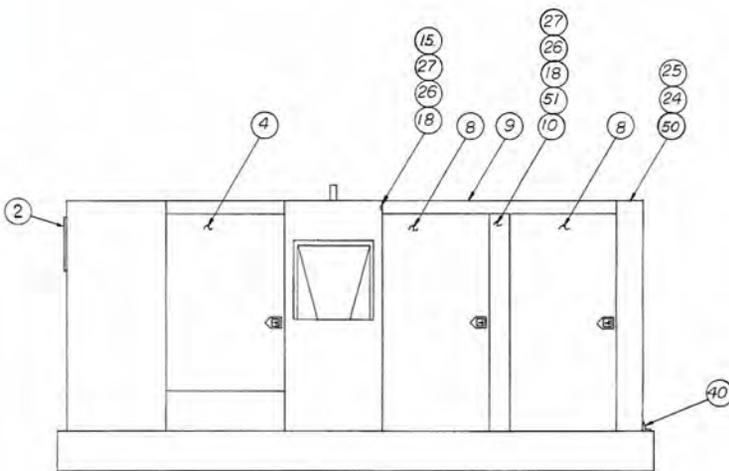
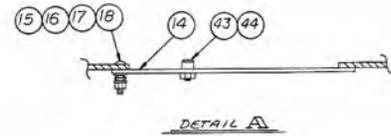
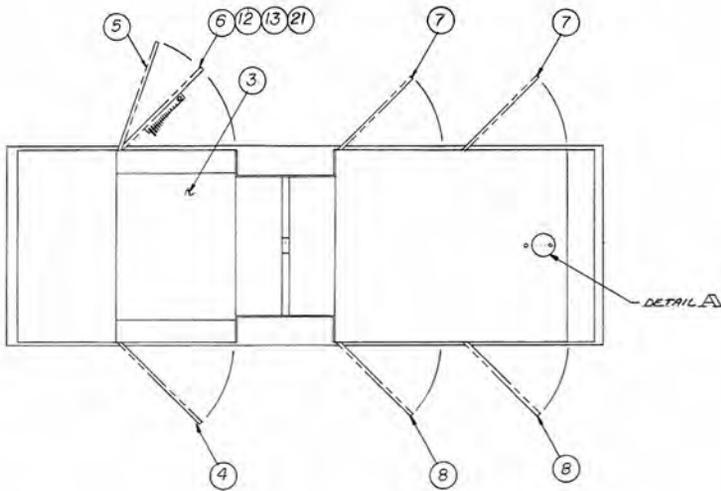


MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

POWER PACK - ENCLOSURE

810207





MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

POWER PACK - ENCLOSURE

810207

Item	P/N	Qty.	Description
2	400277	1	ICE Logo Plate
3	140195	1	Exhaust Door
4	140185	1	Cover Door
5	140189	1	Cover Door
6	140187	1	Cover Door
7	140181	2	Cover Door
8	140183	2	Cover Door
9	140221	1	Unit Cover
10	140223	2	Door Post
12	100600	1	Hex Key Rack
13	810045	1	Hex Key Group
14	100761	1	Water Fill Door
15	100309	4	BHCS 5/16 - 18 x 1
16	100795	2	Spring Washer 5/16"
17	100797	1	Nut 5/16 - 18 (ESNA)
18	100293	10	Flatwasher 5/16"
21	100651	1	24 V Test Light
22	140143	20	SHSS 1/2 - 13 x 3/4
23	140125	1	Front Panel
24	130209	14	Hex Screw 1/4 - 14 x 5/8 (HEX TEK)
25	130227	14	Fender Washer 1/4"
26	100287	8	Lockwasher 5/16"
27	100289	8	Hex Nut 5/16 - 18
29	140197	2	Bracket
33	140439	10	1/2 Roll Pin x 1-1/2" LG
34	140121	10	Louver
35	140123	1	Spacer Bar
36	100595	2	SHCS 1/4 - 20 x 1-1/4
37	100559	2	Lockwasher 1/4"
39	140193	20	Rivnut
40	140437	2	Tie-down Bracket
41	140447	10	Spring
43	100047	1	SHCS 7/16 - 14 x 1
44	100793	1	Nut 7/16 - 14 (ESNA)
46	400069	4	SHCS 3/4 - 10 x 2
47	100589	4	Flatwasher 3/4"
48	100069	4	Lockwasher 3/4"
49	100587	4	Hex Nut 3/4 - 10
50	810219	1	Louver Frame
51	100105	4	SHCS 5/16 - 18 x 1

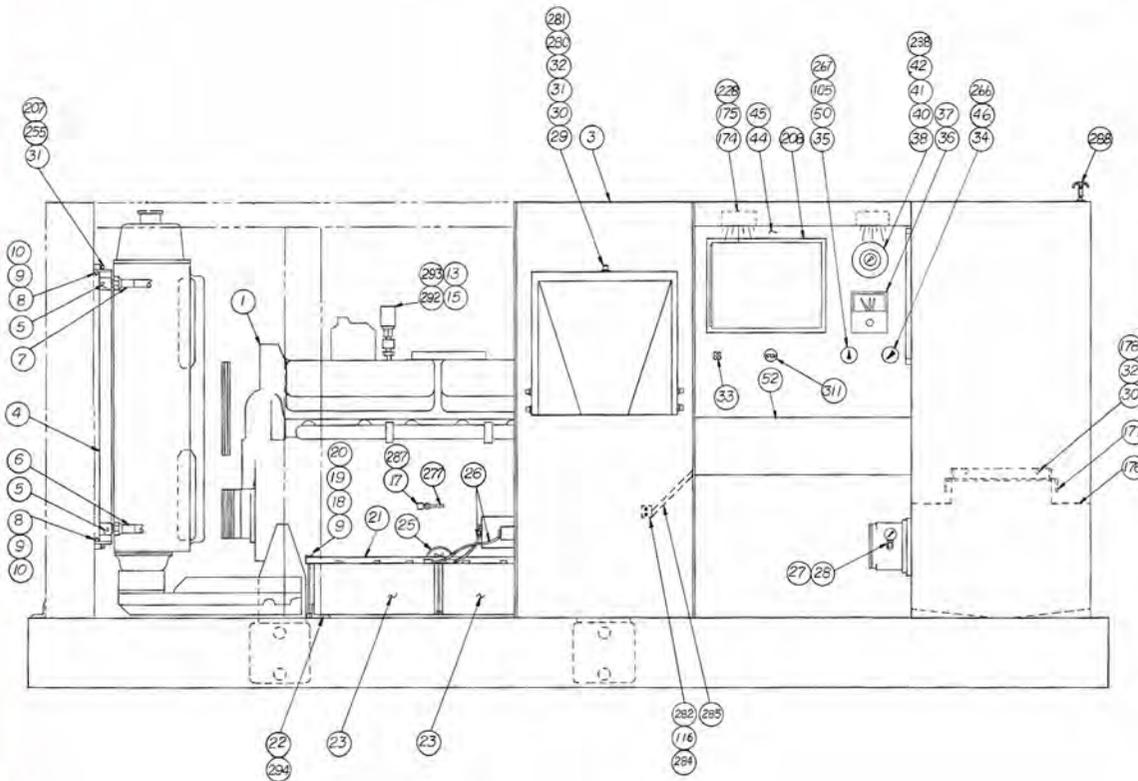
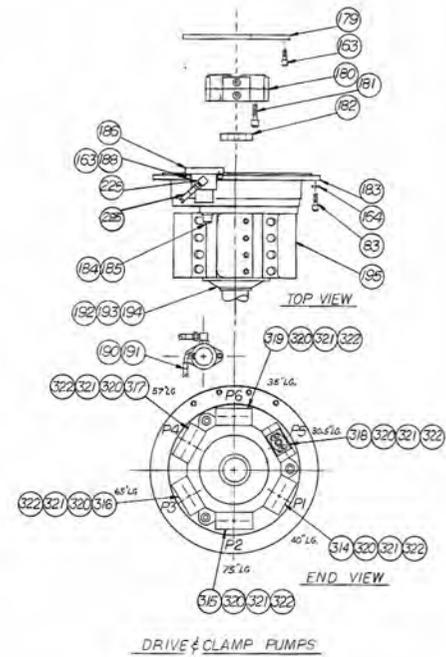
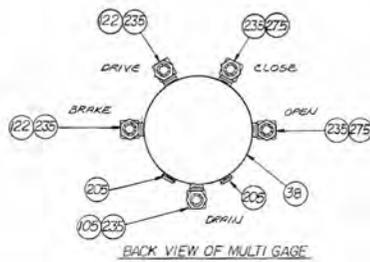


**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

POWER PACK - INTERNAL

800137



(For bulkhead elevation and view of far side see page VIII-20.)



MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

POWER PACK - INTERNAL

800137

Item	P/N	Qty.	Description
1	140067	1	3412 Ditt Engine (E)
3	810065	1	780 Power Unit Frame Assembly
4	140237	1	Heat Exchanger (HE)
5	810009	3	Cooler Elbow
6	140339	2	HOSE200R02J032F932L13200
7	140341	1	HOSE200R02J032F932L15600
8	100105	10	SHCS 5/16 - 18 x 1 (L.W.)
9	100293	15	Flatwasher 5/16"
10	100287	14	Lockwasher 5/16"
13	110447	1	Tachometer Drive Adapter
15	110631	1	Tachometer Adapter Seal
17	110369	2	Bushing
18	100831	3	Wing Nut 5/16"
19	400231	3	Hold Down Stud
20	110767	3	Hold Down Block
21	810169	1	Battery Hold Down
22	110391	1	Battery Box
23	100529	2	Battery (EB-1, EB-2)
25	140359	1	Battery Cable
26	110755	2	Battery Cable - 15"
27	100825	1	Adapter 90°
28	100775	1	Indicator Gage (GA-4)
29	100648	10	SHCS 3/8 - 16 x 7/8
30	400151	18	Flatwasher 3/8"
31	400149	26	Lockwasher 3/8"
32	100535	24	Hex Nut 3/8 - 16
33	110417	1	Engine Throttle
34	140317	1	Gage 0-15 PSI (GA-3)
35	140275	1	Gage 30-0-15 PSI (GA-2)
36	100316	1	Fluid Level Monitor (TS-2)
37	100323	1	Bulb Well
38	100925	1	Pressure Multi-gage (GA-1)
40	100557	6	SHCS 1/4 - 20 x 3/4
41	100559	6	Lockwasher 1/4"
42	100598	4	Hex Nut 1/4 - 20
43	110355	1	Fluid Level Gage
44	140141	1	Control Plate
45	140209	1	Label Group
46	100321	1	Adapter -90°
47	110613	1	HOSE019R01J004J004L03600



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

POWER PACK - INTERNAL

800137

Item	P/N	Qty.	Description
50	110203	3	Straight Adapter
52	140127	1	Tray
54	140191	1	Pick-Up Filter (F1)
55	110347	2	4" Flexible Coupling
56	140383	1	4" Pipe x 17" Lg. (SCH 40)
57	140267	1	Straight Adapter
58	140171	1	Coupler Panel Plate
59	400155	2	BHCS 3/8 - 16 x 3/4
60	140035	1	Female Disconnect (2") (QD 2)
61	140039	1	Dust Plug (2")
62	140037	1	Male Disconnect (2") (QD 1)
63	140041	1	Dust Cap (2")
65	100069	4	Lockwasher 3/4"
66	120095	1	Bulkhead Fitting 1"
67	120025	1	Female Disconnect (1") (QD 5)
68	120027	1	Dust Plug (1")
69	140335	1	HOSE100R01J016J016L05300
70	140289	1	Fuel Filter Bracket
71	140423	1	Cable Bracket
73	100447	1	Manual Pump (MP)
74	110377	2	Street Ell 1"
75	100449	1	Hex Nipple
76	100451	1	Check Valve (CV 4)
77	300119	1	Straight Adapter
78	100582	1	HOSE075R01J012J012L03800
79	100769	1	Adapter 90°
80	130127	1	Tee Adapter
81	140401	1	Bushing
82	400109	1	Solid Flange 2"
83	100011	34	SHCS 1/2 - 13 x 2
84	140233	7	O-ring (#228)
85	140261	6	Split Flange Half (#32)
86	100119	12	SHCS 1/2 - 13 x 1-1/4 (L.W.)
87	140179	2	Return Filter Assembly (F2, F4)
88	140265	1	Flanged Flexmaster - 90°
89	140381	1	2" Pipe x 12" Lg. (SCH 40)
90	110341	1	Fuel Level Sender
91	110343	1	Sender Installation Kit
92	810001	1	780 Control Manifold Assembly
93	810205	1	780 Clamp Manifold Assembly



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

POWER PACK - INTERNAL

800137

Item	P/N	Qty.	Description
94	810031	1	Temperature Switch Assembly (TS-1)
95	120055	2	Adapter 90°
96	140337	1	HOSE075R01J012J012L06900
100	140105	1	Breather - 5# (RV-5)
105	100149	1	HOSE025R02J004J004L01900
107	400153	2	Flatwasher 7/16"
109	100314	1	Fluid Level Shutdown Switch (FS)
110	100485	46	Hex Nut 1/2 - 13
111	100483	36	Flatwasher 1/2"
112	140425	1	Air Compressor (EM) (M3)
114	100005	12	SHCS 5/8 - 11 x 1-3/4 (L.W.)
116	100007	14	Lockwasher 5/8"
117	110379	1	Hose Bracket
119	100443	2	Lockwasher 7/16"
120	100439	2	SHCS 7/16 - 14 x 1-3/4
121	140245	1	Exhaust Bracket
122	110409	2	HOSE019R01J004J004L07500
123	140417	1	Adapter 90°
124	100461	2	U-Bolt
130	130091	1	Handpump Mounting Bracket
131	100417	1	Fuel Fill Cap
132	100419	3	Fuel Cap Vent
133	110819	1	Suction Filter Tube
136	100777	1	Female Disconnect (3/8") (QD 4)
137	100737	1	Dust Plug (3/8")
138	400357	1	Bushing
139	130203	1	Nipple 3/8" NPT x 3"
140	100245	1	Male Disconnect (3/8") (QD 3)
141	100257	1	Dust Cap (3/8")
142	130221	1	Nipple 3/8" x 1/2"
144	140403	2	Filter Element
145	810161	1	Hydraulic Throttle Assembly
146	140291	1	Lifting Pin
148	140157	1	Link
149	100722	2	Roll Pin
150	140321	1	Electric Actuator
151	140283	2	Clevis Plate
154	140285	2	Exhaust Door Bracket
155	140405	1	3/16" Cable x 20 Feet
156	140431	2	Sheave

