MKT MANUFACTURING, INC.

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OPERATING, MAINTENANCE AND PARTS MANUAL FOR V-52 / HP-700A HYDRAULIC VIBRATORY PILE DRIVER/ EXTRACTOR SYSTEM WITH CATERPILLAR DIESEL ENGINE

CALIFORNIA
PROPOSITION 65 WARNING

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

OCCUPATIONAL HEALTH WARNINGS:

1. Construction equipment frequently operates at very high sound levels. Such sound levels can be harmful to the human hearing system. Sustained exposure to such high sound levels can permanently impair one's hearing. **Hearing protection should be worn by anyone and everyone within close proximity to a Vibratory Pile Driver/Extractor System.**

2. Do not start or operate the V-52/HP-700A until having thoroughly read this manual and having received instructions from an MKT factory authorized service representative or properly trained, experienced operator.

Manual No. 121201

MKT MANUFACTURING, INC.
STANDARD NEW PRODUCT WARRANTY

EXPRESS LIMITED PARTS WARRANTY FOR NEW PRODUCTS

MKT MANUFACTURING, INC. ("MKT") warrants to the first user ("User") of any new product (whether such new product is sold directly to the customer by MKT or through a distributor) that such new product will be free from defects in material or workmanship for a period of ninety (90) days beginning on the date that such new product is delivered to the User. This Express Limited Parts Warranty ("Warranty") applies only to the first User of the new product, and not any subsequent users, regardless of whether such subsequent user becomes the owner of the new product or uses the product within such ninety (90) day warranty period. In no event shall this Warranty extend for more than twelve (12) months from the date that MKT ships the product, whether to a User or to a distributor which may or may not use the product. This Warranty applies to new products only. This Warranty is subject to the following terms and conditions.

If User believes that the product has a defect in the materials or workmanship, User shall send notice of such defect in writing to MKT within the ninety (90) day warranty period. MKT shall have the right to inspect the product for defects, and any parts which appear to MKT upon inspection to have been defective in material or workmanship shall be repaired or replaced at MKT's option. MKT shall have no other liability to User except for such repair or replacement of those parts determined to be defective. Such repair or replacement parts shall be provided at no cost to the User at such location and during such hours as determined by MKT. This Warranty shall not apply to component parts or accessories of products not manufactured by MKT, or to normal maintenance of the product or to normal maintenance parts required therefor. Replacement or repair parts installed in the products covered by this Warranty are warranted only for the remainder of the Warranty as if such parts were original components of said product. **EXCEPT AS EXPRESSLY SET FORTH IN THIS WARRANTY, MKT MAKES NO OTHER WARRANTIES, AND FURTHER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.**

THIS WARRANTY IS NOT APPLICABLE TO ANY ITEM WHICH MKT SELLS THAT IS WARRANTED DIRECTLY TO THE USER BY THE MANUFACTURER OF SUCH ITEM (IF SUCH MANUFACTURER OF SUCH ITEM IS NOT MKT).

MKT EXCLUDES ALL LIABILITY FOR OR ARISING FROM ANY NEGLIGENCE ON ITS PART OR ON THE PART OF ANY OF ITS EMPLOYEES, AGENTS OR REPRESENTATIVES WITH RESPECT TO THE MANUFACTURE OR SUPPLY OF THE PRODUCT.

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Notwithstanding anything in this Agreement to the contrary, MKT shall not be responsible for any costs or charges of User and/or any third party, including but not limited to transportation charges, shipping costs, cost of installation, duty, taxes or any other charges whatsoever including but not limited to any charges or damages due to any delays. If requested by MKT, products or parts for which a warranty claim is made are to be returned transportation prepaid to MKT at MKT's home office. Any improper use, including operation after discovery of defective or worn parts, operation beyond rated capacity, substitution of parts not approved by MKT, or any alteration or repair by others in such manner as in MKT's judgment affects the Product materially and adversely, shall void this Warranty.

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

TABLE OF CONTENTS

I. INTRODUCTION

II. SPECIFICATIONS

III. SYSTEM COMPONENTS

IV. SYSTEM SET UP INSTRUCTIONS

V. START UP PROCEDURES

VI. OPERATING INSTRUCTIONS

VII. MAINTENANCE AND SERVICE INSTRUCTIONS

VIII. FILTER PART NUMBERS

IX. DRAWINGS AND PARTS LISTS

A. V-52 GENERAL ASSEMBLY AND PARTS LIST

B. HYDRAULIC CLAMP ASSEMBLY AND PARTS LIST

C. ECCENTRIC SHAFT ASSEMBLY AND PARTS LIST

D. MOTOR SHAFT ASSEMBLY AND PARTS LIST

E. 150' HYDRAULIC HOSE BUNDLE ASSEMBLY AND PARTS LIST

F. HP-700A GENERAL ASSEMBLY AND PARTS LIST

G. HP-700A CONTROL PANEL ASSEMBLY AND PARTS LIST

H. HP-700A ELECTRICAL CONTROL ASSEMBLY AND PARTS LIST

I. REMOTE PENDANT/CABLE ASSEMBLY AND PARTS LIST

J. HP-700A ELECTRICAL SCHEMATIC

K. DUVAC II MULTI-VOLTAGE ENGINE WIRING SCHEMATIC

L. V-52/HP-700A HYDRAULIC SCHEMATIC AND PARTS LIST

I. INTRODUCTION

The MKT V-52/HP-700A Hydraulic Vibratory Pile Driver/Extractor System is used for installing or removing piling. The three major components of an MKT V-52 Vibratory Pile Driver/Extractor include rotating eccentric weights housed within a gear box which generates the vibratory forces to drive or extract piles, a clamp housing to transmit vibratory forces to the pile section, and an elastomer suspension to isolate the vibratory forces from the holding device.

There are four rotating eccentric weights in the V-52 mounted in special heavy duty roller bearings. Two fixed displacement piston-type hydraulic motors are used to drive pinion shafts and gears mounted directly to the eccentric weights. The gearing system maintains proper timing of the eccentrics during operation. When operating within its load capabilities, the V-52 vibrator is designed to deliver a driving force of about 200 tons to a pile at a rate of 1650 vibrations per minute. The HP-700A hydraulic power unit is correspondingly designed to maintain the necessary hydraulic flow and pressure to the V-52 vibratory hammer.

The V-52/HP-700A system can be controlled from the control panel or remotely by a hand held pendant. Either set of controls allow the operator to start and stop the hammer, control the clamping on and off the piles, and provides a green light indicator for complete clamp closing.

II. SPECIFICATIONS FOR V-52/HP-700A VIBRATORY PILE DRIVER/EXTRACTOR SYSTEM

A. OPERATING DATA - V-52 DRIVER/EXTRACTOR

Driving Force	200 TONS
Free Hanging Frequency	1650 CPM
Free Hanging Amplitude	1.00 INCHES
Eccentric Moment	5200 IN/LBS
Maximum Hydraulic Horsepower	610 HP
Clamping Force @ 2750 PSI	100 TONS
Maximum Line Pull	80 TONS
Clamp Jaw Opening	1 5/8 INCHES
Clamp Cylinder Travel	3 INCHES
Height	136 INCHES
Width @ Throat	16 1/4 INCHES
Shipping Width	96 INCHES
Net Weight	16,850 LBS
Clamp Hoses	2 - 3/4" I.D.
Drain Hose	1 - 1" I.D.
Motor Hoses	2 – 2" I.D.
Hose Bundle Weight W/ Oil	2150 LBS

B. OPERATING DATA - HP-700A HYDRAULIC POWER UNIT

Diesel Engine	CATERPILLAR C18
Engine Horsepower	700 HP
Engine Operating Speed	2100 RPM
Rated Hydraulic Flow	190 GPM
Rated Hydraulic Pressure	5500 PSI
Fuel Tank Capacity @ 90%	130 GAL
Hydraulic Tank Capacity @ 90%	200 GAL
Length	176 INCHES
Width	64 INCHES
Height	88 INCHES
Net Weight	14,300 LBS

C. HOSE BUNDLE

3 pieces - 50 ft. 2" I.D. Motor Pressure Line (4301015)
3 pieces - 50 ft. 2" I.D. Motor Return Line (4301016)
6 pieces - 50 ft. 3/4" I.D. Clamp Line (4200072)
3 pieces - 50 ft. 1" I.D. Drain Line (4360058)

***NOTE: Frequency and engine RPM are set to maximize performance on a normal pile, and normal duty cycle. Should overheating occur to either exciter or engine due to high duty cycle, it is important that the unit be stopped and allowed to cool down. If overheating persists, try reducing engine speed 100 to 200 RPM and monitor temperature. If exciter housing temperatures consistently reach and exceed 200 degrees Fahrenheit consider replacing the exciter lube oil using Shell Omala 220RL or Mobil SHC630.**

III. V-52/HP-700A SYSTEM COMPONENTS

The essential components of a complete V-52/HP-700A Hydraulic Vibratory Pile Driver/Extractor System are:

A. HP-700A diesel driven hydraulic power unit

B. Hydraulic hose bundle with five hoses (normally 150 feet)

C. V-52 exciter fitted with a suspension assembly and hydraulic clamp assembly

D. 50 foot electrical remote control pendant and cable assembly

***NOTE: The power unit reservoir is factory filled with hydraulic oil meeting precise specifications for viscosity, viscosity index, pour point and inhibitors. The oil used, or its equivalent, is readily available from most major oil companies.**

IV. SYSTEM SET UP INSTRUCTIONS

A. HP-700A HYDRAULIC POWER UNIT

The HP-700A hydraulic power unit is assembled on a skid base which also serves as a fuel tank. The skid base is fitted with a lifting bail and two lifting eyes. The power unit is thus designed to be lifted by a crane line using chains or cables capable of lifting the 14,300 pound unit. Locate the HP-700A power unit on firm, level ground with an unobstructed operator view to the intended operation of the V-52 hammer.

B. CONNECTION OF HOSES

All V-52 hammers are thoroughly tested at the factory and consequently all hoses will be filled with hydraulic fluid. Generally, the hose bundle assembly filled with oil is disconnected from the hydraulic power unit. Therefore, it is necessary when reconnecting to make the correct hose connections to the power unit. There are five hoses in the bundle, each 150 feet long, two 2" I.D. lines for the hydraulic motors, two 3/4" I.D. lines for the hydraulic clamp assembly and one 1" I.D. line for the motor case drain. Hose connections at the hydraulic power unit are made easily by quick disconnect assemblies with check valves.

NOTE: Before making any hydraulic hose connections, assure that the connectors are wiped clean of any dirt or contamination to prevent subsequent contamination and damage to the components in the hydraulic system.

IV. SYSTEM SET UP INSTRUCTIONS (CONTINUED)

B. CONNECTION OF HOSES (CONTINUED)

1. When the hoses are attached to the vibratory unit, care should be made to have the bundle hanging free. Extreme care should be made at all times not to kink any of the hoses.

   As an example, the 2" motor line hoses have a minimum bend radius of 25". Even though these hoses have a minimum bursting pressure of 20,000 PSI, a kink will weaken the multiple spiral wire wrap reinforcement and ruptures could result at high operating pressures.

   Any damaged hose within the hydraulic power unit, hose bundle, or vibratory hammer should be replaced with hoses of equivalent ratings.

2. Before making any hydraulic hose connections, assure that the connectors are wiped clean of any dirt or contamination to prevent subsequent contamination and damage to the components in the hydraulic system.

3. Do not permit mobile equipment to run over the hydraulic hose bundle. The hydraulic hose in the bundle, even though filled with hydraulic oil, is not able to withstand external compression forces.

4. If the hose bundle has been disconnected from the short hoses routed over the V-52 suspension assembly, care must be taken to connect the hoses properly. Hose ends should be wiped clean and connected, according to size.

5. Make it a habit whenever the hydraulic lines are disconnected to immediately cap or plug them to avoid contamination and damage to the components of the hydraulic system. Assure that the caps and plugs are wiped clean of any dirt or contamination before using.

C. V-52 RIGGING INSTRUCTIONS

The V-52 hammer is factory fitted with its suspension assembly and is shipped flat on its side. The V-52 suspension and lifting pin is rated for 80 ton line pull.
CAUTION: User should insure adequate safety factor for rigging.

INSPECT RIGGING AND PIN DAILY, REPLACE IF WORN

1. Hanging in the air, the V-52 hammer should be hoisted, swung and rotated to assure that the hose bundle hangs free of any loops or entanglements.

2. Manipulating the V-52 hammer in the air during the foregoing procedure, as well as later when setting the hammer on a pile, will be made possible by fastening a ground handling rope to the V-52 clamp housing before hoisting the hammer aloft.

IV. SYSTEM SET UP INSTRUCTIONS (CONTINUED)

D. V-52 JAW SHIELD

The jaw shield is generally shipped connected to the V-52 clamp assembly. Before using the V-52, assure that the jaw shield is tightly connected (each with four socket head cap screws and lock washers) to the V-52 clamp assembly. The jaw shield not only acts as a guide for positioning the V-52 on a standing pile, but are also necessary to protect the jaws and the clamp assembly from unnatural impact shock and resulting damage.

E. REMOTE CONTROL PENDANT AND CABLE ASSEMBLY

The V-52/HP-700A system has a 50 foot long remote control pendant and cable assembly that connects to the hydraulic power unit at the control panel.

CAUTION: THE REMOTE CONTROL PENDANT SHOULD NOT BE CONNECTED IF THE HAMMER IS BEING OPERATED FROM THE CONTROLS LOCATED ON THE CONTROL PANEL.

The remote control pendant and control panel each have two (2) push buttons and one (1) selector switch. The selector switch is used for jaw clamping or unclamping. When adequate clamp pressure has been attained within the hydraulic system a green light will be illuminated in the hammer start push button. Until this light has been illuminated the hammer will not start. The large red palm button is used for stopping the hammer.

V. START UP PROCEDURES

A. ENGINE FLUIDS

Make all lubricant, fuel, radiator, and preventive maintenance checks recommended in the Engine Manufacturer's Operating and Maintenance Manual before starting the diesel engine.

B. HYDRAULIC FLUID

Check the level of the hydraulic fluid in the reservoir in the HP-700A power unit. Do not operate the HP-700A with the hydraulic oil level below the gauge. If hydraulic fluid must be added to the system, do not allow foreign matter to enter the hydraulic system and use proper hydraulic oil for the HP-700A system. See the lubricant and hydraulic fluid requirements for the V-52/HP-700A system described in this manual.

C. HYDRAULIC VALVES AND PUMPS

The hydraulic valves and pumps in the HP-700A power unit have already been set for proper pressures during the factory break in and operating of the V-52/HP-700A system. **DO NOT MAKE ADJUSTMENTS TO THE VALVES WITHOUT THE ASSISTANCE OF A FACTORY TRAINED SERVICE REPRESENTATIVE.**

The V-52/HP-700A system utilizes four hydraulic filters to maintain clean oil within the system. The charge oil for each of the main pumps is filtered through a spin-on type filter located on the bottom of each pump. Hydraulic fluid returning from the motors is directed through filters located behind the pumps. These filters have a full capacity bypass valve that protects the filter element and system with a minimum of pressure loss, therefore the filter as it becomes clogged will bypass contaminated oil back into the hydrostatic loop. Rigid schedules of the filter element changes should be followed to lengthen the life of all the hydraulic components.

The hydraulic reservoir has a suction strainer located in each of the suction lines leading to the pumps. When the hydraulic tank is drained for servicing, the strainer should be cleaned.

D. EXCITER HOUSING OIL LEVEL

The lubricating oil level in the V-52 exciter housing must be maintained at all times for proper lubrication of the gear train and eccentric bearings. Check the lube oil level by holding the exciter in a vertical position and viewing the two side sight windows, if the oil is below the level sight gauge add oil. Too much oil in the initial check may indicate oil expansion or leakage of hydraulic oil into the exciter housing through the hydraulic motor seals.

