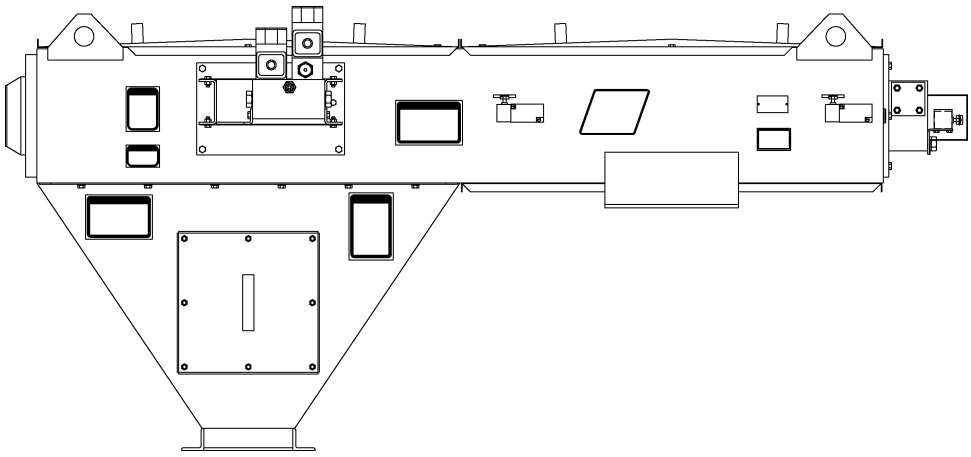


Sampler

Model: HD-PRT-HYD

Installation and Operation Manual

PNEG-2233

Version: 1.0

Date: 05-30-18

PNEG-2233

All information, illustrations, photos, and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

Contents

This manual covers the installation and operation for the Sampler Model HD-PRT-HYD. This manual provides guidelines for installing the product. You must retain a qualified contractor to provide on-site expertise. INTERSYSTEMS IS NOT RESPONSIBLE FOR THE INSTALLATION OF THIS PRODUCT.

InterSystems reserves the right to improve its product whenever possible and practical to do so. We reserve the right to change, improve and modify products at any time without obligation to make changes, improvements and modifications on equipment sold previously.

General Safety Statements

1. The Sampler system is designed and manufactured with operator safety in mind. However, residual hazards remain due to the nature of material handling, and specific material hazards. Use extreme caution at all times.
2. Modifications to equipment may cause extremely dangerous situations that could result in damage to the equipment as well as serious injury or death. Never modify the equipment.
3. InterSystems recommends that you contact the local power company to have a representative survey the installation to ensure wiring is compatible with their system and adequate power is supplied to the unit.
4. Consult InterSystems before making any changes to the sampler 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.
5. 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.
6. 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 products to which this equipment is in contact to determine what PPE is required.

This equipment is to be operated only on the voltage designated on the certified electrical drawings. Fire or explosion may result, which can cause death, serious injury and extensive damage to equipment. Do not connect to voltages other than designated.

Scope

The certified drawings list the non-standard components that have been incorporated into the equipment. InterSystems, Inc. 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.

Ordering Parts

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

InterSystems, Inc.
9575 N. 109th Ave
Omaha, NE. 68137
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 sampler is INSTALLED.

Replacement Parts

The InterSystems, Inc. sampler is a quality built piece of machinery. As with any machine, parts do wear out and fail. It is InterSystem's 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.

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.

Part #	Description
35691	Oil Filter Cartridge
35649	Hydraulic Oil 3062 All Season

Safety Guidelines

Safety guidelines are general-to-specific safety rules that must be followed at all times. This manual is written to help you understand safe operating procedures and problems that can be encountered by the operator and other personnel when using this equipment. Save these safety guidelines for future reference.

As owner or operator, you are responsible for understanding the requirements, hazards, and precautions that exist and to inform others as required. Unqualified persons must stay out of the work area at all times.

Alterations must not be made to the equipment. Alterations can produce dangerous situations resulting in SERIOUS INJURY or DEATH.

This equipment must be installed in accordance with the current installation codes and applicable regulations, which must be carefully followed in all cases. Authorities having jurisdiction must be consulted before installations are made.

When necessary, you must consider the installation location relative to electrical, fuel and water utilities.

Personnel operating or working around equipment must read this manual. This manual must be delivered with equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment.

ST-0001-3

Cautionary Symbol Definitions

Cautionary symbols appear in this manual and on product decals. The symbols alert the user of potential safety hazards, prohibited activities and mandatory actions. To help you recognize this information, we use the symbols that are defined below.

DANGER — This symbol indicates an imminently hazardous situation which, if not avoided, **will result in serious injury or death.**

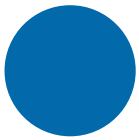
WARNING — This symbol indicates a potentially hazardous situation which, if not avoided, **can result in serious injury or death.**

CAUTION — This symbol indicates a potentially hazardous situation which, if not avoided, **can result in minor or moderate injury.**

NOTICE — This symbol is used to address practices not related to personal injury.

This symbol indicates a general hazard.

This symbol indicates a prohibited activity.



This symbol indicates a mandatory action.

ST-0005-2

Safety Cautions

Use Personal Protective Equipment

- Use appropriate personal protective equipment:

Eye Protection

Respiratory Protection

Foot Protection

Hearing Protection

Head Protection

Fall Protection

Hand Protection

- Wear clothing appropriate to the job.
- Remove all jewelry.
- Tie long hair up and back.

ST-0004-1

Follow Safety Instructions

- Carefully read all safety messages in this manual and safety signs on your machine. Keep signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from the manufacturer.
- Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.
- If you do not understand any part of this manual or need assistance, contact your dealer.

ST-0002-1

Maintain Equipment and Work Area

- Understand service procedures before doing work. Keep area clean and dry.
- Never service equipment while it is operating. Keep hands, feet, and clothing away from moving parts.
- Keep your equipment in proper working condition. Replace worn or broken parts immediately.

ST-0003-1

Stay Clear of Hoisted Equipment

- Always use proper lifting or hoisting equipment when assembling or disassembling equipment.
- Do not walk or stand under hoisted equipment.
- Always use sturdy and stable supports when needed for installation. Not following these safety precautions creates the risk of falling equipment, which could crush personnel and cause serious injury or death.

ST-0047-1

Sharp Edge Hazard

- This product has sharp edges, which can cause serious injury.
- To avoid injury, handle sharp edges with caution and always use proper protective clothing and equipment.

ST-0036-2

Install and Operate Electrical Equipment Properly

- Electrical controls must be installed by a qualified electrician and must meet the standards set by applicable local codes (National Electrical Code for the US, Canadian Electric Code, or EN60204 along with applicable European Directives for Europe).
- Lock-out power source before making adjustments, cleaning, or maintaining equipment.
- Make sure all equipment and bins are properly grounded.

ST-0075-1

Stay Clear of Moving Parts

- Stay clear - machine can start without warning.
- Entanglement in gate will cause serious injury.
- Keep all shields and covers in place at all times.
- Lock-out power source before making adjustments, cleaning, or maintaining equipment.

ST-0070-1

Flying Material and High Pressure Air Hazard

- Flying material and/or high pressure air can cause severe eye injury or blindness.
- Wear safety glasses around operating equipment.

ST-0071-1

Stay Clear of Rotating Parts

- Do not service equipment while it is in operation.
- Entanglement in rotating parts or exposed belts will cause serious injury or death.
- Keep all shields and covers in place at all times.
- Lock-out power source before making adjustments, cleaning, or maintaining equipment.

ST-0072-1

Toxic Fume and Dust Hazard

- Do all work outside or in a well-ventilated area. Dispose of paint and solvent properly.
- Remove paint before welding or heating:
  - — Avoid potentially toxic fumes and dust. Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.
  - — If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
  - — If you use solvent or paint-stripper, remove stripper with soap and water before welding.
  - — Remove solvent or stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

ST-0043-2

Safety Sign-Off Sheet

Below is a sign-off sheet that can be used to verify that all personnel have read and understood the safety instructions. This sign-off sheet is provided for your convenience and personal record keeping.

Date	*Employee Name*	*Supervisor Name*

ST-0007

3. Decals

The safety decals on your equipment are safety indicators which must be carefully read and understood by all personnel involved in the installation, operation, service and maintenance of the equipment.
To replace a damaged of missing decal, contact us to receive a free replacement.

InterSystems
9575 N. 109th Ave.
Omaha, Nebraska 68137
Phone: (402) 330-1500
FAX: (402) 330-3350

