

SAFETY
INSTALLATION
OPERATION
MAINTENANCE



M A N U A L

SAMPLER

Model HD-PRT-HYD

No. PC 526250A
Revised 2010-01-11

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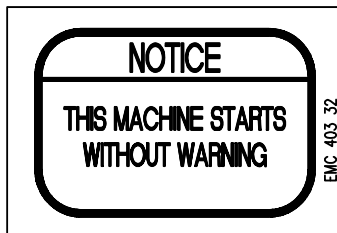
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I. GENERAL SAFETY INFORMATION

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

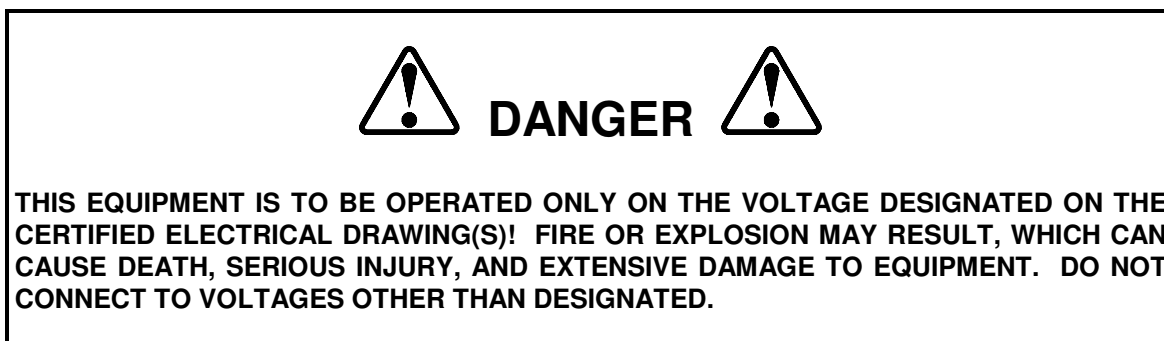


MOVING PART
EMC3032

Consult InterSystems, Inc. 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.

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.



NOTE: THESE SIGNS MUST NEVER BE REMOVED, TAMPERED WITH, PAINTED OVER, OR OBSCURED IN ANY WAY. IF LABELS ARE DAMAGED OR BECOME UNREADABLE, REPLACEMENT LABELS ARE AVAILABLE FROM INTERSYSTEMS.