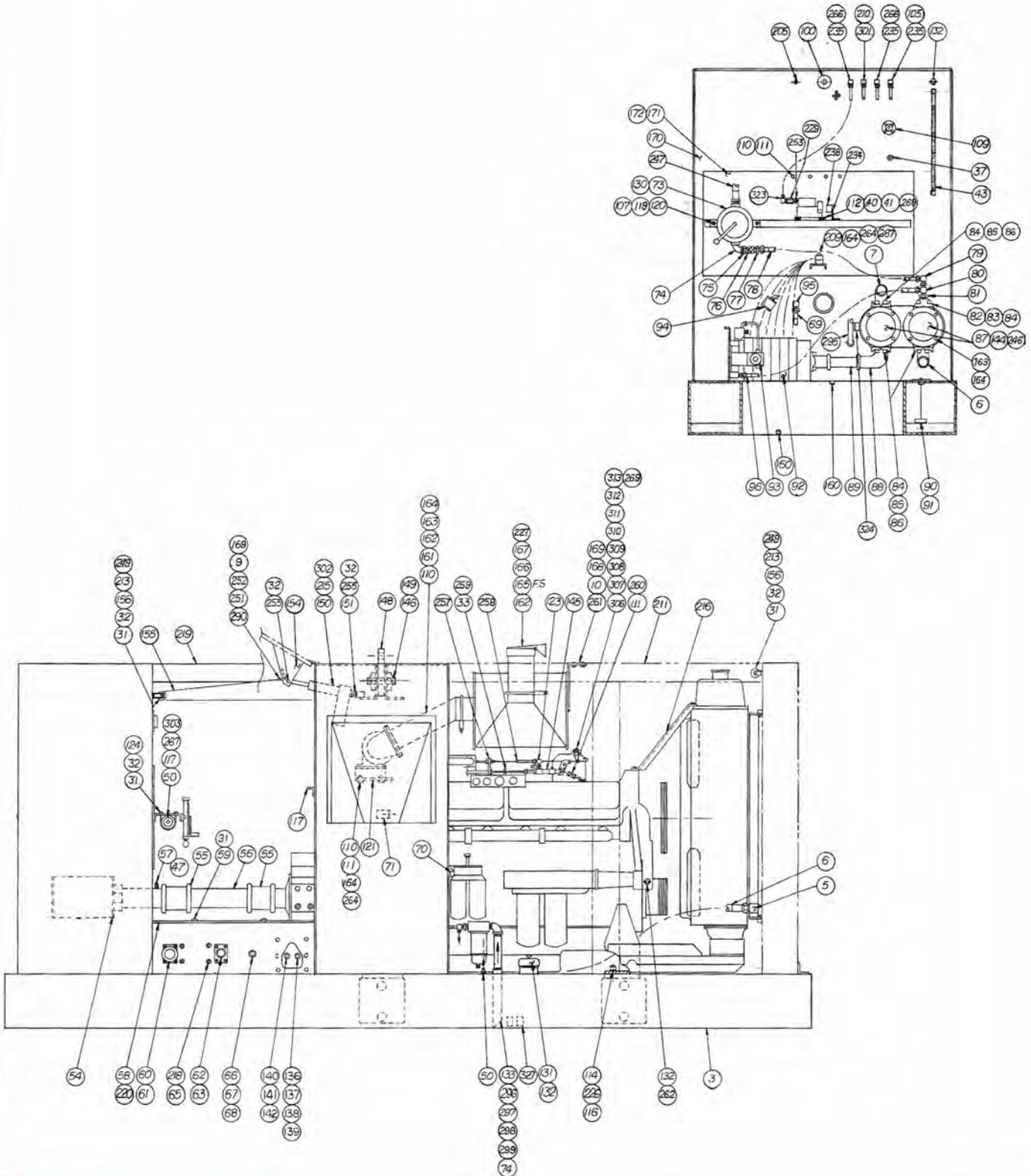


MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

POWER PACK - INTERNAL

800137





MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

POWER PACK - INTERNAL

800137

Item	P/N	Qty.	Description
160	100423	3	SHPP 1/2 NPT
161	140243	1	Exhaust Divider
162	140369	4	U-Bolt - 5"
163	100513	18	SHCS 1/2 - 13 x 1-1/2
164	100121	43	Lockwasher 1/2"
165	140271	1	Right Spirial Silencer
166	140273	1	Left Spirial Silencer
167	140411	2	Rain Cap - 5"
168	140421	2	Silencer Mounting Bracket
169	100289	6	Hex Nut 5/16 - 18
170	140113	1	Reservoir
171	140115	1	Cover Plate
172	140219	1	Cover Plate Gasket
174	140427	2	Control Panel Light
175	140429	2	Panel Light Bulb
176	140119	1	Reservoir Divider
177	140117	1	Reservoir Baffle
178	100051	8	SHCS 3/8 - 16 x 1
179	810179	1	Flywheel Adapter Assembly
180	110787	1	Shaft Coupling
181	110729	4	SHCS 20mm x 80mm
182	140061	1	Drive Coupling Spacer
183	810177	1	Pump Adapter Assembly
184	100207	3	SHCS 1 - 8 x 3 (L.W.)
185	100209	3	Lockwasher 1"
186	110401	1	Clamp Pump (P2)
188	100027	2	Lockwasher 1/2" (H.C.)
190	100139	1	Straight Adapter
191	140343	1	HOSE050R09J908J008L06000
192	110571	1	Pick-up Flange
193	110635	8	SHCS 12mm x 30mm
194	110637	8	Lockwasher 12mm
195	140057	1	Drive Pump (P1)
205	100845	3	SHPP 1/4 NPT
207	140213	2	Cooler Bracket
208	810209	1	780 Control Box Assembly
209	140433	1	Pump Hose Clamp
210	110017	1	HOSE038R02J006J006L07400
211	810207	1	780 Cover Group Assembly
213	140371	4	Sheave Bracket



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

POWER PACK - INTERNAL

800137

Item	P/N	Qty.	Description
215	140441	6 ¹	12/2 S/O Cord
216	140435	2	Radiator Bracket
218	400275	4	SHCS 3/4 - 10 x 1-1/2
219	140129	2	Brace
220	140169	1	Coupler Panel
225	100783	1	Adapter 90°
226	130141	12	Wrought Washer 5/8"
227	140363	2	Exhaust Extension
228	140505	2	Panel Light Bracket
229	140509	1	Check Valve
230	130323	As Req'd.	Angle
234	140551	1	S/O Cord Bracket
235	100145	10	Adapter 90°
238	110237	2	S/O Connection
246	140543	2	Return Filter Gasket
247	400215	1	HOSE100R01P016P016L08400
249	130117	2	SHCS 3/8 x 1-1/2
251	140545	2	Cable Clamps
252	400361	1	SHCS 5/16 - 18 x 2
253	110691	1	Hex Nipple
255	100017	10	SHCS 3/8 - 16 x 2
257	140535	1	Throttle Bracket
258	130393	1	HOSE019R01J004J004L11000
259	300337	1	Set Collar 1/4"
260	140537	1	Throttle Spring
261	100987	4	BHCS 7/16 - 14 x 1
262	100186	1	Bushing
264	100163	7	SHCS 1/2 - 13 x 1-3/4 (L.W.)
266	100719	2	HOSE025R02J004J004L03000
267	110805	1	HOSE019R01J004J004L05500
269	110861	3	PHMS #10 - 32 x 1/2" LG
275	130205	2	HOSE019R01J004J004L09000
277	110415	10 ¹	Hose, Oil Pressure 1/8" x 120"
278	110871	1	Adapter 45°
280	140513	2	Air Cleaner Bracket
281	140511	4	Air Cleaner Bracket
282	110225	2	BHCS 5/8 - 11 x 1-1/2
284	140547	1	Seal Tight Bracket
285	110785	1	Seal Tight



MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

POWER PACK - INTERNAL

800137

Item	P/N	Qty.	Description
287	140541	1	Hose Clamp Bracket
288	110221	1	Door Latch
290	140577	1	Turn Buckle
292	810299	1	Tachometer Transmitter Assembly
293	110972	1	Overspeed Switch
294	110715	24"	Battery Box Supports
295	140333	1	HOSE100R01P016J016L06300
296	120423	1	Water Separator
297	120245	1	Nipple 1" x 10"
298	100715	1	Reducer Bushing
299	400227	1	Adapter 90°
301	140581	1	Adapter 90°
302	100963	1	Hose Clamp
303	810295	1	Accumulator - #10 (ACC)
306	110968	1	Key
307	110966	1	Shut-down Arm
308	110964	1	Pivot
309	110962	1	Clamp
310	110960	1	Shim
311	100345	1	Stop Cable
312	100429	1	Throttle Cable Seal
313	400161	2	Lockwasher #10
314	140591	1	HOSE100PT4F016H016L04000 (Note 1)
	140491	1	HOSE075R02H012J012L03800 (Note 2)
315	140325	1	HOSE100PT4F016H016L07500 (Note 1)
	140485	1	HOSE075R02H012J012L07300 (Note 2)
316	140327	1	HOSE100PT4F016H016L06500 (Note 1)
	140487	1	HOSE075R02H012J012L06300 (Note 2)
317	140329	1	HOSE100PT4F016H016L05700 (Note 1)
	140489	1	HOSE075R02H012J012L05500 (Note 2)
318	140331	1	HOSE100PT4F016H016L03050 (Note 1)
	140495	1	HOSE075R02H012J012L02850 (Note 2)
319	140589	1	HOSE100PT4F016H016L03500 (Note 1)
	140493	1	HOSE075R02H012J012L03300 (Note 2)
320	100505	24	SHCS 12mm x 40mm
321	810289	12	Special Split Flange Half (#16)
322	100091	6	O-ring (#219)
323	140587	1	Adapter 90°
324	140413	1	Filter Pressure Switch (PS-3)