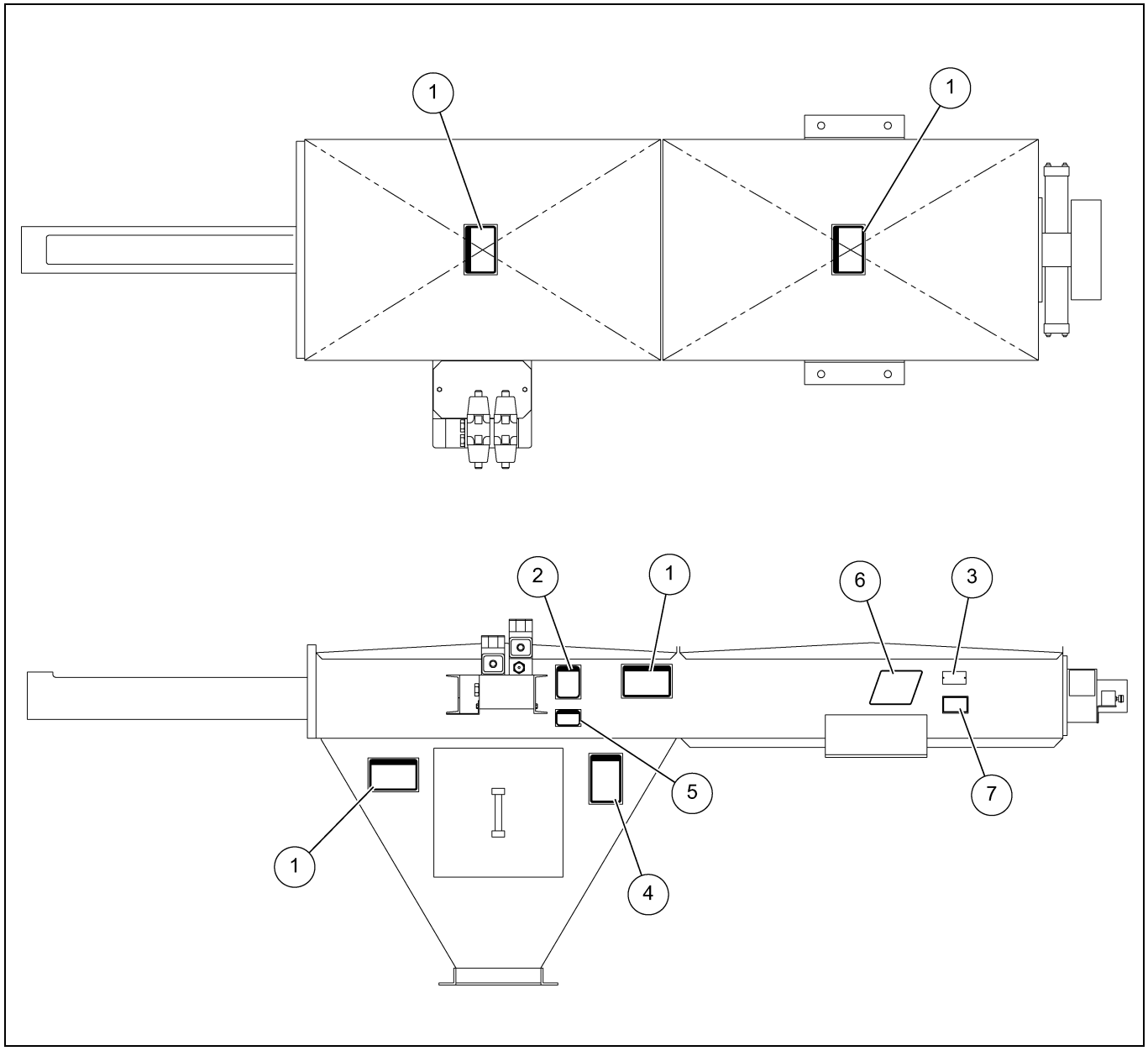
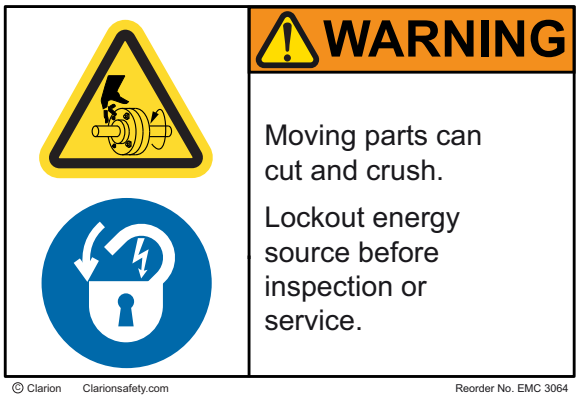
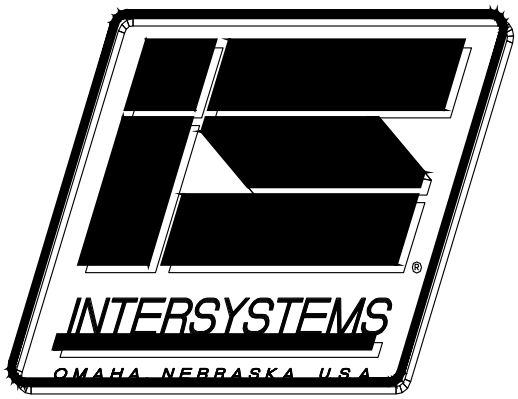
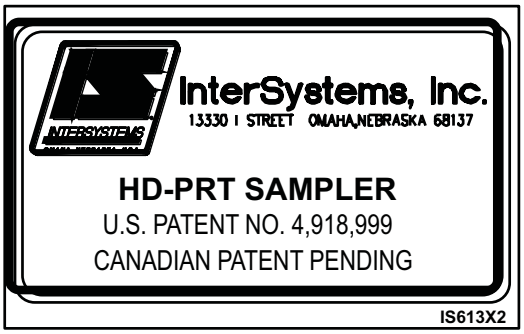


Figure 3A *Model HD-PRT-HYD Sampler Safety Label Locations*

NOTE: *These signs must never be removed, tampered with, painted over or obscured in anyway. If labels are damaged or become unreadable, replacement labels are available from InterSystems.*

Ref #	Decal #	Decals	Description
1	EMC 30 64		Moving Part (N.S., F.S)
2	EMC 40 234		Lock Out Machine
3	IS Tag		IS Serial No Tag
4	EMC 28 46		Eye Protection

3. Decals

Ref #	Decal #	Decals	Description
5	IS623X2		Bleed Off Pressure
6	IS526X4		IS Logo
7	IS613X2		HD-PRT Patent

System Description

The HD-PRT-HYD Sampler is designed to collect a representative sample of granular, pellet, chip, flake or other materials in a gravity chute or from a conveyor discharge. *Figure 4A* illustrates a typical HD-PRT-HYD Sampler application.

Sample collection is initiated in response to either an operator's manual command or a signal automatically generated by controller logic. A sample cycle begins when a pair of double-acting hydraulic cylinders extend the slotted sampling probe into the product stream. Then the rotary actuator rotates the sample probe clockwise (when viewed from the rotary actuator end of the sampler) through a 270° arc, exposing the sample probe cavity to the product stream to collect a sample of the material. Next, the cylinders retract the sample probe from the product stream, isolating the sample and sample probe cavity from the product stream. Subsequently, the rotary actuator rotates the sample probe counterclockwise through 270°, dumping the collected sample into the sampler's discharge chute. The sample then falls down and out of the discharge chute to the desired sample collection point, at which point an InterSystems SCS Sample Collection System (optional) may be installed.

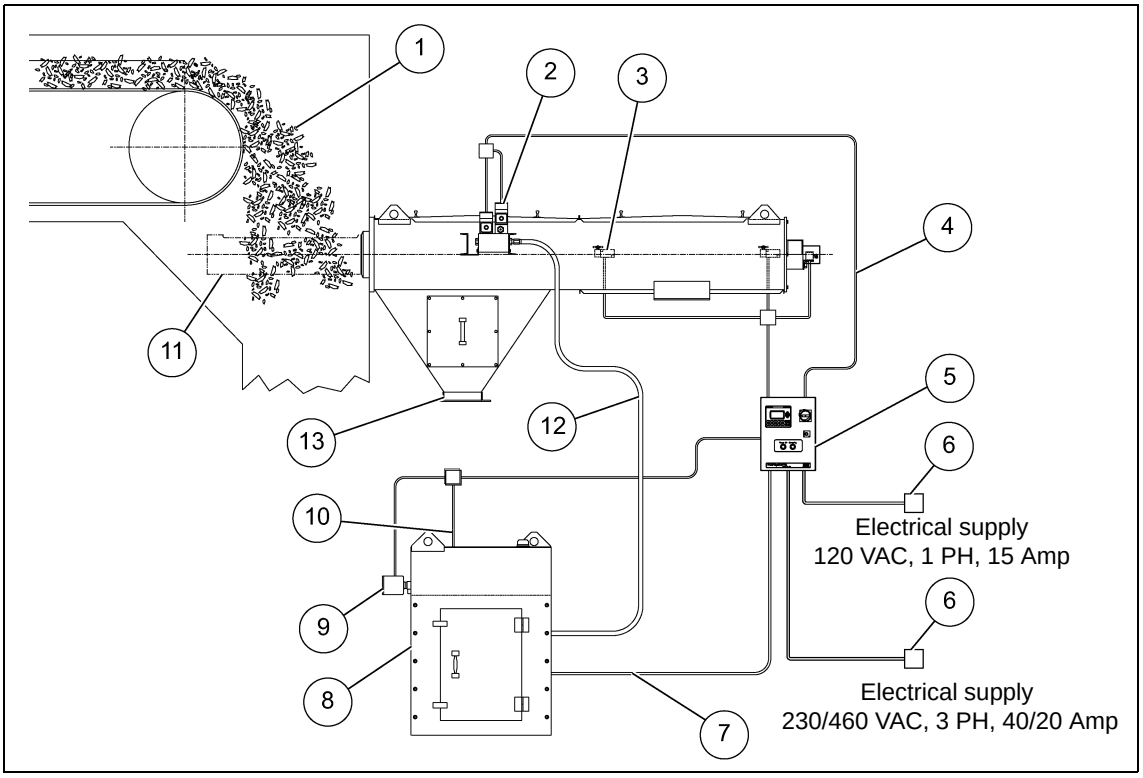


Figure 4A *Typical Installation, Model HD-PRT-HYD Sampling System*

Ref #	Description
1	Material to be Sampled
2	Directional Control Valve Coils (4)
3	Limit Switches (4)
4	Electrical Conduits
5	Sampler Control Panel
6	Circuit Breaker
7	To Hydraulic Motor

Ref #	Description
8	Hydraulic Power Unit
9	Tank Heater
10	Low Level/High Temperature Switch
11	Sample Probe
12	Hydraulic Hoses (2)
13	Sample discharge extend to desired collection point.

Optional Features

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

1. Controller arranged to initiate a sampling cycle based on quantity or volume of material passing through conveying line rather than upon elapsed time periods.
2. Explosion-Proof Sampling System. There are several major differences in an explosion-proof sampler as compared to a standard sampling system. An explosion-proof sampler will typically have the following features.

    a. An explosion-proof solenoid on the directional control valve with the rating of:

        Class 1, Groups C and D, Division 1 and 2

        Class 2, Groups E, F and G, Division 1 and 2

    b. An explosion-proof limit switch with the rating of:

        Class 1, Groups C and D, Division 1 and 2

        Class 2, Groups E, F and G, Division 1 and 2

    The explosion-proof sampler control is available in two enclosure classifications.

    a. The NEMA 9 control with the rating of:

        Class 2, Groups E, F and G, Division 1 and 2

    b. The NEMA 7 control with the rating of:

        Class 1, Groups C and D, Division 1 and 2

        Class 2, Groups E, F and G, Division 1 and 2

3. Components of special materials, such as 316 stainless steel, monel, inconel or nedox coatings.
4. Programmable controls to sequence the sampler and the sample collection equipment.

Material Sampled

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

Sampler Construction

Standard sampler housing construction is of painted carbon steel. This includes the frame, mount plate, sample hopper and guards. The sample probe is of Type 304 Stainless Steel. 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 sampler.

Receiving Inspection

Carefully inspect the sampling system 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.

Pre-Installation Preparation

NOTE: *Before starting sampling 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).*

Location

The HD-PRT-HYD sampler is typically mounted horizontally in the chute at the discharge end of a belt conveyor carrying the product to be sampled, as shown in *Figure 4A on Page 15*. If this is the arrangement to be used, maintain a minimum of 6" clearance between the end of the sample probe and the face of the head or drive pulley. If the conveyor belt has cleats, maintain a 6" minimum clearance between the end of the sample probe and the tips of the cleats. Reasons for maintaining the minimum clearance includes:

1. To prevent damage to the sample probe resulting from a drive pulley wobbling on its shaft or from a flap of loose or damaged belt.
2. To prevent conveyed product or material from jamming in the gap between the pulley and the sample probe.
3. To ensure that complete, representative samples are collected. The sample probe should extend under the drive pulley to ensure that all fines are collected.

The sampler and associated equipment should be located for ease of access and maintenance.

The sampler 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 sampler is of a general design with modifications specifically for your application. It may be necessary to rework the sampler in order for it to function properly if you alter the application.

General Mounting Guidelines

The sampler assembly is designed to support ONLY its own weight. As shown on the certified drawing of the sampler, the sampler must be installed with additional hanger rods or braces to rigidly support the sampler. Support should bear on the side support angles located toward the rear on each side of the sampler frame. Each angle has two 7/8" diameter holes for securing the angles to the support(s). Refer to the certified drawing(s) of the sampler for the dimensioned locations of these holes. The hangers or braces should be capable of fully supporting the sampler.

Sampler cannot support any other equipment or conveying line. Collapse of the whole system can cause death, serious injury, and extensive damage to equipment. Properly support all spouts, containers, and conveying lines.

NOTE: *If the surface area to which the mounting plate is to be attached is warped or bent, straighten and smooth the metal so the sampler will be properly aligned when the installation is complete. The surface to which the sampler is mounted must not flex.*

Sampler without Optional Mounting Accessories

Weld-on plates are typically used when mounting the sampler to a large existing surface, such as on a storage hopper or a long section of chute work.