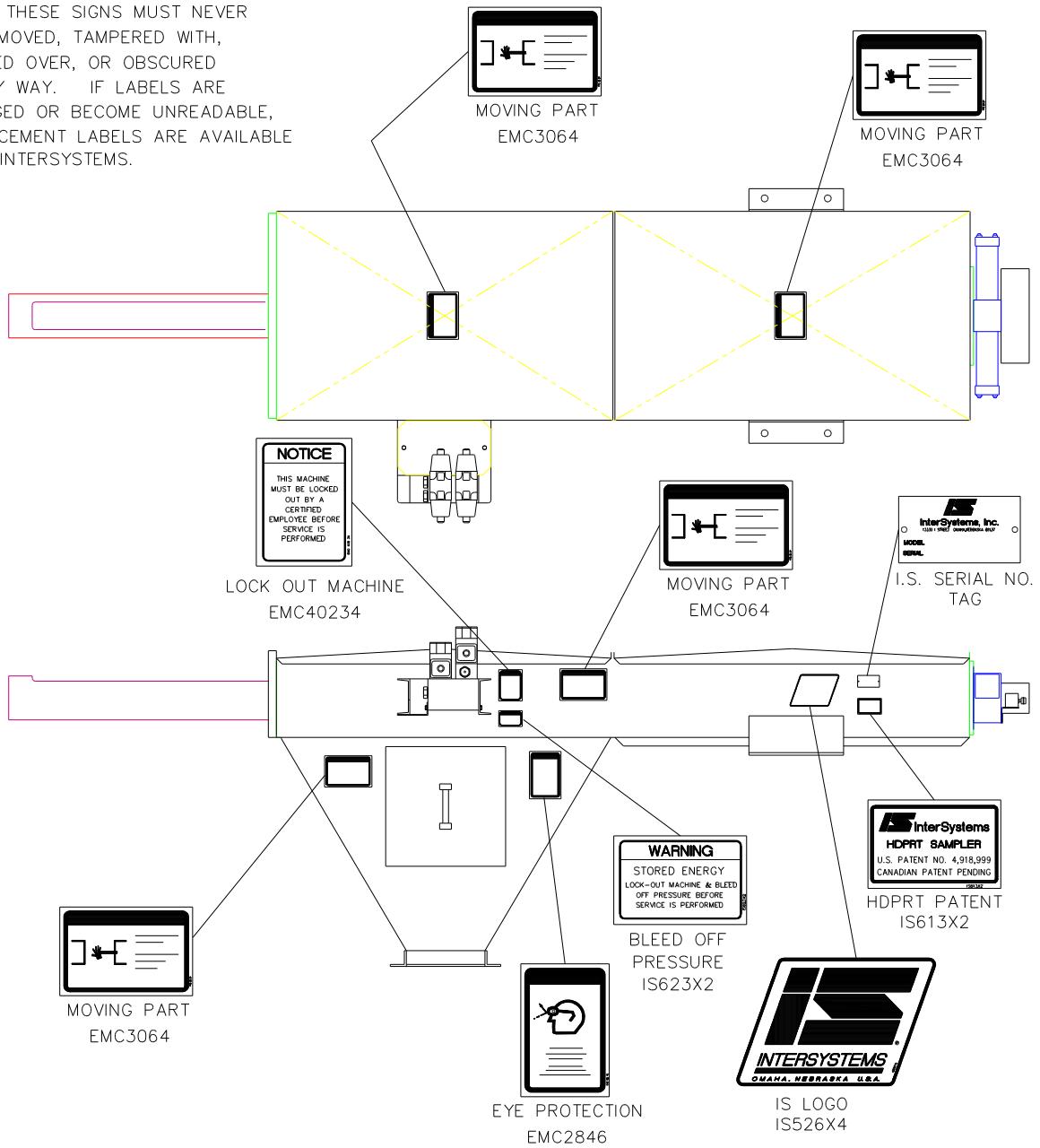


FIGURE 1-1, HD-PRT-HYD SAMPLER SAFETY LABEL LOCATIONS

II. GENERAL INFORMATION

2.1 System Description

The HD-PRT 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 2-1 illustrates a typical HD-PRT 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 counter-clockwise 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.