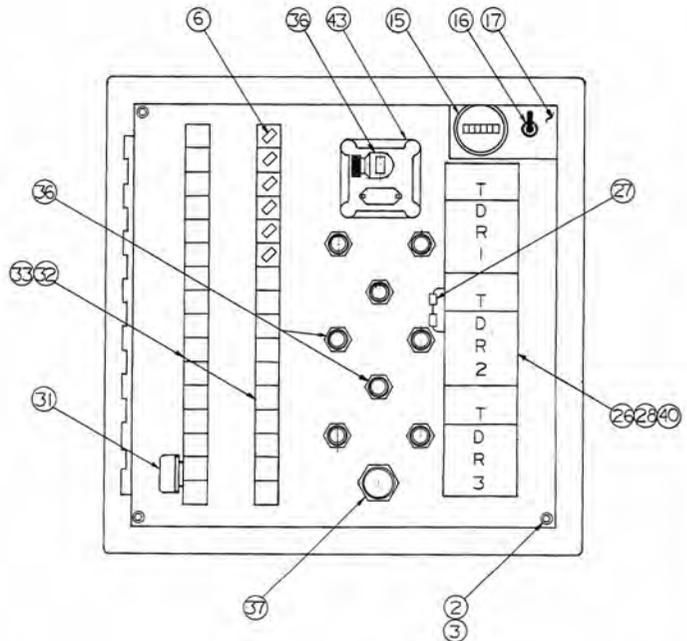
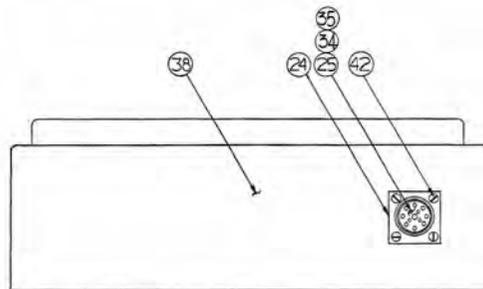
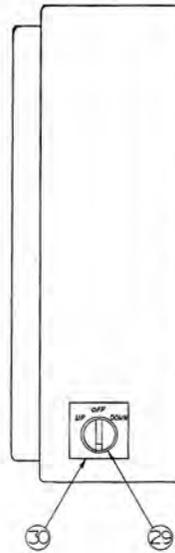
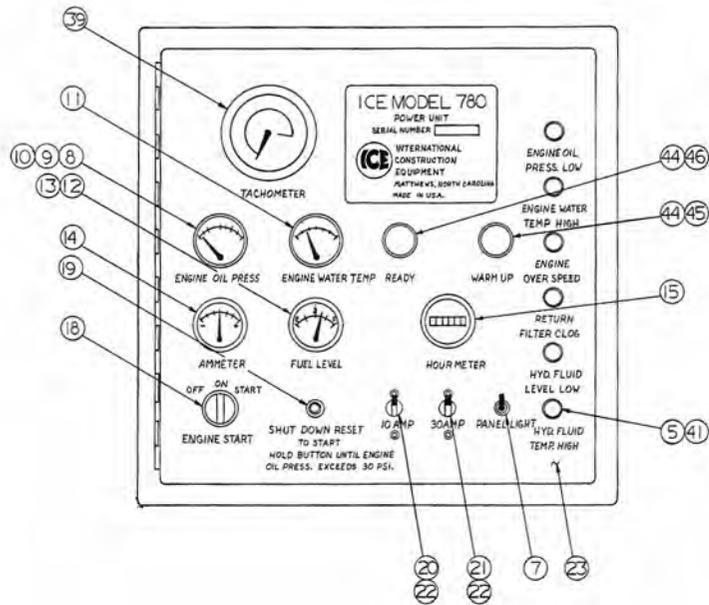


**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

CONTROL BOX

810209





MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

780 CONTROL BOX

810209

Item	P/N	Qty.	Description
2	100309	4	BHCS 5/16 - 18 x 1
3	100289	4	Hex Nut 5/16 - 18
5	100355	6	Light (L1 - L6)
6	100413	6	Diode (D1 - D6)
7	100580	1	Toggle Switch
8	100329	1	Oil Pressure Gage
9	100333	1	Adapter 90°
10	110415	10'	Oil Pressure Hose
11	110697	1	Water Temperature Gage
12	110339	1	Fuel Gage
13	110345	1	Resistor
14	110371	1	Ammeter
15	100343	2	Hour Meter (M1)
16	140361	1	Toggle Switch
17	140365	1	Hour Meter Bracket
18	110615	1	Start Switch
19	110387	1	Reset Button
20	400141	1	Circuit Breaker - 10A
21	140239	1	Circuit Breaker - 30A
22	100331	4	BHCS #6 - 32 x 1/4
23	140209	1	Label Group
24	100397	1	Amphenol Receptacle
25	110763	1	Amphenol Insert (Socket) Female
26	140319	3	Time Delay Relay (TDR)
27	140409	2	Diode
28	140281	14"	Relay Mounting Track
29	140353	1	Switch (M4)
30	140355	1	UP-OFF-DOWN Nameplate
31	140407	1	Circuit Breaker - 20A
32	110567	40	Terminal Block
33	110569	32"	Terminal Mounting Channel
34	110231	9	S/O Cord - 12 Feet
35	140441	6'	12/3 S/O Cord
36	100853	9	S/O Compression Fitting 90°
37	110693	1	S/O Compression Fitting 90°
38	810215	1	780 Control Box
39	110974	1	Tachometer
40	140345	2	Mounting Track Brackets
41	130305	6	Light Bulb
42	130061	4	RHMS #10 - 32 x 1/2
43	140503	1	Pressure Swtich (PS-2)
44	100359	2	Light (G) (B)
45	140477	1	Lens - Blue
46	140479	1	Lens - Green