1. Locate and mark the desired mounting location on the discharge chute, spout, or conveying line.
2. Cut and deburr a clearance hole in the chute where the sample probe is to enter the chute. This hole will need to be 8" diameter for the 5-1/2" diameter HD-PRT-HYD probe or 11" diameter for the 8-1/2" diameter HD-PRT-HYD probe. Refer to the certified drawing(s).
3. The mounting flange on the end of the sampler drive housing has six 0.88" (7/8") clearance holes for 3/4" mounting screws or studs. Using the sampler mounting face as a pattern, layout or transfer punch the hole locations onto the conveying line.
4. Drill and tap the holes for the mounting screws, or weld studs to the conveying line for fastening the sampler.
5. Position the sampler on the conveying line and loosely install the mounting fasteners. Verify that the sample probe will extend and retract without interference. The probe should be centered in the clearance hole. Tighten the mounting fasteners.
6. Finally, attach the sample discharge hopper to the sampler.
7. The user or installer must provide hanger rods or braces to rigidly support the sampler. Support should bear on the side support angles located toward the rear on each side of the sampler frame. Each angle has two 7/8" diameter holes for securing the angles to the support(s). Refer to the certified drawing(s) of the sampler for the dimensioned locations of these holes. The hangers or braces should be capable of fully supporting the sampler.

Field-Mounted Sampler Using Weld-On Plates

Weld-on plates are typically used when mounting the sampler to a large existing surface, such as on a storage hopper or a long section of chute work.

1. Locate and mark the desired mounting location on the conveying line.
2. Cut and deburr a clearance hole in the chute where the sample probe is to enter the conveying line. This hole will need to be 8" diameter for the 5-1/2" diameter HD-PRT-PYD probe or 11" diameter for the 8-1/2" diameter HD-PRT-HYD probe. Refer to the certified drawing(s).
3. Position the sampler mounting plate by aligning the sample probe clearance holes.
4. Tack weld the sides of the mounting plate to the product line surface and double check alignment.
5. Weld a continuous bead around all sides of the mounting plate.

   NOTE: *When welding the mounting plate to thin gauge sheet or thin plate, skip weld alternating sides of the mounting plate to limit heat input to minimize warping.*
6. Position the sampler on the conveying line and loosely install the mounting fasteners. Verify that the sample probe will extend and retract without interference. The probe should be centered in the clearance hole. Tighten the mounting fasteners.
7. Finally, attach the sample discharge hopper to the sampler.
8. The user or installer must provide hanger rods or braces to rigidly support the sampler. Support should bear on the side support angles located toward the rear on each side of the sampler frame. Each angle has two 7/8" diameter holes for securing the angles to the support(s). Refer to the certified drawing(s) of the sampler for the dimensioned locations of these holes. The hangers or braces should be capable of fully supporting the sampler.

Material Sample Transport Lines

The tubing used to transport material samples must be adequately sized and compatible with the operating environment and the material sampled. Tubing size is usually determined by the size of the flanged discharge chute outlet as shown on the certified drawing(s) furnished with the sampler. All sample lines must be installed either vertically or at a maximum slope to ensure the sampled material flows freely. Use rigid tubing having a smooth interior surface. The sample line is routed to allow material to flow via gravity to a convenient collection point. At that point it may be connected to a collection jar bracket or a Sample Collection System cabinet.

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.

Controller Location

1. Use vibration isolation pads when mounting the control enclosure or mount the controller in a vibration-free location.
2. Unless ordered for severe duty, locate controller so it is protected from water and dust.
3. Unless an explosion-proof rated controller was specifically ordered, DO NOT locate the controller in a hazardous area.
4. Most applications require that the sampler be in easy view of the controller.

System Wiring

Refer to the certified electrical drawing(s) for specific wiring requirements. As explained in Terminal Strip *on Page 20*, the terminal strip mounted INSIDE the controller enclosure is the connection point for ALL external circuitry.

The controller was completely assembled and tested with the sampler before it left the factory. 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 sampler unit is run through rigid conduit, use a short length of flexible conduit to connect wiring to the sampler. This will isolate the rigid conduit from any vibration originating in the product conveying line and sampler.

Electrical Power Requirements, System

110/120 VAC 50/60 Hz, Single Phase, 20 Amp Service

Optional - 220/240 VAC 50/60 Hz, Single Phase, 10 Amp Service

Refer to the certified electrical drawing(s) for specific wiring requirements. InterSystems strongly recommends that electrical service to the sampling system be an isolated line. Voltage fluctuations and line noise can affect the controller's circuit board, thus causing the sampler to malfunction.

Controller

110/120 VAC, 50/60 Hz, Single Phase, 4 Amp Max.

Optional - 220/240 VAC, 50/60 Hz, Single Phase, 2 Amp Max.

Solenoid Valve Coil

110/120 VAC, 50/60 Hz, Single Phase, 50 Watts

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

Hydraulic Tank Heater

120 VAC, 50/60 Hz, Single Phase, 750 Watts

Hydraulic Pump Motor

230/460 VAC, 60 Hz, Three Phase, 19.8/9.9 Amp

System Plumbing

The hydraulic system was pre-plumbed and tested with the sampler 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 sampler at the factory.

The sampler was also provided with two pre-made hoses for connecting to the hydraulic power unit. The hoses and hydraulic power unit fittings were capped and plugged for shipment. When connecting the hoses to thehydraulic 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.*

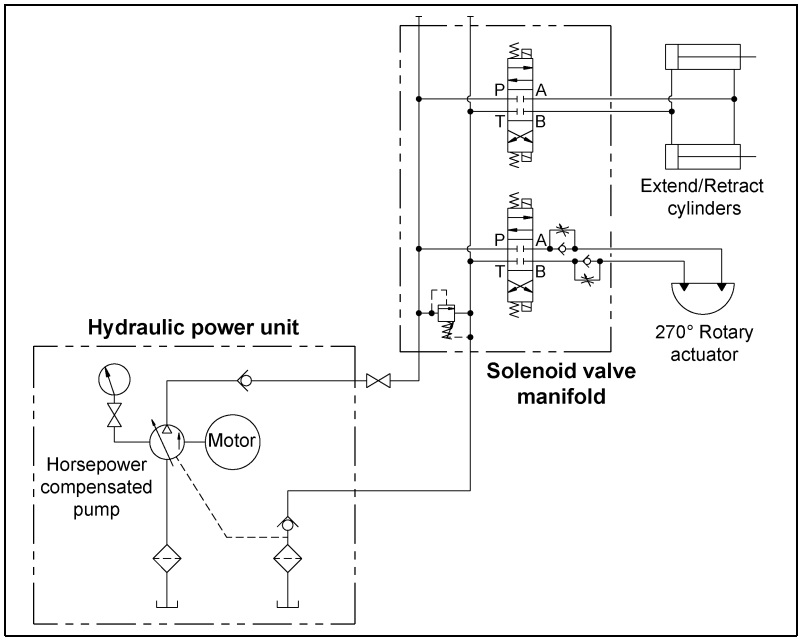


Figure 5A *Hydraulic Schematic*

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. Lock out power before performing any maintenance.

Control Components and their Functions

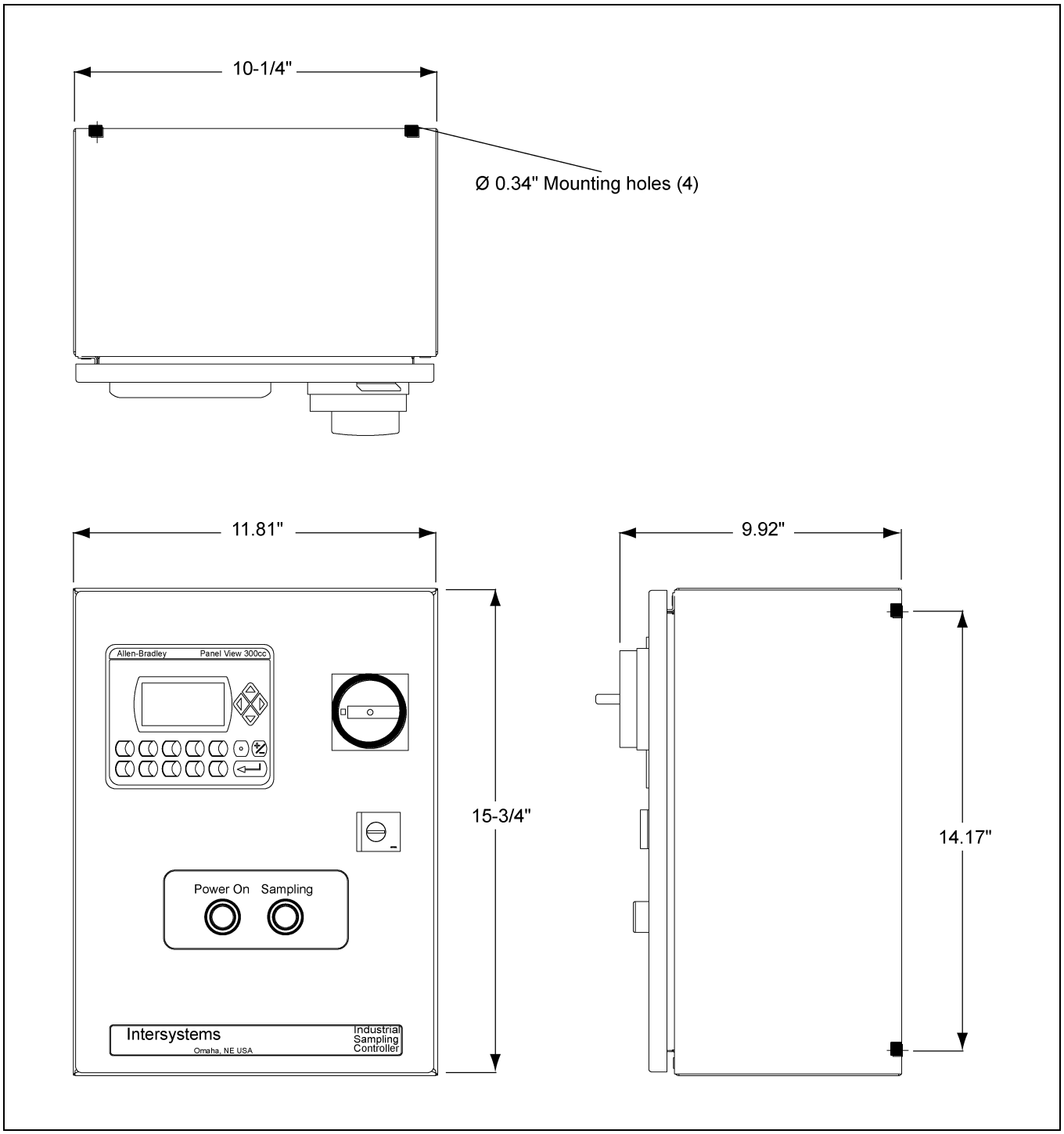


Figure 6A *Standard NEMA 4 Control Panel Detail*

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

Power OFF/ON Switch (S1)

The power OFF/ON Switch controls the electrical power to the controller and the sampler.

This machine starts without warning. Moving parts can cause severe injury. Clear area prior to controller start-up.