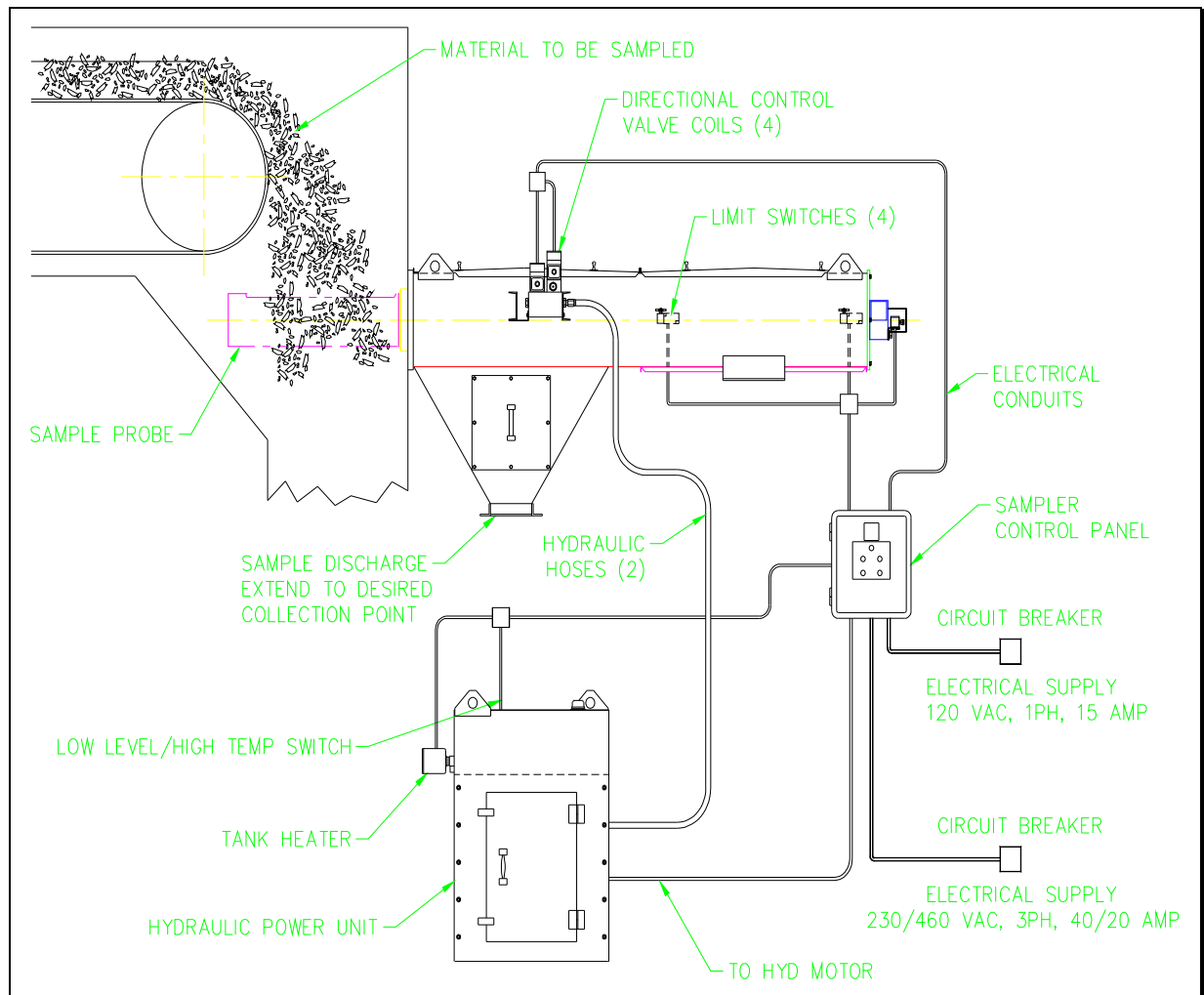


FIGURE 2-1, TYPICAL INSTALLATION, MODEL HD-PRT-HYD SAMPLING SYSTEM

2.2 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.

- A. Controller arranged to initiate a sampling cycle based on quantity or volume of material passing through conveying line rather than upon elapsed time periods.
- B. 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.
 - 1. An explosion-proof solenoid on the directional control valve with the rating of:
 - Class 1, Groups C & D, Division 1 & 2
 - Class 2, Groups E, F & G, Division 1 & 2
 - 2. An explosion-proof limit switch with the rating of:
 - Class 1, Groups C & D, Division 1 & 2
 - Class 2, Groups E, F & G, Division 1 & 2

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

- 1. The NEMA 9 control with the rating of:
 - Class 2, Groups E, F & G, Division 1 & 2
 - 2. The NEMA 7 control with the rating of:
 - Class 1, Groups C & D, Division 1 & 2
 - Class 2, Groups E, F & G, Division 1 & 2
- C. Components of special materials, such as 316 stainless steel, monel, inconel or nedox coatings.
 - D. Programmable Controls to sequence the sampler and the sample collection equipment.
 - A.

2.3 Material Sampled

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

2.4 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.

III. GENERAL INSTALLATION REQUIREMENTS

3.1 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.

3.2 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).

3.3 Location

The HD-PRT sampler is typically mounted horizontally in the chute at the discharge end of a belt conveyor carrying the product to be sampled, as in Figure 2-1. 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:

- A. 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.
- B.
- B. To prevent conveyed product or material from jamming in the gap between the pulley and the sample probe.
- C.
- C. To insure that complete, representative samples are collected. The sample probe should extend under the drive pulley to ensure that all fines are collected.
- D.

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.

3.4 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.



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.

3.4.1 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 chutework.

- E. Locate and mark the desired mounting location on the discharge chute, spout, or conveying line.
- F. 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 5.50" dia HD-PRT probe or 11" diameter for the 8.50" dia HD-PRT probe. Refer to the certified drawing(s).
- G. 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.
- H. Drill and tap the holes for the mounting screws, or weld studs to the conveying line for fastening the sampler.
- I. 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.
- J. Finally, attach the sample discharge hopper to the sampler.
- K. 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.

3.4.2 Field-Mounted Sampler Using Weld-On Plate

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 chutework.

- A. Locate and mark the desired mounting location on the conveying line.
- B. 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 5.50" dia HD-PRT probe or 11" diameter for the 8.50" dia HD-PRT probe. Refer to the certified drawing(s).
- C. Position the sampler mounting plate by aligning the sample probe clearance holes.
- D. Tack weld the sides of the mounting plate to the product line surface and double check alignment.
- E. 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.

