SAFETY
INSTALLATION
OPERATION
MAINTENANCE

M A N U A L

TRUCK PROBE
Model TP and STP

No. PC 529834J
Revised 2017-02-15

9575 N. 109th Ave.
Omaha, Nebraska 68142
(402) 330-1500
www.intersystems.net

Table of Contents

I. GENERAL SAFETY INFORMATION 3
II. GENERAL INFORMATION 5
2.1 System Description 5
2.2 Optional Features 6
2.3 Material Sampled 6
2.4 Truck Probe Construction 6
III. GENERAL INSTALLATION REQUIREMENTS 7
3.1 Receiving Inspection 7
3.2 Pre-Installation Preparation 7
3.3 Location 8
3.4 General Installation Guidelines 8
3.5 Initial Startup 10
3.6 Controller Location 11
3.7 System Wiring 11
3.7.1 Electrical Power Requirements, System 11
3.7.1.1 Controller 12
3.7.1.2 Solenoid Valve Coils 12
3.7.1.3 Hydraulic Tank Heater (Optional) 12
3.7.1.4 Hydraulic Pump Motor 12
3.8 System Plumbing 13
IV. OPERATIONS AND ADJUSTMENTS 14
4.1 Operators Control Components And Their Functions 14
4.1.1 POWER OFF/ON Switch S-1 & Light 15
4.1.2 VACUUM MOTOR OFF/ON Switch S-2 15
4.1.3 PROBE MOVEMENT Push-button Switches S-3 thru S-10 (Old Style Control) 15
4.1.4 PROBE MOVEMENT Joy-stick Switches S-3 & S-4 (Standard JS Control) 15
4.1.5 Main Fuse 15
4.1.6 Terminal Strip 15
4.1.7 Vacuum Motor(s) Relay 15
4.2 Electrical Components 16
4.2.1 Hydraulic Pump Motor 16
4.2.2 Pump Motor Starter & Thermal Overload 16
4.2.3 Hydraulic Oil Heater 16
4.2.4 Vacuum Motor 16
4.3 Hydraulic Components 17
4.3.1 Solenoid Valves V-1, V-2, V-3, & V-4 17
4.3.1.1 Boom UP/DOWN Valve V-1 17
4.3.1.2 Counter Balance Valve V-12 17
4.3.1.2.1 Counter Balance Valve adjustment: 17
4.3.1.3 Boom LEFT/RIGHT Valve V-2 18
4.3.1.4 Boom IN/OUT Valve V-3 18
4.3.1.5 Sample Ports OPEN/CLOSE Valve V-4 (Compartmentalized Probe Only) 18
4.3.2 Relief Valve V-5 18
4.3.3 Boom Left/Right Flow Control Valves V-6, V-7 19
4.3.4 Hydraulic Cylinders 19
4.3.5 Rotary Actuator (Compartmentalized Probe Only) 19
4.3.6 Rotational Motor 20
4.3.7 Hydraulic Pump 20

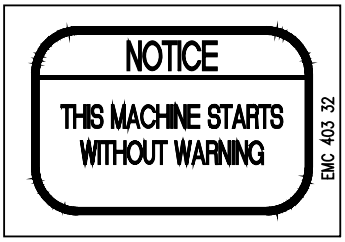
V. MAINTENANCE AND REPAIR 21
5.1 General Maintenance 21
5.2 Periodic Inspection 21
5.3 Lubrication 22
5.3.1 Boom Pivoting And Sliding Joints, Monthly 22
5.3.2 Boom Rotation Drive Chain & Sprockets, Every 6 Months 22
5.4 Hydraulic Power Unit Service 22
5.4.1 Hydraulic Oil Inspection, Daily 22
5.4.2 Breather Cap Cleaning, Every 3 Months 23
5.4.3 Hydraulic Filter Replacement, Every 3 Months 23
5.4.4 Hydraulic Oil & Filter Replacement, Annually 23
5.5 Compartmentized Probe Tip Inspection 24
5.6 Core Probe Vacuum Pressure Equalization 24
VI. TROUBLESHOOTING 25
6.1 General Truck Probe Troubleshooting 25
6.2 Directional Solenoid Valve Troubleshooting 26
6.3 Hydraulic Components Troubleshooting 26
6.3.1 Cylinder Leaking 26
VII. REPLACEMENT PARTS 27
7.1 Scope 27
7.2 Ordering Parts 27
7.3 Replacement Parts 27
7.4 Repair Kits 27
7.4.1 Truck Probe Parts Listing 28
VIII. WARRANTY 39

List of Illustrations & Drawings

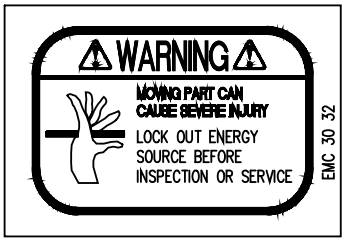
FIGURE 1-1, TRUCK PROBE SAFETY LABEL LOCATIONS 4
FIGURE 2-1, TYPICAL INSTALLATION, TRUCK PROBE SYSTEM 5
FIGURE 3-1, HOSE & REUSABLE FITTING ASSEMBLY INSTRUCTIONS 9
FIGURE 3-2, HYDRAULIC SCHEMATIC 13
FIGURE 4-1, STANDARD NEMA 12 OPERATORS CONTROL PANEL DETAIL 14
FIGURE 4-2, RELIEF VALVE 19
FIGURE 4-3, ROTATIONAL MOTOR & DRIVE CHAIN 20
FIGURE 7-1, MAIN STAND ASSEMBLY 31
FIGURE 7-2, TELESCOPING BOOM ASSEMBLY 32
FIGURE 7-3, COMPARTMENTIZED & CORE PROBES 32
FIGURE 7-4, SAMPLE CABINETS 33
FIGURE 7-5, VACUUM MOTOR UNITS 34
FIGURE 7-6, HYDRAULIC POWER UNIT ASSEMBLY 35
FIGURE 7-7, HYDRAULIC POWER UNIT FITTINGS& HOSES 36
FIGURE 7-8, HYDRAULIC HOSES & FITTINGS 37

I. GENERAL SAFETY INFORMATION

SAFETY FIRST! The symbols shown identify examples of the safety labels and signs to be found on InterSystems equipment. They are affixed to the equipment to warn of danger to persons and of possible equipment damage. These signs must never be removed, tampered with, painted over or obscured in any way. (See Page 4 for label locations.) If labels are damaged or become unreadable, replacement labels are available from InterSystems. The user must institute a continuing program to instruct all personnel in safe operating and maintenance procedures, and to insure that all safety devices, guards, and covers are intact and operable, and that all safety signs are legible.



STARTS W/OUT WARNING
EMC40332



MOVING PART
EMC3032

Consult InterSystems before making any changes to the Truck Probe or its operating environment. Careless changes could result in death or serious injury to people, and reduce the performance and service life of the equipment.

Never perform any service on this equipment or any other powered equipment until all power has been shut off and locked out so that it cannot be restored without the consent and knowledge of the person who interrupted power. Power includes electrical, fluid, mechanical, or pneumatic energy.

Never perform any service on this equipment without utilizing the required PPE (personal protective equipment). Refer to the MSDS(s), material safety data sheet(s), on all the products to which this equipment is in contact with to determine what PPE is required.

DANGER

THIS EQUIPMENT IS TO BE OPERATED ONLY ON THE VOLTAGE DESIGNATED ON THE CERTIFIED ELECTRICAL DRAWING(S)! FIRE OR EXPLOSION MAY RESULT, WHICH CAN CAUSE DEATH, SERIOUS INJURY, AND EXTENSIVE DAMAGE TO EQUIPMENT. DO NOT CONNECT TO VOLTAGES OTHER THAN DESIGNATED.

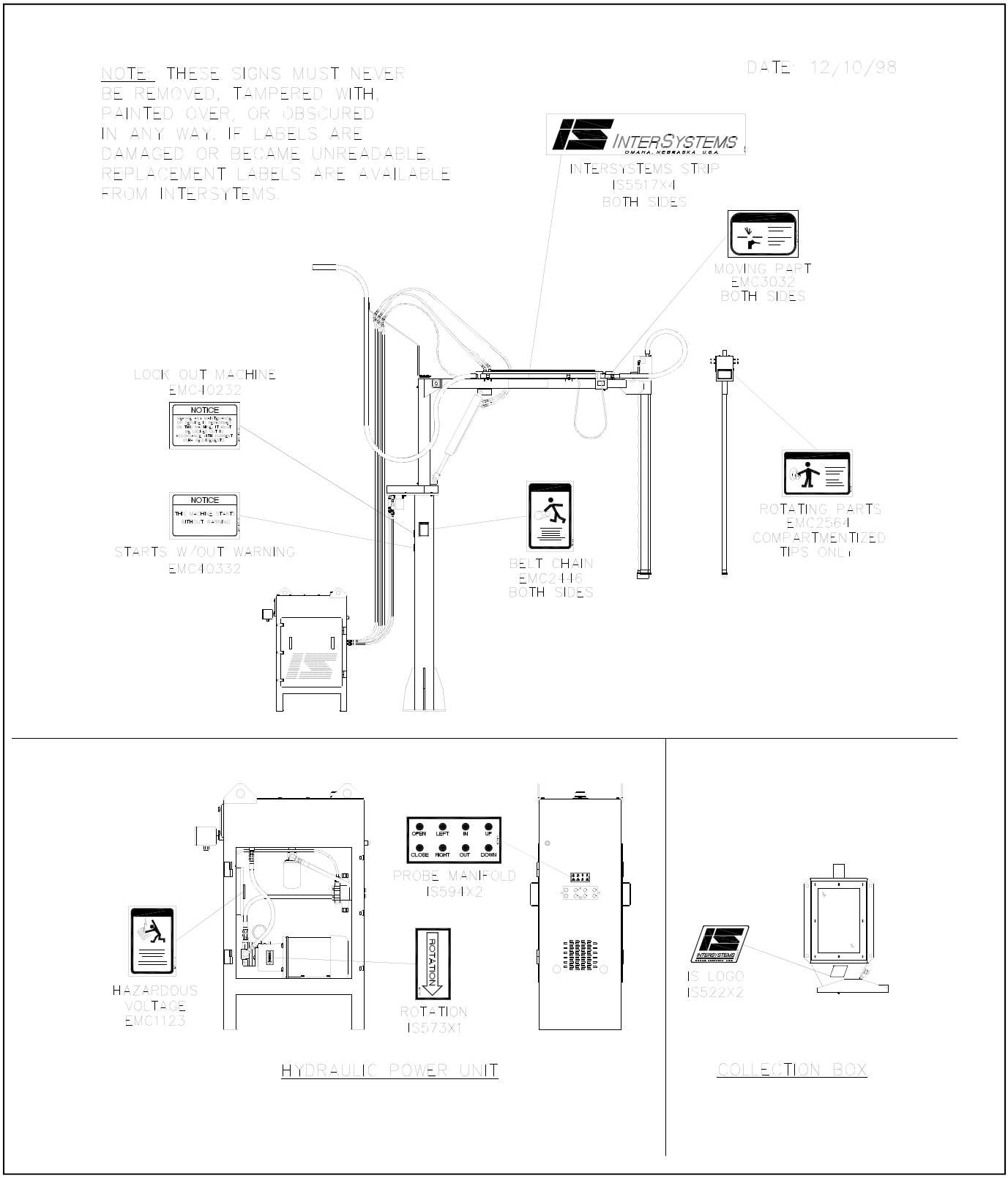


FIGURE 1-1, TRUCK PROBE SAFETY LABEL LOCATIONS

II. GENERAL INFORMATION

2.1 System Description

The Truck Probe is designed to collect a representative sample of granular, pellet, chip, flake or other materials from an open top hopper truck. Figure 2-1 illustrates a typical Truck Probe installation.

Sample collection is initiated in response to the operator's manual command generated by controller logic. A sample cycle begins when the operator positions the probe tip for insertion into the truck by rotating the boom and stroking it in or out to the desired sampling position. The vacuum system is turned on and then the probe tip is inserted down into the hopper truck with the sampling ports closed. The sampling ports are opened to receive a sample and then closed to dump the sample in the vacuum conveying chamber of the probe tip. The probe tip is raised and re-inserted into the material in a different location. This is repeated as required by the FGIS or other regulating guidelines. Once the truck has been properly sampled and sufficient time has elapsed for the sample to be thoroughly conveyed to the collection cabinet the operator will shut off the vacuum system. The sample can now be emptied from the collection cabinet to be analyzed.