Power Pilot Light

This light is illuminated as long as power is available to the controller and the POWER switch (S1) is set to ON.

Sampling Pilot Light

This light is illuminated when a sampling cycle has been initiated and will stay lit until the sampling cycle has completed.

Control Keypad

The operator keypad is the source of all inputs necessary to operate the control.

The operator keypad is set up using linked menus to step through the operation of the control.

See the control manual PNEG-2170 for further information on the sampler control.

Main Fuse (FU1)

The fuse, located along the top center of the control, protects the controller and sampler components against overloads and short circuits.

For 110/120 VAC, 1 PH operation, use ONLY a BUSS Type FNM 2 Amp, 250 VAC Slo-Blo fuse or equivalent.

For 220/240 VAC, 1 PH operation, use ONLY a Buss Type FNM, 1 Amp, 250 VAC Slo-Blo fuse of equivalent.

Terminal Strip

This 19-position terminal strip is located along the bottom of the controller. It serves as the controller's interface and connection point for all external circuits and for the components mounted inside the enclosure. Refer to the certified electrical drawing(s).

Power Supply

The controller is equipped with a power supply which converts 120/240 VAC to 24 VDC for the operation of the PLC, Micro-View, display lights, input signals and the operation of the control relays. Refer to the certified drawing(s).

Control Relays

The controller is equipped with four control relays which are driven by the PLC 24 VDC outputs.

Each relay has a mechanical flag indicator showing the relay is energized.

The relay contacts are wired for 120/240 VAC. Refer to the certified drawing(s).

Micrologix PLC

The PLC for the control is an Allen Bradley Micrologix controller. The PLC operates using 24 VDC and is prewired to the proper terminal strip inputs and outputs. The processor program is protected to prevent any alterations to the existing program. This control is designed to run InterSystem equipment.

Manual Sampling

The operator may choose to run the sampler in Manual Mode by selecting manual mode in the PanelView menu. (Refer to manual PNEG-2170.) After selecting manual mode, each time F1 is pressed on the PanelView, a manual sample is initiated.

Automatic Sampling

The operator may choose to run the sampler in the Automatic Mode by selecting automatic mode in the PanelView menu. (Refer to manual PNEG-2170.) **NOTE**: *A jumper or switch must be installed between the controller's terminals 1 and 2 to initiate automatic sampling. When automatic mode is selected, an automatic sample will not be initiated until the jumper circuit between terminals 1 and 2.* By installing a remote switch across terminals 1 and 2, the user can initiate the sampling cycle remotely. See manual PNEG-2170 for sampling automatic sampling options.

This control is to be operated only on the voltage designated on the certified electrical drawing. Fire or explosion may result, which can cause death, serious injury, and extensive damage to equipment. Do not change the 115/230 VAC switch setting without consulting InterSystems.

Sampler Mounted Electrical Components

Sample Probe Extended Limit Switch, LS-1

This switch is actuated when the sample probe is fully extended into the product stream. Closing of the N.O. contacts energizes the "A" coil of the rotation control valve, V-2. The rotary actuator causes the sample probe to rotate clockwise (when viewed from the rotary actuator end of the sampler) from the six o'clock to the three o'clock position to collect a sample. The switch is restored when the cylinders retract the sample probe from the product stream.

Sample Probe Retracted Limit Switch, LS-2 (Actuated at Rest)

This switch is actuated when the sample probe is fully retracted from the product stream. Closing of the N.O. contacts energizes the "B" coil of the rotation control valve, V-2, which rotates the sample probe counterclockwise (when viewed from the rotary actuator end of the sampler) from the three o'clock position to the six o'clock position to dump the sample into the discharge chute. The switch is actuated at rest and restores when the cylinders extend at the beginning of a cycle.

Sample Probe @ Six o'Clock Limit Switch, LS-3 (Actuated at Rest)

This switch is actuated when the rotary actuator has rotated fully counterclockwise to the six o'clock position. Closing of the N.O. contacts signals a sample cycle is complete and allows the digital display timer to run (in the automatic mode). An automatic or manual sample cycle may be initiated if, and only if, this switch is actuated. The switch is actuated at rest and restores when the rotary actuator begins to rotate to sample.

Sample Probe @ Three o'Clock Limit Switch, LS-4

This switch is actuated when the rotary actuator has rotated fully clockwise to the three o'clock position. Closing of the N.O. contacts energizes the "B" coil of the EXTEND/RETRACT control valve, V-1. The switch restores later in the cycle when the sample probe rotates to dump the sample.

Hydraulic Power Unit Mounted Electrical Components

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. A label is located on the motor designating the correct direction of rotation. Verify that the motor is turning the proper direction of rotation when wiring the system.

NOTE: *Do not run the motor in the wrong direction. Damage to the hydraulic pump will result.*

Hydraulic Oil Heater (Optional)

This 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 750 watts and has in internal thermostat to shut it off at when the oil has been heated. The thermostat should be set at 90°F.

High Temperature and Low Level Hydraulic Oil Switch

This dual action switch is trip if the hydraulic oil level drops below the set point on the switch. The switch also will trip if the temperature rises above the set point. If either of the switches trip, the sampler will shut down and signal a malfunction error on the MLX1000 processor.

Hydraulic Components

Solenoid Valves V-1 And V-2

These valves are 4-way, 3-position, double-solenoid operated, spring-centered directional control valves.

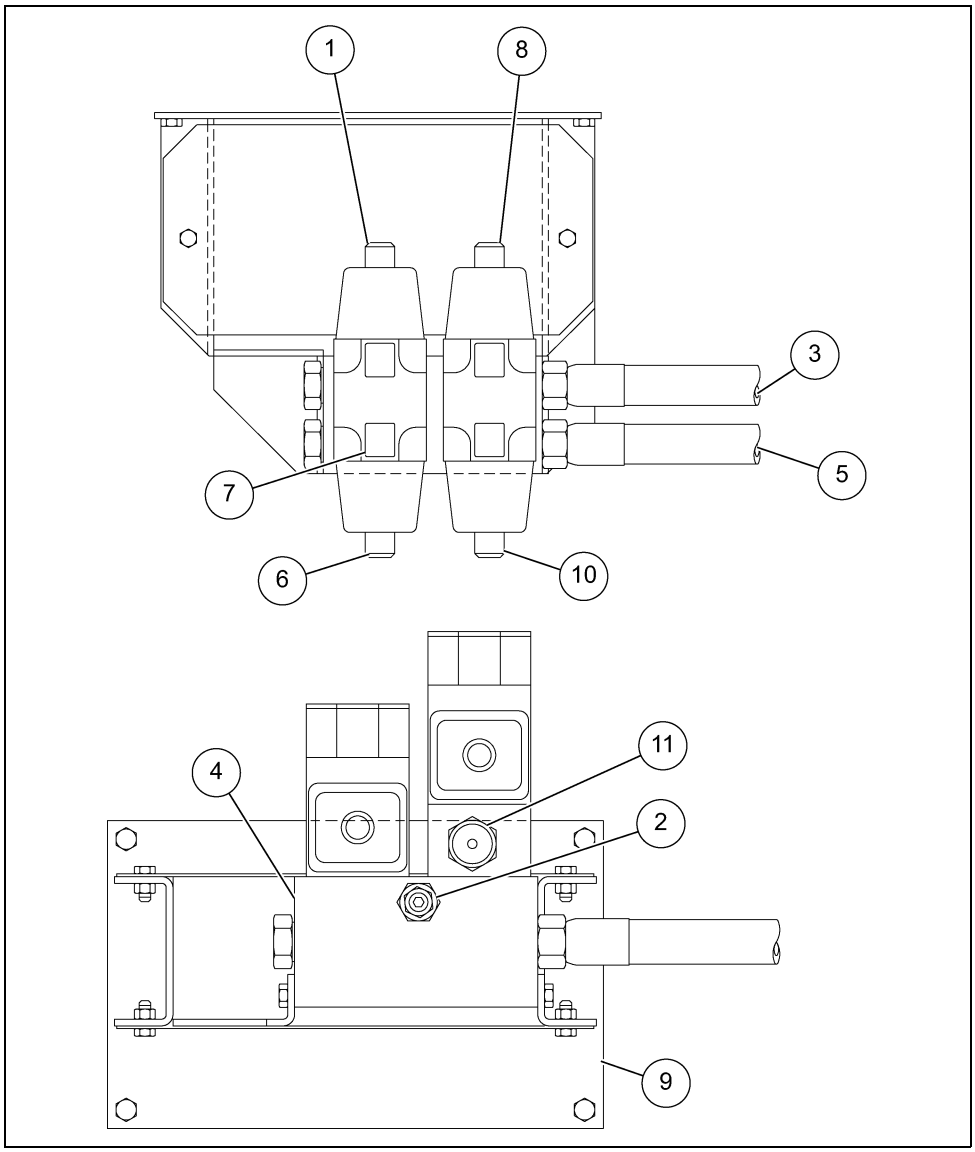


Figure 6B *Hydraulic Valves and Manifold*

Ref #	Description
1	Probe Extend Solenoid Coil V-1 “A”
2	Pressure Relief Valve V-5
3	Hose from Hydraulic Pump (Pressure Line)
4	Hydraulic Valve Manifold
5	Hose to Hydraulic Pump (Return Line)
6	Probe Retract Solenoid Coil V-1 “B”

Ref #	Description
7	Indicating Light (4)
8	Probe Rotate to Collect Sample Solenoid Coil V-2 “A”
9	Valve Mount Bracket
10	Probe Rotate to Empty Sample Solenoid Coil V-2 “B”
11	Near Side Speed Control Valve V-3 (Probe Rotate to Collect Sample). Far Side Speed Control Valve V-4 (Probe Rotate to Empty Sample).

Sample Probe Extend/Retract Valve V-1

This solenoid-operated directional control valve alternately pressurizes the piston end and rod end of two double-acting cylinders to extend and retract the sample probe. When the valve's "A" solenoid is energized, the valve spool shifts, pressurizing the rod ends of the cylinders. The cylinders extend, extending the sample probe into the product stream. When the "B" solenoid is energized, the valve spool shifts, pressurizing the piston ends of the cylinders. The cylinders retract, retracting the sample probe from the product stream. Note, when neither "A"or "B" solenoid is energized the valve is spring centered so that all ports are blocked and movement is inhibited.

Sample Probe Rotate Valve V-2

This solenoid-operated directional control valve alternately pressurizes opposing ports of the rotary actuator to rotate the sample clockwise (CW) to collect samples and counterclockwise (CCW) to dump samples (when viewed from the rotary actuator end of the sampler). When the valve's "A" solenoid is energized, the valve spool shifts, pressurizing the CW port of the actuator. The sample probe rotates, collecting a sample of the material from the product stream. When the "B" solenoid is energized, the valve spool shifts, pressurizing the CCW port of the actuator. The sample probe rotates, dumping the collected sample. Note, when neither "A" or "B" solenoid is energized the valve is spring centered so that all ports are blocked and movement is inhibited.