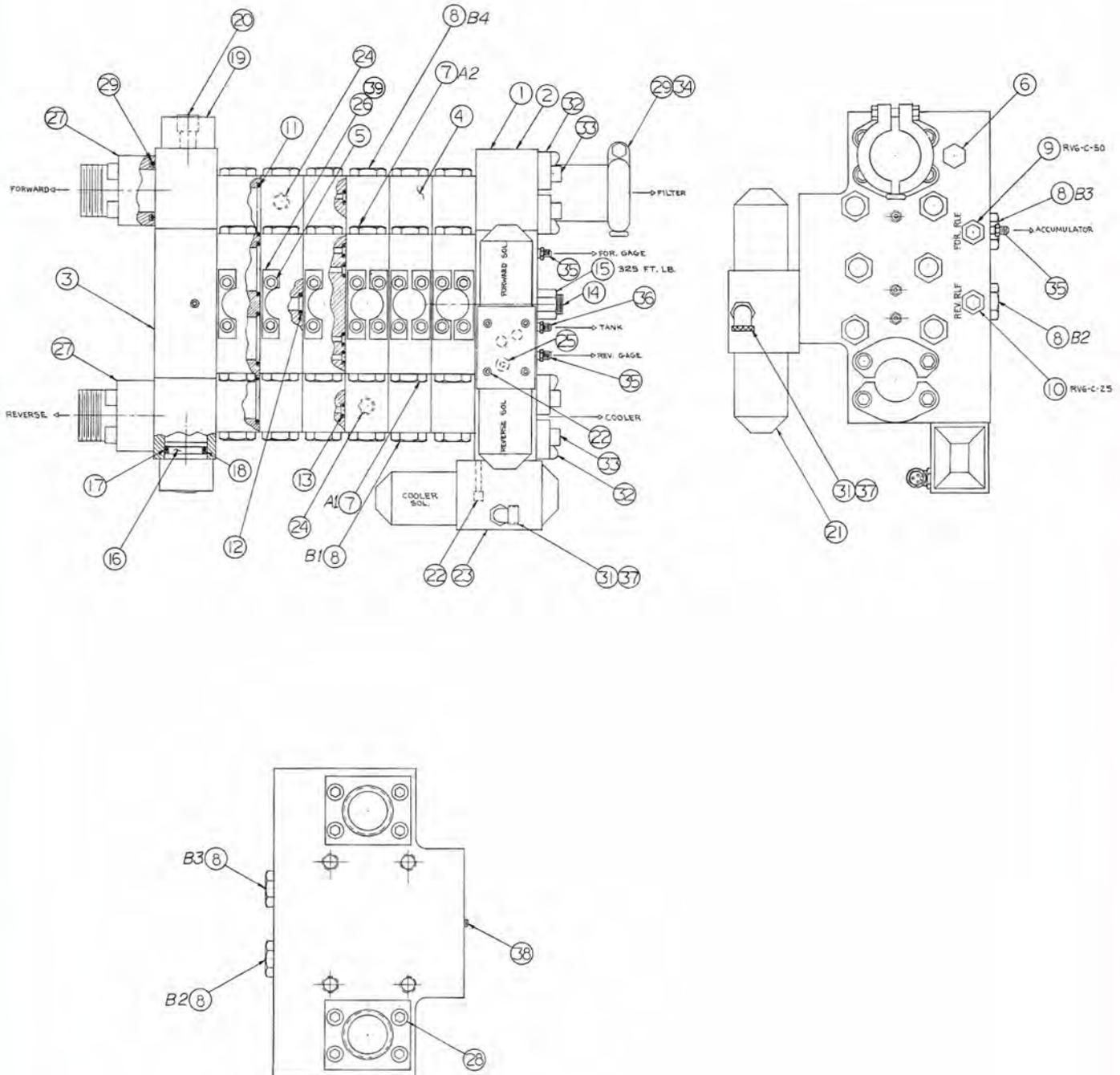


**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

DRIVE CONTROL MANIFOLD

810001





**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

780 DRIVE CONTROL MANIFOLD

810001

Item	P/N	Qty.	Description
	810283	1	Control Manifold (Includes Items Below)
2	140137		(1) Control End Plate
3	140159		(1) Port End Plate
4	140247		(6) Valve Block
5	100143		(24) SHCS 3/8-16 x 1-1/4
6	140135		(1) Check Valve (CV-2)
7	140251		(12) Piloted Cartridge (A1, A2)
8	140249		(24) Piloted Cartridge (B1-4)
9	140131		(1) Start Relief Valve (RV-1)
10	140133		(1) Brake Relief Valve (RV-4)
11	140253		(28) O-ring (#330)
12	100107		(14) O-ring (#210)
13	140255		(42) O-ring (#113)
14	140130		(6) Tie Rod
15	140257		(6) Hex Nut 7/8-14 UNF
16	140163		(2) Plug
17	140215		(2) O-ring (#134)
18	140217		(2) Back-up Ring (#134)
19	140161		(2) Retainer
20	140269		(4) SHCS 3/4-16 x 2 UNF
21	110147		(1) Control Valve (V2)
22	100631		(8) SHCS 1/4-20 x 2
23	140259		(1) Cooler Solenoid Valve (V3)
24	100423		(12) SHPP 1/2 NPT
25	140387		(1) Orifice
26	140101	12	Special Split Flange Half
27	140177	2	Coupler Adapter
28	110735	8	SHCS 1/2-13 x 2-1/2
29	140233	3	O-ring (#228)
31	110235	2	S/O Cord Adapter 90°
32	140261	4	Split Flange Half (#32)
33	100119	8	SHCS 1/2-13 x 1-1/4 (L.W.)
34	140263	1	Flanged Flexmaster
35	140267	3	Straight Adapter
36	140385	1	Straight Adapter
37	110885	2	Conduit Adapter
38	100646	1	SHPP 1/8 NPT
39	100091	6	O-ring (#219)

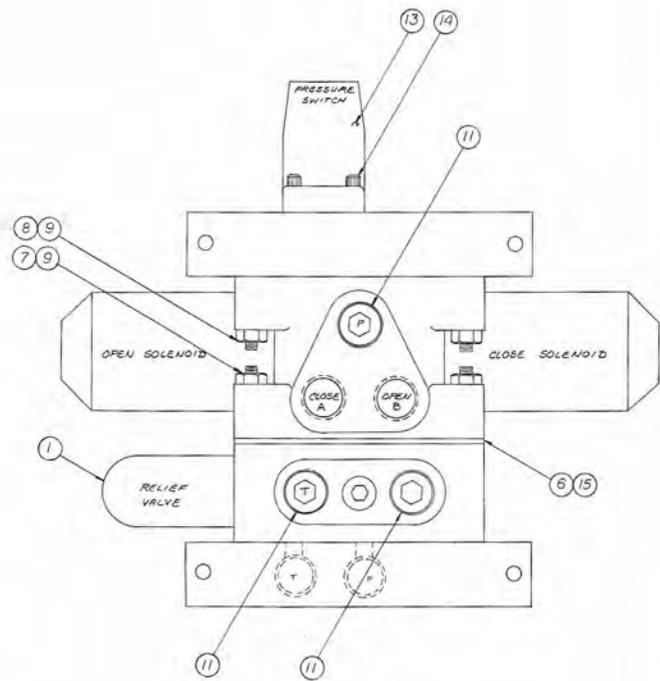
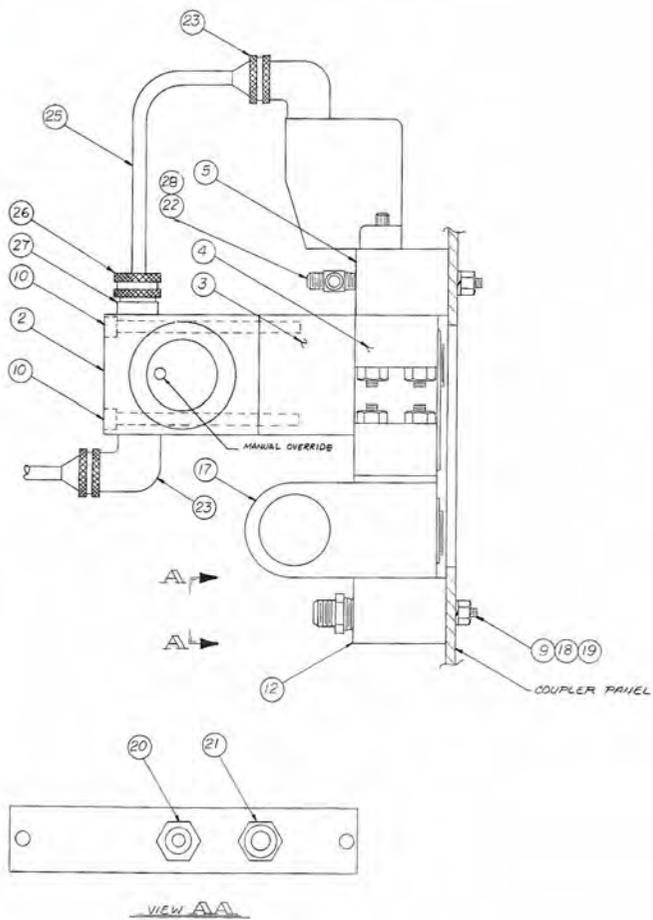


**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

CLAMP MANIFOLD ASM.

810205





MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

780 CLAMP MANIFOLD ASSEMBLY

810205

Item	P/N	Qty.	Description
	810159	1	Clamp Manifold (Includes Items Below)
1	110145		(1) Clamp Relief Valve (RV-2)
2	110147		(1) Clamp Control Valve (VI)
3	110149		(1) Clamp Check Valve (CV 5)
4	110151		(1) Subplate
5	130187		(1) End Plate
6	110157		(1) Dividing Plate
7	110159		(4) SHCS 5/16-18 x 4-3/4
8	110161		(4) SHCS 5/16-18 x 2-3/4
9	100289		(12) Hex Nut 5/16-18
10	130241		(4) SHCS 1/4-20 x 4
11	100423		(3) SHPP 1/2 NPT
12	130189		(1) End Plate
15	110179		(20) O-ring 12.3 x 2.4 mm
17	110153		(1) Subplate
23	110235		(2) S/O Cord Adapter 90°
9	100289	4	Hex Nut 5/16-18
13	810033	1	Clamp Pressure Switch (PS-1)
14	110167	2	SHCS #10-32 x 1
18	110177	4	SHCS 5/16-18 x 2-1/2
19	100287	4	Lockwasher 5/16"
20	110175	1	Straight Adapter
21	110173	1	Straight Adapter
22	110203	1	Straight Adapter
23	110235	1	S/O Cord Adapter 90°
25	110227	1	S/O Cord
26	100855	1	S/O Compression Fitting
27	110885	1	Conduit Adapter
28	100601	1	Tee Adapter