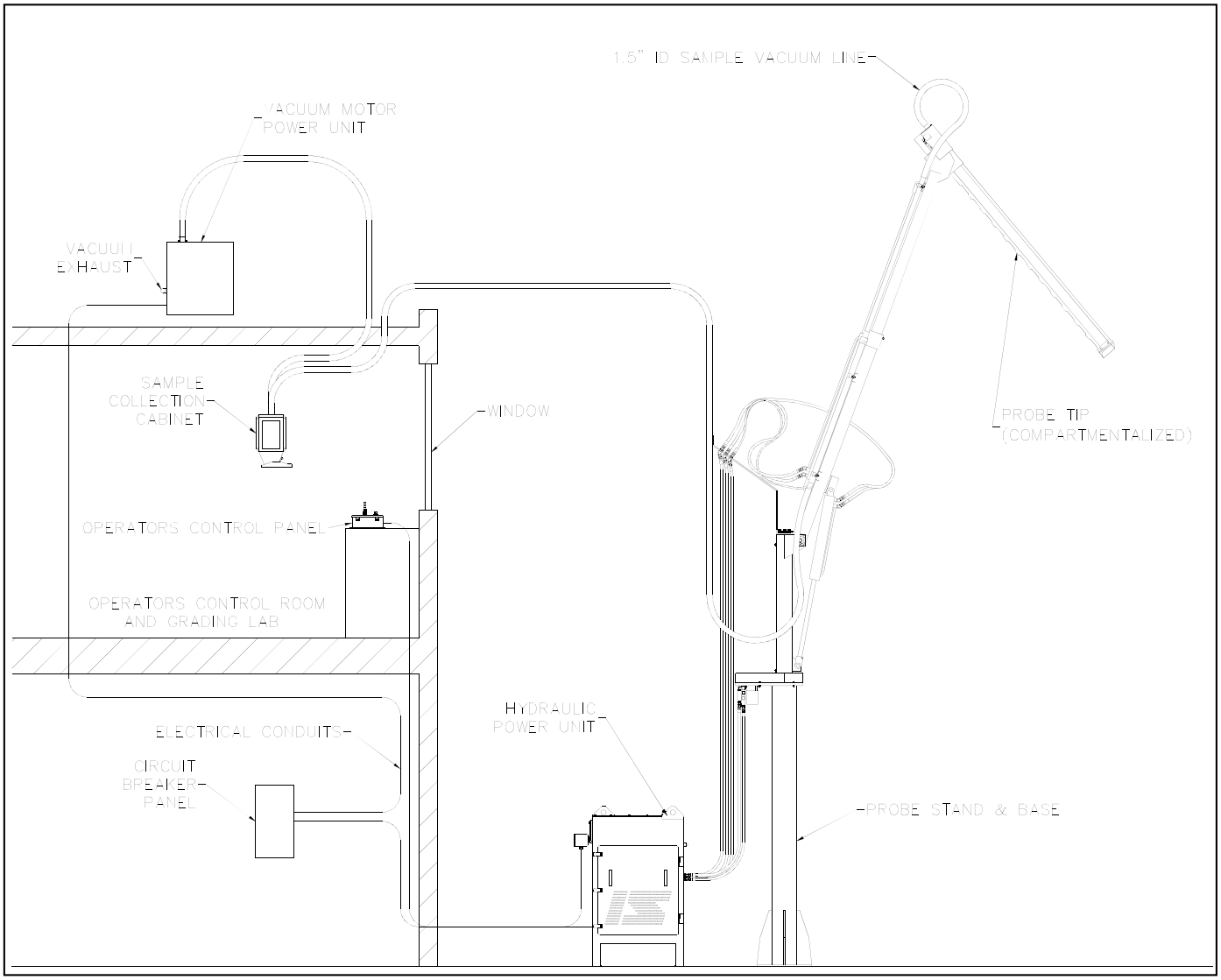


FIGURE 2-1, TYPICAL INSTALLATION, TRUCK PROBE SYSTEM

2.2 Optional Features

The certified drawings indicate which, if any, optional features are included with a Truck Probe System. Some of the more frequently specified optional features are briefly described in the following list.

Additional optional items that may be furnished if described in the Equipment Quotation and if specifically ordered, may include some or all of the following items:

A. Traffic control lights
B. Intercom system
C. Aluminum sample conveying tubing

2.3 Material Sampled

Most material from light to heavy density powders, granules, flakes and pellets.

2.4 Truck Probe Construction

Standard Truck Probe construction is of painted carbon steel, this includes the base, stand, booms, probe, etc. Other materials and/or finishes appropriate to the operating environment and the material or product being sampled may be used. Refer to the certified drawing(s) for any optional or special components installed on the Truck Probe.

III. GENERAL INSTALLATION REQUIREMENTS

3.1 Receiving Inspection

Carefully inspect the equipment for damage as soon as it is received. Also, verify that the quantity of parts or packages actually received corresponds to the quantity shown on the packing slip. Report any damage or shortage to the delivering carrier as soon as possible. InterSystems' responsibility for the equipment ended with acceptance by the delivering carrier. Refer to the bill of lading.

A typical shipment of a Standard Truck Probe, without any of the optional items described in Section 2.3, has five major units:

A. Hydraulic Power Unit
B. Main Stand and Boom Pivot
C. Probe Boom
D. Probe Tip
E. Bulkhead Bracket, Operators Control Panel, Vacuum Power Unit, Vacuum Hose, Sample Collection Cabinet, Hydraulic Hoses & Fittings Kit, Hydraulic Fluid, Hydraulic Power Unit Motor, Starter & Heaters and Hardware Package.

NOTE: ANCHORING DEVICES & FASTENERS ARE NOT PROVIDED.

3.2 Pre-Installation Preparation

Note, before starting Truck Probe System installation, study this manual, the certified drawing(s) furnished with the system, and other applicable documents (including, but not limited to OSHA Regulations; the National Electrical Code; and all other applicable federal, state, and local codes and regulations).

InterSystems Truck Probes are designed to be self-supporting when securely anchored to a reinforced concrete base constructed as specified by the certified drawing(s). The Truck Probe requires no bracing but it was not designed to support other equipment. Separate support must be provided for any accessory equipment. The user or installer is advised to retain a civil or architectural engineer to plan the overall installation and more specifically, the reinforced concrete bases for the probe itself and the hydraulic power unit.

InterSystems does not assume turnkey responsibility for the installation. Therefore, the factors presented hereafter for consideration are just that and only that.

A. Before initiating the actual installation process, determine where the probe, sample cabinet, vacuum unit, control panel, and hydraulic power unit will be situated.

B. As shown on the General Data Drawing, plan to locate the control panel so that the probe operator has a clear, unobstructed view of the loads to be sampled, so that the operator's signals to drivers of the loaded vehicles will be seen and understood.

C. The Truck Probe may be set up for either 180 degree rotation single lane or 300 degree rotation dual lane operation.

D. Plan the routing of the vacuum sampling hose for a minimum distance, number of bends and changes in elevation.

E. The air exhausted from the vacuum power unit may include dust or other fines from the material being sampled. Plan to exhaust the air to a roof or another location away from pedestrian traffic where the occasional discharge will not be objectionable.

F. Plan the location of the Sample Collection Cabinet. Most often the desired site is at the beginning of the sample grading process in the grain inspection area. If the material other than grain is being sampled, other criteria may apply.

G. Plan the location of the concrete base for the hydraulic power unit. Preferably, it should be located within four feet of the concrete probe base. If the Probe is separated from the power unit by more than four feet, the user or installer may have to purchase additional hydraulic hose. Maximum separation between the Probe and power unit should be held to ten feet or less.

H. Excessively long hydraulic hoses can result in pressure loss, which in turn results in slow, erratic probe operation. Excessive vacuum hose length can produce low vacuum at the probe tip. The Sample Collection System may not function properly.

I. It is recommended that guard posts and/or rails be placed around the Probe and hydraulic power unit for protection from vehicular traffic.

J. Review all installation plans once more. Double-check to be sure that the probe will not interfere with any power and communications lines, and that no conveyors or spouting are routed through the area where the Probe is to operate.

3.3 Location

The Truck Probe is typically installed near the receiving truck scale and sample lab, as in Figure 2-1. Locate the Truck Probe and associated equipment for ease of access and maintenance. The Truck Probe operator should have an unobstructed view of the entire area of boom movement.

The Truck Probe is to be installed only as shown on the certified drawing(s). If an alternate mounting arrangement is desired, contact InterSystems, prior to installation for proper guidance. The Truck Probe is of a general design with modifications specifically for your application. It may be necessary to rework the Truck Probe in order for it to function properly if you alter the application.

3.4 General Installation Guidelines

The Truck Probe assembly is designed to support ONLY its own weight. As shown on the certified drawing, the Truck Probe must be installed on a special concrete foundation. The main stand base has eight clearance holes for securing to the foundation. Refer to the certified drawing(s) of the Truck Probe for the dimensioned locations of these holes.

DANGER

TRUCK PROBE CANNOT SUPPORT ANY OTHER EQUIPMENT! COLLAPSE OF THE WHOLE SYSTEM CAN CAUSE DEATH, SERIOUS INJURY, AND EXTENSIVE DAMAGE TO EQUIPMENT. PROPERLY SUPPORT ALL ELECTRICAL CONDUITS, AND CONVEYING LINES.

A. Verify that the concrete probe and power unit bases have cured to develop adequate strength.

B. Position the main stand assembly on the concrete foundation as shown on the certified drawing(s). Install a washer and two (2) nuts on each of the anchor bolts. Verify that the main stand is plumb and tighten the anchor nuts.

C. Loosen the bearing set screws on the 1" diameter boom pivot shaft at the top of the main base assembly, remove cotter pin and pull the shaft out enough for the boom to be positioned in place. Hoist the boom assembly into position. Re-insert the boom pivot shaft, tighten the bearing set screws, and re-install the cotter pin.

D. Remove the top up/down cylinder pivot pin from the cylinder. Cut the shipping strap on the up/down cylinder and attach to the boom assembly. Replace the cylinder pivot pin and spring clips.

E. Remove the ¾" diameter nut and bolt from the end of the boom assembly. Position the probe tip assembly and re-install the ¾" nut and bolt. Install the 1/8" diameter x 1.50" lg. cotter pin, from the hardware kit, into the castle nut.

F. Position the hydraulic hose bulkhead to the main stand (as shown in Figure 7-1). Use the (4) ½-13unc x 1.25 lg. bolts and washers from the hardware kit to fasten in place.

G. Position the hydraulic power unit assembly near the base of the main stand. Refer to the recommended placement as shown on the probe foundation drawing(s).

NOTE: THE HYDRAULIC POWER UNIT IS SHIPPED WITH 15 GALLONS OF FLUID ALREADY IN THE RESERVOIR. ANOTHER 5 GALLONS OF FLUID IS FURNISHED WITH THE PROBE, AND IS TO BE ADDED DURING INITIAL STARTUP.

H. Refer to Figure 7-8, and the drawing in the hydraulic fittings & hoses package, it calls out the where each of the fittings & hoses are to be installed. The hoses from the hydraulic unit to the bulkhead bracket and to the rotational motor are to be made to fit.

NOTE: FOR THE COUNTER BALANCE VALVE TO WORK PROPERLY, THE UP AND DOWN HOSES MUST BE INSTALLED CORRECTLY.

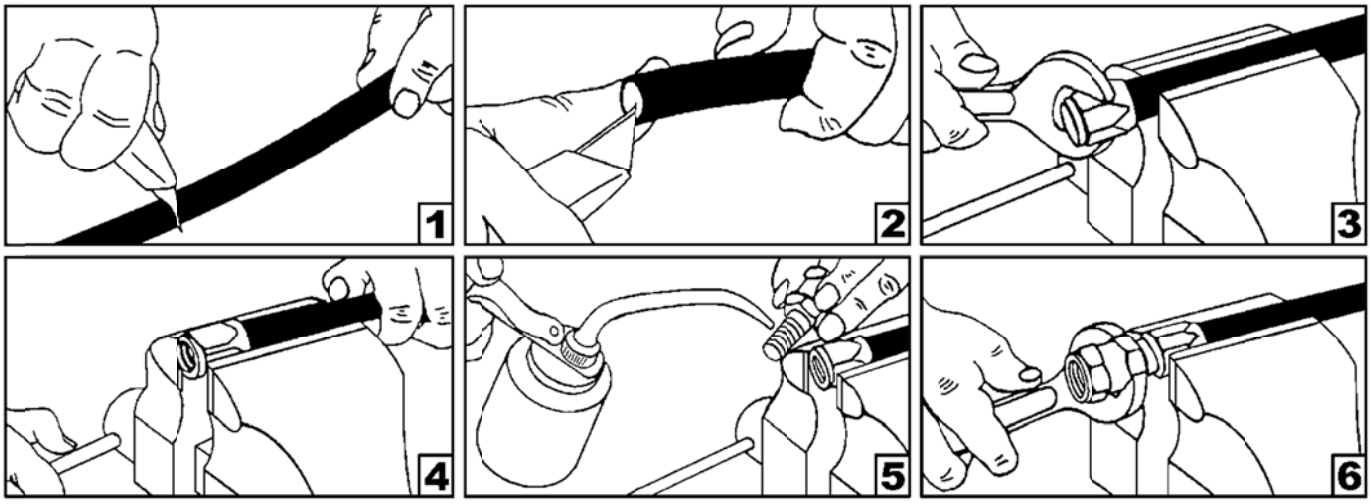


FIGURE 3-1, HOSE & REUSABLE FITTING ASSEMBLY INSTRUCTIONS

1. Cut hose to length.
2. Chamfer end of hose.
3. Screw the socket counter-clockwise until it bottoms out. Back off ¼ turn.
4. Clamp socket in vise.
5. Lubricate nipple thread liberally.
6. Screw the nipple clockwise into the socket.

I. Compartmentized Probe only: Cut & install one 5'-0" length of vacuum hose between the probe tip & the inner telescoping vacuum tube. Clamp in place using the worm screw clamps provided in the hardware package.

J. Core Probe only: Install the core vacuum tube kit provided. Refer to the kit installation drawing and the already installed vacuum tube assembly for proper placement. Cut & install two 5'-0" lengths of vacuum hose between the core probe vacuum ports & the inner telescoping vacuum tubes. Clamp in place using the worm screw clamps provided in the hardware package.

K. Route the vacuum hose from the outer telescoping vacuum tube(s) to the Sample Collection Cabinet and the vacuum power unit. Route the sample hose along the most direct and shortest path. Avoid tight bends and joints that may become locations that plug. Make all connections airtight and make sure all interior surfaces of joints are smooth and flush. Any ragged or raised tube ends will collect dust and debris as well as retard material flow. Escaping sample material can contaminate surrounding atmosphere and equipment. Clamp in place using the worm screw clamps provided in the hardware package.

L. Install the 1" x 1.5" x 1.5" rotational stops. The two stops must be field-welded to the 1" thick top plate of the probe stand beneath the driven sprocket of the pivot tube. These stops limit clockwise and counter-clockwise (right and left) probe rotation. The probe rotation must be limited to 180 degrees for single lane or 300 degrees for dual lane operation. This will prevent the probe from being swung around and hitting the hydraulic hoses. Reduce the amount of rotation if other obstructions such as buildings, poles, etc. are nearby. First lightly tack weld the stops to the plate on top of the probe stand. Then swing the Probe through the entire range of travel to verify that it does not hit any obstruction. When proper stop placement is determined, weld the stops in their permanent position.

NOTE: WHEN WELDING THE STOPS, CAREFULLY SHIELD THE DRIVE SPROCKET AND OTHER DRIVE COMPONENTS FROM WELD SPATTER.