- F. 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.
- G. Finally, attach the sample discharge hopper to the sampler.
- H. 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.

3.5 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.

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 sampler be in easy view of the controller.

3.7 System Wiring

Refer to the certified electrical drawing(s) for specific wiring requirements. As explained in Paragraph 4.1.10, 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.

3.7.1 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.

3.7.1.1 Controller

110/120 VAC, 50/60 Hz, Single Phase, 4 Amp Max.
Optional - 220/240 VAC, 50/60 Hz, Single Phase, 2 Amp Max.

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

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

3.7.1.4 Hydraulic Pump Motor

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

3.8 System Plumbing

The hydraulic system was preplumbed 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 (2) 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 the hydraulic power unit, exercise caution in preventing any contaminants from entering into the hydraulic lines.



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

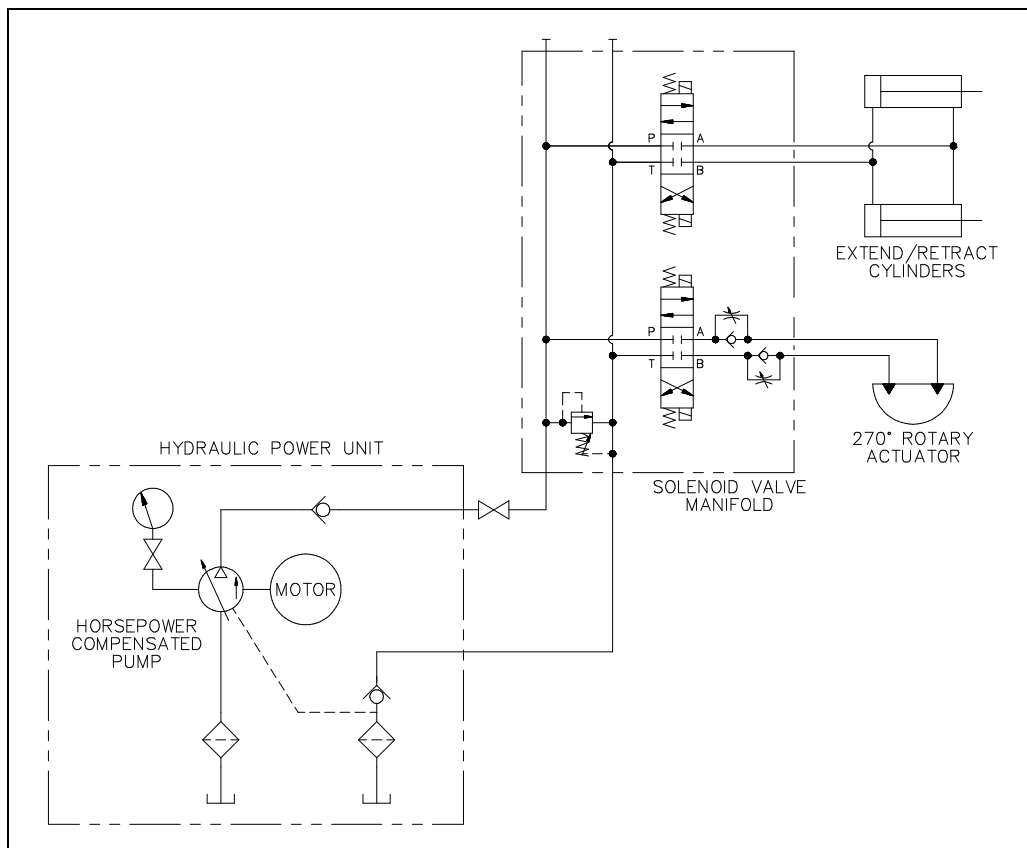


FIGURE 3-1, HYDRAULIC SCHEMATIC

IV. OPERATIONS AND ADJUSTMENTS



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 Control Components And Their Functions