Flow Control Valves V-3, V-4

A manifold mounted double flow control valve (sandwiched between valves V-1, V-2 and the manifold), controls the flow of hydraulic fluid to the rotary actuator. The valves are designated as shown in *Figure 6B on Page 25*. V-3 controls the sample probe rotation to collect a sample speed. V-4 controls the sample probe rotation empty the sample speed. The flow controls were factory set but will need some final adjustment upon initial start-up. To adjust, first loosen the small set screws on the metering screw. Turn clockwise to decrease probe speed and counterclockwise to increase probe speed. After proper speed is achieved, re-tighten the set screws to lock setting. **NOTE**: *Avoid excessive sample probe speed which will result in increased wear and tear on the sampler. A good indicator of over speeding will be the loud banging of the sampler when reaching its travel limits.*

Relief Valve V-5

The relief valve has been set at the factory at 2750 PSI. No further adjustment should be necessary. Refer to *Page 29* for adjustment instructions.

Hydraulic Cylinders

These double-acting, non-cushioned rod cylinders extend and retract the sample probe. Stroke length varies with the sample probe stroke. Cylinder rods are attached to the sample probe assembly using an alignment coupler. Solenoid valve V-1 controls extension and retraction of the cylinders.

Rotary Actuator

The actuator is essentially a double acting hydraulic cylinder which drives a rack and pinion unit, thus converting linear motion into rotary motion. The actuator is coupled directly to the sample probe, alternately rotating the sample probe clockwise to collect samples and counterclockwise to dump samples. Solenoid valve V-2 controls rotary actuator motions.

Hydraulic Pump

This pump is horsepower compensated and was set at the factory. No further adjustment should be necessary. Refer to *Page 29* for adjustment instructions.

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. Lock out power before performing any maintenance.

General Maintenance

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

Periodic Inspection

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

1. Loose or missing hardware
2. Functioning and properly adjusted shock absorbers.
3. Structural damage
4. Rust or corrosion
5. Structural damage
6. Damaged wiring, including exposed conductors and connections
7. Damaged hydraulic lines and components, hydraulic leaks.
8. Keep the areas around the limit switches clear of accumulations of dirt and debris which might prevent the switches from functioning as intended.
9. Make sure that all guards are in place and that all warning labels are in place and legible. *See Page 7*, 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.

Lubrication

Guide Bushings and Drive Bearings

All shafts and bearings have been coated with a liberal amount of multi-purpose grease. Bearings and shafts should be thoroughly cleaned and re-greased once a year. It is essential that all covers remain fastened in place to prevent the entrance of dust and dirt, which would contaminate the grease.

Hydraulic Power Unit Service

Name	Viscosity, SSU @ 1000° F
Mobile DTE 13 (Summer)	150
McCollister 3062 Hydraulic Oil (All Season)	155

The service intervals are for average operating conditions. More severe conditions such as extreme heat or cold or nearly continuous sampler operation may dictate more frequent service.

HYDRAULIC FLUID RECOMMENDATION: Use petroleum-based fluids ONLY.

Hydraulic Oil Inspection (Daily)

1. Check the reservoir fluid level with the sampler operating. The level must be above the RED Low Oil Level bar on the sight gage. Replenish reservoir as necessary to maintain minimum level.
2. Check fluid temperature after the sampler has operated for a time. Fluid temperature should stabilize between 110° and 135° Fahrenheit.

   Probable causes of hydraulic fluid overheating include:

   a. 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.

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

   c. 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.

   d. Pump cavitation. This condition is usually signaled by a crackling or popping sound originating in the pump. It 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.

NOTE: *The hydraulic power unit incorporates a combination low level/high temperature sensor which is wired to the control. Extreme conditions registered by the sensor will inhibit the sampler from operating.*

Breather Cap Cleaning, Every 3 Months

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

Hydraulic Filter Replacement, Every 3 Months

Remove and replace the filter canister. A check valve between the filter and the oil reservoir prevents excessive oil spillage during replacement.

Hydraulic Oil and Filter Replacement, Annually

1. Operate the sampler until the fluid temperature has stabilized.
2. Shut off and lock out all power to the probe.
3. 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.
4. Disconnect the pressure and suction hoses at the pump to drain any remaining fluid and solvent. Then reconnect the hoses.
5. Make sure the hoses to the sampler 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.
6. Replace the return line filter cartridge.
7. Temporarily remove the suction strainer. Wash it with solvent and blow it dry. Re-install the strainer or replace it if it cannot be cleaned.
8. Remove the breather cap. Wash it with solvent and blow it dry. Replace the breather.
9. Make sure the 1" NPT drain plug is threaded securely in the reservoir drain. Then refill the reservoir with fifteen gallons of approved hydraulic fluid.
10. Operate the sampler until no air bubbles are apparent from the return line.
11. Re-check hydraulic fluid level gauge and add additional oil if required.
12. 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. Re-install 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.

Hydraulic Relief Valve, Horsepower Limiter and Compensator Setting

These valves were factory set. No further adjustment should be necessary. The following, is the required sequence of adjustments to properly set all the valves.

1. Shut off the hydraulic pump motor.
2. Loosen the jam nut on the relief valve on the sampler manifold and turn the set screw all the way in.
3. Loosen the jam nut on the compensator and turn the hex screw all the way out.
4. Loosen the jam nut on the horsepower limiter and turn the hex screw all the way in.
5. Start the hydraulic motor.
6. Open the shut off valve to the pressure gauge.
7. Turn the compensator hex screw in until the gauge reads 3000 PSI.
8. Turn the horsepower limiter hex screw out until gauge falls to 2900 PSI.
9. Turn the relief valve set screw out until pressure drops to 2750 PSI and tighten the jam nut.
10. Turn the compensator hex screw out until the gauge reads 2500 PSI and tighten the jam nut.
11. Turn the horsepower limiter hex screw out to 2400 PSI. Then slowly turn it back in until it just reaches 2500 PSI and tighten the jam nut.

The compensator is horizontal on top of the pump. The horsepower limiter is vertical on a separate block fastened to the side of the pump.

Rotation Reversal

Depending on the installation it may be desirable to reverse the rotation of the sampler probe to prevent material from flowing into the sample slot when the probe is in the 3 o'clock position. This is typically encountered in an installation where the sampler is probing from a sideways moving pile of material as in a drag conveyor or truck pit. The sampler is re-configured as follows.

1. Shut off and lockout all power (electrical and pneumatic).
2. Shut down the conveying line or conveyor when empty and lock out.
3. Remove the top cover(s) of the sampler and the access cover on the sample hopper.
4. Remove the 1/4"-20 UNC hex head bolts attaching the shear nose, bearing and locator.
5. Rotate the serrated shear nose 180°.
6. Re-install the 1/4"-20 UNC hex head bolts and tighten.
7. Remove the four 1/2"-13 UNC hex head nuts and washers attaching the drive bearing to the probe, and slide the drive bearings off the probe.
8. Without moving the square drive tube rotate the probe 90° clockwise (as viewed from the actuator end).
9. Re-install the drive bearing, washers and nuts and tighten.
10. Re-install the top covers and the sample hopper access cover.
11. Reverse the electrical wiring from the control to the two rotation solenoids.
12. Reverse the electrical wiring from the control to the two rotation limit switches.
13. Make notations in this manual and on the electrical drawings that the limit switches and the solenoids are reversed and re-designate.
14. Restore power to the sampler and operate it through several collection cycles. It may be necessary to re-adjust the rotation speed control valves. Refer to Flow Control Valves section *on Page 26*.

General HD-PRT-HYD Sampler Troubleshooting

Careless or accidental restoration of power can result in death or serious injury. Make certain area is clear before removing lock outs.

Problem	Possible Cause	Corrective Action
Sampler does not cycle in either Auto or Manual modes (Power light OFF).	Power switch OFF.	Turn power switch ON.
	Circuit breaker is open.	Reset breaker.
	Main fuse is blown.	Replace fuse. Refer to Main Fuse (FU1) section *on Page 22*.
	Faulty supply wiring.	Correct. Refer to certified electrical schematic.
	Defective power switch.	Replace switch.
Sampler does not cycle in either Auto or Manual modes (Power light ON).	Faulty system wiring.	Correct. Refer to certified electrical schematic.
	Limit switch malfunction.	Inspect. Refer to *Pages 23-24*.
	No or low hydraulic pressure.	Check pressure gauge.
	Defective control valve.	Refer to Directional Solenoid Valve Troubleshooting section *on Page 32*.
	Defective control relay.	Replace Relay.
Sampler cycles in Manual mode, but not in Automatic mode.	Automatic initiate jumper not installed.	Install jumper across terminals 1 and 2.
Sample size too small or large.	Rotational speed of the sample probe too fast or too slow.	Adjust needle valve V-3. Refer to Flow control Valves section *on Page 26*. See location as noted in *Figure 6B on Page 25*.
Sampler sluggish. (Operates too slowly).	Relief valve set too low.	Reset. Refer to Hydraulic Cylinders section *on Page 26*.
	Cylinder seal leakage.	Refer to Cylinder Leaking Section *on Page 32*.
Sampler probe continuously extends and retracts.	Probe jam timer setting too low.	Increase Time Setting. Refer to PLC Program
	Limit switch LS-2 and/or LS-3 not properly set.	Inspect and adjust If limit switch arm bent or loose.
	Limit switch LS-2 and/or LS-3 defective.	Replace if contacts not opening and closing by manually tripping.
Sampler stops with probe extended.	Limit switch LS-1 and/or LS-4 not properly set.	Inspect and adjust if limit switch arm bent or loose.
	Limit switch LS-1 and/or LS-4 defective.	Replace if contacts not opening and closing by manually tripping.
	Excessive gap between probe and shear nose.	Replace shear nose.

Directional Solenoid Valve Troubleshooting

Problem	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 and clean. Or replace.

NOTE: *The control program mode must be set to "5" five. Refer to the PLC controller manual PNEG-2170 for instructions.*

Hydraulic Components Troubleshooting

Cylinder Leaking

1. **External Leakage**

   a. 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.

2. **Internal Leakage**

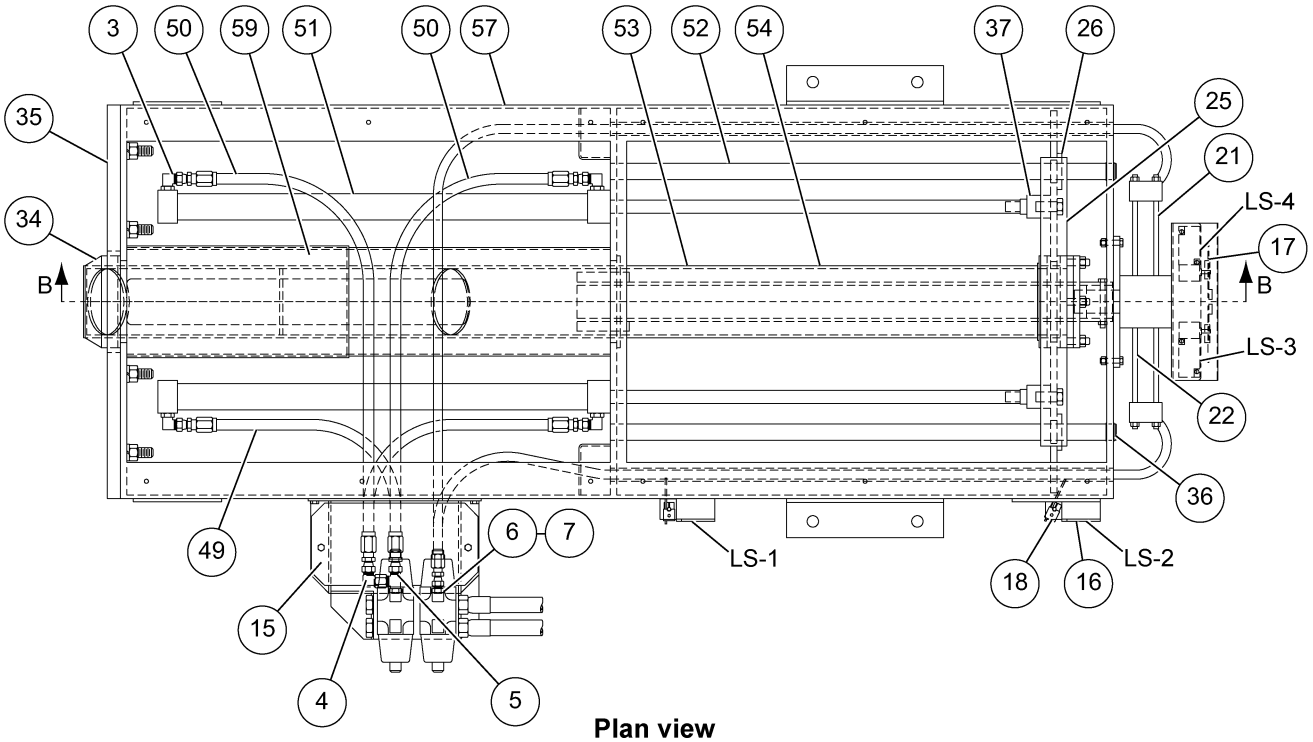
   a. The piston seals are virtually leak free unless they are worn or damaged. Replace defective seals.

   b. 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.