V. START UP PROCEDURES (CONTINUED)

E. HYDRAULIC CLAMP CYLINDER

Whenever the hydraulic lines of the V-52/HP-700A system have been reconnected, **THE CLAMP CYLINDER CIRCUIT MUST BE BLED OF ENTRAINED AIR.** Lift the V-52 hammer vertically off the ground, switch the clamp selector switch to the "clamp close" position to close the jaws. Using the proper tools unscrew the vent valve screw located on the outboard end of the clamp cylinder. Verify all personnel and objects are clear from clamping jaws.

CAUTION: A STREAM OF FROTHING HYDRAULIC FLUID WILL SHOOT FROM THE RELIEVED VENT SCREW.

After approximately thirty seconds, close the vent screw. Now switch the clamp selector switch to the "clamp open" position to open the jaws and repeat the process at the inboard vent valve screw. Repeat the procedure until an air free stream of oil comes from each relieved vent screw. **FAILURE TO COMPLETELY BLEED THE CLAMP CIRCUIT OF AIR MAY IMPAIR CLAMPING FORCE AND DAMAGE JAWS.**

F. HYDRAULIC CIRCUITRY

The repetitive functions of the V-52 hammer are powered by three pumps contained within the HP-700A power unit. The hammer is first able to clamp onto a pile, vibrate the pile, stop vibration and unclamp from the pile. Two different types of hydraulic circuits are used to perform these functions.

The hydraulic clamp assembly is operated by the use of a pressure compensated piston pump and directional control valve. This pump is bolted to a mounting pad on the engine. Hydraulic fluid from the reservoir first passes through a suction strainer and then into a suction hose before entering the clamp pump. The hydraulic fluid leaving the pump is directed to the directional control valve. The directional control valve is shifted by the use of 24 volt solenoid operators. The pressure compensator on the pump is set at 2750 PSI. When this pressure has been reached in either the clamp open or clamp close function, the pressure compensated pump will destroke and maintain itself in a zero flow condition. If any additional fluid is required the pump will respond to this need and again send fluid to the clamp open or clamp close function. There is also a pressure relief valve contained within the clamp directional control valve to act as a safety feature in case of a malfunction within the pressure compensator on the pump. The clamp circuit of the V-52/HP-700A system also has a pilot operated check valve on the clamp cylinder. In the event of a broken clamp hose or other loss of clamp pressure the check valve will maintain clamp pressure on the pile.

The two hydraulic motors on the V-52 hammer are powered by two piston pumps operating in a closed loop circuit.

V. START UP PROCEDURES (CONTINUED)

F. HYDRAULIC CIRCUITRY (CONTINUED)

The pumps are stroked from the zero position by the means of a hydraulic pilot signal. The signal is received from a small, 24 volt solenoid operated directional control valve which is either located on the power unit skid or included as an integral part on each pump. Each pump has its own charge pump built into the pump housing and a pressure limiter system which destrokes the pump when a maximum pressure has been reached. Hydraulic fluid returning from the V-52 hammer motors is directed through a hydraulic filter before returning to the pumps. The filters are located just inside of the power unit. Charge pressure oil on each of the pumps is directed through a spin on type filter located on the bottom of the pump. Warm hydraulic fluid is split off from each of the closed loop circuits through a hot oil shuttle valve. The hot oil shuttle valve is piggy-back mounted to a manifold which also supports the hydraulic filters. Warm oil from the shuttle valves is directed through the pump cases and into a hydraulic oil cooler located in front of the engine radiator. Oil is then routed from the cooler back to the hydraulic reservoir.

G. START UP LIST

1. Open all enclosure doors except for the small doors located beneath the control panel.

2. Check engine water, fuel, and shut down solenoid to be sure it's locked in the proper position. Check hydraulic fluid.

3. Connect electrical pendant if the hammer will be operated from the remote pendant position.

4. Turn the control panel power switch to the remote or panel position. The remote pendant should not be connected if the hammer is being operated from the controls located on the control panel. A green lamp on the control panel will indicate that the power is on.

5. Start the engine at an idle speed of 700 - 800 RPM. Allow the engine to idle until charge pressure registers on the gauges. Check engine oil pressure.

6. Run the engine at part throttle for approximately five minutes for warm-up. It may be necessary to run the engine longer in cold weather conditions. After engine warm-up is completed bring engine speed up to the operating speed of 2100 RPM. Some of the enclosure side doors may be closed at this time if desired.

7. Check the charge pressure gauges to be sure that the gauges register between 300 - 400 PSI.

8. Lift the hammer vertically off the ground.

9. Turn clamp switch on the pendant (or the panel) to the closed position, the clamp should close.

10. Check clamp pressure gauge to verify adequate clamping force (2500 - 2750 PSI). Bleed the clamp cylinder at the outboard end with the vent screw. **(CAUTION: Do not back the bleeder vent screw out all the way, oil and air will come out of the bleeder, let it run until you have a free stream of oil.)**

V. START UP PROCEDURES (CONTINUED)

G. START UP LIST (CONTINUED)

11. Operate the clamp switch on the pendant (or the panel) to the open position and bleed the inboard vent screw in the same manner.

12. Failure to bleed the clamp circuit may impair clamping force.

13. After all the preceding steps have been taken hold the hammer vertically in the air to check the lubrication oil level in the exciter case. Sight glasses are located on the side of the exciter case. This level should be checked twice per day.

14. Control panel power switch will determine which hammer controls will be functional (remote pendant or panel).

15. Hammer start push button will become illuminated when adequate clamp pressure has been attained. If the button is not illuminated the hammer will not start.

VI. OPERATING INSTRUCTIONS

A. OPERATING THE V-52/HP-700A SYSTEM - DRIVING MODE

1. With a preset pile, the V-52 hammer with the clamp jaws open is hoisted above, entered over and lowered onto the pile head section which is to be gripped.

CAUTION: BEFORE CLOSING THE JAWS, ASSURE THAT THE PILE HEAD IS ENTERED COMPLETELY INTO THE OPENING BETWEEN THE JAWS. GRIPPING THE PILE WITH MERELY THE LOWER END OF THE JAWS WILL PUT UNNATURAL STRESSES ON THE JAWS AND CLAMP SYSTEM RESULTING IN POTENTIAL FAILURE OF THE JAWS, THE CLAMP SLIDE AND/OR OTHER CLAMP ASSEMBLY COMPONENTS.

2. The clamp jaws will close upon the pile by operating the clamp close switch on either the remote pendant or panel. A built in pilot operated check valve system in the clamp cylinder assures that the jaws remain locked until powered in the opposite direction.

3. A pile is driven with the V-52 hammer by completely relaxing the hoist line after clamping the V-52 to the pile.

4. The V-52/HP-700A hydraulic driver/extractor system responds as follows to an overload from the pile-soil system. When a pile can be moved no further and the hydraulic fluid pressure is at a maximum, the pressure limiters on the hydraulic pumps will destroke and slow down the V-52 frequency.

5. The addition of driving weight to the suspension of the V-52 hammer may help to acquire some additional pile penetration. When a pile slows to a point of little movement however, the user will usually find it economically wise to discontinue trying to use the vibratory hammer and switch to some other driving system, such as a MKT diesel or steam/air impact hammer.

6. Occasionally the inability of the V-52 hammer to continue to move a pile will be the result of the pile striking an impenetrable soil material or obstruction. The observable action of the V-52 hammer and clamped pile will be noted by a considerable fall-off of drive pressure and the exciter will "dance" in place. This "dancing" often causes an erratic interaction of the V-52 exciter and its suspension assembly.

CAUTION: WHENEVER THE V-52 HAMMER IS OBSERVED "DANCING" IN PLACE, IT SHOULD BE HOISTED UNTIL THE ACTION STOPS. SERIOUS DAMAGE MAY BE DONE TO THE V-52 HAMMER IF IT IS OPERATED IN THIS TYPE OF CONDITION.

To continue operation the obstruction must be removed or penetrated by switching to another driving system, such as a MKT diesel or steam/air impact pile hammer.

VI. OPERATING INSTRUCTIONS (CONTINUED)

B. OPERATING THE V-52/HP-700A SYSTEM - EXTRACTING MODE

1. A pile is extracted by merely tensioning the V-52 hammer hoisting line. The amount of pull which can be exerted on the V-52 hammer and extraction is limited by the rating of the suspension assembly and the tensile strength of the pile.

CAUTION: DO NOT PULL IN EXCESS OF THE RATING OF THE V-52 HAMMERS SUSPENSION ASSEMBLY OR EXCESS STRESSES WILL BE PUT ON THE SUSPENSION ASSEMBLY DAMAGING ONE OR MORE PARTS.

EXTREME CARE MUST BE TAKEN DURING THE EXTRACTION PROCESS DUE TO THE HIGH LINE PULL FORCE APPLIED BY THE PULLING CRANE. THE REACTION DUE TO A SUDDEN LOSS OF LOAD WILL TYPICALLY CAUSE THE CRANE BOOM TO FALL BACKWARDS ACROSS THE CRANE CAB CAUSING SEVERE DAMAGE TO THE CRANE AS WELL AS POSSIBLE SERIOUS INJURY TO JOB PERSONNEL. A SUDDEN LOSS OF LOAD COULD BE CAUSED BY A PARTED CRANE LINE, UNEXPECTED LOSS OF CLAMPING FORCE, OR SEPARATION OF THE PILE AT THE AREA HELD WITHIN THE CLAMPING JAWS. ("BITTING THE TOP OUT OF THE PILE")

A SECOND CRANE LINE SHOULD BE ATTACHED TO AN ADJACENT PILE ("DEAD MAN") AND DRAWN TIGHT AS A PRECAUTIONARY MEASURE AGAINST A SUDDEN LOSS OF LOAD. CRANES USED FOR PILE EXTRACTION APPLICATIONS SHOULD ALWAYS BE EQUIPPED WITH BOOM STOPS.

2. The ability of the V-52 hammer to switch instantly from driving to extracting mode by merely pulling on its hoist line, has evolved a pile driving procedure exclusive to vibratory usage. A hammer hanging on the number one crane line is swung into the air. A sheet pile, for example, is lifted from the ground on the number two crane line so that the head of the pile is pulled between the clamp jaws of the hammer. The jaws are then closed and the number two line is slacked. Both hammer and pile are then held by the number one line. The pile is stabbed in its location with the hammer. The hammer is then turned on and the pile is worked into the ground. Usually out of plumb at the outset, the pile is alternately driven and extracted until it penetrates the soil sufficiently to be self-supporting. It is then pulled far enough to be straightened plumb and quickly driven. (Sheet piles are usually driven only a few feet and the adjacent pile is set.)

3. For pile extracting operations, a V-52 hammer is frequently fitted with a shackle and a short auxiliary line attached to the crane hook. The V-52 hammer is clamped to a steel sheet pile to be pulled and the shackle is fastened into the lifting hole in the pile. The V-52 hammer is operated to extract the pile until the pile can easily be lifted out of place exclusively by the line pull of the crane. The V-52 hammer is then stopped by depressing the stop push button. The pile is then pulled out of the ground and the hammer and pile swung to where the pile will be stacked. The lower end of the pile is set on the ground and the V-52 hammer jaws are opened allowing the pile head to fall away from the jaws and hang by the line and shackle. The V-52 hammer and dangling pile are lowered to the ground where the shackle is disconnected from the pile.

VI. OPERATING INSTRUCTIONS (CONTINUED)

C. SYSTEM SHUT DOWN PROCEDURES

1. Stop hammer and open jaws.

2. Reduce engine speed to idle (700 - 800 RPM) and allow to idle for several minutes.

3. To stop engine turn engine start switch to the off position.

4. Turn the main power selector switch on the control panel to the off position. The green indicator light on the panel will go off.

VII. MAINTENANCE AND SERVICE INSTRUCTIONS

A. The V-52 hammer and the HP-700A hydraulic power unit should be inspected regularly to help keep it in good operating condition. The time interval between necessary adjustments and repairs depends primarily on how much and how hard the machine has been used. Repair or replace broken or damaged parts as soon as they are discovered. Periodic cleaning and repainting will help keep all parts in better working order and prolong the machine's life.

B. Maintenance procedures for the diesel engine in the HP-700A are described in the engine manufacturers manual.

C. Proper maintenance of the total V-52/HP-700A system begins with cleanliness; assuring that no dirt or foreign material enters the hydraulic fluid circuit. Contamination of the components of the hydraulic system - pumps, motors, valves, etc., will result in erratic operation, down time, shortened equipment life, damaged parts and expensive repair or replacement costs.

To trap foreign material, which might inadvertently enter, the hydraulic circuit the V-52/HP-700A system contains several filters and strainers. The spin-on type charge filter elements located on each main hydraulic pump should be changed after the initial fifty (50) hours of driving time or after the hydraulic fluid has been changed. During normal operation, these filter elements should be changed at least two (2) times per year or after every 200 hours of driving time.

The main hydraulic filters, filter the hydraulic oil in the closed-loop system before it re-enters the main hydraulic pumps. These filter elements should also be changed on the intervals given for the charge filter elements mentioned above. The main filters also have a visual indicator which will show if the filters are clogged and in a bypass condition. If the hydraulic oil is bypassing these filters a red band will be visible under the transparent dome of the indicator.

The hydraulic oil in the reservoir passes through a suction strainer before it enters any of the pumps. These strainers should be cleaned whenever the hydraulic tank is serviced.

VII. MAINTENANCE AND SERVICE INSTRUCTIONS (CONTINUED)

D. The hydraulic fluid in the system should be maintained at all times. Leaks in the hydraulic system, particularly noticeable after transport and set up of this system, should be eliminated by checking and retightening the leaking parts. Hose connections may leak as a result of manipulating and straightening the lines and should be promptly tightened. **THE CAUSE OF HYDRAULIC LEAKS WHICH CANNOT BE CORRECTED SHOULD BE ELIMINATED BY CALLING FOR FACTORY AUTHORIZED DISTRIBUTOR SERVICE ASSISTANCE.**

1. Check the hydraulic fluid level on the HP-700A tank gauge before and during operation of the V-52/HP-700A system. **DO NOT OPERATE THE V-52/HP-700A SYSTEM IF THE HYDRAULIC FLUID REGISTERS BELOW THE TANK FLUID GAUGE.**

2. In normal, safe operation of the V-52/HP-700A system, the hydraulic fluid temperature should remain in its typical range of 115 degrees Fahrenheit to 165 degrees Fahrenheit. This temperature can be read on the thermometer located on the control panel.

CAUTION: IF THE HYDRAULIC OIL TEMPERATURE BECOMES EXCESSIVE (ABOVE 180 DEGREES FAHRENHEIT) STOP OPERATIONS AND CONSULT WITH THE NEAREST FACTORY AUTHORIZED SERVICING DISTRIBUTOR.

A temperature switch will automatically turn on a red light on the control panel if the temperature reaches 170 degrees Fahrenheit.

E. Make a daily check of all hoses in the hydraulic hose bundle for cuts or other damage. Hoses are sometimes cut or bruised by dragging them across pile heads while setting the V-52 hammer. Stop V-52 hammer operations that may cause damage to the hoses and redirect the hose bundle to avoid dragging and damage. Damaged hose sections must be replaced to eliminate failure and down time during operations.

F. Inspect the V-52 hammer for normal hanging posture and loosened fasteners, particularly on the suspension and clamp assemblies before and during operation.

SAFETY WARNING: STAND AWAY FROM THE PILE AND FROM BELOW THE V-52 DURING VIBRATING OPERATIONS. ANY UNOBSERVED, UNCORRECTED, LOOSE NUT OR OTHER FASTENER MAY FALL.