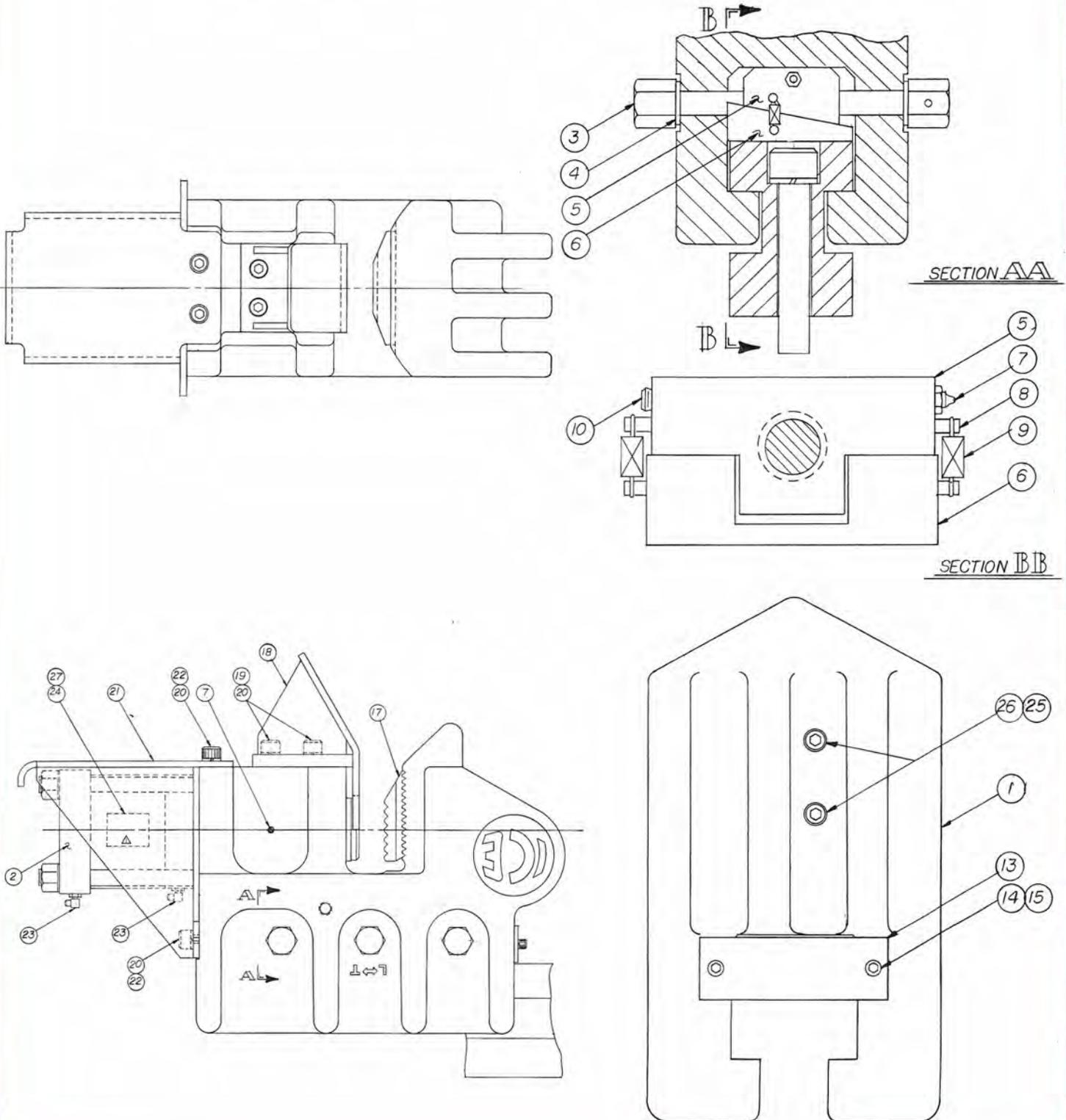


**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

122 CAISSON CLAMP

800153





MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

122 CAISSON CLAMP

800153

Item	P/N	Qty.	Description
1	810183	1	122 Caisson Clamp
2	810187	1	122 Caisson Clamp Cylinder (CYL)
3	810109	3	Caisson Clamp Screw Assembly
4	120111	6	Thrust Washer (Set)
5	120101	3	Wedge
6	120103	3	Lock
7	100229	4	Grease Fitting
8	120113	12	Drive Pin
9	120115	6	Spring
10	100646	3	SHPP 1/8" NPT
13	120119	1	Wedge Guard
14	100119	2	SHCS 1/2 - 13 x 1-1/4 (L.W.)
15	100121	2	Lockwasher 1/2"
17	120261	1	Fixed Jaw
18	120259	1	Caisson Head Guide
19	100213	4	SHCS 1 - 8 x 2-1/2 (L.W.)
20	100209	8	Lockwasher 1"
21	120293	1	Cylinder Guard
22	400401	4	SHCS 1 - 8 x 2
23	130057	2	Adapter 90°
24	120335	1	Clamp Nameplate
25	100007	2	Lockwasher 5/8"
26	100773	2	SHCS 5/8 - 11 x 4-1/2
27	130381	4	Rivet - #2 x 1/4"