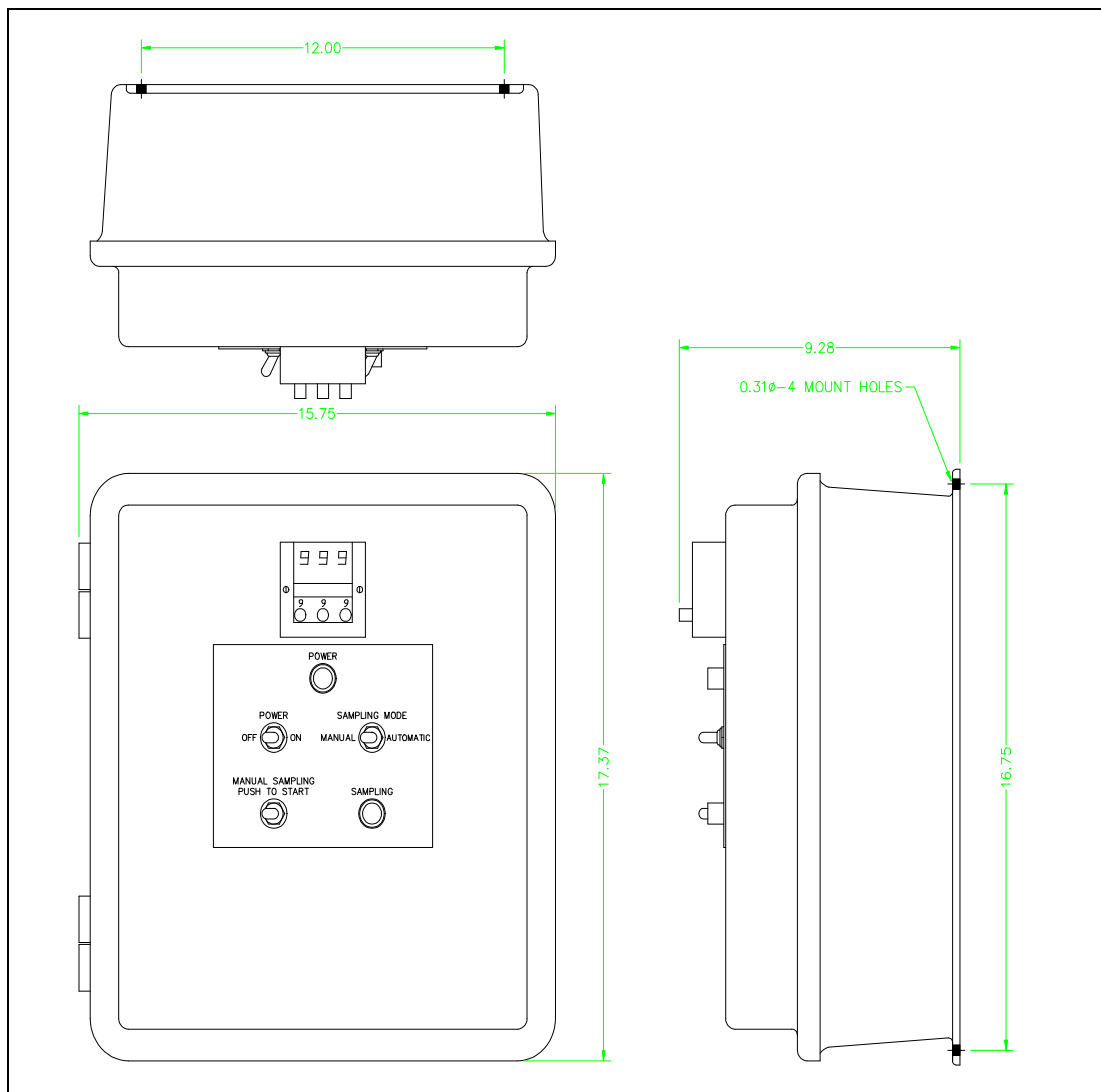
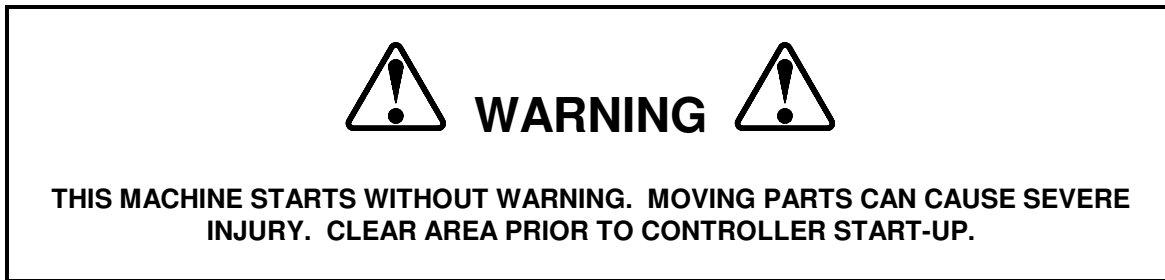


FIGURE 4-1, STANDARD NEMA 4 CONTROL PANEL DETAIL

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

4.1.1 POWER OFF/ON Switch S-2

This toggle switch controls all electrical power to the controller and the sampler unit.