G. Assure that the proper lube oil level is maintained in the V-52 exciter case. If the level of oil is above the sight gauge or the lube oil volume is increasing, this may be an indication that the hydraulic motors are leaking hydraulic fluid through the motor drive shaft seals. Any seal leakage must be corrected immediately. The mixture of hydraulic oil and lube oil is not a lube problem but the increasing level will add load to the rotating eccentrics and cause excessive foaming.

The lube oil in the V-52 exciter case should be changed after every 50 hours of driving time. See page 17 for exciter case lube oil specifications.

VII. MAINTENANCE AND SERVICE INSTRUCTIONS (CONTINUED)

H. The V-52/HP-700A system normally has the hydraulic reservoir, hose bundle and hammer lines filled with hydraulic fluid. Whenever the system has been completely or partially drained (as when a new hose bundle section is replaced in the hose bundle), the hydraulic lines must be purged of air.

I. Daily maintenance checklists - Check the entire unit prior to and during start up of each shift.

1. Prior to starting the engine at each shift, check as follows:

a. Make all daily lubrication and preventive maintenance checks indicated in the engine manufacturer's operating and maintenance manual.

b. Check the hydraulic fluid level before starting the engine. Recheck this level after filling the lines to be sure it remains in the safe operating range. Do not operate the unit with the hydraulic fluid level below the gauge.

c. 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 disconnects.

d. Look for any damage to the unit, in general that might cause it to fail when put into operation.

e. Be sure there is fuel in the tank.

f. Be sure there is cooling fluid in the radiator.

g. Check the V-52 exciter case lube oil level.

h. Check the V-52 clamping jaws for excessive wear, cracks or loose fasteners. If it is necessary, the removal of the movable jaw is done by pushing out the 3/4" roll pin. The single vertical roll pin captivates the movable jaw. The fixed jaw is held tight against the housing with two 1" bolts. Also, operating the V-52 on piling without the jaw shields could result in jaw damage if the hammer is dropped onto the pile.

WARNING: DO NOT START THE POWER UNIT IF THE CLAMP PUMP HAS BEEN INOPERABLE FOR A LONG PERIOD OF TIME WITHOUT FIRST CHECKING TO BE SURE THAT THE PUMP IS PRIMED (THE PUMP CASE IS FULL OF OIL). THIS WILL PREVENT THE STARTING OF THE PUMP WITHOUT LUBRICATION WHICH CAN CAUSE PUMP DAMAGE. TO CHECK THE CLAMP PUMP REMOVE THE DRAIN HOSE AND VISUALLY DETERMINE IF THE CASE IS FULL OF OIL. IF OIL MUST BE ADDED TO THE PUMP FOR PRIMING, EXTREME CARE MUST BE TAKEN WITH THE CLEANLINESS OF THE POURING CONTAINER, FUNNEL, HOSE AND ADAPTERS. THE OIL BEING INTRODUCED TO THE SYSTEM BY PRIMING SHOULD PASS THROUGH A 10 MICRON FILTER.

i. Check all fasteners to assure that they are tight

VII. MAINTENANCE AND SERVICE INSTRUCTIONS (CONTINUED)

2. After start up and operation of the V-52 hammer, check as follows:

   a. Inspect the hydraulic lines for leaks.

   b. Inspect the oil seal areas in the pump drive and control valves for leaks.

   c. Allow hydraulic oil temperature to come up slightly above the pour temperature, preferable to 30 degrees Fahrenheit before starting the hammer.

   d. Before attaching to a pile, open and close the clamp jaws to verify fast and positive action.

   e. Be sure that there are no kinks in the hydraulic lines and that they hang uniformly.

   f. Always maintain a close check on the lifting cable to assure no fraying has occurred.

   g. Check for overheated bearing housings.

J. The HP-700A hydraulic reservoir, V-52 exciter case and HP-700A pump drive have been filled with the proper fluids at the factory. Use the following list for adding fluids that are compatible with those used at the factory.

   1. HP-700A Hydraulic Fluid
      Shell Tellus S 32. . . . . Capacity - 200 Gallons

   2. V-52 Lube Oil
      Shell Omala RL 220. . . . . Capacity - 10.0 Gallons

   3. HP-700A Pump Drive
      Sunfleet GL-5-90 or equivalent

K. Normal gauge reading during operation of the HP-700A hydraulic power unit:

   1. Engine Speed - 2,100 RPM
   2. Drive Pressure - 1,200 to 5,000 PSI
   3. Clamp Pressure - 2,750 PSI
   4. Hydraulic Charge Pressure - 300 to 400 PSI
   5. Hydraulic Oil Temperature - 115 degrees Fahrenheit to 165 degrees Fahrenheit

L. Hydraulic filters and V-52 lube oil change intervals:

   1. Main pump charge filter elements (2)
      a. Change after initial 50 hours of driving time or after the hydraulic oil has been changed.
      b. Change at least two times per year or after every 200 hours of driving time.

VII. MAINTENANCE AND SERVICE INSTRUCTIONS (CONTINUED)

2. Main hydraulic filters (2)

   a. Change after initial 50 hours of driving time or after the hydraulic oil has been changed.
   b. Change at least two times per year or after every 200 hours of driving time.

3. V-52 exciter case lube oil

   a. Change after every 50 hours of driving time.

M. In general the field service that is done by the operators of the V-52/HP-700A is limited to a daily maintenance. The drawings and related parts for identification given in this manual are for reference while discussing troubles or symptoms of trouble with the service department of your authorized distributor. Many times the troubles are minor and corrections can be made by consulting with and being directed by your authorized distributor.

CAUTION: ADJUSTMENT OF THE FACTORY SET VALVES AND PUMPS OF THE V-52/HP-700A SYSTEM SHOULD ONLY BE MADE BY A FACTORY AUTHORIZED DISTRIBUTOR SERVICE REPRESENTATIVE. ATTEMPTS TO RANDOMLY MAKE SUCH ADJUSTMENTS MAY SERIOUSLY MISADJUST THE ENTIRE SYSTEM AND THEREBY VOID THE EQUIPMENT WARRANTY.

N. The HP-700A requires **ROTELLA ELC EXTENDED LIFE COOLANT/ANTIFREEZE,** top off with only Rotella ELC 50/50 Extended Life Coolant/Antifreeze. **DO NOT ADD CONVENTIONAL COOLANTS OR SCA'S**

VIII. FILTER PART NUMBERS

A. HYDRAULIC FILTERS

DESCRIPTION	MKT PART NUMBER	QUANTITY
Main Return Filter Element	9310855	2
Charge Filter	9440215	2

B. ENGINE FILTERS

DESCRIPTION	MKT PART NUMBER	QUANTITY
Oil Filter	9440229	1
Primary Fuel Filter	9440251	1
Air Filter - Primary	9440252	1

IX. DRAWINGS AND PARTS LISTS

This manual includes the following drawings and parts lists:

A. V-52 GENERAL ASSEMBLY AND PARTS LIST

B. HYDRAULIC CLAMP ASSEMBLY AND PARTS LIST

C. ECCENTRIC SHAFT ASSEMBLY AND PARTS LIST

D. MOTOR SHAFT ASSEMBLY AND PARTS LIST

E. 150' HYDRAULIC HOSE BUNDLE ASSEMBLY AND PARTS LIST

F. HP-700A GENERAL ASSEMBLY AND PARTS LIST

G. HP-700A CONTROL PANEL ASSEMBLY AND PARTS LIST

H. HP-700A ELECTRICAL CONTROL ASSEMBLY AND PARTS LIST

I. REMOTE PENDANT/CABLE ASSEMBLY AND PARTS LIST

J. HP-700A ELECTRICAL SCHEMATIC

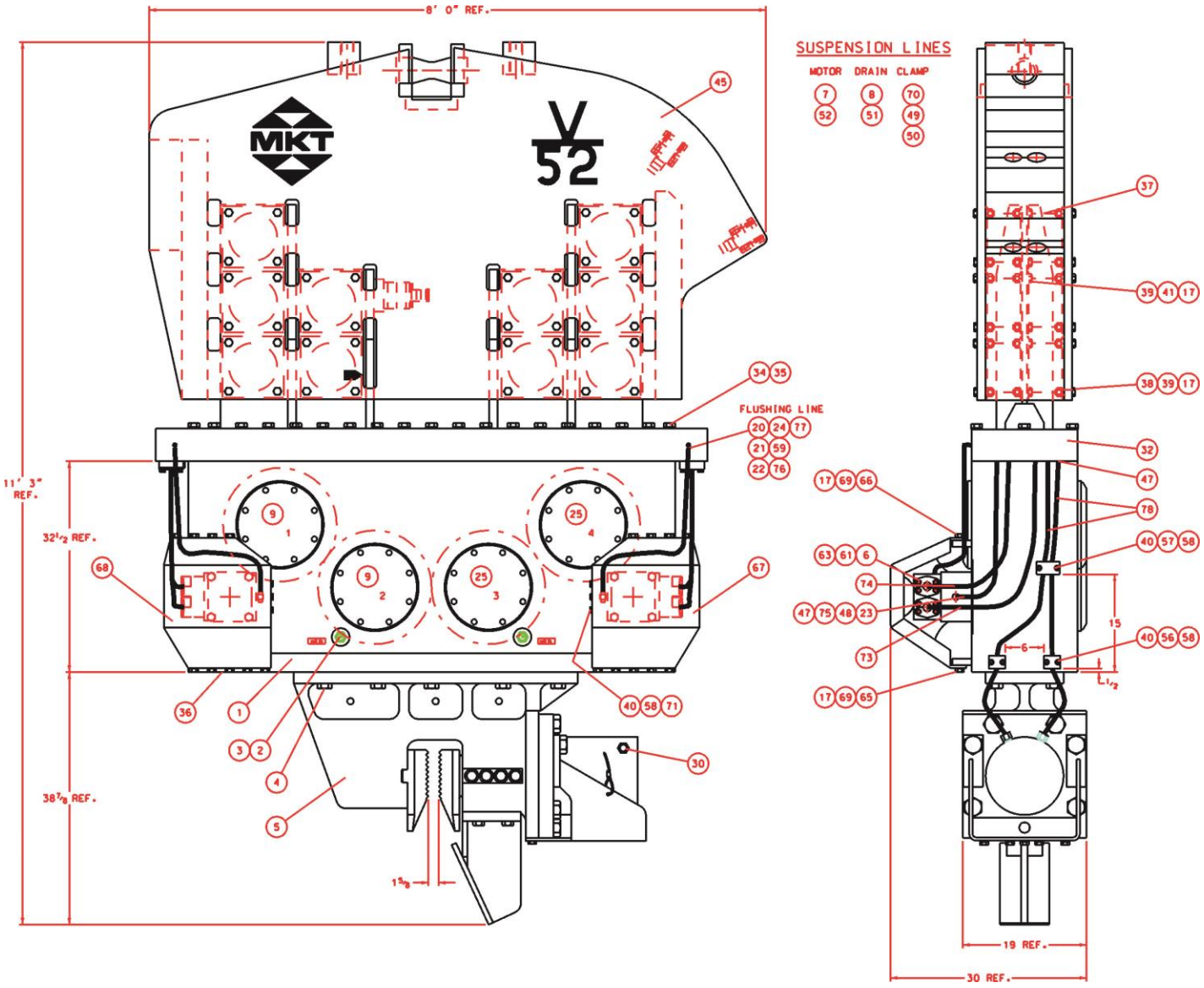
K. DUVAC II MULTI-VOLTAGE ENGINE WIRING SCHEMATIC

L. V-52/HP-700A HYDRAULIC SCHEMATIC AND PARTS LIST

This information is included for the user to have a point of reference while discussing trouble shooting actions with the service department of his factory authorized distributor. Call your nearest MKT factory authorized distributor to remedy any abnormal occurrences in the operation of your V-52/HP-700A system.

Successful internal repairs and general overhaul of a V-52/HP-700A hydraulic vibratory pile driver/extractor system must be handled as a clean shop procedure. MKT factory authorized distributors are properly equipped and should be contacted to provide such service.

For the name of the nearest MKT factory authorized distributor call **MKT Manufacturing, Inc., St. Louis, Missouri. 314/388-2254.**


8' 0" REF.
SUSPENSION LINES
MOTOR DRAIN CLAMP
7 8 70
52 51 49
50
MKT
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39 41 17
38 39 17
34 35
FLUSHING LINE
20 24 77
21 59
22 76
32
47
78
17 69 66
63 61 6
74
47 75 48 23
73
17 69 65
40 57 58
40 56 58
15
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1 1/2
11' 3" REF.
32 1/2 REF.
38 7/8 REF.
68
67
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3 2
4
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40 58 71
30
1 5/8
19 REF.
30 REF.

PARTS LIST
V-52 GENERAL ASSEMBLY
(431 00 00)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
1	430 00 02	EXCITER HOUSING	1
2	931 04 79	OIL RITE WINDOW	2
3	405 01 00	NAMEPLATE	2
4	901 63 13	HEX HEAD CAP SCREW	10
5	430 01 47	HYDRAULIC CLAMP ASSEMBLY	1
6	923 09 50	FLANGE KIT	8
7	923 11 20	FLANGE KIT	2
8	923 05 56	ADAPTER	1
9	419 00 15	ECCENTRIC SHAFT ASSEMBLY	2
10	419 00 13	COVER, MOTOR SHAFT	2
11	905 07 09	SOCKET HEAD CAP SCREW	12
12	913 02 20	O-RING	2
13	914 01 27	ROLLER BEARING, PINION	4
14	419 00 09	PINION & SHAFT	2
15	430 00 24	GASKET, HYDRAULIC MOTOR	2
16	901 59 17	HEX HEAD CAP SCREW	8
17	903 06 10	LOCKWASHER	146
18	902 05 15	FLAT WASHER	8
19	910 00 70	HYDRAULIC MOTOR	2
20	923 05 43	ADAPTER	2
21	923 03 13	ADAPTER	2
22	405 02 83	DRAIN RELIEF (80 PSI)	2

PARTS LIST
V-52 GENERAL ASSEMBLY
(431 00 00)