M. Remove the pump shipping bracket from the hydraulic power unit. Install the drive coupling & spider from the hardware kit on the motor provided, but do not tighten yet. Place the motor in the cabinet, slide the pump mount onto the motor shaft and fasten the motor to the cabinet & the pump mount. Access the coupling through the hole in the pump mount. Make sure the motor coupling is almost fully engaged, (there should be about 0.03" to 0.06" end clearance within the coupling, so that no force is pushing on the pump shaft). Tighten the coupling set screw and replace the pump mount cover.

N. The hydraulic power unit is furnished with the valves pre-wired to an electrical junction box. Have a qualified electrician complete the probe field wiring. This includes bringing the required power supplies to the hydraulic unit electrical junction box, motor starter, motor, tank heater, vacuum motor(s), and the operators control panel. Refer to the certified electrical drawings.

3.5 Initial Startup

A. On the operators control panel, turn the POWER switch on. The hydraulic power unit motor should start, building system pressure. Verify proper hydraulic pump motor rotation. Correct wiring if necessary.

B. Use the push-buttons or joy-sticks to move the probe around. Make sure the air is removed from all hydraulic lines. It may be necessary to loosen a hose where it connects to a cylinder, motor, or actuator to bleed off trapped air.

WARNING

HYDRAULIC LINES UNDER HIGH PRESSURE, FLUID CAN ESCAPE WITH GREAT VELOCITY! EYE AND SKIN INJURY MAY RESULT. USE EYE & HAND PROTECTION WHEN BLEEDING HYDRAULIC LINES.

C. While operating the Probe, make sure that the hydraulic and vacuum hoses do not become pinched and are not pulled tight.

D. Adjust the relief valve pressure setting. Refer to section 4.3.2.

E. Adjust the flow control valves which determine the rotational speed (left and right) of the boom. Turn a valve knob counter-clockwise to increase fluid flow from a motor port; turn a knob clockwise to reduce flow and slow the motor.

F. After the Probe has operated and air has been purged from the system, add hydraulic oil and raise the level up to the top line on the level gauge.

G. Turn the vacuum motor on and verify proper operation.

3.6 Controller Location

A. Use vibration isolation pads when mounting the control enclosure or mount the controller in a vibration-free location.

B. Unless ordered for severe duty, locate controller so it is protected from water and dust.

C. Unless an explosion-proof rated controller was specifically ordered, DO NOT locate the controller in a hazardous area.

D. Most applications require that the Truck Probe be in easy view of the controller.

3.7 System Wiring

Refer to the certified electrical drawing(s) for specific wiring requirements.

The electrical installation must comply with OSHA Regulations; the National Electrical Code; and all other applicable federal, state, and local codes and regulations.

If wiring between the controller and the Truck Probe unit is run through rigid conduit, use a short length of flexible conduit to connect wiring to the Truck Probe. This will isolate the rigid conduit from any vibration originating at the Truck Probe hydraulic unit.

3.7.1 Electrical Power Requirements, System

Refer to the certified electrical drawing(s) for specific wiring requirements.

3.7.1.1 Controller

Refer to the certified electrical drawing(s) for specific wiring requirements.

3.7.1.2 Solenoid Valve Coils

110/120 VAC, 50/60 Hz, Single Phase, 50 Watts.
Optional - 220/240 VAC, 50/60 Hz, Single Phase, 90 Watts.

3.7.1.3 Hydraulic Tank Heater (Optional)

120 VAC, 50/60 Hz, Single Phase, 500 Watts.

3.7.1.4 Hydraulic Pump Motor

Hydraulic Power Unit Horsepower	Voltage & Phase 60 HZ	Amps
3 HP TP Comp & Core	230 1PH	14.0
3 HP TP Comp & Core	230/460 3PH	8.29/4.14
3 HP TP Comp & Core	575 3PH	3.32
5 HP STP Comp & Core	230 1PH	21.5
5 HP STP Comp & Core	230/460 3PH	13.2/6.6
5 HP STP Comp & Core	575 3PH	5.28

NOTE: THE MOTOR CHART AMPERAGES SHOWN ARE FOR REFERENCE ONLY. VERIFY BY CHECKING MOTOR NAMEPLATE.

3.8 System Plumbing

The hydraulic power unit was pre-plumbed and tested before it left the factory. The final installation must comply with OSHA Regulations and all other applicable federal, state, and local codes and regulations.

As shown on the certified drawings, the solenoid valves and manifold were mounted on the hydraulic power unit at the factory.

The Truck Probe was also provided with hoses and fittings for connecting the hydraulic power unit to all the cylinders & actuators. When connecting the hoses to the hydraulic power unit, exercise caution in preventing any contaminants from entering into the hydraulic lines.

CAUTION

HYDRAULIC HOSE WHIP MAY CAUSE MINOR INJURY. CLAMP HOSES TO PREVENT EXCESSIVE MOVEMENT.

NOTE: DO NOT USE TEFLON TAPE OR PIPE SEALANT ON "O-RING" TYPE AND "JIC" TYPE CONNECTIONS.

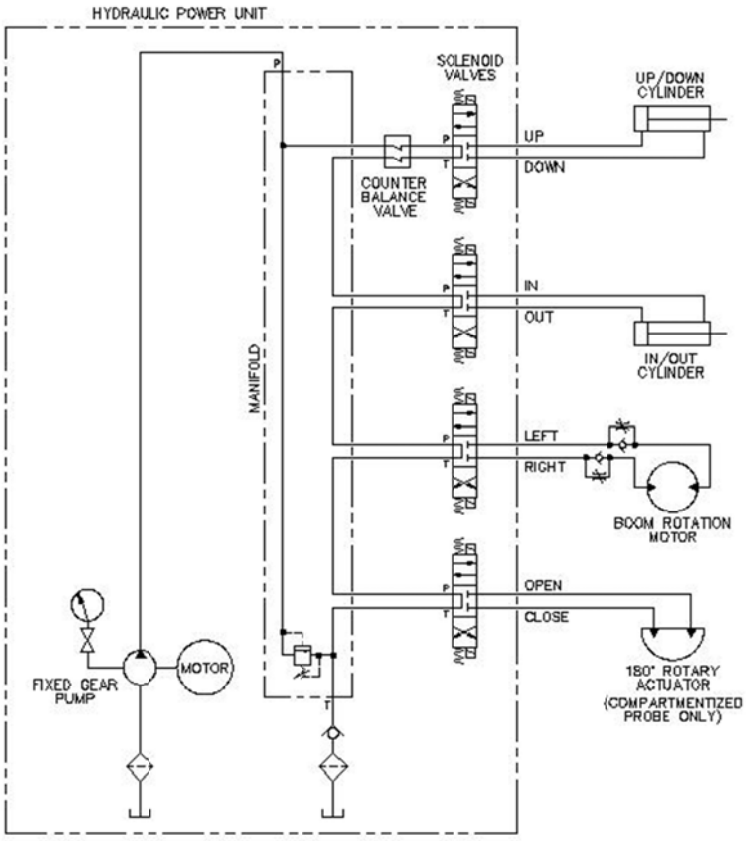


FIGURE 3-2, HYDRAULIC SCHEMATIC

IV. OPERATIONS AND ADJUSTMENTS

DANGER

FAILURE TO OBSERVE ALL SAFETY RULES, WRITTEN AND IMPLIED, AND THOSE SUGGESTED BY COMMON SENSE, CAN RESULT IN DEATH, SERIOUS INJURY, AND /OR EQUIPMENT DAMAGE. LOCKOUT POWER BEFORE PERFORMING ANY MAINTENANCE.

4.1 Operators Control Components And Their Functions

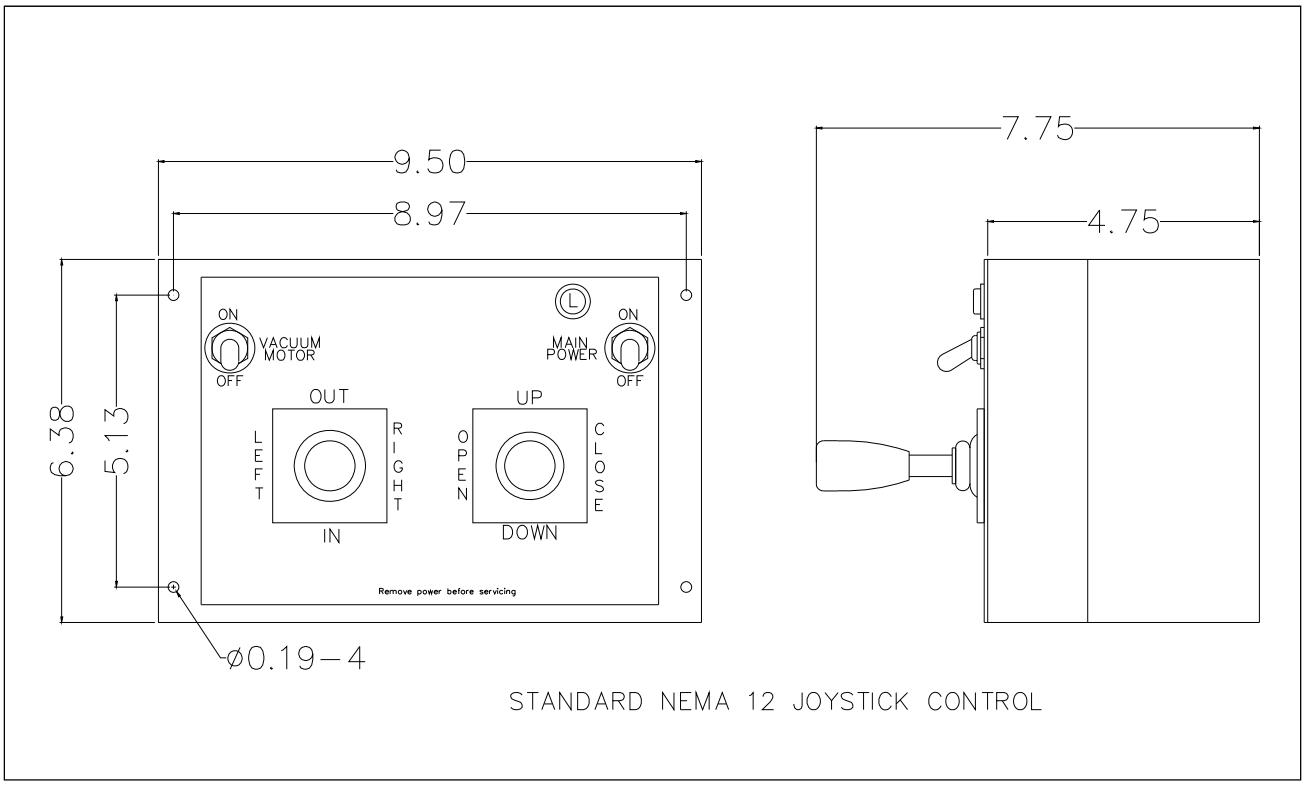


FIGURE 4-1, STANDARD NEMA 12 OPERATORS CONTROL PANEL DETAIL

Refer to the certified electrical drawing(s) for dimensions on control panels with optional features.

4.1.1 POWER OFF/ON Switch S-1 & Light

This illuminated selector switch controls electrical power to the controller, valve solenoid coils, vacuum motor relay coil and the hydraulic motor starter coil. The light is illuminated as long as power is available to the controller and the POWER switch is set to ON.

4.1.2 VACUUM MOTOR OFF/ON Switch S-2

This switch permits the operator to turn on the vacuum motor when sampling. The motor will need to be turned off before opening the collection cabinet door.

4.1.3 PROBE MOVEMENT Push-button Switches S-3 thru S-10 (Old Style Control)

The push-button control panel is wired so that only one of the eight valve solenoids can be energized at any given time. This prevents probe operators from initiating contradictory actions.

4.1.4 PROBE MOVEMENT Joy-stick Switches S-3 & S-4 (Standard JS Control)

Due to the physical arrangement of the switches on the joy-sticks, only one of the four valve solenoids controlled by each joy-stick can be energized at a given time. As a consequence, two boom/probe motions can be initiated simultaneously. However, if two boom motions are initiated simultaneously, both will occur at a slower rate because of the limited pump capacity. It is much harder to accurately control two boom motions simultaneously.

4.1.5 Main Fuse

This fuse, located in a fuse block within the controller enclosure, protects the controller and probe components against overloads and short circuits.

For 110/120 VAC, 1PH operation use ONLY a Buss Type FNM, 4 Amp, 250 Volt Slo-Blo fuse or equal.
For 220/240 VAC, 1PH operation use ONLY a Buss Type FNM, 2 Amp, 250 Volt Slo-Blo fuse or equal.

4.1.6 Terminal Strip

This 17-position barrier terminal strip is fastened to the sub-plate within the operators control enclosure. It serves as the controller's interface with and connection point for all external circuits and for the components mounted on the enclosure's front panel. Refer to the Certified Electrical Drawing(s).

4.1.7 Vacuum Motor(s) Relay

This 25 amp control relay makes and breaks the power to the vacuum motor(s).

4.2 Electrical Components

4.2.1 Hydraulic Pump Motor

This motor is coupled to the hydraulic pump via flexible shaft coupling and a pump adapter that bolts to the motor. The motor runs at fixed speed of ~1800 RPM. A label is located on the pump mount designating the correct direction of rotation (reference Figure 1-1). Verify that the motor is turning the proper direction of rotation when wiring the system.

NOTE: DO NOT RUN THE MOTOR THE WRONG DIRECTION. DAMAGE TO THE HYDRAULIC PUMP WILL RESULT.

4.2.2 Pump Motor Starter & Thermal Overload

The motor starter makes and breaks the power to the hydraulic pump motor. The motor is protected with a set of overload heaters, that sense the motor current and trip if and overload occurs. If the overload trips, it will be necessary to determine the cause and manually reset the overload module inside the starter enclosure.

4.2.3 Hydraulic Oil Heater

The immersion heater is mounted in the side of the oil reservoir to heat the oil to a suitable operating temperature. The heater is rated at 500 watts and has in internal thermostat to shut it off at when the oil has been heated. The thermostat should be set at 90 degrees F.