4.1.2 SAMPLING MODE Switch S-3 (Automatic/Manual)

This switch permits the operator to select whether samples will be collected automatically at precisely timed or counted intervals as determined by the Digital Display Timer T-1 or Counter C-1, OR manually whenever the operator momentarily actuates the MANUAL SAMPLING toggle switch (S-4).

4.1.3 MANUAL SAMPLING Switch S-4

This switch functions ONLY when the AUTO/MANUAL switch has been set to the Manual Mode position. Switch S-4 is a spring-return switch that is maintained in the OFF or Normally Open position. Correct operating procedure is to momentarily actuate S-4 to the Start position. When the SAMPLING light is illuminated, release the switch. The sampler will complete its cycle without further operator intervention.

4.1.4 POWER Pilot Light

This light is illuminated as long as power is available to the controller and the POWER switch (S-2) is set to ON.

4.1.5 SAMPLING Pilot Light

This light will illuminate when a sampling cycle has been initiated and will stay lit until the sampling cycle has completed. If a malfunction has occurred the sample light will blink ON & OFF.

4.1.6 Digital Display Timer T-1 (Standard)

As arranged for use in this system, the timer operates in the DOWN & STOP mode. When the AUTO mode is selected, the illuminated display resets to the value dialed in to the Three Digit Preset. Immediately, the timer begins timing down. When the illuminated display reads all zeroes (000), the timer has "timed out" and initiates a sampling cycle. The sample probe extends, rotates to collect a sample, retracts, and finally dumps the collected sample. The timer display resets to the preset value and another timing interval is initiated. If the controller is shut off or the mode switched from AUTO to MANUAL, the timing cycle is terminated. When power is restored or the AUTO mode is again selected, the display is reset to the preset value and another cycle begins. NOTE: A new timing cycle can be initiated ONLY after the sampling cycle has completed.

A. External Settings

1. THE DISPLAY:

The high intensity blue fluorescent display consists of three digits and decimal point (if decimal is set in tenths or hundredths position). Also, there is a blinking Timing Bar and a special Time-Out symbol. The Timing Bar appears to the right of the digits and blinks once every second during timing. The Timing Bar shows quickly that the timer is actively timing especially when the digits do not change rapidly as in the "hours" ranges. When the delay relay is energized at time-out, a triangular Time-Out symbol appears to the left of the digits. The Timing Bar blinks noticeably faster at time-out.

2. SETTING SWITCHES:

The three digits are set with the rotary switch knobs located beneath each digit. These knobs can be rotated in either direction (CW or CCW), and they are "pull" removable if digit set security is desired. Changing one or more digits, during timing, will instantly be reflected by an equivalent change in the timer's display. Setting all three digits to zero will cause instant time-out of the timer.

B. Internal Settings

THE 365 DIGITAL DISPLAY TIMER MUST BE REMOVED FROM ITS HOUSING TO ALTER ANY OF THE FOLLOWING SETTINGS.

1. TIME RANGE:

Decimal Point Location can be changed with the white plastic lever mounted behind the front face of the timer. This lever moves into three positions. With finger force you can change its position and at the same time observe the front of the timer. NOTE - this procedure sets the decimal point electronically as well as visually.

Time Units (Sec/Min/Hr) are set by moving a small width metal arm in a slotted arc on the side plate nearest to the units (Sec/Min/Hr) window. By depressing this arm slightly with a pencil or pen point, it can be moved to a new position. The time units physically change in the timer's face and the timer is electronically switched to the new units as well.

2. LINE FREQUENCY:

To set the proper line frequency, connect the jumper wire to either the 50 HZ or 60 HZ pin. These pins are clearly marked on the side of the timer.