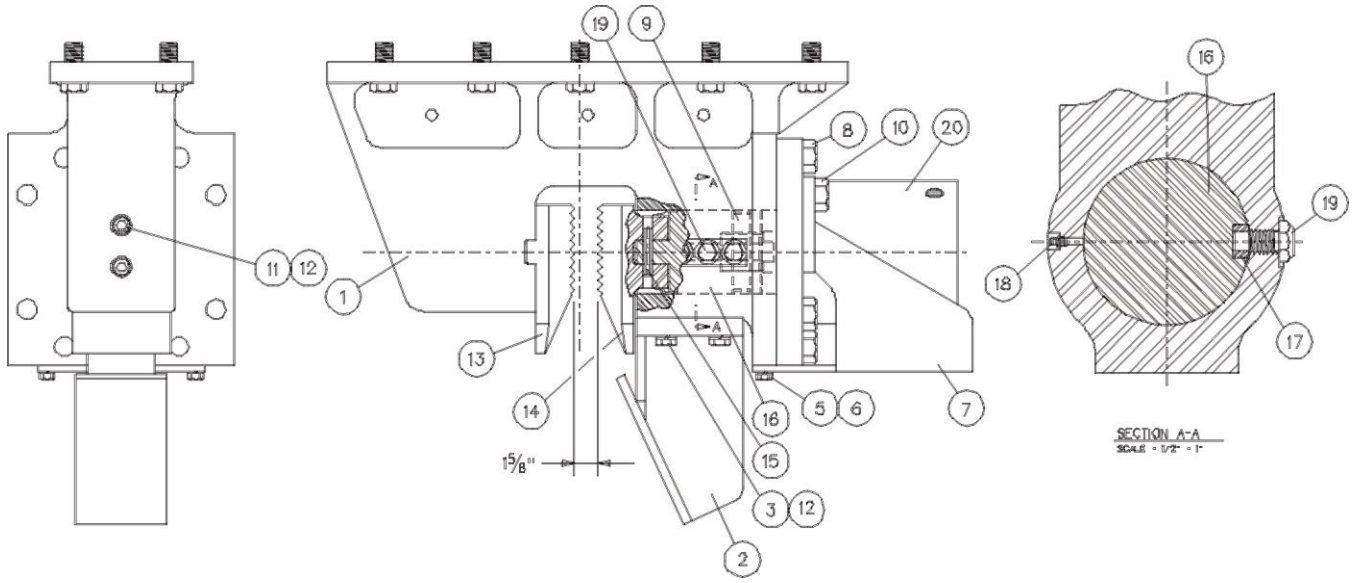
ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
23	923 12 53	ADAPTER	2
24	923 12 08	ADAPTER	2
25	419 00 16	ECCENTRIC SHAFT ASSEMBLY	2
26	419 00 12	BEARING COVER	8
27	914 01 25	ROLLER BEARING, ECCENTRIC	8
28	913 02 21	O-RING	8
29	905 07 11	SOCKET HEAD CAP SCREW	64
30	923 11 23	ADAPTER	2
31	930 00 80	PIPE PLUG	1
32	431 00 04	SUSPENSION BASE	1
33	942 00 11	RELIEF FITTING	1
34	901 61 37	HEX HEAD CAP SCREW	40
35	903 06 12	LOCKWASHER	40
36	931 00 02	MAGNETIC PLUG	4
37	941 00 14	SHEAR BLOCK	20
38	901 59 23	HEX HEAD CAP SCREW	80
39	900 50 07	HEX NUT	120
40	903 06 08	LOCKWASHER	12
41	901 59 19	HEX HEAD CAP SCREW	44
42	405 01 02	NAMEPLATE, LUBE FILL	1
43	099 06 00	NAMEPLATE, EAR PROTECTION	1

PARTS LIST
V-52 GENERAL ASSEMBLY
(430 11 00)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
44	943 02 82	HOSE CLAMP	9
45	430 11 23	SUSPENSION HOUSING	1
46	499 02 13	NAMEPLATE, MODEL & SERIAL NO.	1
47	923 00 73	ADAPTER	6
48	923 05 79	ADAPTER	4
49	923 05 54	ADAPTER	2
50	431 00 24	C.O. & CC SUSPENSION-135”	2
51	430 00 25	DRAIN SUSPENSION – 135”	1
52	430 11 14	MOTOR LINES SUSPENSION-141”	2
53	430 10 14	HYD. HOSE BUNDLE	1
56	430 10 06	HOSE BLOCK	2
57	430 11 07	HOSE BLOCK	1
58	901 57 13	HEX HEAD CAP SCREW	12
59	436 01 38	ORIFICE FITTING	2
61	950 01 23	HEX HEAD CAP SCREW, METRIC	16
63	903 06 19	LOCKWASHER	16
64	923 00 40	ADAPTER	2
65	416 01 21	MOTOR GUARD SUPPORT	2
66	431 00 07	MOTOR GUARD SUPPORT	2
67	431 00 05	MOTOR GUARD RH	1
68	431 00 06	MOTOR GUARD LH	1

PARTS LIST
V-52 GENERAL ASSEMBLY
(430 11 00)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
69	904 59 13	HEX HEAD CAP SCREW	18
70	923 00 20	ADAPTER	2
71	900 50 05	HEX NUT	6
72	420 10 14	NAMEPLATE-OMALA RL 220	1
73	431 00 09	MOTOR LINES EXCITER - 36 ½	2
74	431 00 10	MOTOR LINES EXCITER - 30 ½	2
75	431 00 11	DRAIN LINES EXCITER - 24"	2
76	431 00 12	FLUSHING LINE – 36”	2
77	923 09 19	ADAPTER	2
77	923 12 14	ADAPTER	4
78	431 00 14	CLAMP LINES – 48”	2


19
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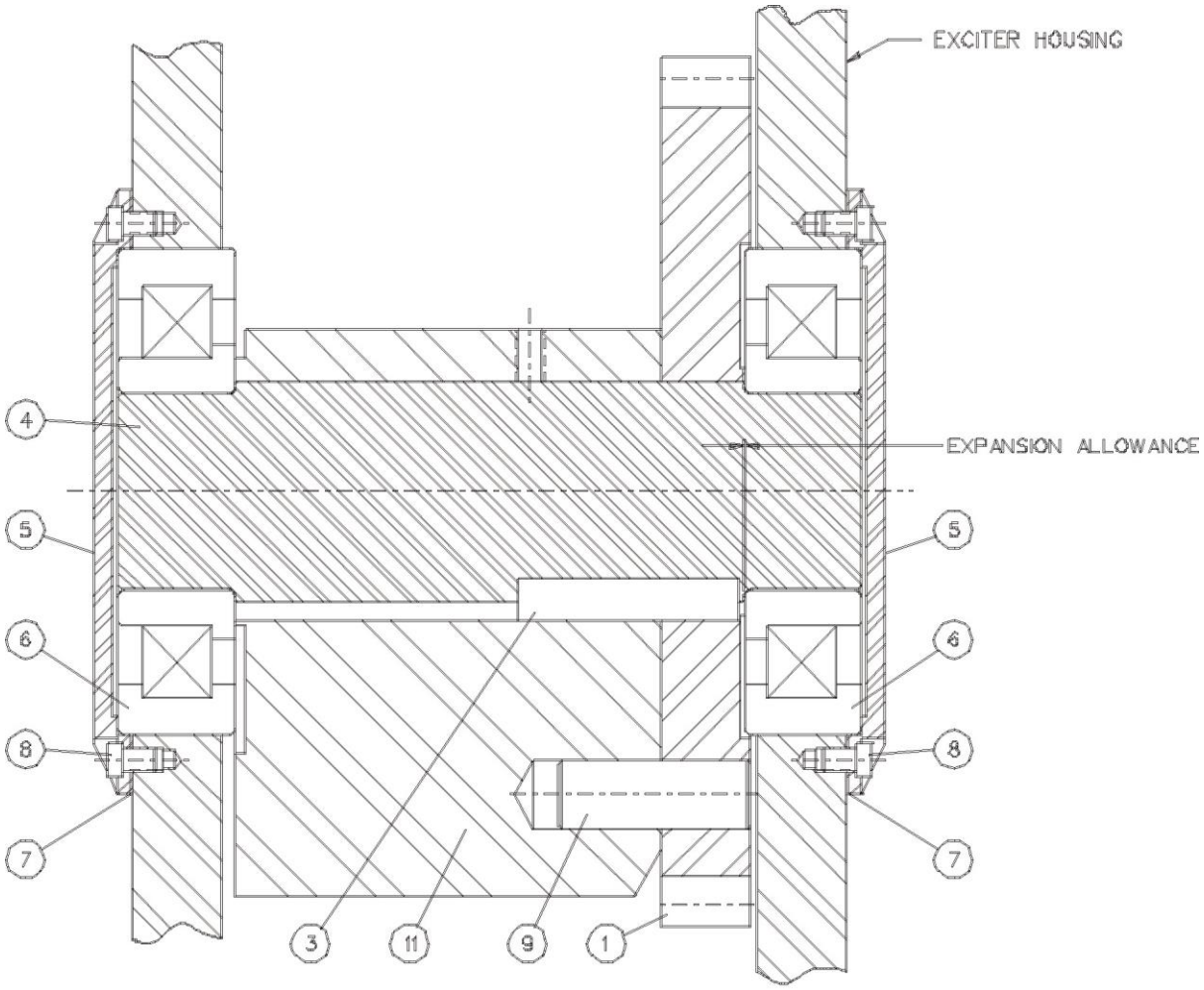
1 5/8"
SECTION A-A
SCALE - 1/2" - 1"

PARTS LIST
V-52 HYDRAULIC CLAMP ASSEMBLY
(430 01 47)

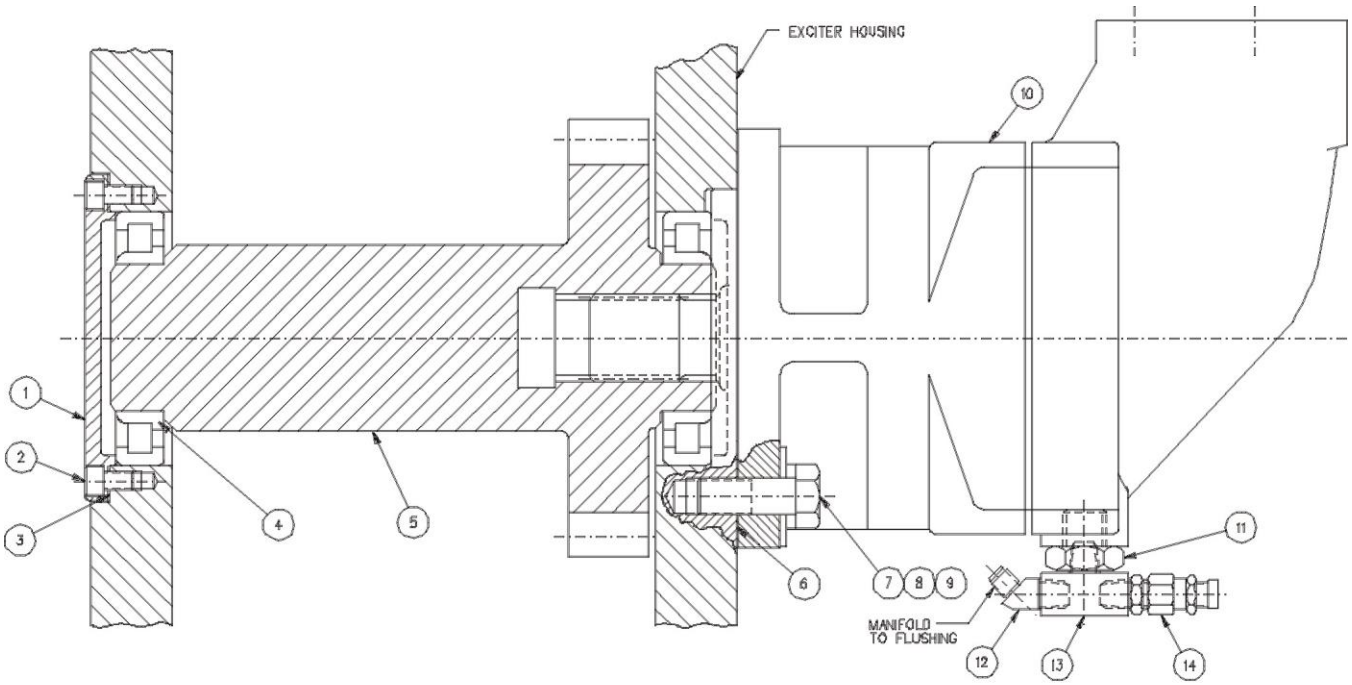
ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
1	436 00 84	CLAMP HOUSING	1
2	495 04 39	JAW SHIELD	1
3	905 11 15	SOCKET HEAD CAP SCREW	4
5	901 59 13	HEX HEAD CAP SCREW	4
6	903 01 17	LOCK WASHER	4
7	436 00 88	CYLINDER SHIELD	1
8	901 64 18	HEX HEAD CAP SCREW	6
9	430 01 48	CLAMP SLIDE PIN	1
10	901 64 24	HEX HEAD CAP SCREW	2
11	905 11 41	SOCKET HEAD CAP SCREW	2
12	903 04 21	LOCK WASHER	6
13	436 01 41	CLAMP JAW – FIXED	1
14	436 01 31	CLAMP JAW – MOVEABLE	1
15	924 00 55	SPIROL PIN	1
16	430 01 55	CLAMP SLIDE	1
17	416 01 43	SLIDE KEY	1
18	942 00 14	GREASE FITTING	1
19	430 01 57	SLIDE KEY BOLT	4
20	430 01 49	CYLINDER	1



ECCENTRIC SHAFT ASSEMBLY
V-52 VIBRATORY HAMMER

PARTS LIST
V-52 ECCENTRIC SHAFT ASSEMBLY

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
1	419 00 15	ECCENTRIC - GEAR SUB ASSEMBLY m (USING GEAR PART NUMBER 419 00 07)	1
2	419 00 16	ECCENTRIC - GEAR SUB ASSEMBLY f (USING GEAR PART NUMBER 419 00 08)	1
3	430 00 41	ECCENTRIC KEY	1
4	419 00 10	ECCENTRIC SHAFT	1
5	419 00 12	BEARING COVER	2
6	914 01 25	CYLINDRICAL ROLLER BEARING	2
7	913 02 21	O-RING	2
8	905 07 11	SOCKET HEAD CAP SCREW	12
9	430 02 27	PIN	1
10	905 10 09	SOCKET HEAD CAP SCREW (NOT SHOWN ON DRAWING)	4

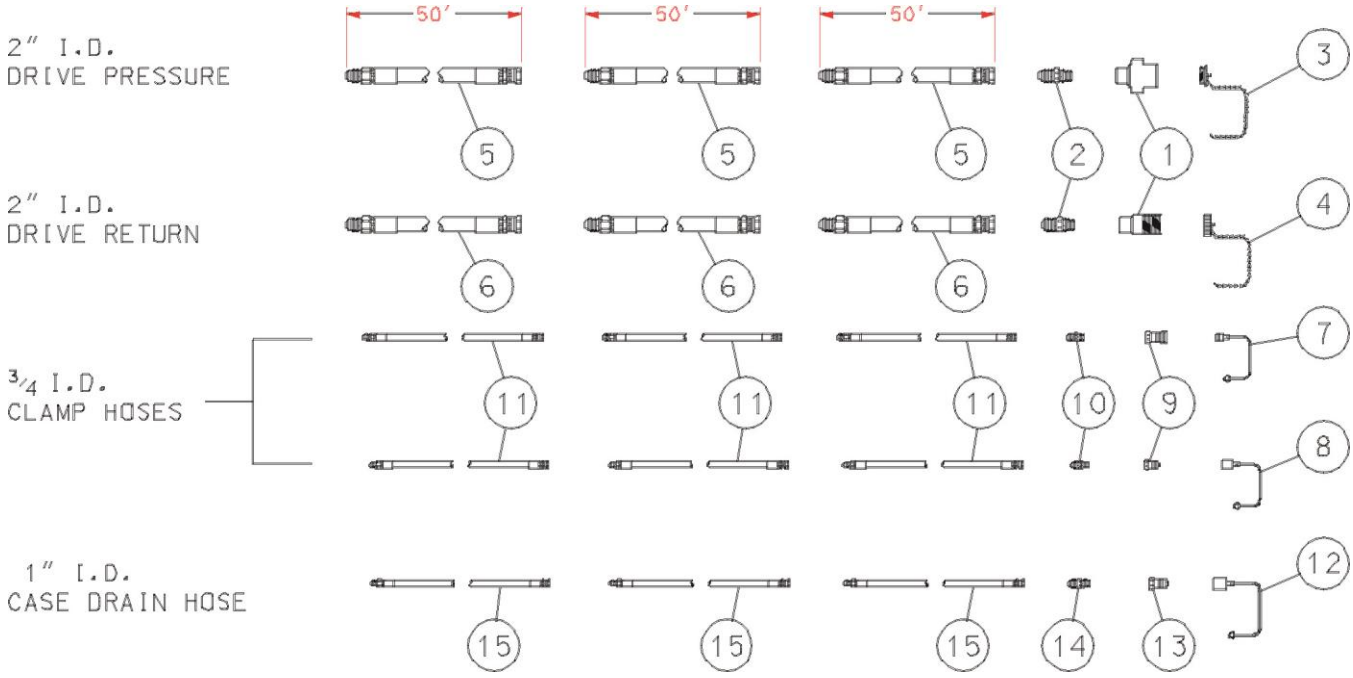


MOTOR SHAFT ASSEMBLY
V-52 VIBRATORY HAMMER

PARTS LIST
V-52 MOTOR SHAFT ASSEMBLY

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
1	419 00 13	MOTOR SHAFT COVER	1
2	905 07 09	SOCKET HEAD CAP SCREW	6
3	913 02 20	O-RING	1
4	914 01 26	SPHERICAL ROLLER BEARING	2
5	419 00 09	V22 ONE PIECE MOTOR PINION AND SHAFT	1
6	430 00 24	GASKET, HYDRAULIC MOTOR	1
7	901 59 17	HEX HEAD CAP SCREW	4
8	903 01 17	LOCKWASHER	4
9	902 01 05	FLATWASHER	4
10	910 00 65	HYDRAULIC MOTOR	1
11	430 02 28	MODIFIED PLUG	1
12	923 05 43	ADAPTER	1
13	923 03 13	ADAPTER	1
14	405 02 83	DRAIN RELIEF VALVE ASSEMBLY	1