4.2.4 Vacuum Motor

The vacuum motor(s) are used to create suction at the probe tip to convey the sample to the collection cabinet. The vacuum motor(s) are turned on during the probing of a truck and must be turned off to retrieve the sample from the collection cabinet.

NOTE: SHUT THE VACUUM SYSTEM OFF WHEN EMPTYING THE COLLECTION CABINET. FAILURE TO DO SO MAY RESULT MECHANICAL DAMAGE TO THE VACUUM MOTOR(S) AND WILL LIKELY PROVIDE A BIASED SAMPLE.

4.3 Hydraulic Components

4.3.1 Solenoid Valves V-1, V-2, V-3, & V-4

These valves are 4-way, 3-position, double-solenoid operated, spring-centered directional control valves. When both solenoids of a valve are de-energized, the valve spool is spring-centered and hydraulic fluid is routed directly into the manifold's return passage.

Each solenoid valve also has a manual operator that can be used to physically shift the valve spool. If a valve does not operate when the associated control switch is actuated, depressing the manual operator with a ball-point pen or a screwdriver will cause the valve to shift. If the valve shifts, it can be determined that the problem is in electrical circuit or solenoid.

The electrical connections to the solenoids are accessible by removing the cover of the terminal box on each valve. The valves are pre-wired to the electrical junction box inside the hydraulic power unit.

Refer to the certified drawings for additional valve information.

4.3.1.1 Boom UP/DOWN Valve V-1

This solenoid-operated directional control valve alternately pressurizes the piston end and rod end of the double-acting cylinder to raise and lower the boom. When the valve's "A" solenoid is energized, the valve spool shifts, pressurizing the piston end of the cylinder, thus raising the boom. When the "B" solenoid is energized, the valve spool shifts, pressurizing the rod end of the cylinder, thus lowering the boom. Note, when neither "A" nor "B" solenoid is energized the valve is spring centered so that all ports are blocked and movement is inhibited.

4.3.1.2 Counter Balance Valve V-12

When at rest, the probe's weight causes static hydraulic pressure. The purpose of the Counter Balance Valve is to prevent the probe from free-falling slightly when the probe is initially powered down. The counter balance valve also prevents the probe from drifting down. If the probe drifts down, the counter balance valve will need to be adjusted as follows:

NOTE: Prior to performing the Counter Balance Valve adjustment, first verify that the UP port, as shown on the power unit decal, is actually the up hose. If not, the UP and DOWN hoses and the control wires must be reversed.

4.3.1.2.1 Counter Balance Valve adjustment:

A. Turn ON the pump and raise the boom half way up (horizontal), extend the boom all the way out. Turn OFF the Pump.
B. Push IN on the DOWN OVERRIDE SPOOL, on the UP/DOWN Directional Control Valve. This is the valve's bottom override as looking inside the Hydraulic Power Unit.
C. While pressing in on the DOWN override, turn the Counterbalance Valve's adjusting screw Clock Wise (CW), to lower the pressure, until the boom just begins to drop. Slowly turn the screw CCW until the boom stops lowering. Turn the adjustment screw an additional ¼ turn CCW.
D. The Counterbalance is adjusted. If there is a problem probing down into the material, the system pressure may need to be increased in small increments until the probe operates normally. After each small increase in pressure, monitor the system pressure by deadheading the probe in the down position. DO NOT EXCEED THE RECCOMENDED SYSTEM PRESSURE. If the pressure was increased, the LEFT/RIGHT flow controls may need to be readjusted.

4.3.1.3 Boom LEFT/RIGHT Valve V-2

This solenoid-operated directional control valve alternately pressurizes opposing ports of the rotational motor to swing the boom left and right. When the valve's "A" solenoid is energized, the valve spool shifts, pressurizing the port that swings the boom to the left. When the "B" solenoid is energized, the valve spool shifts, pressurizing the port that swings the boom to the right. Note, when neither "A" nor "B" solenoid is energized the valve is spring centered so that all ports are blocked and movement is inhibited.

4.3.1.4 Boom IN/OUT Valve V-3

This solenoid-operated directional control valve alternately pressurizes the piston end and rod end of the double-acting cylinder to extend and retract the boom. When the valve's "A" solenoid is energized, the valve spool shifts, pressurizing the rod end of the cylinder, thus retracting the boom. When the "B" solenoid is energized, the valve spool shifts, pressurizing the piston end of the cylinder, thus extending the boom. Note, when neither "A" nor "B" solenoid is energized the valve is spring centered so that all ports are blocked and movement is inhibited.

4.3.1.5 Sample Ports OPEN/CLOSE Valve V-4 (Compartmentalized Probe Only)

This solenoid-operated directional control valve alternately pressurizes opposing ports of the rotary actuator to rotate the sample ports to collect and dump samples. When the valve's "A" solenoid is energized, the valve spool shifts, pressurizing the port of the actuator that opens the sample ports. When the "B" solenoid is energized, the valve spool shifts, pressurizing the port of the actuator that closes the sample ports. Note, when neither "A" nor "B" solenoid is energized the valve is spring centered so that all ports are blocked and movement is inhibited.

4.3.2 Relief Valve V-5

DANGER

EXCESSIVE SYSTEM PRESSURE MAY CAUSE HOSE OR COMPONENT BREAKAGE RESULTING IN PROPERTY DAMAGE, BODILY INJURY AND/OR EVEN DEATH. SET RELIEF VALVE TO PROPER SETTING.

Hydraulic Power Unit Horsepower	Relief Valve Pressure Setting
3 HP TP Comp & Core	750
5 HP STP Comp & Core	1250

The relief valve limits the hydraulic pressure produced by the pump. Adjust the pressure to the recommended setting. Check the hydraulic pressure. First open the gauge shut-off valve. If the pump motor is running and the probe operates at all, then the gauge should register some pressure. If it does not, then the gauge may be defective. It is normal for the gauge needle to vibrate slightly. In order to view the relief valve pressure setting on the gauge, a function must be dead headed momentarily to build pressure. Retract the boom all the way in. Now activate the probes down function until the cylinder bottoms out. Continue activating the solenoid momentarily while observing the pressure setting at which the relief valve is set on the pressure gauge. Adjust the relief valve as necessary.

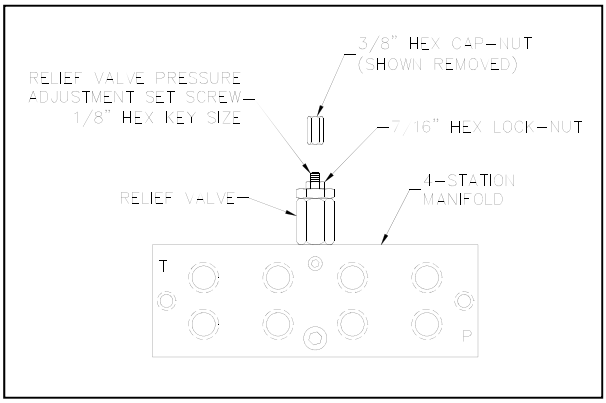


FIGURE 4-2, RELIEF VALVE

To adjust the relief valve setting, remove the protective cap-nut and loosen the lock-nut on the valve stem. Use a 1/8" hex key to turn the valve stem clockwise to increase pressure or counter-clockwise to reduce pressure. Make valve adjustments in small increments and observe the gauge while doing so. When adjustment is complete, tighten the lock-nut to maintain valve adjustment, then tightly rethread the cap-nut onto the valve stem.

If no change in pressure is noted when making adjustments, the relief valve may be sticking or the gauge may be defective. If the gauge and relief valve have been eliminated as the source of the problem, then the pump may be worn, particularly if the problem is low pressure.

NOTE: THE GAUGE WILL LAST LONGER IF IT IS NOT CONTINUOUSLY SUBJECTED TO PUMP PRESSURE PULSATIONS. CLOSE GAUGE SHUT-OFF VALVE AFTER CHECKING & SETTING PRESSURE.

4.3.3 Boom Left/Right Flow Control Valves V-6, V-7

A pair of in-line flow control valves mounted at the rotational motor, meters the flow of hydraulic fluid out of the rotational motor ports (reference figure 4-3). V-6 controls the speed of the boom swing to the left. V-7 controls the speed of the boom swing to the right. The flow controls will need to be adjusted upon initial start-up. To adjust, first loosen the small set screw on the metering screw. Turn clockwise to decrease boom swing speed and counter-clockwise to increase boom swing speed. After desired speed is achieved, re-tighten the set screw to lock setting.

NOTE: AVOID EXCESSIVE BOOM SWING SPEED, WHICH WILL RESULT IN UNCONTROLLABLE BOOM POSITIONING, AND INCREASED WEAR AND TEAR ON THE TRUCK PROBE.

4.3.4 Hydraulic Cylinders

These double-acting, non-cushioned rod cylinders raise or lower, and extend or retract the boom. The up/down cylinder is 3.00 bore x 24 stroke. The in/out cylinder is 1.50 bore x 48 stroke. The cylinders are attached at each end to the boom with a pivot pin. Solenoid valve V-1 controls the up/down movement. Solenoid valve V-3 controls the in/out movement.

4.3.5 Rotary Actuator (Compartmentalized Probe Only)

The actuator is essentially a double acting hydraulic cylinder that drives a rack and pinion unit, thus converting linear motion into rotary motion. The actuator is coupled directly to the inner tube of the compartmentalized probe. The rotary actuator opens the sampling ports to receive a sample. When the sampling ports are closed, the sample dumps into the vacuum conveying chamber of the probe. Solenoid valve V-4 controls rotary actuator motions.

4.3.6 Rotational Motor

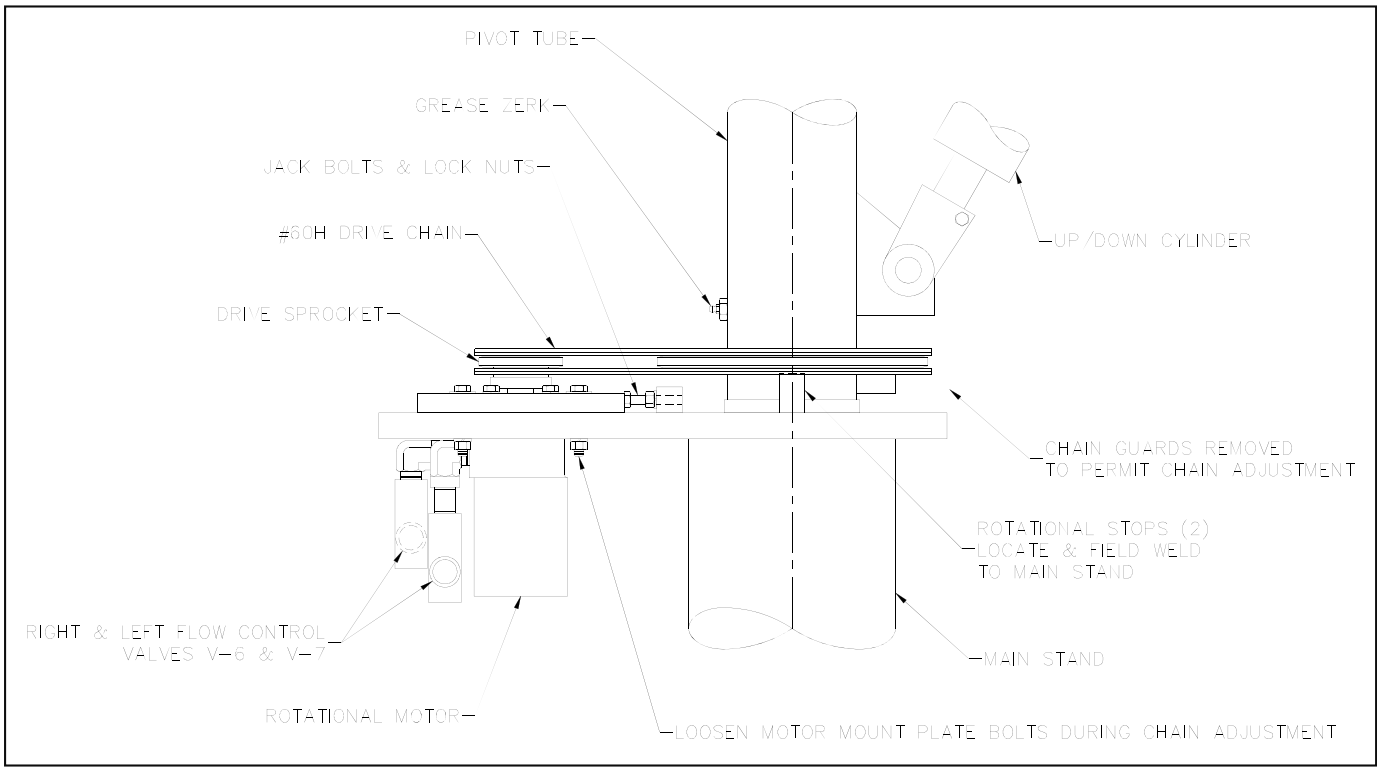


FIGURE 4-3, ROTATIONAL MOTOR & DRIVE CHAIN

The hydraulic torque motor swings the boom left or right by means of a pair of sprockets & roller chain. The motor is mounted to an adjustment plate located under the chain drive guards. The adjustment plate along with a pair of jack screws allow for tightening the drive chain. Solenoid valve V-2 controls left/right movement.

4.3.7 Hydraulic Pump

The hydraulic pump is a fixed displacement gear pump, that produces a flow of 5.6 GPM at 1800 RPM. The probe speed can be decreased by adding flow controls to any of the cylinders & actuators, but cannot be increased. Maximum speeds for troubleshooting are as follows.

Probe Function	Approximate Time
IN	2.5 seconds
OUT	4 seconds
UP	8 seconds
DOWN	7 seconds

V. MAINTENANCE AND REPAIR

DANGER

FAILURE TO OBSERVE ALL SAFETY RULES, WRITTEN AND IMPLIED, AND THOSE SUGGESTED BY COMMON SENSE, CAN RESULT IN DEATH, SERIOUS INJURY, AND /OR EQUIPMENT DAMAGE. LOCKOUT POWER BEFORE PERFORMING ANY MAINTENANCE.