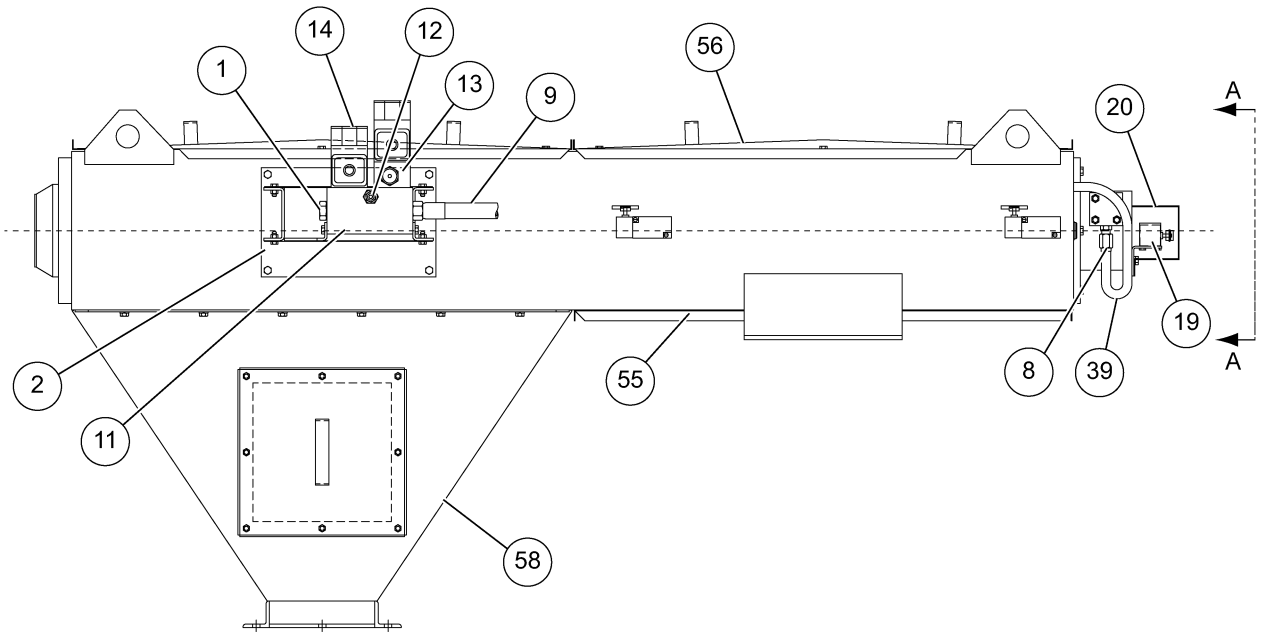
   c. Possible piston cylinder leakage, apparently indicated by piston drift is not always traceable to the piston. A leak through a closed valve port can also cause piston drift.

Refer to the Allen Bradley MLX1000 Programmable Controller Program.

HD-PRT-HYD Sampler with 5-1/2" O.D. Probe



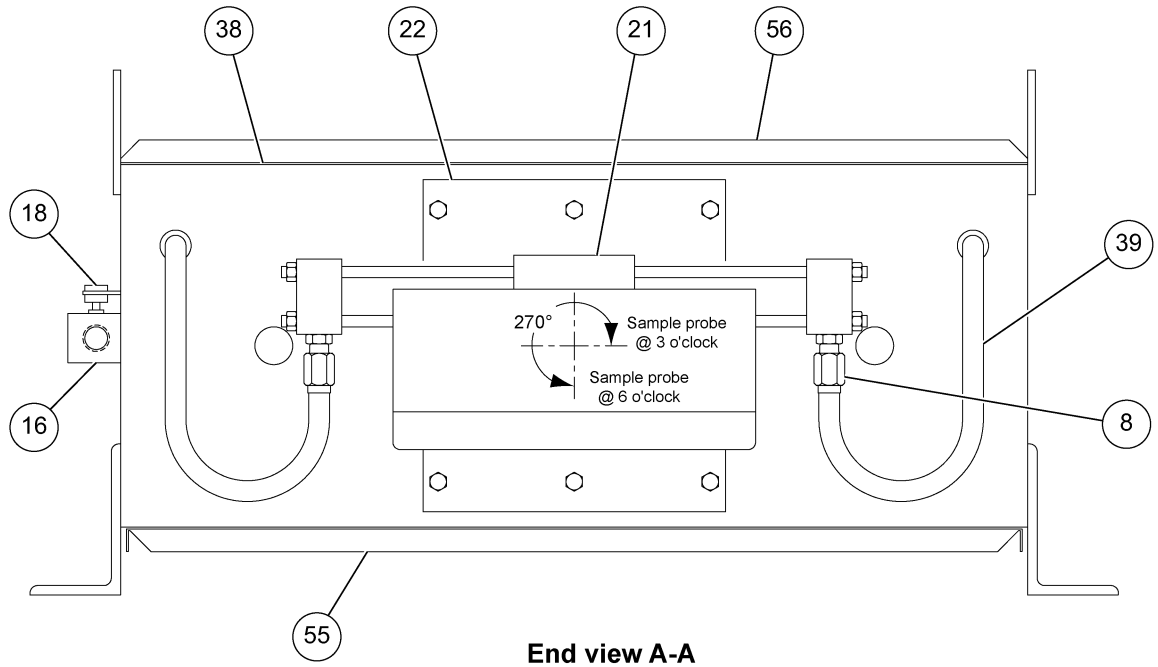
Plan view
(with top covers removed)



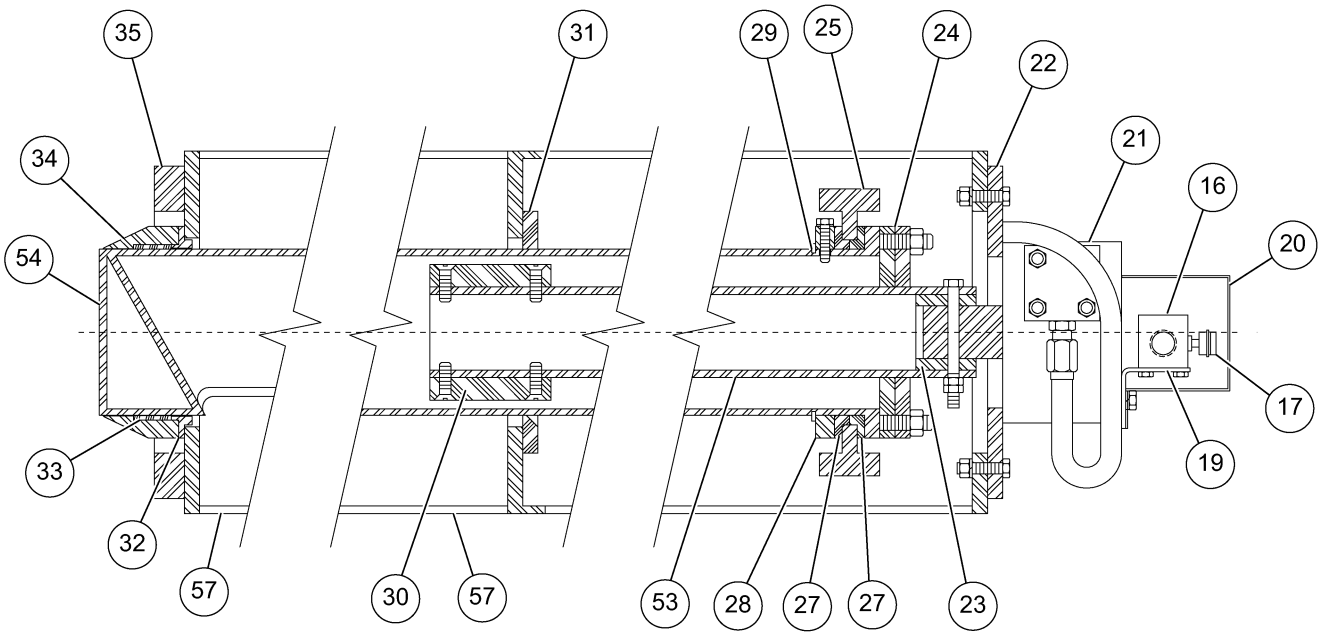
Elevation view

NOTE: *The parts pointed out on this page are listed on Pages 36-37.*

HD-PRT-HYD Sampler with 5-1/2" O.D. Probe (Continued)