NOTE: TWO COMPLETE ASSEMBLIES ON EACH V-52


2" I.D.
DRIVE PRESSURE
2" I.D.
DRIVE RETURN
3/4 I.D.
CLAMP HOSES
1" I.D.
CASE DRAIN HOSE
50'
50'
50'
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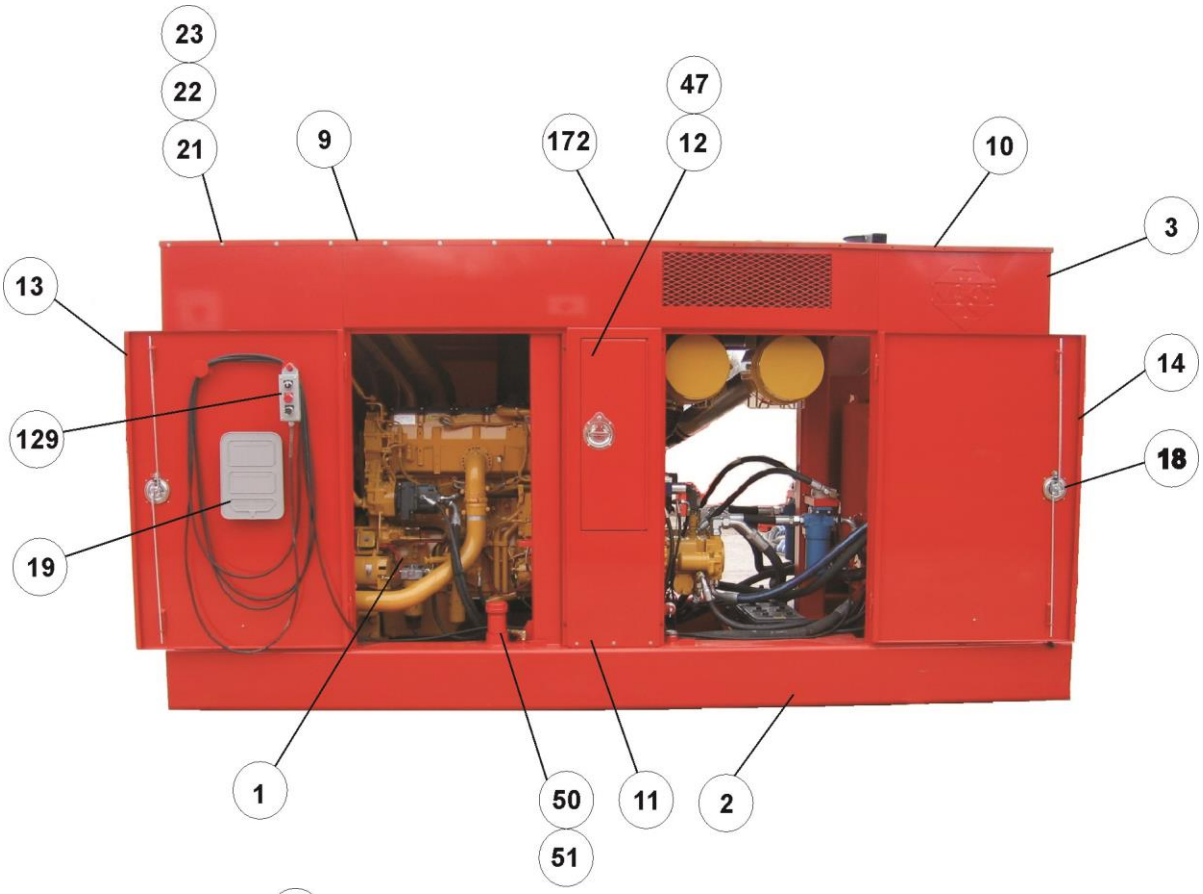
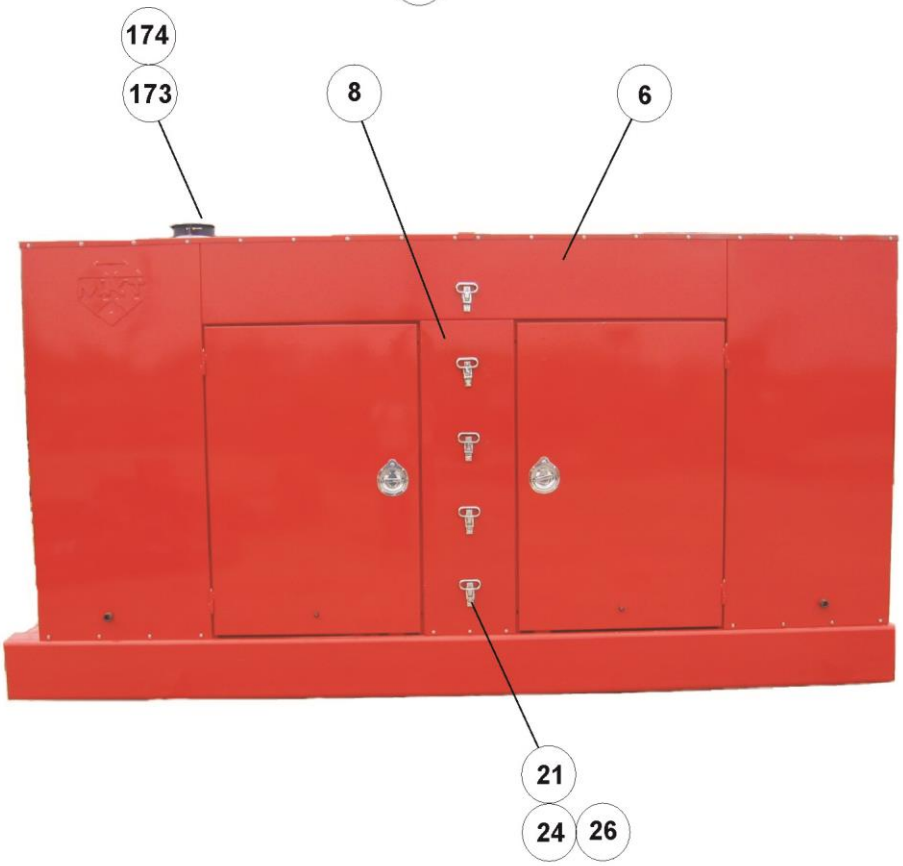
PARTS LIST
V-52/HP-700A 150' HOSE BUNDLE
(430 10 14)

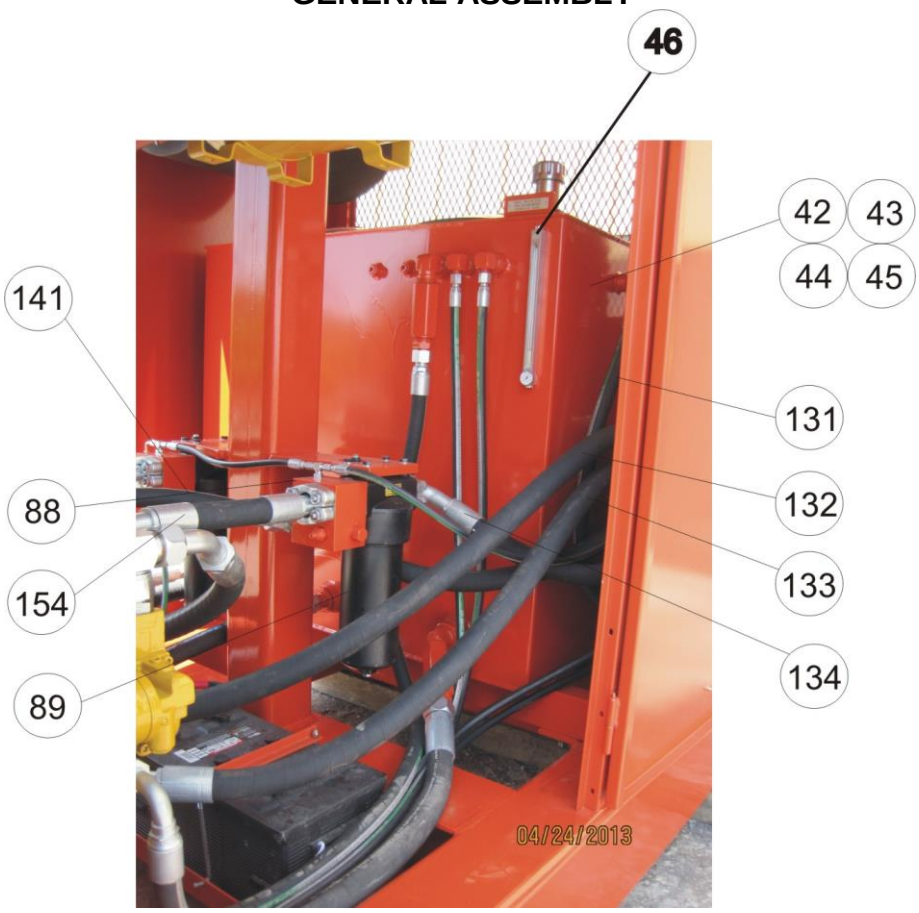
ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
1	927 00 54	QUICK DISCONNECTS	1
2	923 02 07	ADAPTER	2
3	927 00 56	DUST CAP	1
4	927 00 55	DUST PLUG	1
5	430 10 15	HOSE ASSEMBLY	3
6	430 10 16	HOSE ASSEMBLY	3
7	923 00 02	DUST PLUG	1
8	923 00 03	DUST CAP	1
9	927 00 05	CLAMP QUICK DISCONNECT	1
10	923 00 20	ADAPTER	2
11	420 00 72	HOSE	6
12	923 01 29	DUST CAP	1
13	927 00 11	QUICK DISCONNECT	1
14	923 00 40	ADAPTER	1
15	436 00 58	HOSE	3