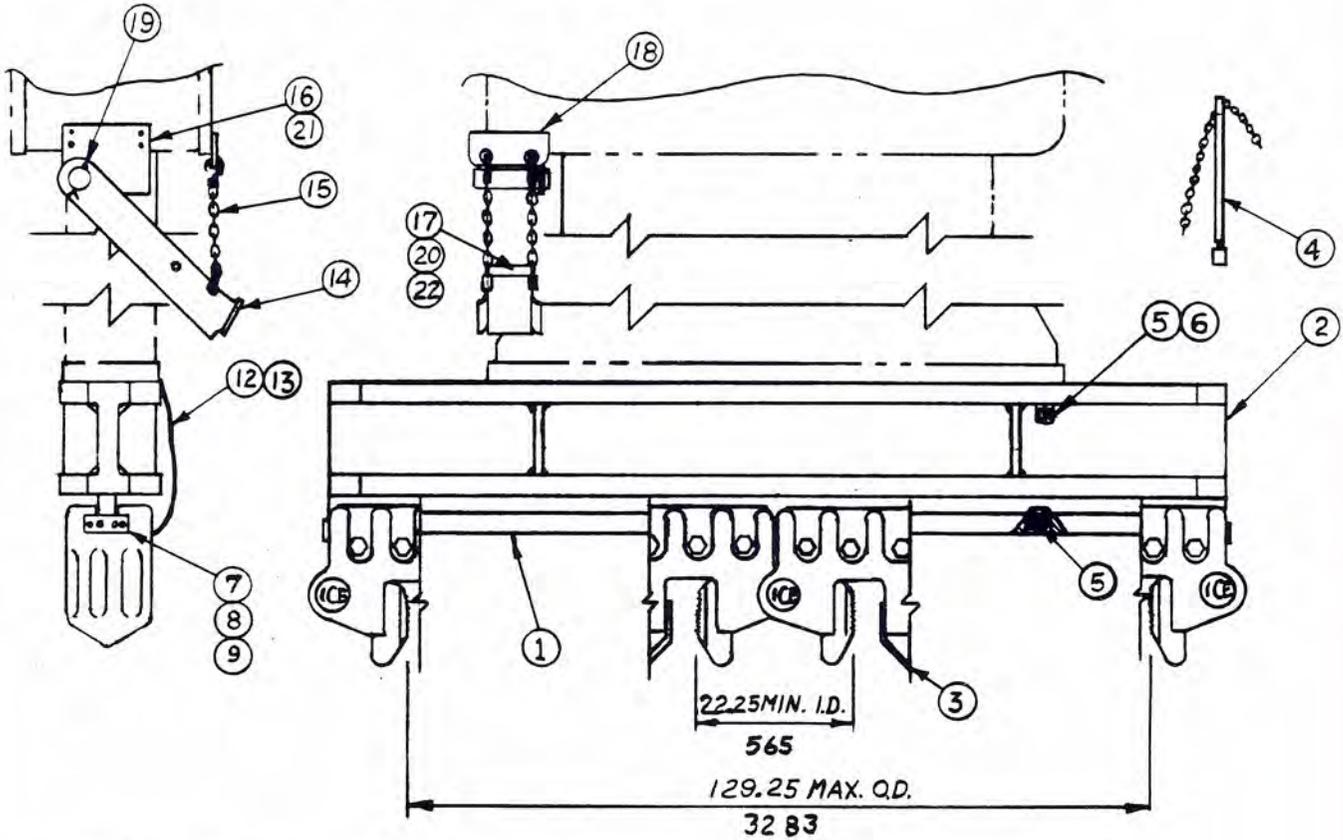


MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

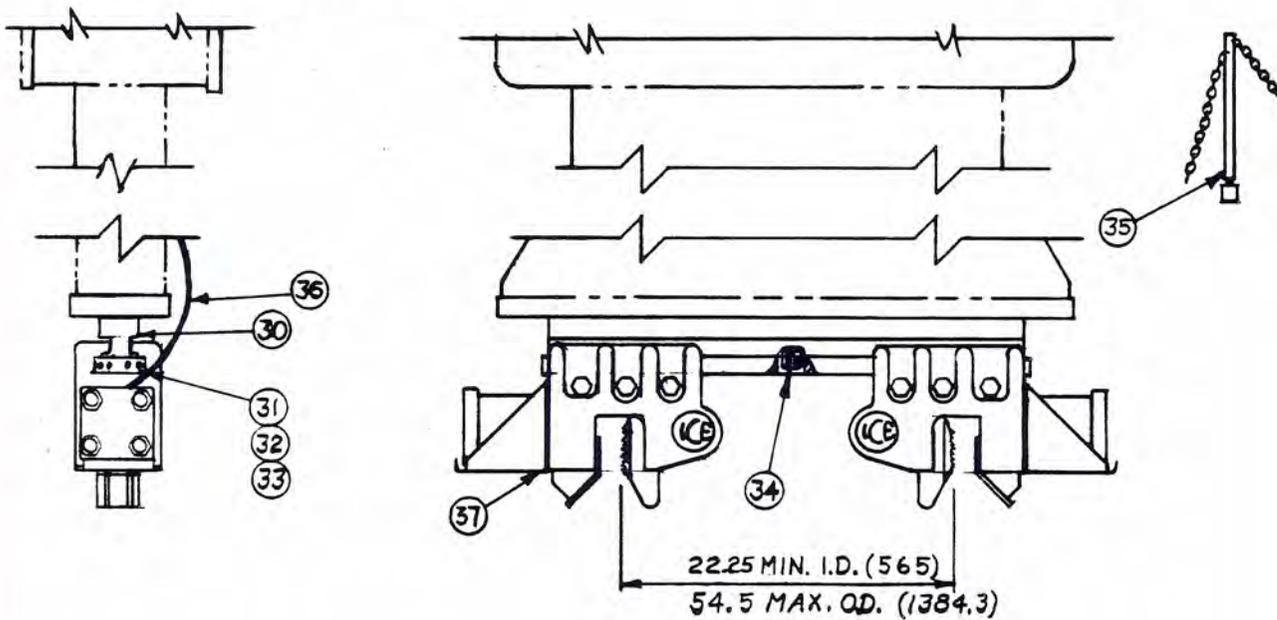
CAISSON BEAM - 10 FOOT

800165



CAISSON BEAM - 4 FOOT

800135





MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

CAISSON BEAM - 10 FOOT

800165

Item	P/N	Qty.	Description
1	140475	1	Caisson Beam - 10 Foot
2	800169	1	Beam Adapter - 1412
3	800153	2	Caisson 122 Clamp
4	810173	1	Caisson Adjustment Tool
5	100193	47	SHCS 1-1/2 - 6 x 5
6	100195	22	Lockwasher 1-1/2"
7	120011	2	Clamp Stop
8	400069	4	SHCS 3/4 - 10 x 2
9	100069	4	Lockwasher 3/4"
12	120411	4	HOSE038R02J006J006L1440S
13	100230	4	Hose Plug - JIC
14	140561	1	Hose Chute
15	810287	2	Chain Assembly
16	140555	1	Chute Bracket
17	140557	1	Guide Rod
18	140559	1	Chain Anchor
19	300375	1	Cotter Key 5/16 x 5 LG
20	100575	2	SHCS 5/8 - 11 x 1-1/4
21	100005	4	SHCS 5/8 - 11 x 1-3/4 (L.W.)
22	100007	6	Lockwasher 5/8"

CAISSON BEAM - 4 FOOT

800135

Item	P/N	Qty.	Description
30	120327	1	Caisson Beam - 4 Foot
31	120011	2	Clamp Stop
32	400069	4	SHCS 3/4 - 10 x 2
33	100069	4	Lockwasher 3/4"
34	120007	12	SHCS 1-1/2 - 16 x 8
35	810173	1	Caisson Adjustment Tool
36	120193	4	HOSE038R02J006J006L1320S
37	800153	2	Caisson 122 Clamp

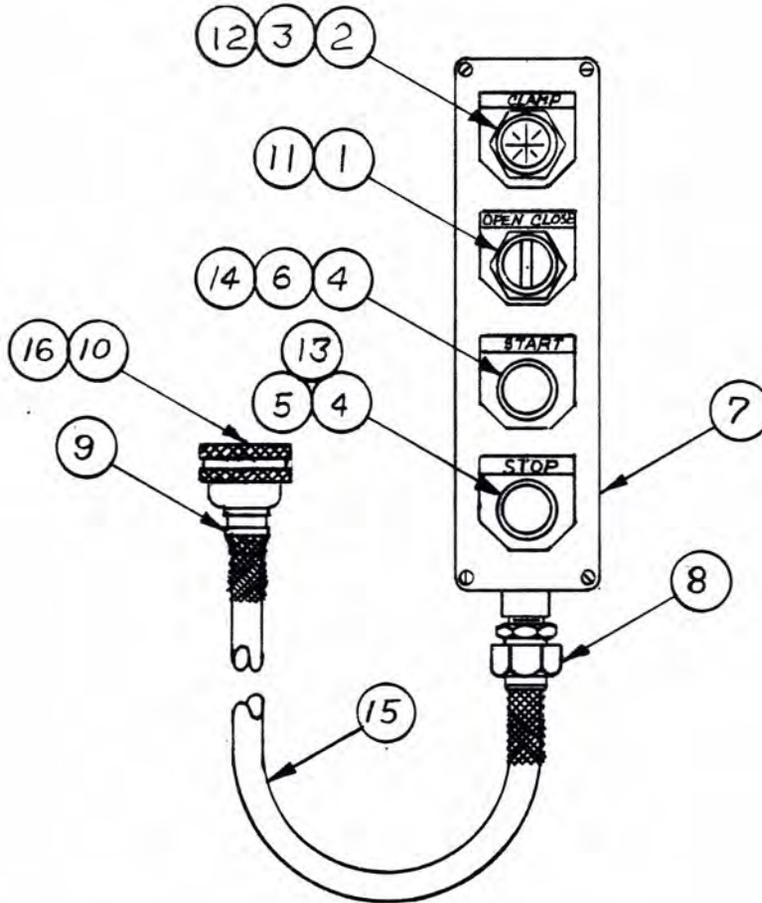


MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR

PARTS LIST

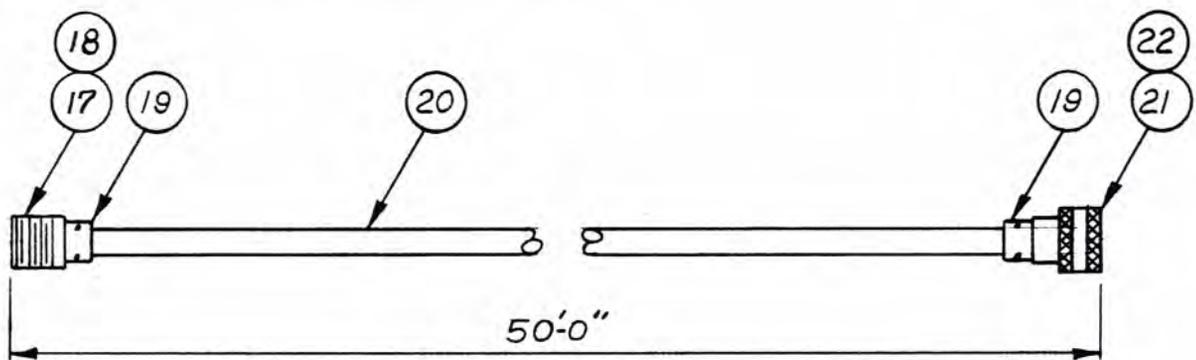
50' PENDANT ASSEMBLY

810093



PENDANT EXTENSION CABLE (OPTIONAL)

800059





**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

50 FOOT PENDANT ASSEMBLY

810093

<u>Item</u>	<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
1	130155	1	Switch
2	100359	1	Light
3	100361	1	Clear Lens
4	100363	2	START/STOP Button
5	100365	1	STOP Dust Cap
6	100367	1	START Dust Cap
7	100369	1	Pendant Box Enclosure
8	100371	1	Strain Relief
9	100375	1	Strain Relief
10	100395	1	Amphenol Plug
11	100401	1	OPEN/CLOSE Nameplate
12	100403	1	CLAMP (CLOSE) Nameplate
13	100405	1	STOP Nameplate
14	100407	1	START Nameplate
15	130365	1	Pendant Cable
16	110761	1	Amphenol Insert (plug) Male

50 FOOT PENDANT EXTENSION CABLE

800059

<u>Item</u>	<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
17	120169	1	Amphenol Cable Jack
18	110763	1	Amphenol Insert (socket) Female
19	100375	2	Amphenol Strain Relief
20	130365	1	Pendant Cable
21	100395	1	Amphenol Plug
22	110761	1	Amphenol Insert (plug) Male