End view A-A



Section view B-B

NOTE: *The parts pointed out on this page are listed on Pages 36-37.*

Sampler Parts Listing HD-PRT-HYD with 5-1/2" Diameter Probe

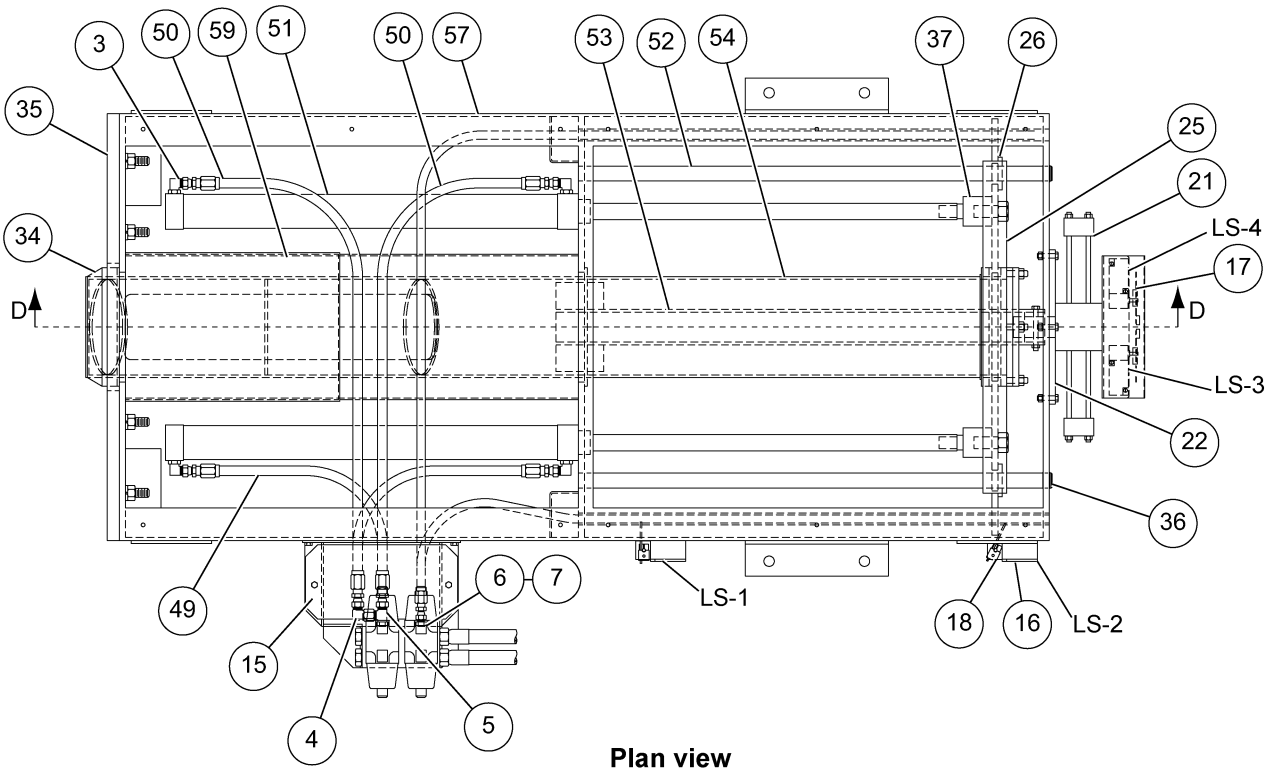
Ref #	Part #	Description	Qty
1	35960	Plug 1-1/16" SAE O-Ring	2
2	535964	HD-PRT-HYD Valve Mount	1
3	36659	7/8" M SAE O-Ring to 3/4" JIC Elbow	4
4	522408	Elbow 3/4" JIC 90 Swivel Nut	2
5	522409	3/4" M SAE O-Ring Run Tee 3/4" M JIC	2
6	518990	Adapter 3/4" M SAE O-Ring 9/16" JIC	2
7	516845	9/16" F JIC to 3/8" Rubber Hose End	2
8	518883	9/16" M SAE O-Ring to 3/8" Rubber Hose End	2
9	529283	3/4" I.D. Hydraulic Hose Assembly 15' LG	2
10			
11	523181	Manifold Hydraulic 2 Station Parallel with Relief	1
12	523180	Cartridge Relief Valve 30 GPM	1
13	527979	Sub Plate Mount Flow Control for D03	1
14	527978	3 Position Hydraulic Valve 110 VAC 60 Hz	2
15	523107	HD-PRT-HYD Hose Cover	2
16	26402	Limit Switch NEMA 4, 12	4
17	35341	Limit Switch Roller Arm	2
18	35355	Limit Switch Arm 13" Rod Lever	2
19	519458	Limit Switch Bracket	1
20	519459	Limit Switch Guard	1
21	518995	270° Rotary Actuator Hydraulic 1 Rack	1
22	518888	HD-PRT-HYD Actuator Mount Plate (5-1/2" Probe)	1
23	523124	HD-PRT-HYD Actuator Probe Coupler	1
24	512471	HD-PRT Drive Bearing (5-1/2" Probe)	2
25	523062	HD-PRT-HYD Drive Plate (5-1/2" Probe)	1
26	519461	HD-PRT-HYD Guide Rod Bushing 1-1/4" Diameter	2
27	516548	HD-PRT-HYD Drive PL Flange Bearing (5-1/2" Probe)	2
28	516768	HD-PRT-HYD Lock Collar (5-1/2" Probe)	1
29	516549	5-1/2" Shaft Retaining Ring (5-1/2" Probe)	1
30	512470	HD-PRT-HYD Drive Tube Support Bearing	2
31	523112	HD-PRT-HYD Drive Seal (5-1/2" Probe)	1
32	518979	HD-PRT-HYD Shear Nose Locator (5-1/2" Probe)	1
33	518980	HD-PRT-HYD Shear Nose Bearing (5-1/2" Probe)	1
34A	518875	HD-PRT-HYD Shear Nose (Wood Chips) (5-1/2" Probe)	A/R
34B	522449	Chisel Nose (Hard Materials) (5-1/2" Probe)	A/R
35	519462	HD-PRT-HYD Mount Plate (5-1/2" Probe)	1
36	519463	1-1/4" Shaft Retaining Ring	4
37	28149	Rod Coupler 3/4"-16 UNF	2
38	34185	Doortite Seal 3/16" x 3/4"	A/R
39	522406	Hydraulic Hose 3/8" I.D. 4000 PSI	A/R

Sampler Parts Listing HD-PRT-HYD with 5-1/2" Diameter Probe (Continued)

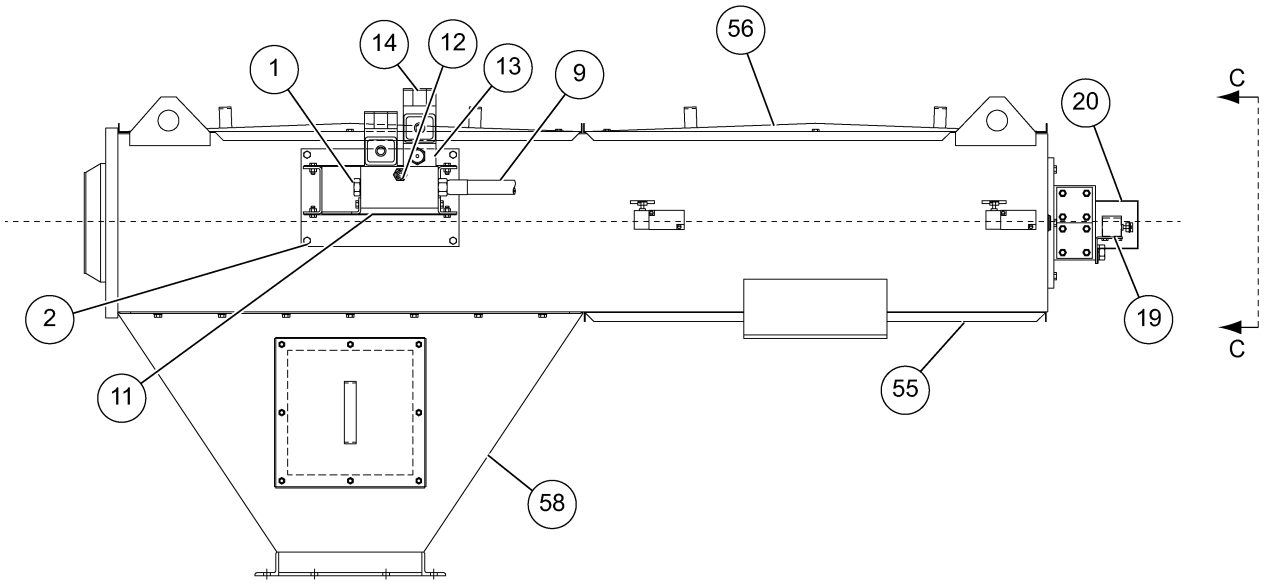
Ref #	Part #				Description	Qty
	HD-PRT-12	HD-PRT-18	HD-PRT-24	HD-PRT-30		
	12" Stroke	18" Stroke	24" Stroke	30" Stroke		
49	529447 (18")	529448 (21")	529449 (24")	529450 (27")	Hydraulic Hose 1/2" I.D. Short	2
50	529453 (36")	529454 (39")	529455 (42")	529456 (45")	Hydraulic Hose 1/2" I.D. Long	2
51	526477	526478	526479	526480	1-1/2" Bore Hydraulic Cylinder	2
52	519509	519510	519511	519512	HD-PRT-HYD SS Guide Rod	2
53	519517	519518	519519	519520	HD-PRT-HYD Drive Tube	1
54	519525	519526	519527	519528	HD-PRT-HYD Probe	1
55	519537	519534	519535	519536	HD-PRT-HYD Cover Bottom	1
56	519545	519542	519543	519544	HD-PRT-HYD Cover Top	2
57	535941	535942	535943	535944	HD-PRT-HYD Housing	1
58	519464	519465	519466	519467	HD-PRT-HYD Hopper	1
59	535965	535966	535967	535968	HD-PRT-HYD Probe Cover	1

Ref #	Part #				Description	Qty
	HD-PRT-36	HD-PRT-42	HD-PRT-48	HD-PRT-54		
	36" Stroke	42" Stroke	48" Stroke	54" Stroke		
49	529451 (30")	529452 (33")	529453 (36")	529454 (39")	Hydraulic Hose 1/2" I.D. Short	2
50	529457 (48")	529458 (51")	529459 (54")	529460 (57")	Hydraulic Hose 1/2" I.D. Long	2
51	526481	526482	526483	526484	1-1/2" Bore Hydraulic Cylinder	2
52	519513	519514	519515	519516	HD-PRT-HYD SS Guide Rod	2
53	519521	519522	519523	519524	HD-PRT-HYD Drive Tube	1
54	519529	519530	519531	519532	HD-PRT-HYD Probe	1
55	519537	519538	519539	519540	HD-PRT-HYD Cover Bottom	1
56	519545	519546	519547	519548	HD-PRT-HYD Cover Top	2
57	535945	535946	535947	535948	HD-PRT-HYD Housing	1
58	519468	519469	519470	519471	HD-PRT-HYD Hopper	1
59	535969	535970	535971	535972	HD-PRT-HYD Probe Cover	1