5.1 General Maintenance

A good maintenance program involves thorough general housekeeping, adequate periodic re-lubrication, and replacement of worn or damaged components.

5.2 Periodic Inspection

At regularly scheduled intervals, while observing all safety precautions observe the equipment as it operates. Inspect for:

A. Loose or missing hardware.

B. Proper hydraulic oil level.

C. Noisy motors or motor bearings.

D. Structural damage.

E. Rust or corrosion.

F. Damaged wiring, including exposed conductors and connections.

G. Hydraulic leaks, damaged hydraulic lines and components, hoses that are kinked, chaffed or that are binding

H. Excessive dirt accumulation in the hydraulic power unit, vacuum unit, boom pivot and telescoping joints.

I. Vacuum hoses that are kinked or chaffed. Vacuum leaks.

J. Make sure that all guards are in place and that all warning labels are in place and legible. Section I, GENERAL SAFETY INFORMATION, explains the purpose and intended location of the warning signs. Warning signs are an important part of any safety program; replace any missing signs IMMEDIATELY!

5.3 Lubrication

5.3.1 Boom Pivoting And Sliding Joints, Monthly

Lubricate all shafts and bearings with a liberal amount of multi-purpose grease. Bearings and shafts should be re-greased monthly. All boom motions should be smooth and constant. Jerky operation may indicate mechanical damage to the boom, to a cylinder, or the rotation motor.

5.3.2 Boom Rotation Drive Chain & Sprockets, Every 6 Months

Because of the operating environment, the boom rotation drive chain and sprockets rapidly accumulate dust and dirt. At the recommended interval, thoroughly flush the chain with an approved solvent to rinse off all accumulated dirt. Then, while the boom is rotating, brush on a coat of lubricant. Be sure to work the lubricant into the chain pin joints.

5.4 Hydraulic Power Unit Service

The hydraulic power unit requires scheduled maintenance for long life and trouble free operation. Recommended hydraulic oil is "IS Blue All Season" (Viscosity 73.6 @ 100deg F). This is a high-performance anti-wear oil, with excellent low-temperature performance, suitable for environments with wide fluctuations in ambient temperature. An alternative is Exxon Mobil Univis N32 (Viscosity 177 @ 100deg F).

NOTE: DO NOT MIX OIL TYPES. COMPLETELY DRAIN AND FLUSH THE SYSTEM COMPONENTS WHEN CHANGING THE HYDRAULIC OIL.

5.4.1 Hydraulic Oil Inspection, Daily

A. Check the reservoir fluid level with the probe operating. The level must be above the RED Low Oil Level bar on the sight gage. Replenish reservoir as necessary to maintain minimum level.

B. Check fluid temperature after the truck probe has operated for a time. Fluid temperature should stabilize between 110 and 135 degrees Fahrenheit.

   Probable causes of hydraulic fluid overheating include:

   1. Prolonged periods of continuous operation in a hot environment. A heat exchanger may have to be installed to cool the fluid. If the high temperature environment is a temporary condition, a forced draft of cooling air may be sufficient.

   2. Low hydraulic fluid level. Fluid circulates through the system so rapidly that it can't transfer heat to the reservoir. Add fluid.

   3. Dirty power unit. A coating of hydraulic fluid and dirt prevents the power unit from shedding heat to the surrounding air. Clean the hydraulic power unit.

   4. Pump cavitation is usually signaled by a crackling or popping sound originating in the pump, this is most often caused by a clogged suction strainer resulting in the fluid vaporizing in the pump. Cavitation causes the fluid to overheat and loss of system pressure. The pump and motor will run hotter, and the pump will eventually be destroyed. Identify and correct the problem as soon as possible.

5.4.2 Breather Cap Cleaning, Every 3 Months

Remove the breather cap. Wash it thoroughly and blow it dry. Replace the cap.

5.4.3 Hydraulic Filter Replacement, Every 3 Months

Remove & replace the filter canister. A check valve between the filter & the oil reservoir prevents excessive oil spillage during replacement. Check the hydraulic pressure as outlined in Section 4.3.2.

5.4.4 Hydraulic Oil & Filter Replacement, Annually

A. Operate the Probe until the fluid temperature has stabilized. Move boom to the fully extended and down position.

B. Shutoff and lockout all power to the Probe.

DANGER

UNEXPECTED MOVEMENT OF THE PROBE BOOM CAN RESULT IN DEATH OR SERIOUS INJURY. MAKE CERTAIN LOCKOUTS ARE IN PLACE AND THE BOOM IS AT ITS LOWEST POINT OF OPERATION.

C. Immediately drain the reservoir of fluid. Remove the reservoir cover. It will probably have to be pried off since a bead of silicone sealant was applied at the factory to prevent fluid or vapors from leaking. Use an approved solvent to thoroughly flush any remaining fluid and dirt from the reservoir. DO NOT replace the cover at this time.

D. Disconnect the pressure and suction hoses at the pump to drain any remaining fluid and solvent. Then reconnect the hoses.

E. Make sure the hoses to the Truck Probe are labeled where they connect to the fittings on the end of the power unit. Disconnect the hoses to drain them of fluid. Then reconnect the hoses.

F. Replace the return line filter cartridge.

G. Temporarily remove the suction strainer. Wash it with solvent and blow it dry. Reinstall the strainer or replace it if it cannot be cleaned.

H. Remove the breather cap. Wash it with solvent and blow it dry. Replace the breather.

I. Make sure the 1/2" NPT drain plug is threaded securely in the reservoir drain. Then refill the reservoir with fifteen gallons of approved hydraulic fluid.

J. Operate the Truck Probe until no air bubbles are apparent from the return line.

K. Re-check hydraulic fluid level gauge and add additional oil if required.

L. Wipe the rim of the reservoir and the cover with a solvent-soaked rag, to provide clean, dry sealing surfaces. Apply an even bead of silicone sealant around the rim of the reservoir. Reinstall the cover. Sealing the cover to the reservoir is not essential but will help to keep the exterior of the power unit clean and minimize accumulation of dirt.

M. Check the hydraulic pressure as outlined in Section 4.3.2.

5.5 Compartmentized Probe Tip Inspection

This inspection is best done with the probe lowered near ground level.

A. While keeping the hands clear of the Probe, have someone OPEN and CLOSE the probe tip through several cycles. The inner tube should rotate smoothly and evenly within the outer tube.

B. The plastic cap on the end of the probe tip should be in good condition. A damaged cap should be replaced at once; otherwise it will leak, reducing the vacuum drawn in the probe tip.

C. With the probe tip OPEN, the inner tube should be clear and free of any obstructions.

D. The probe tip should pivot freely on the end of the boom without side play.

5.6 Core Probe Vacuum Pressure Equalization

The Core Probe is designed to be a balanced system such that air is neither being pulled into or pushed out of the sampling end of the tip. Check for correct air balance as follows.

A. Turn the vacuum motor on.

B. Place a three inch square piece of paper over the sample opening.

C. The paper should stay in place without being sucked into the opening.

D. To correct air imbalance, loosen the vacuum hose where it connects to the probe tip.

E. To increase suction slide hose up to expose some of the existing relief holes.

F. To decrease suction slide hose down to cover up some of the relief holes.

G. Check for proper balance again & re-adjust if necessary.

VI. TROUBLESHOOTING

6.1 General Truck Probe Troubleshooting

DANGER

CARELESS OR ACCIDENTAL RESTORATION OF POWER CAN RESULT IN DEATH OR SERIOUS INJURY. MAKE CERTAIN AREA IS CLEAR BEFORE REMOVING LOCKOUTS.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Truck Probe does not operate (Power light Off).	Power switch OFF.	Turn power switch ON.
	Circuit breaker is open.	Reset breaker.
	Fuse(s) is blown.	Replace. Refer to Section 4.1.5.
	Faulty supply wiring.	Correct. Refer to certified electrical schematic.
	Disconnect switch OFF.	Turn disconnect switch ON.
	Defective power switch.	Replace switch.
Truck Probe does not operate (Power light On).	Faulty system wiring.	Correct. Refer to certified electrical schematic.
	Starter overloads tripped.	Reset. Refer to Section 4.2.2.
	Pump motor power off.	Turn motor power on.
	No or low hydraulic pressure.	Check pressure gauge.
	Defective control valve.	Refer to Section 6.2.
Truck Probe sluggish (Operates too slowly).	Relief valve set too low.	Reset. Refer to Section 4.3.2.
	Cylinder seal leakage.	Refer to Section 6.3.1.
	Hydraulic oil cold.	Check oil temperature. Install or inspect oil heater.
	Hydraulic pump worn out.	Replace.
	Partial blockage of solenoid valves. (Teflon tape used during installation)	Check valves and spools. Clean or replace solenoids.
Probe Drifts Down	Counter Balance may need adjustment.	Adjust. Refer to 4.3.1.2.1.

6.2 Directional Solenoid Valve Troubleshooting

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Valve does not shift but full line voltage signal is present at the terminal strip inside the control.	No or low hydraulic pressure.	Check.
	Faulty field wiring.	Check for full line voltage at the solenoid.
	Solenoid coil burnt out.	Replace coil if no continuity through coil.
	Valve clogged or stuck.	Remove & clean. Or replace.

6.3 Hydraulic Components Troubleshooting

6.3.1 Cylinder Leaking

A. External Leakage

1. Rod seal leakage can generally be traced to worn or damaged seals. Examine the piston rod for wear or damage. Replace the rod and seals if rod's surface is rough or worn out-of-round.

B. Internal Leakage

1. The lip seal piston seals are virtually leak free unless they are worn or damaged. Replace defective seals.

2. Contaminants in the hydraulic supply can lead to scored cylinder walls, resulting in rapid seal wear. If such is the case, check to see if the filter is being replaced frequently. A different type of filter may be required; one that can remove finer particles or one that can filter out different kinds of contaminants.

3. Possible piston cylinder leakage, apparently indicated by piston drift is not always traceable to the piston. A leak through a closed valve port can also cause piston drift.

VII. REPLACEMENT PARTS

7.1 Scope

The certified drawings list the non-standard components that have been incorporated into the equipment. InterSystems normally stocks non-fabricated parts and non-custom OEM parts. Replacement parts for any other components, including fabricated parts and custom OEM components can be supplied upon request.

7.2 Ordering Parts

Direct parts orders or requests for technical assistance to your sales representative or to:

InterSystems
9575 No. 109th Ave.
Omaha, NE. 68142
Phone: (402) 330-1500
FAX: (402) 330-3350

Please have available the MODEL NUMBER, SERIAL NUMBER and CUSTOMER ORDER NUMBER of the equipment in question as well as the location where the truck probe is INSTALLED.

7.3 Replacement Parts

The InterSystems Truck Probe is a quality built piece of machinery. As with any machine, parts do wear out and fail. It is InterSystems' recommendation that a small supply of spare parts be kept on hand to cover any minor breakdowns. A separate priced Spare Parts List will be sent identifying the suggested spare parts. It is also necessary to check the certified drawings, which will list any special or custom components utilized on this equipment.

7.4 Repair Kits

The following chart lists repair kits and parts that are available from InterSystems. These kits are offered as a more economical solution by rebuilding the defective part rather than replacing it. However in some cases the part may be beyond repair and replacement will be necessary.

Product Code	Description
522387	Gear Pump Seal Kit (Parker H series)
512853	Actuator Repair Kit (Parker LTR series)
512524	Valve Seal Kit (Parker)
35301	1-1/2” Bore Hydraulic Cylinder O-ring Repair Kit (Columbus LD series)
35290	3” Bore Hydraulic Cylinder O-ring Repair Kit (Columbus LDH series)
35691	Oil Filter Cartridge
552917	Hydraulic Oil (InterSystems Blue) 5 Gallon Pail

7.4.1 Truck Probe Parts Listing

			TP		STP
ITEM NO.	DESC	QTY	PART NO	QTY	PART NO
1	MAIN STAND WELDMENT	1	531748	1	531749
2	CHAIN GUARD SMALL HALF	1	531750	1	531752
3	CHAIN GUARD LARGE HALF	1	531751	1	531753
4	DRIVE SPROCKET	1	35688	1	35688
5	PIVOT TUBE WELDMENT	1	531900	1	543931
6	RYERTEX TEE BUSHING	2	518911	2	529628
7	ZERK BOLT ½-13UNC (1/2 TP & 1.25STP)	2	531755	2	529787
8	BOOM SHAFT (1" TP & 1-1/4" STP)	1	35176	1	XE8931
9	4 BOLT FLANGE BEARING(1"TP & 1.25"STP)	2	34792	2	24058
10	INNER BOOM WELDMENT	1	531885	1	531887
10A	DRILL BUSHING ¾ ID x 1 OD x 1 LG	-	-	2	543908
11	OUTER BOOM WELDMENT	1	531886	1	531888
12	IN/OUT RYERTEX BEARING PLATE	1	531882	1	531883
13	HEX HEAD BOLT ¾-10UNC	1	531884	1	542295
14	BUSHING 1.50 OD x 1.00 ID x 1 LG DURALON	-	-	1	531395
15	BUSHING 1.50 OD x 1.00 ID x 0.5 LG DURALON	-	-	2	543933
38	BUSHING 1.50 OD x 1.00 ID x 1 LG DURALON	1	531395	2	531395

ITEM NO.	PART NO	DESCRIPTION	QTY
		STAND & PIVOT TUBE COMPONENTS	
16	35684	CYLINDER HYD 3 BORE X 24 STROKE	1
17	34029	CHAIN ROLLER NO. 60-H	A/R
18	34758	CHAIN LINK NO. 60-H CONNECTOR	1
19	34033	CHAIN LINK NO. 60-H OFFSET	A/R
20	35687	HYD TORQUE MOTOR W/ 1.00 SHAFT	1
21	531754	TP & STP HYD MOTOR SLIDE PLATE	1
22	35628	ELBOW 90 M-F ½ MPT x ½ FPT STL	2
23	35623	PIPE NIPPLE ½ NPT X 2 LG BLACK	2
24	35629	ADJ FLOW CONTROL ½ NPT 15 GPM	2
25	36298	GEASE ZERK STRAIGHT ¼-28 UNF	2
26	522911	PIVOT STOP HR BAR 2 X 1.5 X 1.5	2
27	531935	BULKHEAD BRACKET DUAL LANE	1
28	516539	PAINT DTM GRAY TOUCH UP SPRAY CAN	A/R
		BOOM COMPONENTS	
31	35685	CYLINDER HYD 1-1/2 BORE X 48 STROKE	1
32	531934	INNER VAC TUBE 60.00 LG	A/R
33	531933	OUTER VAC TUBE 54.25 LG	A/R
34	527072	INNER VAC TUBE MTG BRKT	A/R
35	527071	OUTER VAC TUBE MTG BRKT	A/R
36	527073	FITTING FLEX HOSE 1.50 ID	A/R
37	34506	WORM CLAMP 1-9/16 TO 2-1/2	A/R