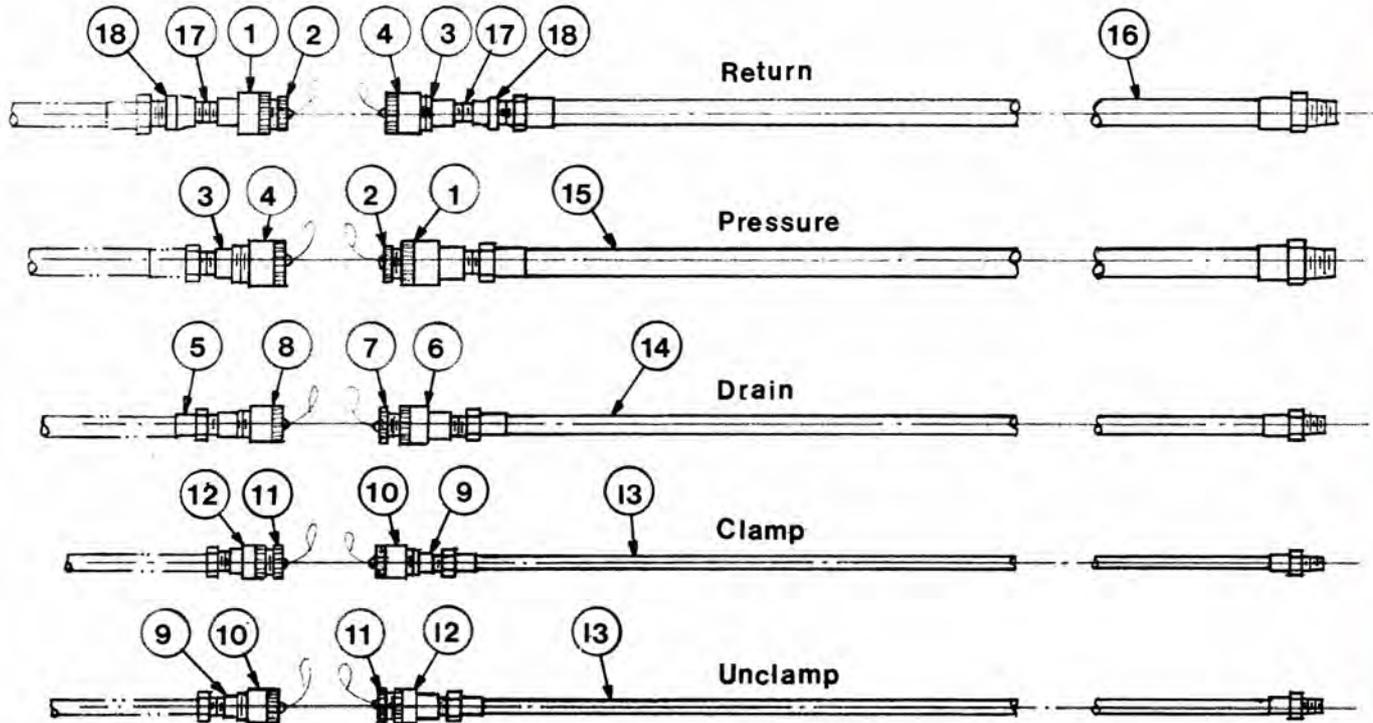


**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

PIGTAIL KIT - 1412 (OPTIONAL)

850029



Item	P/N	Qty.	Description
1	140035	2	Female Disconnect (2")
2	140039	2	Dust Plug (2")
3	140037	2	Male Disconnect (2")
4	140041	2	Dust Cap (2")
5	120023	1	Male Disconnect (1")
6	120025	1	Female Disconnect (1")
7	120027	1	Dust Plug (1")
8	120029	1	Dust Cap (1")
9	100245	2	Male Disconnect (3/8")
10	100257	2	Dust Cap (3/8")
11	100737	2	Dust Plug (3/8")
12	100777	2	Female Disconnect (3/8")
13	140515	2	HOSE038R02P006P006L12000
14	140517	1	HOSE100R02P016P016L12000
15	140519	1	HOSE200PT4P032P032L10800
16	140251	1	HOSE250R02P040P040L12000
17	140393	2	Close Nipple (2")
18	140395	2	Bell Reducer



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

VIII. ORDERING PARTS

D. MISCELLANEOUS ACCESSORIES

1. BULK

P/N	Qty.	Description
810013	5 GAL	Hydraulic Fluid
810011	5 GAL	Transmission Oil
100726	1 GAL	Coolant/Anti-Freeze
100298	1 GAL	I.C.E. Green Paint
100299	1 GAL	Primer

2. TOOLS

P/N	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) 1/2" Allen Wrench - Long Arm
100681		(1) 9/16" Allen Wrench - Long Arm
100683		(1) 5/8" Allen Wrench - Long Arm
100685		(1) 3/4" Allen Wrench - Long Arm
100687		(1) 7/8" Allen Wrench -Short Arm
100689		(1) 1" Allen Wrench -Short Arm



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

VIII. ORDERING PARTS

D. MISCELLANEOUS ACCESSORIES (CONTINUED)

3. 1412 HOSE GROUP KIT 850043

<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
140375	2	HOSE038R02J006J006L11800
140313	1	HOSE050R01J008F908L11600
140311	1	HOSE050R01J008F908L12400
140315	1	HOSE050R01J008F008L2Q600
140445	1	HOSE050R01J008F008L20600
140297	1	HOSE100R10J016F916L11800
140295	1	HOSE100R01J016F916L12100
140301	1	HOSE100R10J016F016L20300
140299	1	HOSE100R10J016F016L20700
140305	1	HOSE100R01J016F916L11400
140303	1	HOSE100R01J016F916L11700
140309	1	HOSE100R01J016F016L19900
140307	1	HOSE100R01J016F016L20100

4. 780 HOSE GROUP KIT 850045

<u>P/N</u>	<u>Qty.</u>	<u>Description</u>
110613	1	HOSE019R01J004J004L03600
110805	1	HOSE019R01J004J004L05500
130205	3	HOSE019R01J004J004L09000
130393	1	HOSE019R01J004J004L11000
110409	2	HOSE019R01J004J004L07500
100149	1	HOSE025R02J004J004L01900
100719	2	HOSE025R02J004J004L03000
110017	1	HOSE038R02J006J006L07400
140343	1	HOSE050R09J908J008L06000
100582	1	HOSE075R01J012J012L03800
140337	1	HOSE075R01J012J012L06900
140335	1	HOSE100R01J016J016L05300
140333	1	HOSE100R01P016J016L05500
400215	1	HOSE100R01P016P016L08400
140339	2	HOSE200R02J032F932L13200
140341	1	HOSE200R02J032F932L15600
140331	1	HOSE100R01F016H016L02900
140589	1	HOSE100PT4F016H016L03500
140591	1	HOSE100PT4F016H016L04000
140329	1	HOSE100R10F016H016L05700
140327	1	HOSE100R10F016H016L06500
140325	1	HOSE100R10F016H016L07500



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

VIII. ORDERING PARTS

D. MISCELLANEOUS ACCESSORIES (CONTINUED)

5. 1412/780 O-RING KIT 850047

P/N	Qty.	Description
100091	24	O-Ring #219
100097	8	O-Ring #214
100107	12	O-Ring #210
110197	8	O-Ring #159
140031	8	O-Ring #170
140033	8	O-Ring #454
140211	12	O-Ring #3-924
140215	2	O-Ring #134
140217	2	Back-Up Ring #134
140233	18	O-Ring #228
140497	5	O-Ring #246 (filter)
140499	2	Back-Up Ring #246 (filter)

E. RECOMMENDED SPARE PARTS

VIBRATOR ASSEMBLY 800129 Reference Page VIII-4

Item	P/N	Qty.	Description
15	100003	1	Elastomer
25	100097	2	O-Ring (#214)
30	140233	2	O-Ring (#228)
36	140109	1	Filter Element
38	100091	8	O-Ring (#219)
41	100107	4	O-Ring (#210)
69	140375	1	HOSE038R02J006J006L11800

VIBRATION CASE - 810203 Reference Page VIII-8

Item	P/N	Qty.	Description
-	140205	4	Motor Shaft Seal
10	140211	4	O-Ring (#3-924)
13	100185	1	Sight Gauge
16	140031	4	Motor O-Ring (#170)
17	140033	8	O-Ring (#454)
33	110197	8	O-Ring (#159)



**MODEL 1412
VIBRATORY
DRIVER/EXTRACTOR**

PARTS LIST

VIII. ORDERING PARTS

E. RECOMMENDED SPARE PARTS

HOSE ASSY. - INTERCONNECTING 800133 Reference Page VIII-12

Item	P/N	Qty.	Description
4	140069	1	HOSE200PT4P032P032L60000
9	140071	1	HOSE250R02P040P040L60000
13	120057	1	HOSE100R02P016P016L62000
17	100247	2	HOSE038R02P006P006L62000

POWER PACK - INTERNAL 800137 Reference Page VIII-16

Item	P/N	Qty.	Description
84	140233	3	O-Ring (#228)
96	140337	1	HOSE075R01J012J012L06900
144	140403	4	Filter Element
322	100091	6	O-Ring (#219)

DRIVE CONTROL MANIFOLD 810001 Reference Page VIII-26

Item	P/N	Qty.	Description
12	100107	14	O-Ring (#210)
29	140233	3	O-Ring (#228)
39	100091	6	O-Ring (#219)

MODEL 122 CAISSON CLAMP 800153 Reference Page VIII-30

Item	P/N	Qty.	Description
--	810213	1	Seal Kit for Cylinder
17	120261	1	Fixed Jaw
23	130057	2	Adapter
26	100773	2	SHCS (Jaw Bolts - Fixed) 5/8 - 11 x 4-1/2