HD-PRT-HYD Sampler with 8-1/2" O.D. Probe



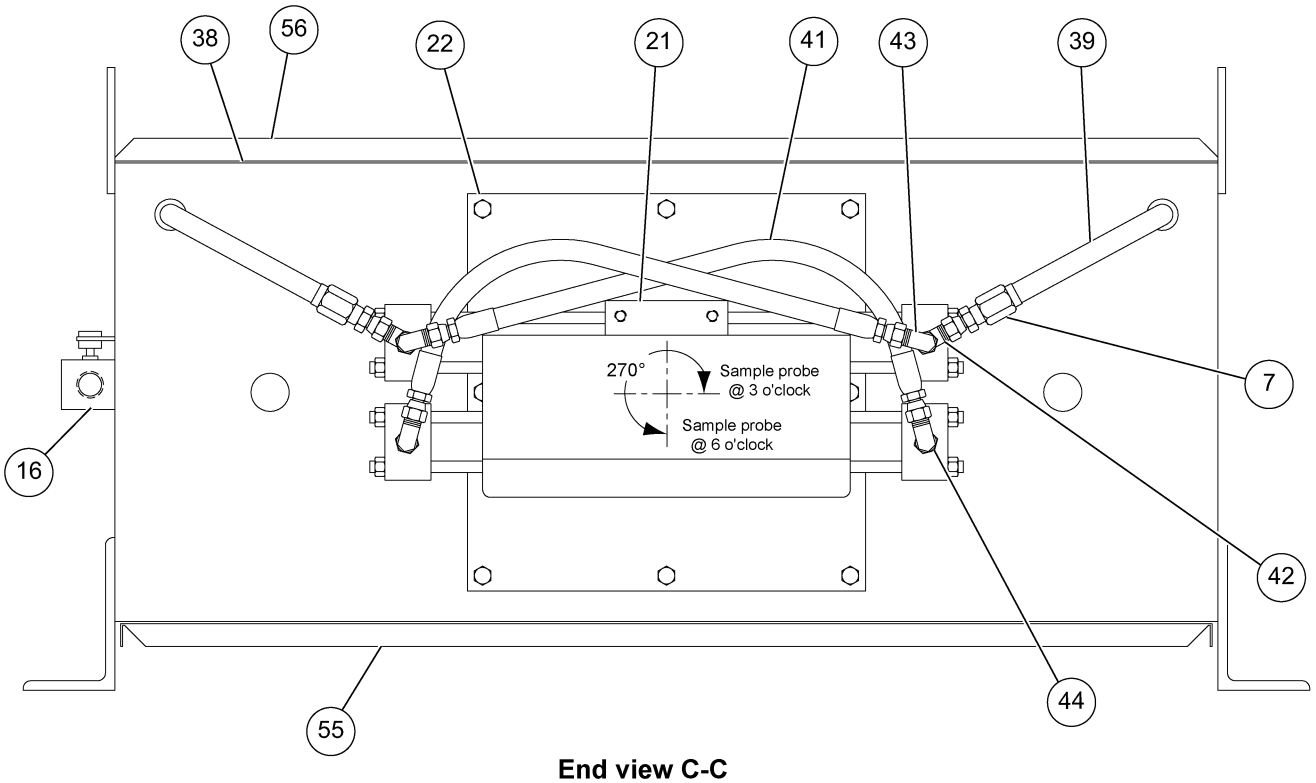
Plan view
(with top covers removed)



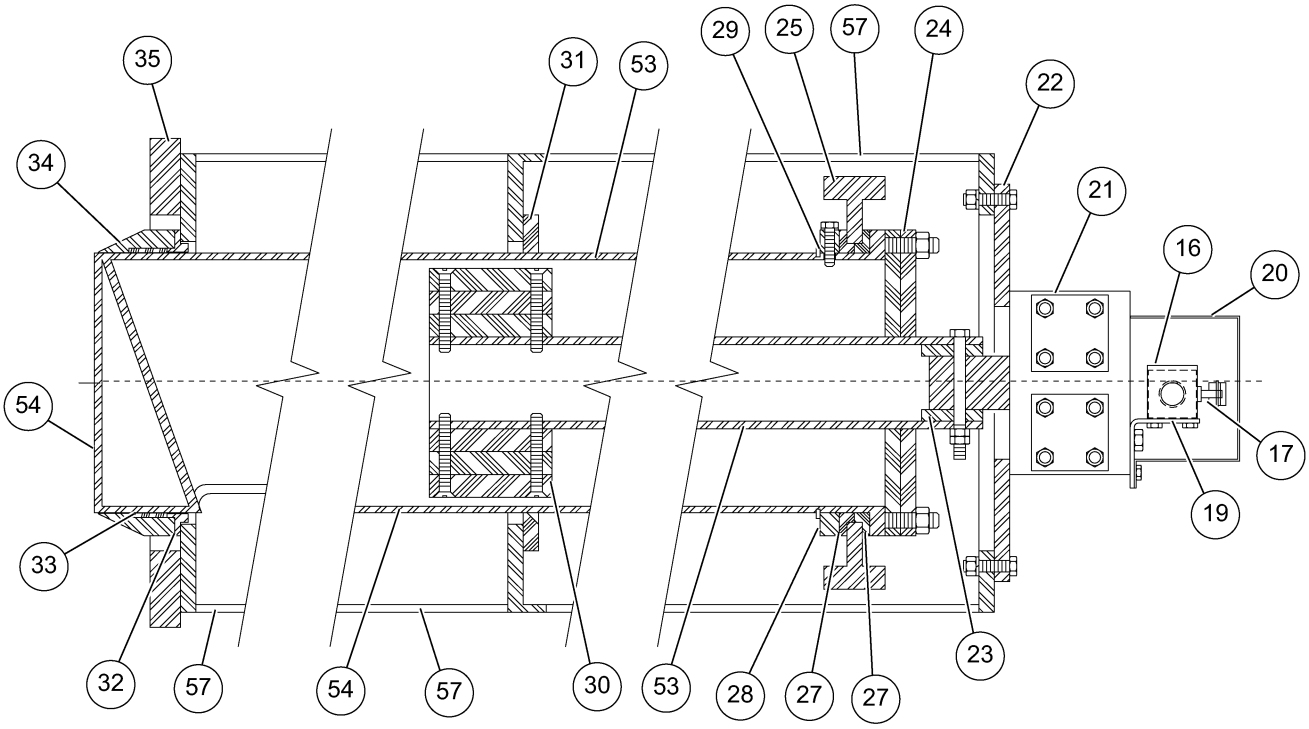
Elevation view

NOTE: *The parts pointed out on this page are listed on Pages 40-41.*

HD-PRT-HYD Sampler with 8-1/2" O.D. Probe (Continued)



End view C-C



Section view D-D

NOTE: *The parts pointed out on this page are listed on Pages 40-41.*

Sampler Parts Listing HD-PRT-HYD with 8-1/2" Diameter Probe

Ref #	Part #	Description	Qty
1	35960	Plug 1-1/16" SAE O-Ring	2
2	535964	HD-PRT-Hydraulic Valve Mount	1
3	36659	7/8" M SAE O-Ring to 3/4" JIC Elbow	4
4	522408	Elbow 3/4" JIC 90° Swivel Nut	2
5	522409	3/4" M SAE O-Ring Run Tee 3/4" M JIC	2
6	518990	Adapter 3/4" M SAE O-Ring 9/16" JIC	2
7	516845	9/16" F JIC to 3/8" Rubber Hose End	4
8			
9	529283	3/4" I.D. Hydraulic Hose Assembly 15' LG	2
10			
11	523181	Manifold Hydraulic 2 Station Parallel with Relief	1
12	523180	Cartridge Relief Valve 30 GPM	1
13	527979	Sub Plate Mount Flow Control for D03	1
14	527978	3 Position Hydraulic Valve 110 VAC 60 Hz	2
15	523107	HD-PRT Hydraulic Hose Cover	2
16	26402	Limit Switch NEMA 4, 12	4
17	35341	Limit Switch Roller Arm	2
18	35355	Limit Switch Arm 13" Rod Lever	2
19	519458	Limit Switch Bracket	1
20	519459	Limit Switch Guard	1
21	531947	270° Rotary Actuator Hydraulic 2 Rack	1
22	527992	HD-PRT Hydraulic Actuator Mount Plate (8-1/2" Probe)	1
23	523124	HD-PRT Hydraulic Actuator Probe Coupler	1
24	524590	HD-PRT-HYD Drive Bearing (8-1/2" Probe)	2
25	524591	HD-PRT Hydraulic Drive Plate (8-1/2" Probe)	1
26	519461	HD-PRT-HYD Guide Rod Bushing 1-1/4" Diameter	2
27	524592	HD-PRT-HYD Drive PL Flange Bearing (8-1/2" Probe)	2
28	524593	HD-PRT-HYD Lock Collar (8-1/2" Probe)	1
29	522412	8-1/2" Shaft Retaining Ring (8-1/2" Probe)	1
30	512470	HD-PRT-HYD Drive Tube Support Bearing	2
31	524595	HD-PRT-HYD Drive Seal (8-1/2" Probe)	1
32	524596	HD-PRT-HYD Shear Nose Locator (8-1/2" Probe)	1
33	524597	HD-PRT-HYD Shear Nose Bearing (8-1/2" Probe)	1
34A	524598	HD-PRT-HYD Shear Nose (Wood Chips) (8-1/2" Probe)	A/R
34B	524599	Chisel Nose (Hard Materials) (8-1/2" Probe)	A/R
35	524600	HD-PRT-HYD Mount Plate (8-1/2" Probe)	1
36	519463	1-1/4" Shaft Retaining Ring	4
37	524589	Rod Coupler 1-14" UNF	2
38	34185	Doortite Seal 3/16" x 3/4"	A/R
39	522406	Hydraulic Hose 3/8" I.D. 4000 PSI	A/R
40	524594	HD-PRT-HYD Support Bearing Spacer	4
41	531948	20" LG Hydraulic Hose 3/8"	2
42	522869	9/16"-18 SAE Run Tee	2
43	531949	9/16"-18 JIC Swivel Nut Elbow 90°	2
44	522868	9/16"-18 SAE Elbow 90°	2

Sampler Parts Listing HD-PRT-HYD with 8-1/2" Diameter Probe (Continued)

Ref #	Part #				Description	Qty
	HD-PRT-12	HD-PRT-18	HD-PRT-24	HD-PRT-30		
	12" Stroke	18" Stroke	24" Stroke	30" Stroke		
49	529447 (18")	529448 (21")	529449 (24")	529450 (27")	Hydraulic Hose 1/2" I.D. Short	2
50	529455 (42")	529456 (42")	529457 (48")	529458 (51")	Hydraulic Hose 1/2" I.D. Long	2
51	527983	527984	527985	527986	2" Bore Hydraulic Cylinder	2
52	524665	524666	524667	524668	HD-PRT-HYD SS Guide Rod	2
53	519517	519518	519519	519520	HD-PRT-HYD Drive Tube	1
54	524609	524610	524611	524612	HD-PRT-HYD Probe	1
55	524633	524634	524635	519536	HD-PRT-HYD Cover Bottom	1
56	524625	524626	524627	524628	HD-PRT-HYD Cover Top	2
57	535949	535950	535951	535952	HD-PRT-HYD Housing	1
58	524641	524642	524643	524644	HD-PRT-HYD Hopper	1
59	535973	535974	535975	535976	HD-PRT-HYD Probe Cover	1

Ref #	Part #				Description	Qty
	HD-PRT-36	HD-PRT-42	HD-PRT-48	HD-PRT-54		
	36" Stroke	42" Stroke	48" Stroke	54" Stroke		
49	529451 (30")	529452 (33")	529453 (36")	529454 (39")	Hydraulic Hose 1/2" I.D. Short	2
50	529459 (54")	529460 (57")	529470 (60")	529471 (63")	Hydraulic Hose 1/2" I.D. Long	2
51	527987	527988	527989	527990	2" Bore Hydraulic Cylinder	2
52	524669	524670	524671	524672	HD-PRT SS Guide Rod	2
53	519521	519522	519523	519524	HD-PRT-HYD Drive Tube	1
54	524613	524614	524615	524616	HD-PRT-HYD Probe	1
55	524637	524638	524639	524640	HD-PRT-HYD Cover Bottom	1
56	524629	524630	524631	524632	HD-PRT-HYD Cover Top	2
57	535953	535954	535955	535956	HD-PRT-HYD Housing	1
58	524645	524646	524647	524648	HD-PRT-HYD Hopper	1
59	535977	535978	535979	535980	HD-PRT-HYD Probe Cover	1

NOTES

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InterSystems
9575 N. 109th Ave.
Omaha, Nebraska 68142
Toll Free: (800) 228-1483
www.gsiag.com

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