			7 FT PROBE	9 FT PROBE
ITEM NO.	DESC	QTY	PART NO	PART NO
41	CORE PROBE	1	531745	531746
42	COMPLETE COMP PROBE ASSY	1	531906	531907
43	PROBE ASSY (INCLUDES 44 & 46)	1	35593	35774
44	INNER PROBE WELDMENT	1	35590	512140

ITEM NO.	PART NO	DESCRIPTION	QTY
45	530288	URETHANE PROBE TIP REPLACEMENT KIT	1
46	-	-	-
47	531904	RAIN COVER TOP COMP PROBE	1
48	531905	RAIN COVER FRONT COMP PROBE	1
49	35702	COUPLING ACTUATOR	1
50	35686	HYD ROTARY ACTUATOR 180 DEG	1
51	35611	VACUUM HOSE 1-1/2” ID	A/R
		COLLECTION CABINET COMPONENTS	
61	35790	COLLECTION BOX FRAME	1
62	512871	COLLECTION BOX SCREEN	1
63	525643	COLLECTION BOX DOOR	1
64	523981	COLLECTION BOX WINDOW	1
65	34670	1/8 THICK NEOPRENE 4.88 X 6.00	1
66	530552	TP CYCLONE	1
67	530553	TP CYCLONE COLLECTION CHAMBER	1
68	530554	TP CYCLONE 1.50 OD OUTLET ELBOW	1
		SINGLE 2-STAGE VAC UNIT COMPONENTS	
71	34783	VAC HOUSING SINGLE 2-STAGE	1
72	35606	VAC HOUSING COVER	1
73	35940	VAC OUTLET 1.50 OD 90 DEG	1
74	35607	VAC GASKET 9.7X 9.7 X 1	1
75	35532	2-STAGE VAC MOTOR W/ TANGENTIAL DISCHARGE	1
		DUAL VAC UNIT COMPONENTS	
76	35607	VAC GASKET 9.7X 9.7 X 1	2
77	34498	HOSE 2.0 ID PLASTIFLEX	A/R
78	35212	VAC HOSE ADAPTER 2.0” OD	1
79	35605	VAC HOSE ADAPTER 1.5” OD	1
80	34069	PANEL LOCK W/ KEY	1
81	515495	VAC HOUSING DUAL 2 OR 3-STAGE	1
82A	35940	VAC OUTLET 1.50 OD 90 DEG	1
82B		VAC OUTLET 2.38 OD 90 DEG	1
83A	35532	2-STAGE VAC MOTOR W/ TANGENTIAL DISCHARGE	2
83B	529239	3-STAGE VAC MOTOR W/ TANGENTIAL DISCHARGE	2
		HYDRAULIC POWER UNIT COMPONENTS	
91	531744	HYD UNIT HOUSING W/ DOORS	1
92	35786	HYD UNIT COVER	1
93	514539	NEMA 1 ELECTRICAL JUNCTION BOX 10 X 8 X 4	1
94	514538	SUB PANEL	1
95	34605	TERMINAL BLOCK 10 SPACE	1
96	34726	½” CONDUIT LOCK RING	4
97	35576	STRAIN RELIEF CONNECTOR ½ NPT	8
98	35575	16/3 S CONDUCTOR CORD	20
99	35041	FIT PIPE PLUG 1 NPT BLACK	1
100	35767	INTANK FILTER STRAINER	1
101	35776	FILLER FILTER BREATHER	1
102	35619	½” FNPT OIL FILTER & BLOCK	1
103	35683	BLACK 90 DEG STREET ELBOW ½ NPT	1
104	35943	BLACK 90 DEG STREET ELBOW ¾ NPT	2
105	35624	BLACK PIPE PLUG ½ NPT	3

ITEM NO.	PART NO	DESCRIPTION	QTY
106	35547	PIPE NIPPLE ADAPTER ¼ MPT TO ½ MPT	1
107	35789	BLACK PIPE NIPPLE ½ X 1-1/2 LG	1
108	36440	BLACK PIPE NIPPLE ¾ X 1-1/2 LG	2
109	35737	BLACK PIPE BUSHING 1 MNPT TO ½ FNPT	1
110	35742	7/8 MSAE O-RING X ½ FNPT 90 DEG ELBOW	1
111	548400	FIT HYD ELB 90 3/4-16SAE(OR) X 3/4-16MJIC	2
112	35546	JIC 90 DEG ELBOW ¾ MNPT X ¾ MJIC	2
113	36654	JIC ADAPTER ½ MNPT X ¾ MJIC	2
114	511060	STREET TEE ½ NPT 2 FPT 1 MPT	1
115	35743	HYD HOSE 19.0” LG	1
116	35745	HYD HOSE 30.5” LG	2
117	35727	HYDRAULIC PRESSURE GAGE 3000 PSI	1
118	35766	OIL TEMPERATURE GAGE	1
119	547881	MANIFOLD 4 STA HYD 8 3/4-16 SAE-ORB PORT	1
120A	551514	HYDRAULIC VALVE 4-WAY DUAL COIL	4
120B	531379	COUNTER BALANCE VALVE D03	1
121	35663	HYDRAULIC RELIEF VALVE	1
122	35772	¼” FNPT SHUT-OFF VALVE	1
123	525502	¾” FNPT SWING CHECK VALVE	1
124	35768	HYD PUMP 5.6 GPM @ 1800 RPM	1
125	35769	PUMP MOUNTING ADAPTER	1
126	35781	COUPLING SPIDER RUBBER L100	1
127	35782	COUPLING HALF ¾ BORE L100	1
128	35783	COUPLING HALF 1-1/8 BORE L100	1
129		TEFC C-FACE, FT MT, ELECTRIC MOTOR	1
	35792	3 HP, 1 PH, 115/230VAC, 60 HZ	
	35791	3 HP, 3 PH, 230/460VAC, 60 HZ, (190/380VAC, 50 HZ)	
	524368	3 HP, 3 PH, 575VAC, 60 HZ	
	35794	5 HP, 1 PH, 115/230VAC, 60 HZ	
	35770	5 HP, 3 PH, 230/460VAC, 60 HZ, (190/380VAC, 50 HZ)	
	523135	5 HP, 3 PH, 575VAC, 60 HZ	
130	548404	FIT HYD PLUG 3/4-16MSAE(OR)	2

ITEM NO.	PART NO	DESCRIPTION	QTY	QTY
		DUAL LANE HYDRAULIC HOSES & FITTINGS KIT	**CORE**	**COMP**
131	36654	JIC ADAPTER ½ MNPT X ¾ MJIC	2	2
132	534762	½” HYDRAULIC HOSE	100	130
133	36655	HOSE END ½” TO ¾ FJIC	12	16
134	529432	BULKHEAD 45 DEG ELBOW ¾ MJIC TO ¾ MJIC	4	6
135	529539	½” HYD HOSE 72” LG ¾ FJIC TO ¾ FJIC	2	2
136	529543	1.75 ID HOSE SLEEVE	A/R	A/R
137	529538	½” HYD HOSE 96” LG ¾ FJIC TO ¾ FJIC	2	2
138	518921	JIC 45 DEG ELBOW ½ MNPT X ¾ MJIC	4	4
139	534763	REDUCER ¾ FJIC TO 7/16 MJIC	-	2
140	534764	¾-16 JIC NUT	-	2
141	534765	¼” HYD HOSE 192” LG 7/16 FJIC TO 7/16 FJIC	-	2
142	534766	¼” HOSE SUPPORT CLAMP	-	6
143	36476	JIC 90 DEG ELBOW ¼ MNPT X 7/16 MJIC	-	2
144	548403	JIC ADAPTER ¾-16 OR X ¾ MJIC	6	8