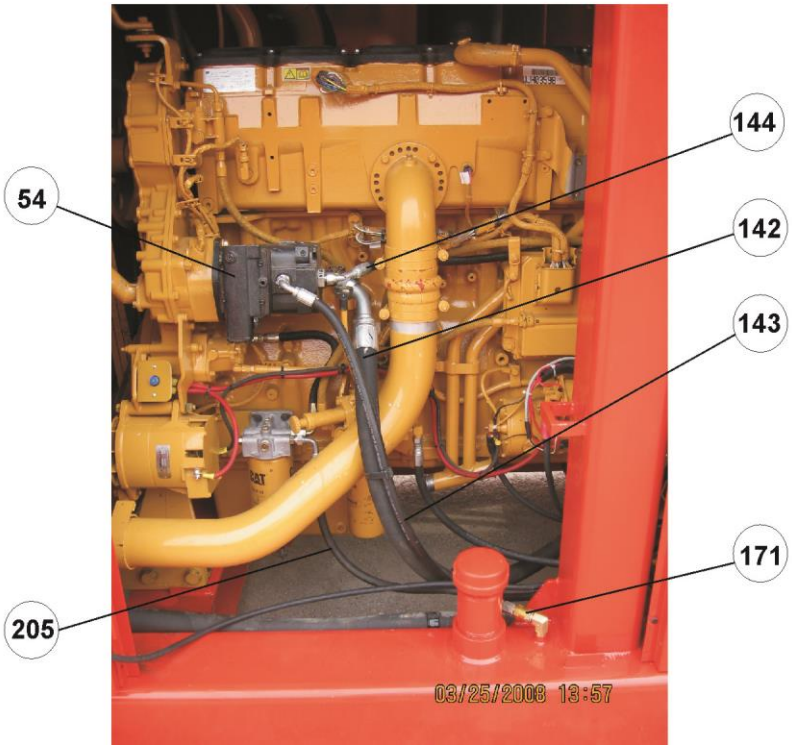
HP-700A HYDRAULIC POWER UNIT
GENERAL ASSEMBLY



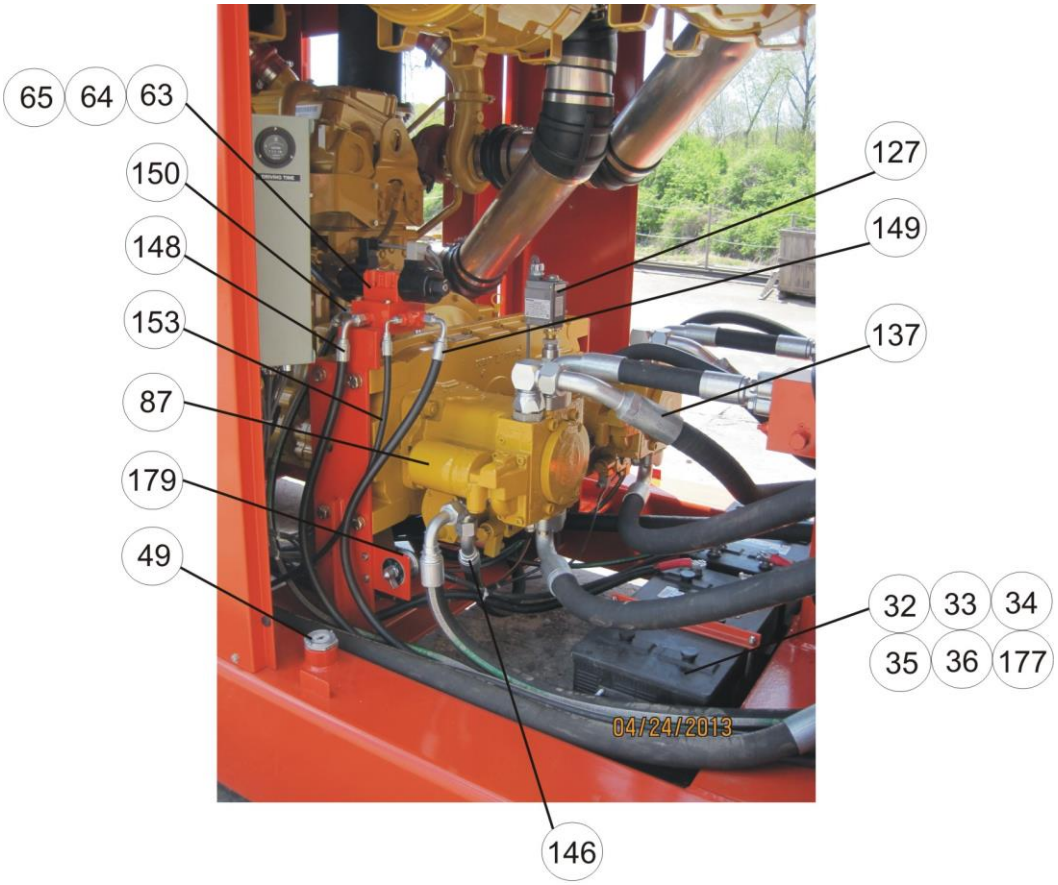


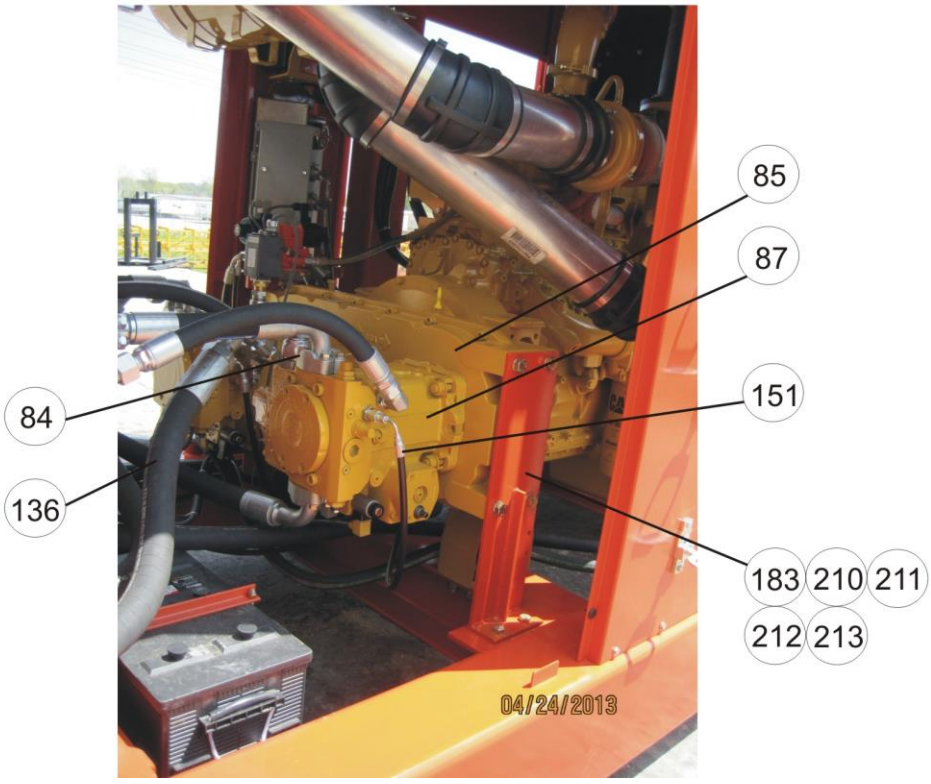
HP-700A HYDRAULIC POWER UNIT
GENERAL ASSEMBLY





HP-700A HYDRAULIC POWER UNIT
GENERAL ASSEMBLY





PARTS LIST
GENERAL ASSEMBLY
HP-700A HYDRAULIC POWER UNIT
(441 08 00)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
1	944 02 41	ENGINE	1
2	441 08 49	SKID	1
3	441 06 02	SIDE CORNER PANEL	4
4	441 06 03	REAR PANEL	1
5	441 06 04	FRONT PANEL	1
6	441 06 05	CENTER PANEL	1
7	441 08 06	CENTER PANEL	1
8	441 05 12	DOOR CENTER PANEL	1
9	441 05 13	ROOF PANEL	1
10	441 08 07	ROOF PANEL	1
11	441 05 14	DOOR CENTER PANEL	1
12	441 05 16	CONTROL PANEL DOOR	1
13	441 05 08	L.H. DOOR	2
14	441 05 09	R.H. DOOR	2
15	441 08 02	OIL COOLER MOUNT	2
16	943 04 73	HINGE	10
18	943 03 63	DOOR LOCK	4
19	946 00 27	WEATHER PROOF MAN. CASE	1
20	943 04 27	HOLE NUT	32
21	920 00 08	LOCK NUT	170

PARTS LIST
GENERAL ASSEMBLY
HP-700A HYDRAULIC POWER UNIT
(441 08 00)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
22	943 04 80	HEX HEAD CAP SCREW SS	170
23	943 04 81	FLAT WASHER SS	215
24	943 04 41	HEX HEAD FLANGE BOLT	50
25	943 04 29	DOOR HOLDER	4
26	943 04 22	FOLDING STEP	7
27	934 00 27	HYDRAULIC OIL COOLER	1
28	941 00 32	RUBBER MOUNT	10
29	900 50 02	HEX NUT	20
30	902 05 08	FLAT WASHER	10
31	903 06 05	LOCK WASHER	24
32	933 03 41	BATTERY	2
33	406 03 05	BATTERY HOLD DOWN ROD	4
34	903 06 06	LOCK WASHER	4
35	902 01 02	FLAT WASHER	4
36	920 00 18	NYLOC NUT	4
37	933 03 48	BATTERY CABLE (PER FOOT)	14
38	933 03 89	END CONNECTOR	2
39	933 03 44	POSITIVE TERMINAL	2
40	933 03 43	NEGATIVE TERMINAL	2
41	933 03 46	SHRINK TUBE	3
42	441 08 31	RESERVOIR	1

PARTS LIST
GENERAL ASSEMBLY
HP-700A HYDRAULIC POWER UNIT
(441 08 00)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
43	901 59 21	HEX HEAD CAP SCREW	4
44	920 00 09	LOCK NUT	4
45	903 06 10	LOCKWASHER	20
46	931 03 59	LEVEL GAUGE	1
47	943 04 62	DOOR LOCK	1
48	923 06 35	ADAPTER	1
49	931 02 67	FUEL LEVEL	1
50	441 05 21	FUEL FILLER	1
51	930 04 06	PIPE CAP	1
52	931 04 83	FILTER BREATHER	1
53	930 04 59	PIPE COUPLING	1
54	911 02 50	CLAMP PUMP	1
57	923 00 40	ADAPTER	1
58	923 01 92	ADAPTER	4
59	931 07 81	SUCTION STRAINER	1
60	923 08 49	ADAPTER	1
62	923 05 79	ADAPTER	2
63	931 07 86	CLAMP CONTROL VALVE	1

PARTS LIST
GENERAL ASSEMBLY
HP-700A HYDRAULIC POWER UNIT
(441 08 00)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
64	931 07 64	RELIEF VALVE CARTRIDGE	1
65	931 05 95	VALVE SUBPLATE	1
66	923 11 63	ADAPTER	2
67	923 09 17	ADAPTER	2
68	923 11 42	ADAPTER	2
69	927 00 05	FEMALE QUICK DISCONNECT	1
70	927 00 05A	MALE QUICK DISCONNECT	1
71	923 00 03	DUST CAP	1
72	923 00 02	DUST PLUG	1
73	927 00 11	FEMALE QUICK DISCONNECT	1
74	923 01 28	DUST PLUG	1
75	923 11 58	ADAPTER	1
76	927 00 54	QUICK DISCONNECT	1
77	927 00 56	DUST CAP	1
78	927 00 55	DUST PLUG	1
79	923 12 91	ADAPTER	2
80	441 08 42	MANIFOLD	2
81	923 03 15	ADAPTER	4
82	923 12 92	ADAPTER	2
84	923 09 50	FLANGE KIT	4

PARTS LIST
GENERAL ASSEMBLY
HP-700A HYDRAULIC POWER UNIT
(441 08 00)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
85	911 02 44	PUMP DRIVE	1
86	901 57 09	HEX HEAD CAP SCREW	8
87	911 01 99	MAIN PUMP	2
	933 04 92	24V COILS	2
88	931 08 48	HOT OIL SHUTTLE VALVE	2
89	931 08 47	FILTER ASSEMBLY	2
90	931 06 32	PRESSURE SWITCH	1
91	905 03 15	SOCKET HEAD CAP SCREW	4
92	920 00 07	HEX NUT	8
93	931 06 33	PRESSURE SWITCH	1
94	923 11 29	ADAPTER	2
95	923 04 42	ADAPTER	1
96	923 10 44	ADAPTER	1
97	923 11 28	ADAPTER	2
98	923 05 38	ADAPTER	2
99	931 06 87	CHECK VALVE	1
101	923 10 63	ADAPTER	1
102	923 12 19	ADAPTER	2
104	923 11 49	ADAPTER	4

PARTS LIST
GENERAL ASSEMBLY
HP-700A HYDRAULIC POWER UNIT
(441 08 00)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
105	930 04 09	BUSHING	3
106	923 11 48	ADAPTER	2
107	923 09 79	ADAPTER	4
108	931 06 92	CHECK VALVE	1
110	931 07 88	CHECK VALVE	2
111	930 04 44	PIPE TEE	1
112	923 11 13	ADAPTER	1
113	923 10 40	ADAPTER	2
114	931 05 99	SUCTION STRAINER	2
115	411 00 15	NAMEPLATE "#2 DIESEL FUEL"	2
116	411 00 20	NAMEPLATE "PRESS. TO MOTORS"	1
117	411 00 13	NAMEPLATE “DRAIN”	1
118	411 00 22	NAMEPLATE "CLAMP OPEN"	1
119	411 00 23	NAMEPLATE "CLAMP CLOSE"	1
120	411 00 21	NAMEPLATE "MOTOR RETURN"	1
122	923 10 49	ADAPTER	1
123	923 12 18	ADAPTER	1
124	923 01 33	ADAPTER	2

PARTS LIST
GENERAL ASSEMBLY
HP-700A HYDRAULIC POWER UNIT
(441 08 00)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
127	933 03 31	TEMPERATURE SWITCH	1
128	943 04 32	STAINLESS STEEL “S” HOOK	1
129	441 08 62	REMOTE PENDANT ASSEMBLY	1
131	441 07 03	HOSE ASSY (BH DRAIN TO TANK)	1
132	441 08 11	HOSE ASSY (LEFT PUMP TO BH)	1
133	441 08 12	HOSE ASSY (RIGHT PUMP TO BH)	1
134	441 08 50	HOSE ASSY (LEFT FILTER TO BH)	1
135	441 08 51	HOSE ASSY (RIGHT FILTER TO BH)	1
136	441 07 08	HOSE ASSY (RIGHT PUMP TO TANK)	1
137	441 07 09	HOSE ASSY (LEFT PUMP TO TANK)	1
138	441 08 13	HOSE ASSY (COOLER TO TANK)	1
139	441 08 28	HOSE ASSY (COOLER UPRIGHT)	1
140	923 03 35	ADAPTER	1
141	441 08 52	HOSE ASSY (HOT OIL SHUTTLE VALVE TO PUMPS)	2
142	441 08 14	HOSE ASSY (CLAMP PUMP TO TANK SUCTION)	1
143	441 08 15	HOSE ASSY (CLAMP PUMP TO TANK RETURN)	1
144	441 08 16	HOSE ASSY (CLAMP PUMP TO CLAMP VALVE)	1

PARTS LIST
GENERAL ASSEMBLY
HP-700A HYDRAULIC POWER UNIT
(441 08 00)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
145	441 07 16	HOSE ASSY (LEFT PUMP TO TANK)	1
146	441 08 17	HOSE ASSY (RIGHT PUMP TO COOLER)	1
147	441 08 22	HOSE ASSY (LEFT PUMP TO COOLER)	1
148	441 08 18	HOSE ASSY (CLAMP OPEN BH TO VALVE)	1
149	441 08 19	HOSE ASSY (CLAMP CLOSE BH TO VALVE)	1
150	441 08 20	HOSE ASSY (CLAMP VALVE TO TANK)	1
151	441 08 23	HOSE ASSY (RH PUMP TO PSI GAGE)	1
152	441 07 23	HOSE ASSY (FILTER MANIFOLD TO FILTER MANIFOLD)	1
153	441 08 24	HOSE ASSY (CLAMP PRESS. SWITCH TO CLAMP VALVE	1
154	441 08 54	HOSE ASSY (FILTER TO PUMP)	2
155	441 08 25	HOSE ASSY (CHARGE PRESS. SWITCH TO GAGE	1
156	441 08 53	HOSE ASSY	1
157	441 08 26	HOSE ASSY (PRESS. SWITCH TO 5000PSI GAGE)	1
158	441 08 27	HOSE ASSY (FILTER MANIFOLD TO BH)	1
159	099 06 00	DECAL	1
160	441 08 57	ELECTRICAL CONTROL ASSEMBLY	1
161	923 08 41	ADAPTER	4
162	931 06 64	PRESSURE GAGE (10,000 PSI)	1
163	931 06 58	PRESSURE GAGE (5,000 PSI)	1
164	931 06 57	PRESSURE GAGE (1,000 PSI)	2

PARTS LIST
GENERAL ASSEMBLY
HP-700A HYDRAULIC POWER UNIT
(441 08 00)

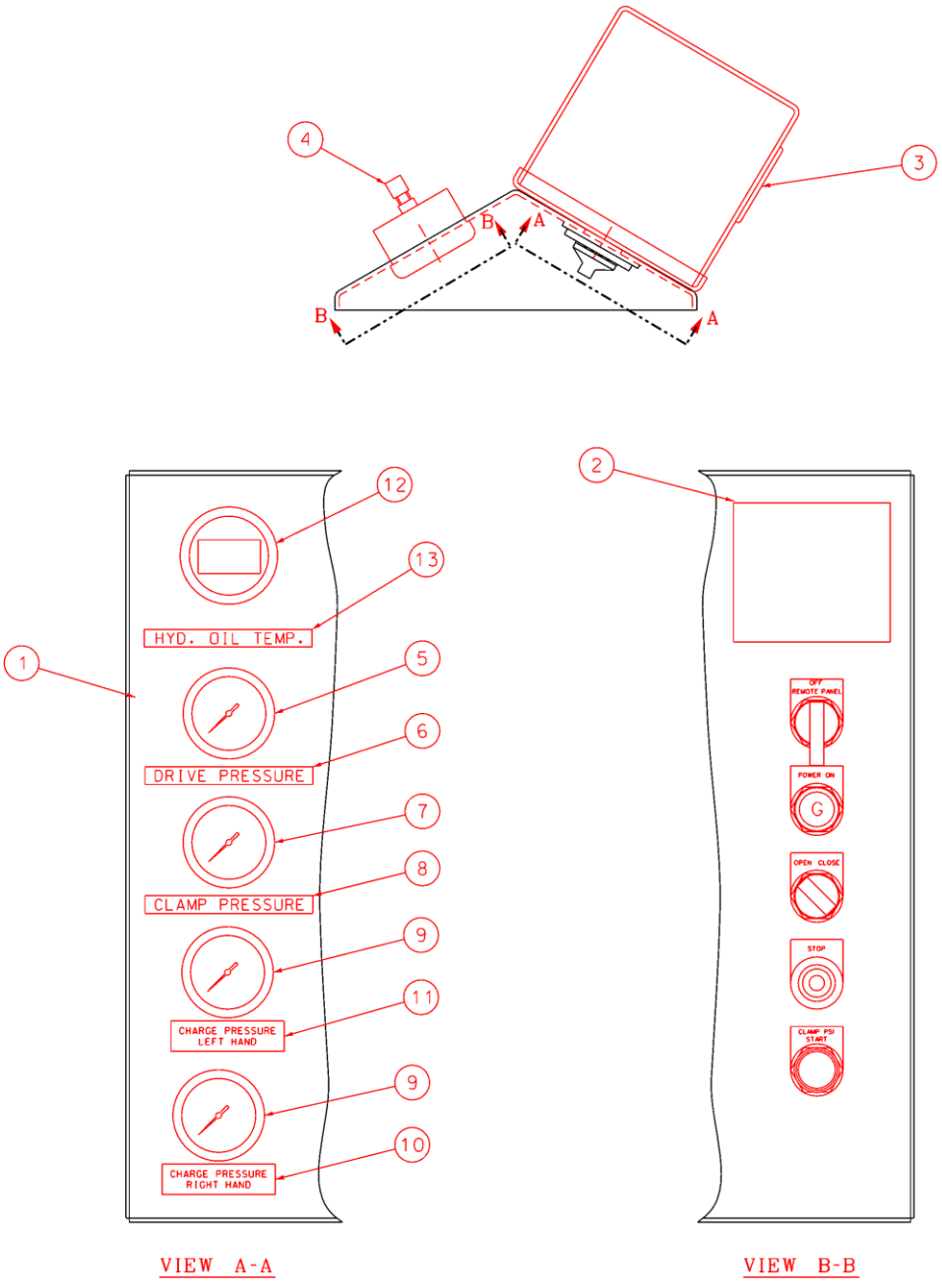
ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
165	931 08 61	TEMPERATURE GAGE	1
166	903 07 04	LOCK WASHER	3
167	900 00 06	HEX NUT	3
168	943 03 12	MACHINE SCREW	3
169	411 00 31	NAMEPLATE	1
170	699 02 77	SAFETY CAUTION SIGN	1
171	944 00 85	CHECK VALVE, FUEL	1
172	441 07 26	SPLICE PLATE, ENCLOSURE	1
173	944 01 95	EXHAUST SILENCER 8”	1
174	944 01 97	RAIN CAP 8”	1
175	441 08 55	CONTROL PANEL	1
176	941 00 25	PANEL SHOCK MOUNT	4
178	417 21 16	MOUNT PENDANT BOX	1
179	933 04 65	SWITCH BATTERY DISCONNECT	1
180	944 01 96	FLEX CONNECTOR, EXHAUST	1
181	923 11 12	ADAPTER	1
182	441 08 32	HOSE ASSY	1
183	441 08 47	FILTER MANIFOLD TO 10000PSI GAGE PUMP DRIVE SUPPORT	2
184	441 08 05	MOUNT STRIP-AIR INTAKE	2
185	441 08 03	BOX-AIR INTAKE	1