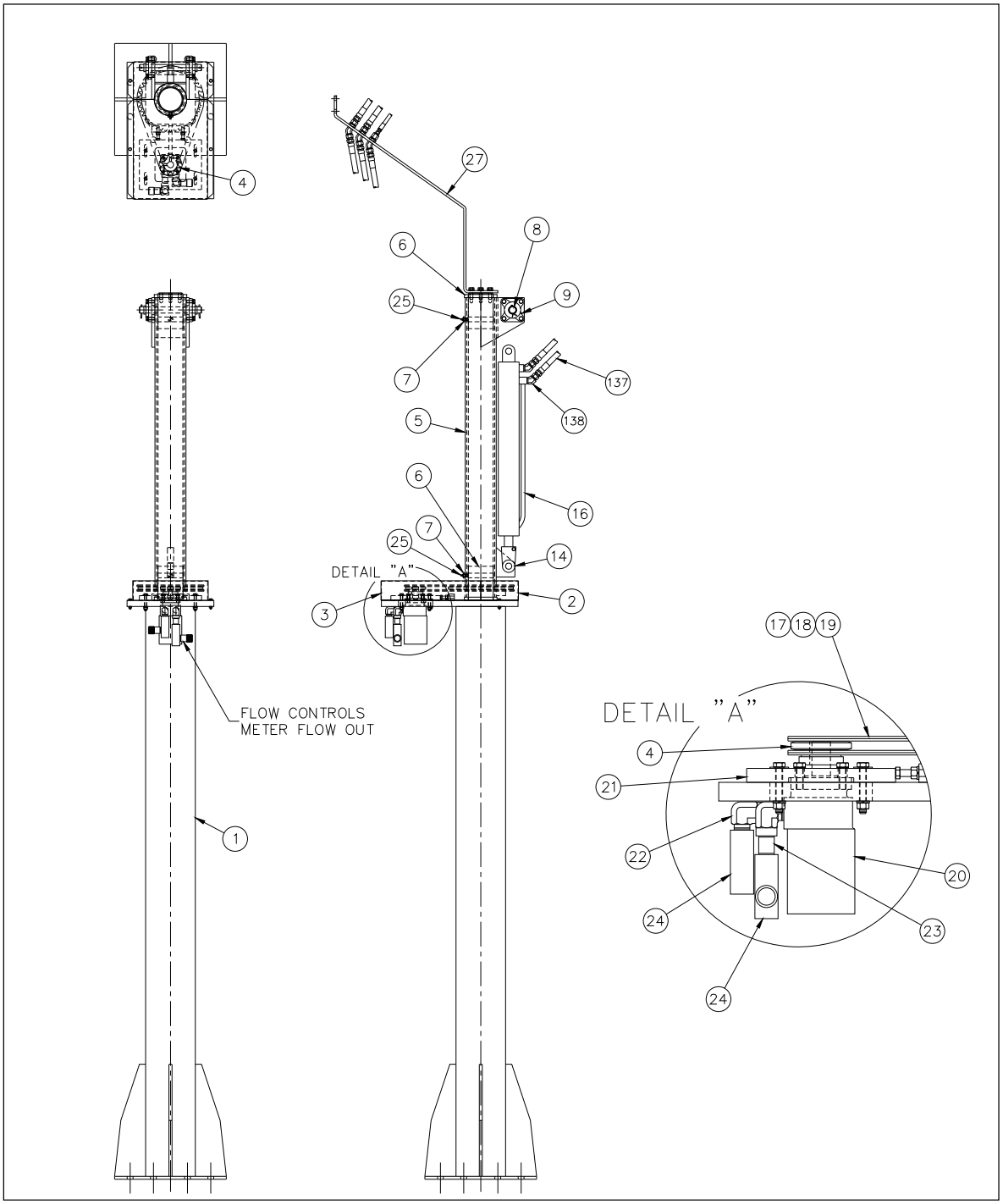


FIGURE 7-1, MAIN STAND ASSEMBLY

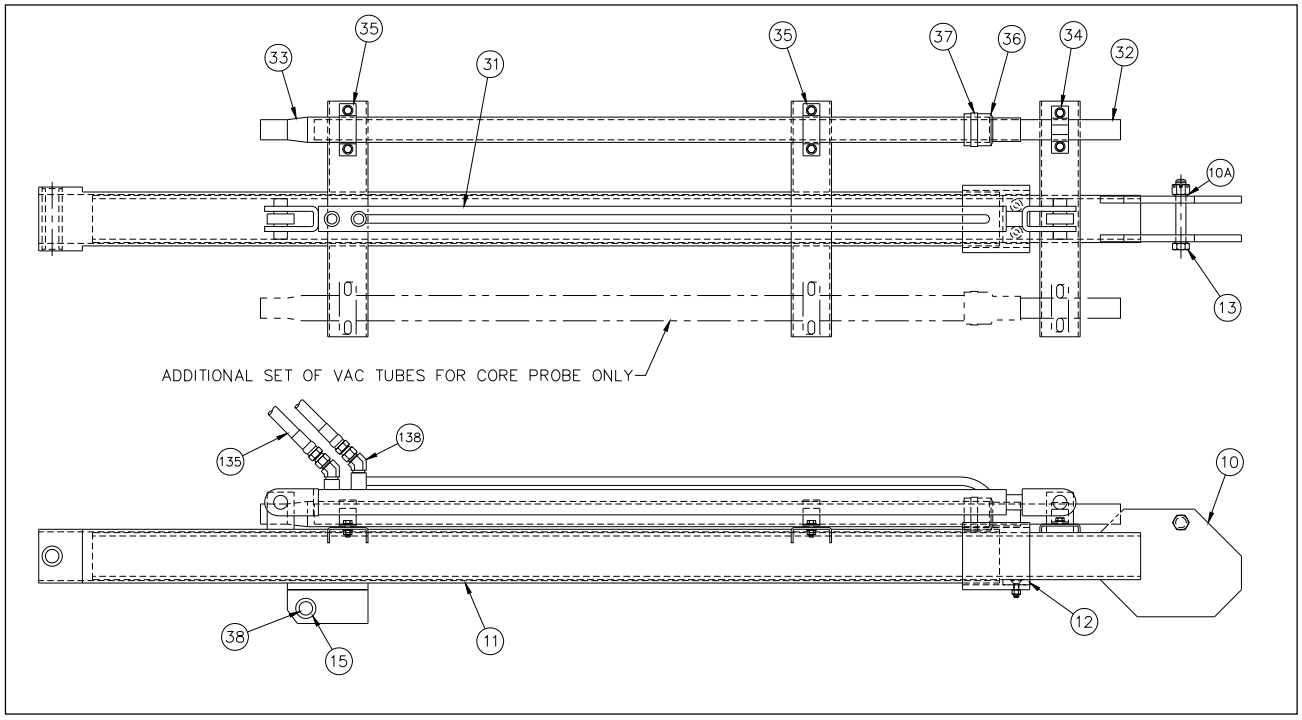


FIGURE 7-2, TELESCOPING BOOM ASSEMBLY

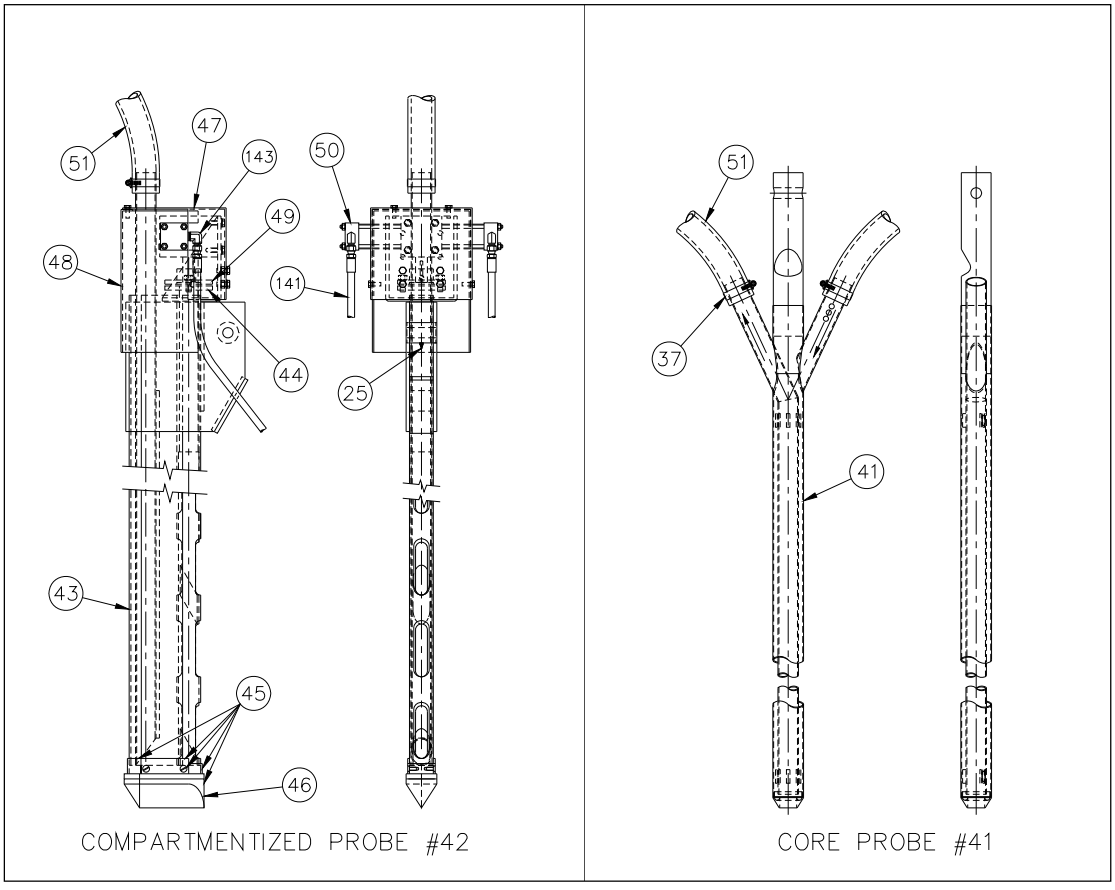


FIGURE 7-3, COMPARTMENTIZED & CORE PROBES

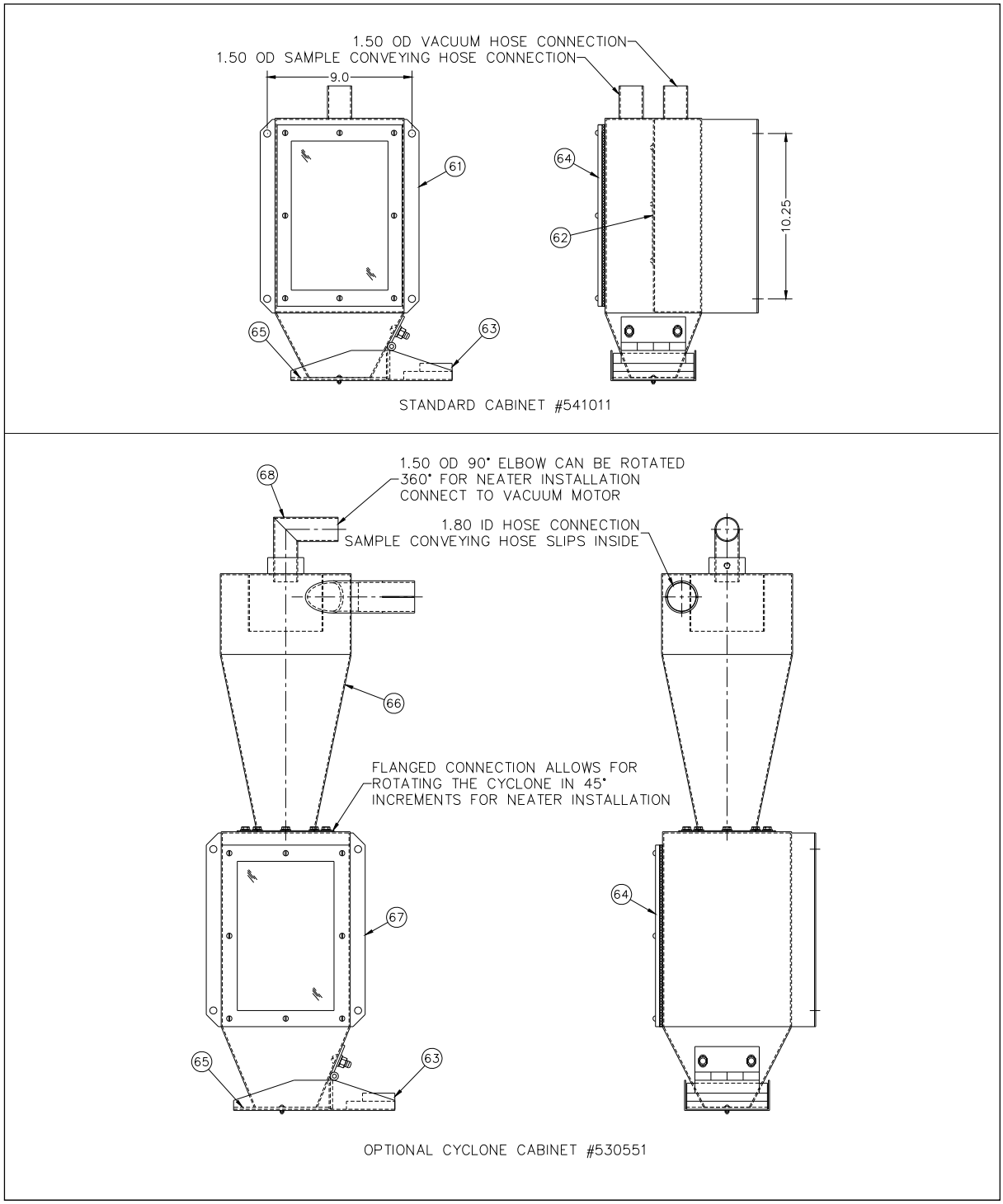


FIGURE 7-4, SAMPLE CABINETS

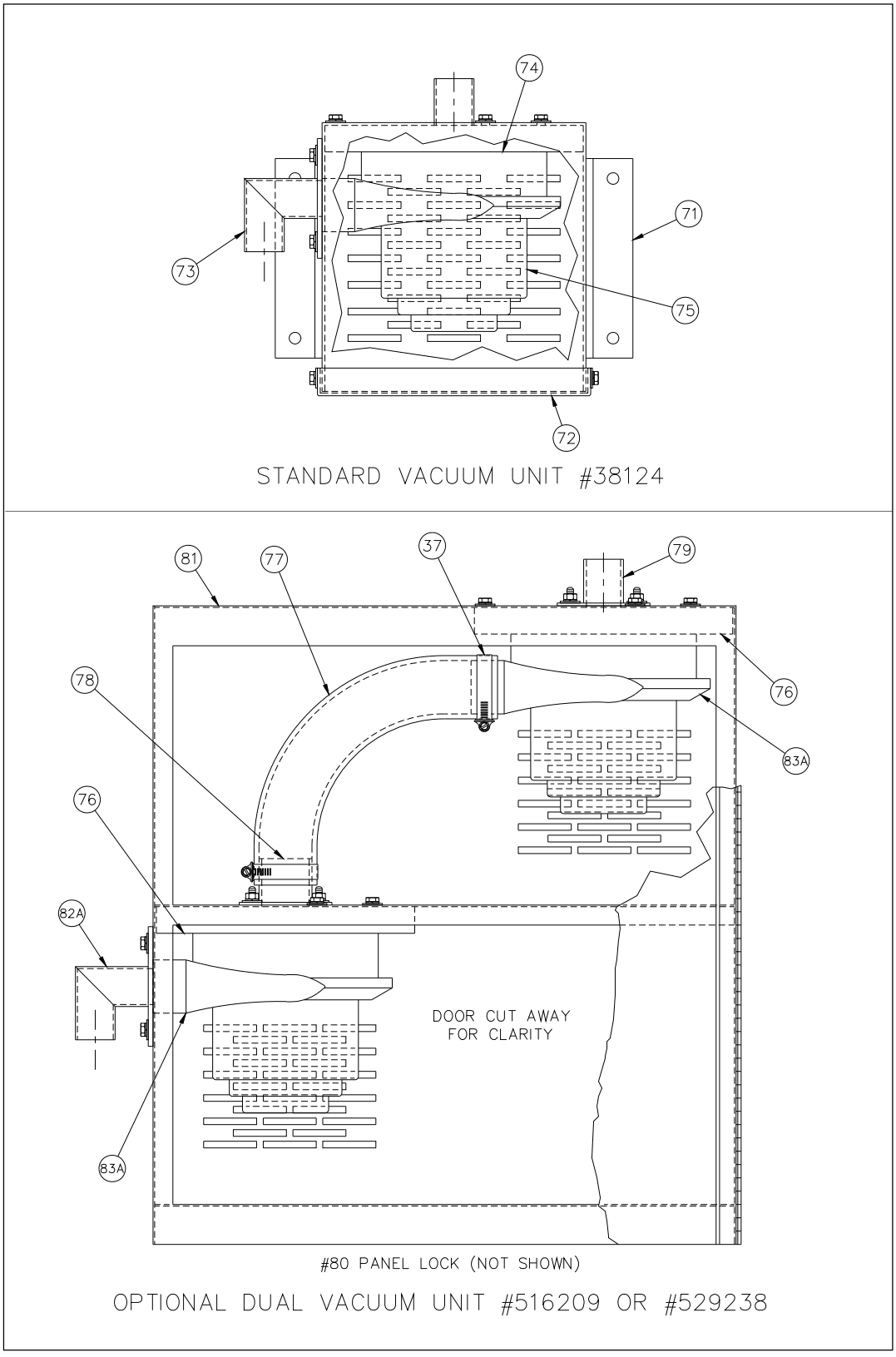


FIGURE 7-5, VACUUM MOTOR UNITS

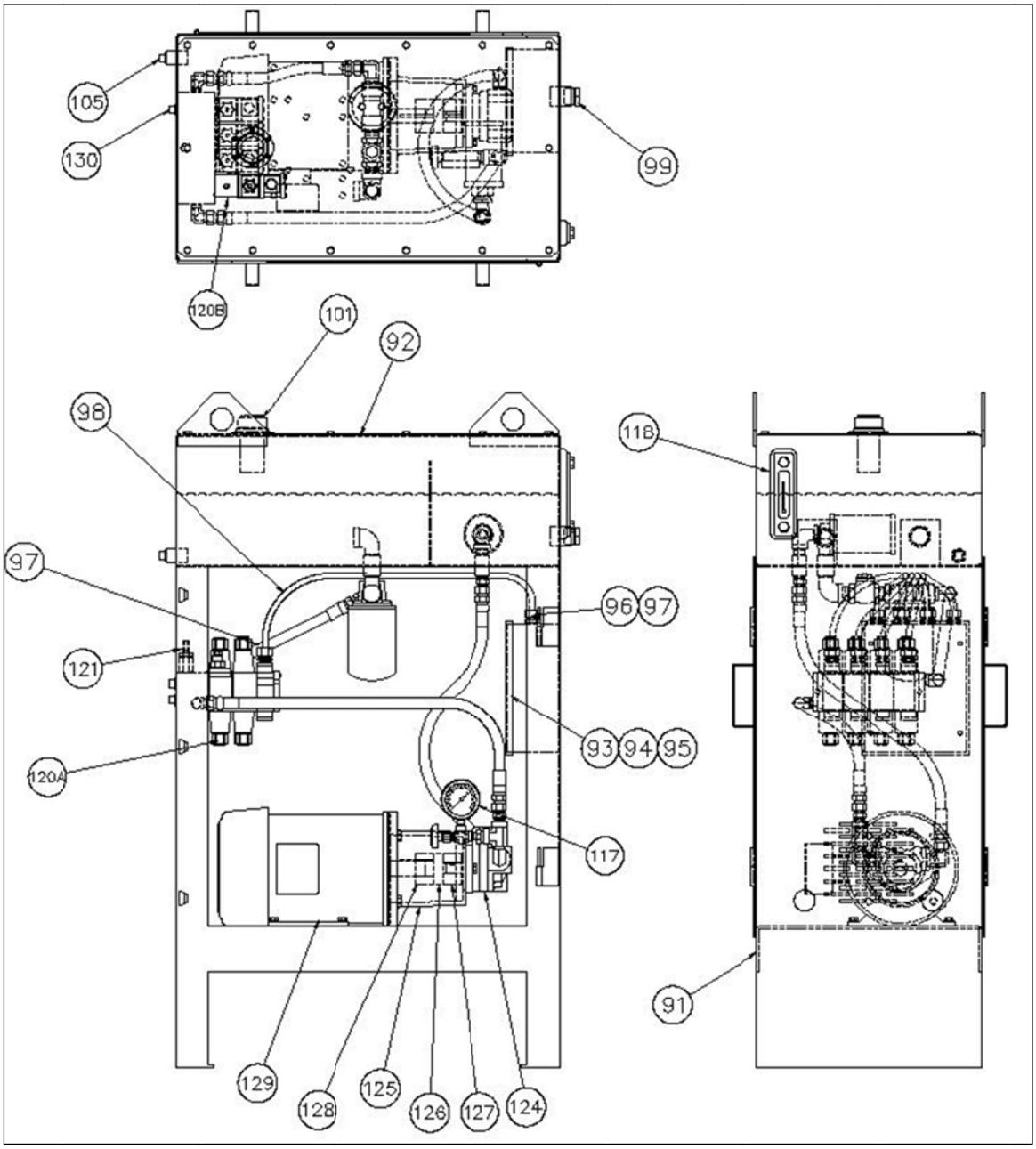


FIGURE 7-6, HYDRAULIC POWER UNIT ASSEMBLY

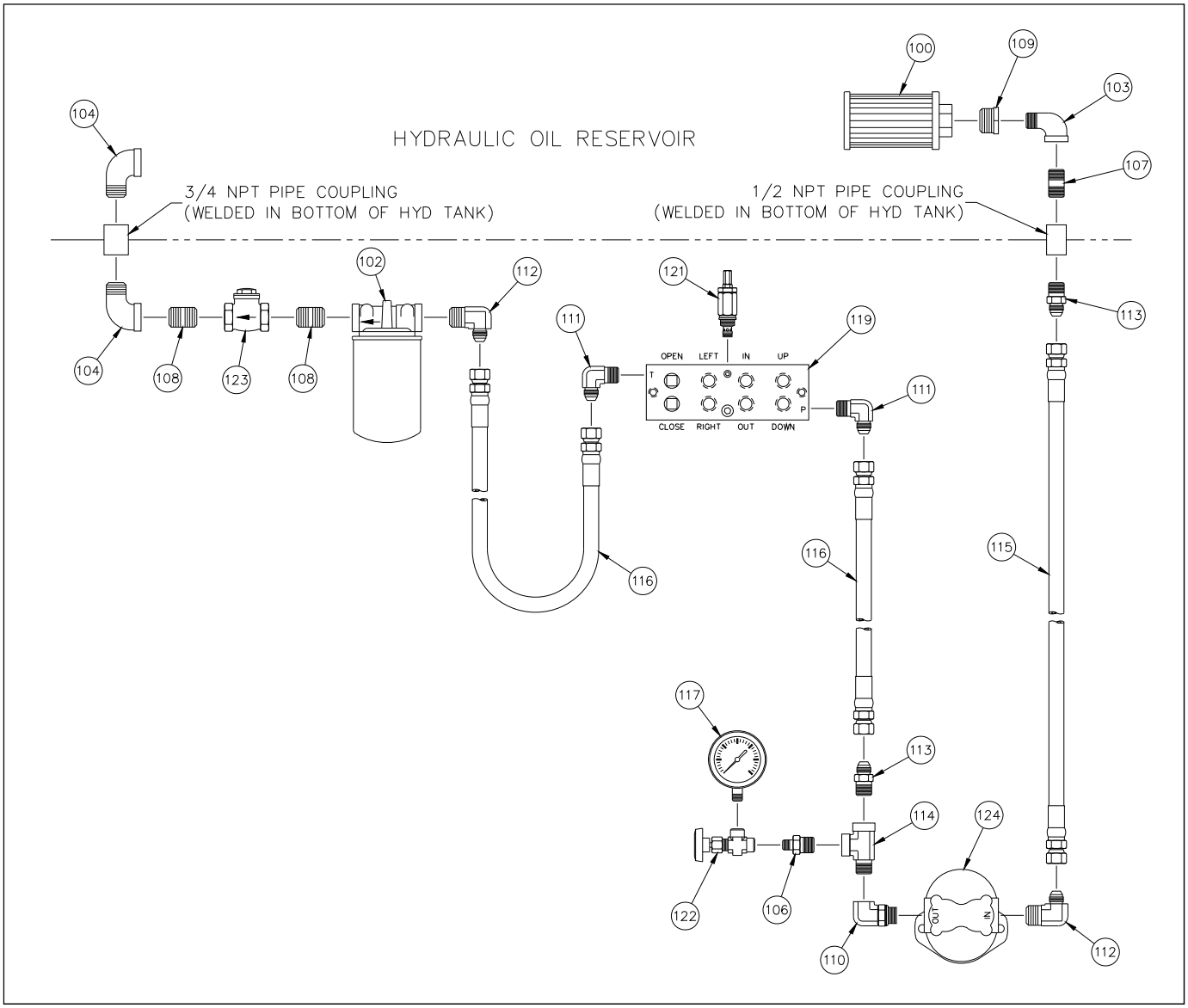


FIGURE 7-7, HYDRAULIC POWER UNIT FITTINGS& HOSES

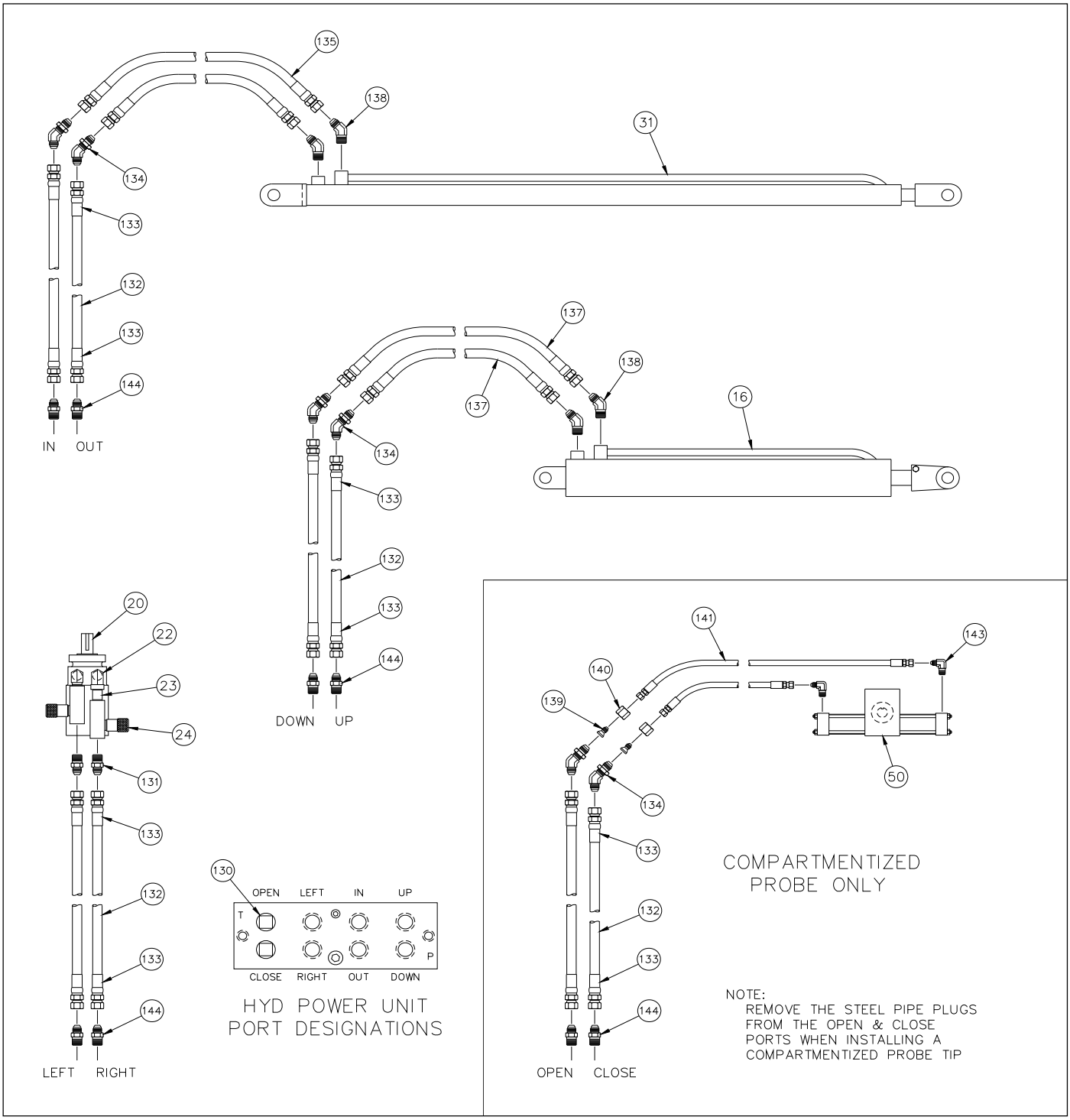


FIGURE 7-8, HYDRAULIC HOSES & FITTINGS

AUTOMATIC TRUCK PROBE MAINTENANCE CHECK LIST

Firm _____
City _____ **State** _____
Name _____
Date _____
Manager _____

intersystems

I. Machine Type and Size _____ Serial No. _____

YES	NO	
_____	_____	Check for leaks in hydraulic lines and fittings
_____	_____	Check in/out cylinder for leaks around piston and rod gland
_____	_____	Check up/down cylinder for leaks around piston and rod gland
_____	_____	Inspect chain on rotational motor
_____	_____	Check rotational stops on sprocket
_____	_____	Check for loose or missing hardware
_____	_____	Check telescoping boom for ease of movement
_____	_____	Lubricate shafts & bearings
_____	_____	Structural damage
_____	_____	Rust or corrosion
_____	_____	Check foundation bolts
_____	_____	Guards & safety labels in place
_____	_____	Inspect pivot guard for excessive play
_____	_____	Lubricate chain and sprocket
_____	_____	Check speed controls on rotational motor
_____	_____	Inspect all welds on probe

II. Hydraulic Power Unit

YES	NO	
_____	_____	Noisy motor or bearings
_____	_____	Overheated motor or pump
_____	_____	Check condition of oil (change at least once a year)
_____	_____	Check oil level in reservoir (must be above red low level)
_____	_____	Check oil pressure relief valve (750 PSI for 3 HP) (1250 PSI for 5 HP)
_____	_____	Check hydraulic line connections
_____	_____	Inspect oil filter cartridge (change if req'd)
_____	_____	Grease zerks
_____	_____	Clean breather vent & suction filter
_____	_____	Check hydraulic fluid temperature (110-135 degrees F)

III. Control Box Type _____

YES	NO	
_____	_____	Damaged wiring including exposed connections conductors and
_____	_____	Check fuses
_____	_____	Box cleaned
_____	_____	Switches work properly

IV. Collection Box

YES	NO	
_____	_____	Plex-glass okay
_____	_____	Check and clean screen
_____	_____	Gasketing okay
_____	_____	Door seals properly
_____	_____	Check for excessive dust in cabinet

V. Sample Tube and Vacuum System