PARTS LIST
GENERAL ASSEMBLY
HP-700A HYDRAULIC POWER UNIT
(441 08 00)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
186	441 08 04	SIDE-AIR INTAKE	2
187	944 02 54	RUBBER ELBOW 6”	2
188	944 02 55	RUBBER ELBOW 5” TO 6”	1
189	944 02 56	RUBBER ELBOW 6”	4
190	944 02 57	TUBE AIR INLET 6”	1
192	943 04 82	HOSE CLAMP	14
196	930 02 47	FEMALE ELL	1
197	930 01 86	STREET ELBOW	1
200	496 00 08	CAP	2
201	923 12 89	ADAPTER	2
202	923 05 88	ADAPTER	3
203	923 12 79	ADAPTER	1
204	923 10 08	ADAPTER	1
205	441 08 29	HOSE ASSY(FUEL SUCTION)	1
206	441 08 30	HOSE ASSY(FUEL RETURN)	1
207	923 00 61	ADAPTER	1
208	923 10 31	ADAPTER	1
209	923 09 18	ADAPTER	2
210	901 59 15	HEX HEAD CAP SCREW	8
211	901 58 17	HEX HEAD CAP SCREW	4
212	903 06 09	LOCK WASHER	12

PARTS LIST
GENERAL ASSEMBLY
HP-700A HYDRAULIC POWER UNIT
(441 08 00)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
213	900 50 06	HEX NUT	4
214	901 60 13	HEX HEAD CAP SCREW	12
215	903 06 11	LOCK WASHER	12
216	900 50 08	HEX NUT	12
217	923 05 89	ADAPTER	1
218	923 01 61	ADAPTER	1
219	923 07 86	ADAPTER	1
222	930 02 00	PIPE NIPPLE	1
223	441 08 48	CLAMP VALVE MOUNT	2
224	923 10 14	ADAPTER	1
225	923 01 76	ADAPTER	2
226	944 02 90	EXHAUST FLANGE	1
227	411 00 37	DECAL-EMISSION CONTROL	1
228	933 05 89	CONNECTOR, NON INSULATED	20
229	905 03 17	SOCKET HEAD CAP SCREW	4
230	441 08 60	ENGINE WIRE HARNESS EXT.	1
231	441 08 61	THROTTLE CONTROL ASSY.	1



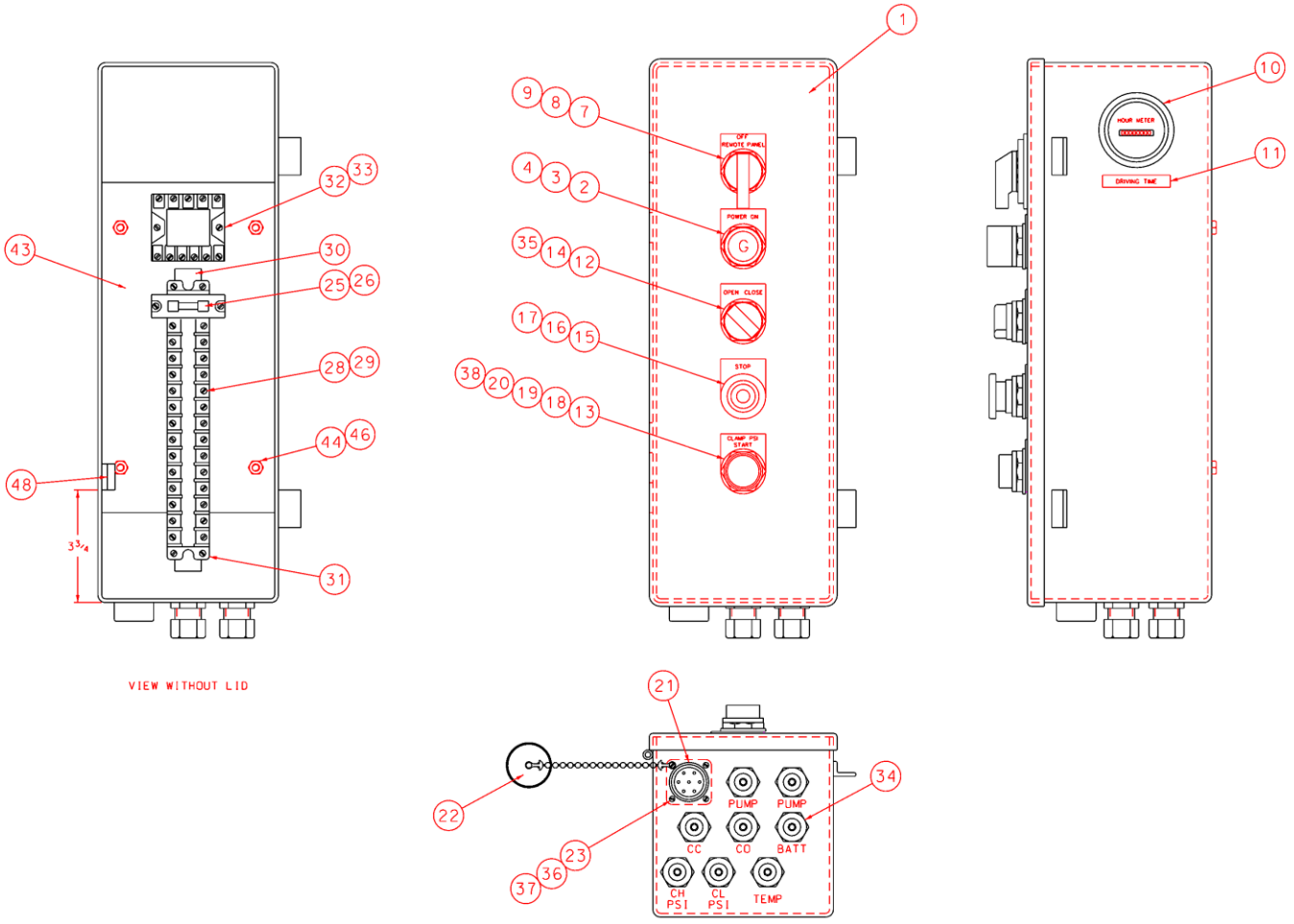
VIEW A-A

VIEW B-B

PARTS LIST
HP-700A CONTROL PANEL ASSEMBLY

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
1	441 08 55	INSTRUMENT PANEL	1
2	099 06 00	EAR PROTECTION DECAL	1
3	441 08 57	ELECTRICAL CONTROL ASSEMBLY	1
4	923 08 41	ADAPTER	4
5	931 06 64	PRESSURE GAUGE	1
7	931 06 58	PRESSURE GAUGE	1
9	931 06 57	PRESSURE GAUGE	2
12	931 08 61	TEMPERATURE GAUGE	1
14	903 07 04	LOCKWASHER	3
15	900 00 06	HEX NUT	3
16	943 03 12	ROUND HEAD MACHINE SCREW	3
17	411 00 31	SPECIFICATION TAG	1
18	699 02 77	SAFETY CATION SIGN	1
20	441 03 02	WARNING STARTUP & CHECKLIST	1
21	417 30 48	GAUGE GUARD	1

HP-700A ELECTRICAL CONTROL ASSEMBLY
(441 08 57)



PARTS LIST
HP-700A ELECTRICAL CONTROL ASSEMBLY
(441 08 57)

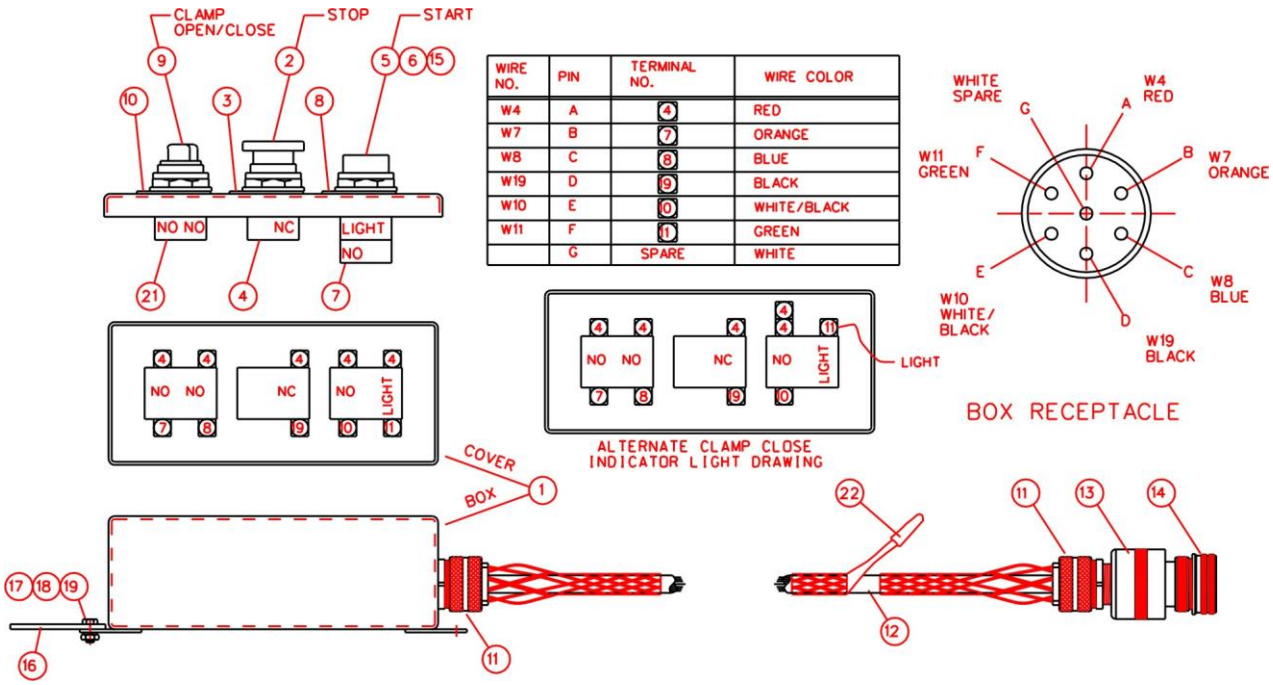
ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
1	441 08 56	ELECTRICAL CONTROL ENCLOSURE	1
2	933 02 05	INDICATOR LIGHT	1
3	933 02 06	STANDARD LEGEND PLATE BLACK – POWER ON	1
4	933 01 49	GREEN LENS	1
7	933 04 00	SELECTOR SWITCH	1
8	933 03 21	CONTACT BLOCK	3
9	933 04 02	LEGEND PLATE, BLACK REMOTE/OFF/PANEL	1
10	931 03 76	HOUR METER	1
11	411 00 10	NAMEPLATE – DRIVING TIME	1
12	933 04 19	SELECTOR SWITCH	1
13	933 00 06	CONTACT BLOCK	1
14	933 03 95	LEGEND PLATE, BLACK-OPEN/CLOSE	1
15	933 01 45	PUSHBUTTON – RED	1
16	933 02 61	STANDARD LEGEND PLATE, RED – STOP	1
17	933 01 51	CONTACT BLOCK	1
18	933 03 91	ILLUMINATED PUSHBUTTON 757 BULB	1 3
19	933 03 92	LENS BUTTON – GREEN	1

PARTS LIST
HP-700A ELECTRICAL CONTROL ASSEMBLY
(441 08 57)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
20	933 03 93	LEGEND PLATE, BLACK START/CLAMP PSI	1
21	417 24 03	AMPHENOL CONNECTOR ASSEMBLY	1
22	933 04 04	RECEPTACLE COVER & CHAIN	1
23	943 03 11	SOCKET HEAD CAP SCREW	4
24	933 04 09	SHRINK TUBE	1
25	933 04 18	FUSE	1
26	933 02 56	FUSE BLOCK	1
27	933 02 13	JUMPER	1
29	933 01 97	TERMINAL BLOCK	14
30	933 02 00	CHANNEL	1
31	933 02 51	INSTALLATION KIT	1
32	933 01 94	RELAY	1
33	933 04 08	RELAY SOCKET	1
34	933 03 69	CONNECTOR	8
35	933 03 21	CONTACT BLOCK	1
36	943 04 10	HEX NUT	8
37	943 04 11	LOCKWASHER	4
38	933 04 16	ILLUMINATED PUSHBUTTON GUARD	1
39	933 03 70	WIRE	76 ft.
40	933 02 98	STRANDED WIRE	100 ft.