YES	NO	
_____	_____	All fasteners securely attached to the tubing
_____	_____	Tube checked at entrance through walls for leaks
_____	_____	All hoses free of cracks
_____	_____	Inspect for dents or kinks in tubing lines
_____	_____	Check suction on vacuum motor
_____	_____	Check wear on vacuum motor housing
_____	_____	Inspect impeller blades on vacuum motor

VI. Probe Tip

YES	NO	
		CORE TIP
_____	_____	Check balance on air suction
_____	_____	Check for blockage between inner and outer tube
_____	_____	Check for damage (dents, etc.)
		COMPARTMENTALIZED TIP
_____	_____	Check open/close actuator
_____	_____	Inspect ceramic grout along length of tip
_____	_____	Remove urethane tip and clean
_____	_____	Inspect urethane tip (replace if necessary)
_____	_____	Inspect caulking on rain cover
_____	_____	Inspect rotating tube for wear

VIII. WARRANTY

InterSystems reserves the right to make changes in design or in construction of equipment and components without obligation to incorporate such changes in equipment and components previously ordered.

WARRANTY, LIMITATION OF LIABILITY, DISCLAIMER OF IMPLIED WARRANTIES:
InterSystems manufactured equipment and components are guaranteed against defects in workmanship or materials for one year from date of shipment. The obligation of InterSystems with respect to any goods is limited to replacement or repair of defective parts and equipment provided those parts are returned, shipping costs prepaid, to InterSystems' factory and provided the product has not been subject to misuse, negligence, or accident, or repaired or altered outside of our factory, or other than by an Authorized Service Representative. This warranty does not cover the replacement of parts inoperative because of wear occasioned by use, the cost of replacing parts by a person other than an InterSystems employee or an Authorized Service Representative, or the adjustment of a product where the product was improperly adjusted by the purchaser. In addition, this warranty does not cover components manufactured by others such as motors, drives, clutches, cylinders, valves, blowers, and the like. On those components the standard Manufacturers' warranty applies. In any event, liability is limited to the purchase price paid, and InterSystems will, under no circumstances, be responsible for special or consequential damages, or for incidental damages.

INTERSYSTEMS NEITHER MAKES NOR AUTHORIZES ANY WARRANTY OTHER THAN AS HEREIN CONTAINED. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.