PARTS LIST
HP-700A ELECTRICAL CONTROL ASSEMBLY
(441 08 57)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
41	943 04 30	LOCK NUT	8
43	417 24 02	SUBPLATE	1
48	933 04 31	7 PIN TERMINAL CONNECTOR	1



WIRE NO.	PIN	TERMINAL NO.	WIRE COLOR
W4	A	4	RED
W7	B	7	ORANGE
W8	C	8	BLUE
W19	D	9	BLACK
W10	E	10	WHITE/BLACK
W11	F	11	GREEN
	G	SPARE	WHITE

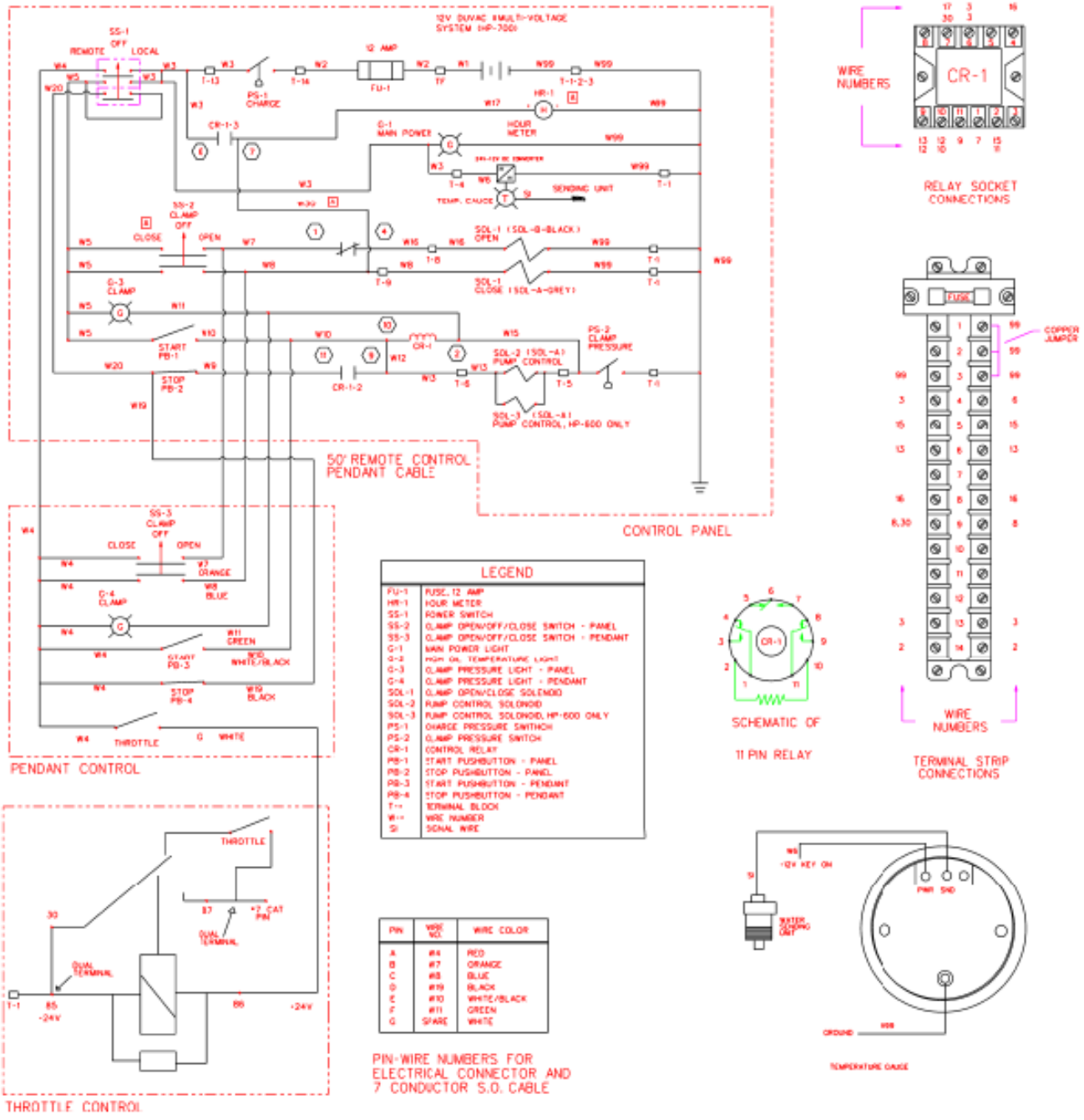
PARTS LIST
REMOTE PENDANT AND CABLE ASSEMBLY
(441 08 62)

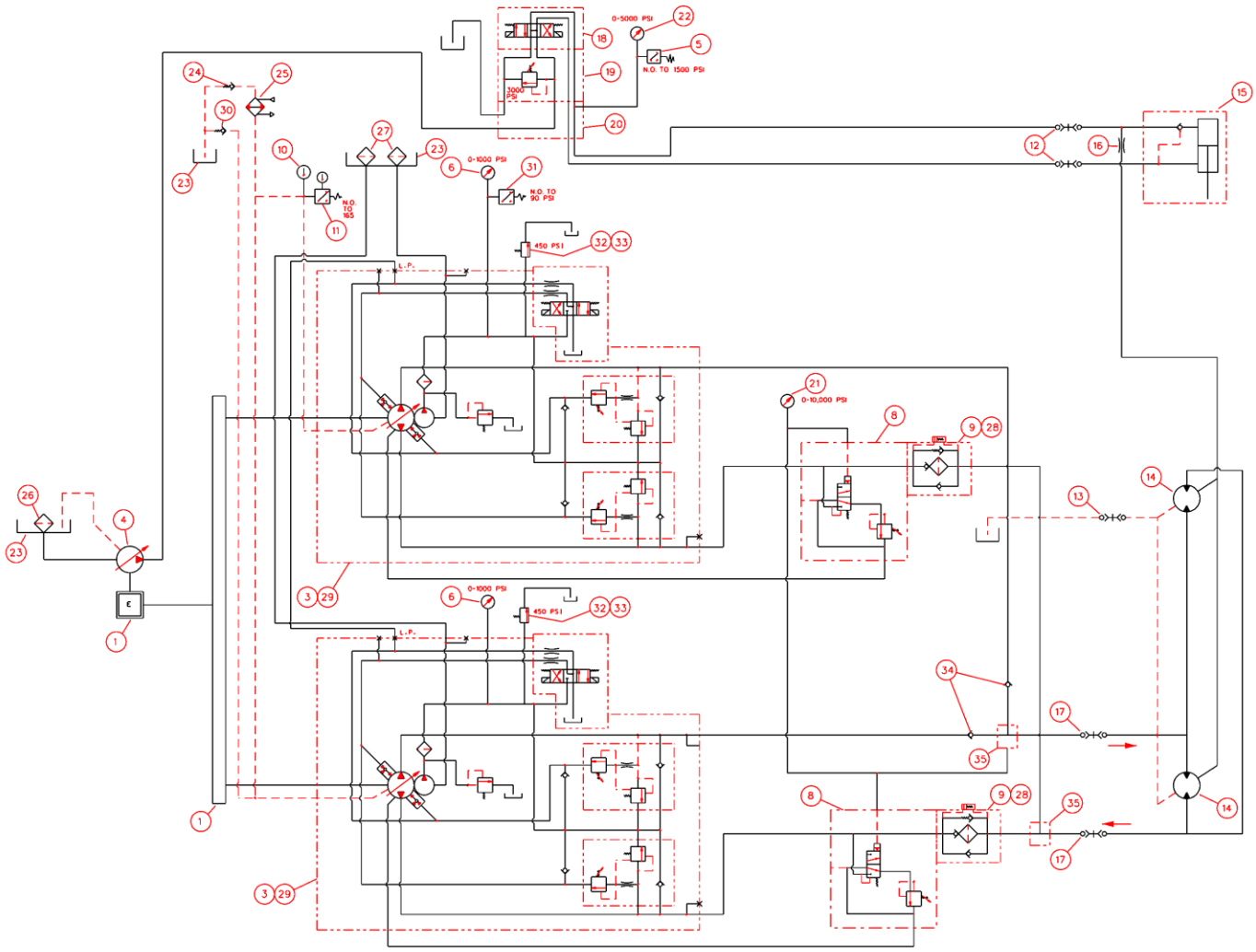
ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
1	933 03 90	PUSHBUTTON ENCLOSURE	1
2	933 01 45	PUSHBUTTON – RED	1
3	933 02 61	STANDARD LEGEND PLATE, RED – STOP	1
4	933 01 51	CONTACT BLOCK	1
5	933 03 91	ILLUMINATED PUSHBUTTON 757 BULB	1 1
6	933 03 92	LENS BUTTON – GREEN	1
7	933 00 06	CONTACT BLOCK	1
8	933 03 93	LEGEND PLATE, BLACK START/CLAMP/PSI	1
9	933 04 19	SELECTOR SWITCH	1
10	933 03 95	LEGEND PLATE, BLACK-OPEN/CLOSE	1
11	933 03 96	CORD GRIP WITH STRAIN RELIEF	2
12	933 03 97	CONDUCTOR, 50’ LONG	1
13	933 03 98	CORD GRIP ADAPTER	1
14	933 03 99	ELECTRICAL PLUG	1
15	933 04 16	ILUMINATED PUSHBUTTON GUARD	1
16	441 02 01	PENDANT STORAGE PLATE	1
17	901 02 06	HEX HEAD CAP SCREW	2
18	900 00 06	HEX NUT	2
19	903 00 07	LOCKWASHER	2
21	933 03 21	CONTACT BLOCK	1

PARTS LIST
REMOTE PENDANT AND CABLE ASSEMBLY
(441 08 62)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
22	933 04 30	DROP GRIP	1
23	933 04 31	LOCK NUT	1
24	933 04 32	S-HOOK	1

HYDRAULIC SCHEMATIC HP-700A POWER UNIT
(441 08 59)




0-5000 PSI
N.O. TO 1500 PSI
3000 PSI
0-1000 PSI
N.O. TO 90 PSI
N.O. TO 165
450 PSI
L.P.
0-10,000 PSI

PARTS LIST
HYDRAULIC SCHEMATIC HP-700A POWER UNIT
(441 06 09)

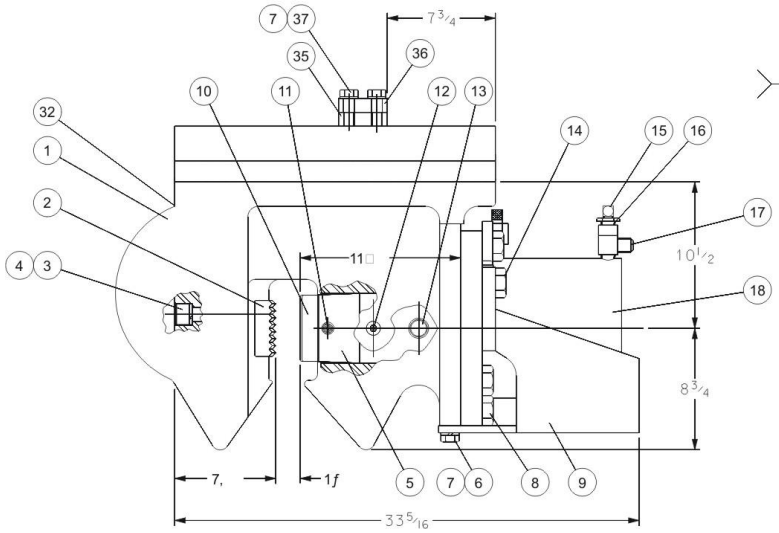
ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
1	944 02 41	ENGINE	1
2	911 01 97	PUMP DRIVE	1
3	911 01 99 933 04 92	HYDRAULIC PUMP 24V COILS	2 2
4	911 02 50	HYDRAULIC CLAMP PUMP	1
5	931 06 32	PRESSURE SWITCH	1
6	931 06 06	CHARGE PRESSURE GAUGE	2
8	931 08 48	HOT OIL SHUTTLE VALVE	2
9	931 08 47	RETURN FILTER ASSEMBLY	2
10	931 02 62	TEMPERATURE GAUGE	1
11	933 03 31	TEMPERATURE SWITCH	1
12	927 00 05	QUICK DISCONNECT	2
13	927 00 11	QUICK DISCONNECT	1
14	910 00 70	HYDRAULIC MOTOR	2
15	430 01 49	CLAMP CYLINDER	1
16	436 01 38	FLOW CONTROL	1
17	927 00 54	QUICK DISCONNECTS	2
18	931 07 86	CLAMP CONTROL VALVE	1
19	931 07 64	RELIEF VALVE	1
20	931 05 95	VALVE SUBPLATE	1
21	931 06 08	DRIVE PRESSURE GAUGE	1
22	931 06 07	CLAMP PRESSURE GAUGE	1

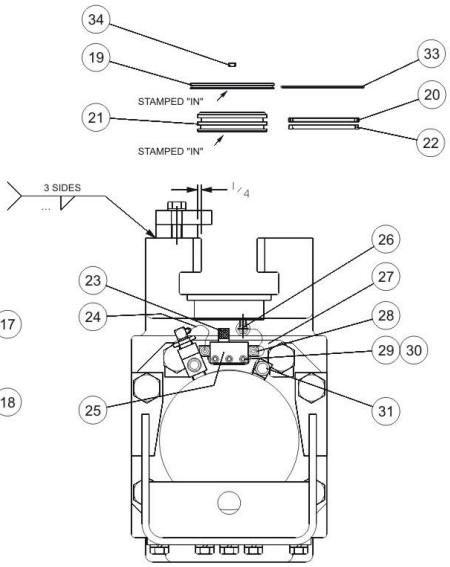
PARTS LIST
HYDRAULIC SCHEMATIC HP-700A POWER UNIT
(441 06 09)

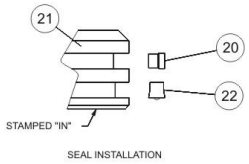
ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
23	441 08 31	HYDRAULIC RESERVOIR	1
24	931 06 92	CHECK VALVE	1
25	934 00 27	HYDRAULIC OIL COOLER	1
26	931 05 98	SUCTION STRAINER	1
27	931 05 99	SUCTION STRAINER	2
28	931 08 55	FILTER	2
29	931 06 01	FILTER	2
30	931 03 69	CHECK VALVE	1
31	931 06 33	PRESSURE SWITCH	1
32	931 07 02	RELIEF CARTRIDGE	2
33	931 07 03	VALVE BODY	2
34	931 07 04	CHECK VALVE	2
35	441 08 42	MANIFOLD	2

NOTES:

1. SEAL INSTALATION TOOL 495 05 58 MUST BE MUST BE USED TO INSTALL PISTONS IN HOUSING.
2. ITEM 19, SEALING DISC, AND ITEM 21, PISTON, MUST BE INSTALLED AS MARKED
3. REMOVE PIPE PLUG TO INSTALL ITEM 19 TO ALLOW AIR TO ESCAPE. APPLY SMALL AMOUNT OF LOCKTITE 272 TO PLUG AT ASSEMBLY. PLUG MUST BE FLUSH WITH BOTH SIDES OF SEALING DISC
4. HAND TIRGHTEN LOCK VALVE ONLY. OVER TIGHTENING WILL DAMAGE LOCK VALVE ASSEMBLY & DAMAGE CLAMP ASSEMBLY
5. ITEM 4, LOCKWASHER, MUST BE INSTALLED FOR PROPER JAW RETENSION







CAISSON CLAMP ASSEMBLY
(4 495 05 39)

PARTS LIST
CAISSON CLAMP ASSEMBLY
(4 495 05 39)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
1	495 05 32	CAISSON CLAMP HOUSING	1
2	495 03 50	FIXED JAW	1
3	905 11 31	SOCKET HEAD CAP SCREW	2
4	903 04 21	LOCKWASHER	2
5	495 00 63	JAW SLIDE	1
6	901 59 13	HEX HEAD CAP SCREW	4
7	903 01 17	LOCKWASHER	6
8	901 62 18	HEX HEAD CAP SCREW	4
9	405 03 04	CYLINDER SHIELD	1
10	495 00 62	MOVABLE JAW	1
11	924 00 55	ROLL PIN	1
12	942 00 14	GREASE FITTING	2
13	420 01 38	CLAMP SLIDE PIN	1
14	901 62 24	HEX HEAD CAP SCREW	4
15	923 11 34	ADAPTER	1
16	923 00 60	ADAPTER	1
17	923 11 33	ADAPTER	1
18	416 01 31	CLAMP CYLINDER	1
19	495 05 53	DISC	3

PARTS LIST
CAISSON CLAMP ASSEMBLY FOR CAISSON BEAMS
(495 05 39)

ITEM NO.	MKT PART NO.	DESCRIPTION	QUANTITY REQUIRED
20	913 02 02	GLASS FILLED TEFLON SEAL	3
21	495 04 23	PISTON	3
22	913 02 05	U-SEAL	3
23	931 07 54	CHECK VALVE	1
24	495 05 57	HOSE	2
25	495 04 31	CHECK MOUNT HOLDER	1
26	923 11 35	ADAPTER	1
27	495 05 55	CHECK VALVE PLATE	1
28	923 09 19	ADAPTER	2
29	905 04 13	SOCKET HEAD CAP SCREW	3
30	903 04 10	LOCK WASHER	3
31	923 00 17	ADAPTER	1
32	931 06 53	BLEEDER VALVE	1
33	913 02 06	O-RING	3
34	930 00 57	PIPE PLUG	3
35	495 06 12	MOUNT BLOCK	1
36	495 06 13	STOP BLOCK	1
37	901 59 17	HEX HEAD CAP SCREW	2