NOTE: THE TIMER CHASSIS AND THE HOUSING ARE POLARIZED SO THAT THE CHASSIS CANNOT BE INSERTED INTO ITS HOUSING UPSIDE-DOWN. IF THE TIMER IS FORCED INTO THE HOUSING UPSIDE-DOWN DAMAGE WILL RESULT.

4.1.7 Digital Display Counter C-1 (Optional)

As arranged for use in this system, the counter operates in the DOWN & STOP mode. When the AUTO mode is selected, the illuminated display resets to the value dialed in to the Three Digit Preset. Immediately, the counter begins counting down. When the illuminated display reads all zeroes (000), the counter has "counted out" and initiates a sampling cycle. The sample probe extends, rotates to collect a sample, retracts, and finally dumps the collected sample. The counter display resets to the preset value and another counting interval is initiated. If the controller is shut off or the mode switched from AUTO to MANUAL, the counting cycle is terminated. When power is restored or the AUTO mode is again selected, the display is reset to the preset value and another cycle begins. NOTE: A new counting cycle can be initiated ONLY after the sampling cycle has completed.

A. External Settings

1. THE DISPLAY:

The high intensity blue fluorescent display consists of three digits and a Counting Bar with a special Count-Out symbol. The Counting Bar appears to the right of the digits and blinks once every count, regardless of range. When the delay relay is energized at count-out, a triangular Count-Out symbol appears to the left of the digits.

2. SETTING SWITCHES:

The three digits are set with the rotary switch knobs located beneath each digit. These knobs can be rotated in either direction (CW or CCW), and they are "pull" removable, if digit set security is desired. Changing one or more digits, during counting, will instantly be reflected by an equivalent change in the counter's display. Setting all three digits to zero will cause instant count-out of the counter.

B. Internal Settings

THE 366 DIGITAL DISPLAY COUNTER MUST BE REMOVED FROM ITS HOUSING TO ALTER THE COUNT RANGE:

The 366 has three ranges.

1x	=	Counts single pulses to 999
10x	=	Counts every tenth pulse to 9,990
100x	=	Counts every hundredth pulse to 99,900

Each range is selectable using finger force on the white plastic lever behind the front face of the counter. In two of the three possible lever positions, an indicator will appear in a range window located on the front face of the counter. When nothing appears in this window the count is in the x 1 range.

NOTE: THE COUNTER CHASSIS AND THE HOUSING ARE POLARIZED SO THAT THE CHASSIS CANNOT BE INSERTED INTO ITS HOUSING UPSIDE-DOWN. IF THE COUNTER IS FORCED INTO THE HOUSING UPSIDE-DOWN DAMAGE WILL RESULT.

4.1.8 MLX1000 Programmable Controller

This 10 input/6 output compact programmable logic controller (PLC) controls and monitors the sampler operation. Refer to the program ladder logic diagram in the last section of this manual for any programming maintenance or troubleshooting. Also refer to Allen Bradley Bulletin 1761-HHP-B30 programmable controllers user manual.

NOTE: CONSULT INTERSYSTEMS PRIOR TO MAKING ANY ALTERATIONS OR MODIFICATIONS TO THE PLC PROGRAM. EQUIPMENT FAILURE MAY RESULT FROM IMPROPER CONTROL SEQUENCING.

4.1.9 Main Fuse

This fuse, located in a fuse block within the controller enclosure, protects the controller and sampler 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.

4.1.10 Terminal Strip

This 24-position barrier terminal strip is fastened to the sub-plate within the controller 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).

4.2 Sampler Mounted Electrical Components

4.2.1 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.

4.2.2 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 counter-clockwise (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.

4.2.3 Sample Probe @ SIX O'CLOCK Limit Switch, LS-3 (actuated at rest)

This switch is actuated when the rotary actuator has rotated fully counter-clockwise 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.

4.2.4 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.

4.3 Hydraulic Power Unit Mounted Electrical Components

4.3.1 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. 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 THE WRONG DIRECTION. DAMAGE TO THE HYDRAULIC PUMP WILL RESULT.

4.3.2 Hydraulic Oil Heater

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 an internal thermostat to shut it off when the oil has been heated. The thermostat should be set at 90 degrees F.

4.3.3 High Temperature & Low Level Hydraulic Oil Switch

This dual action switch trips 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 trips, the sampler will shut down and signal a malfunction error on the MLX1000 processor.

4.4 Hydraulic Components

4.4.1 Solenoid Valves V-1 And V-2

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

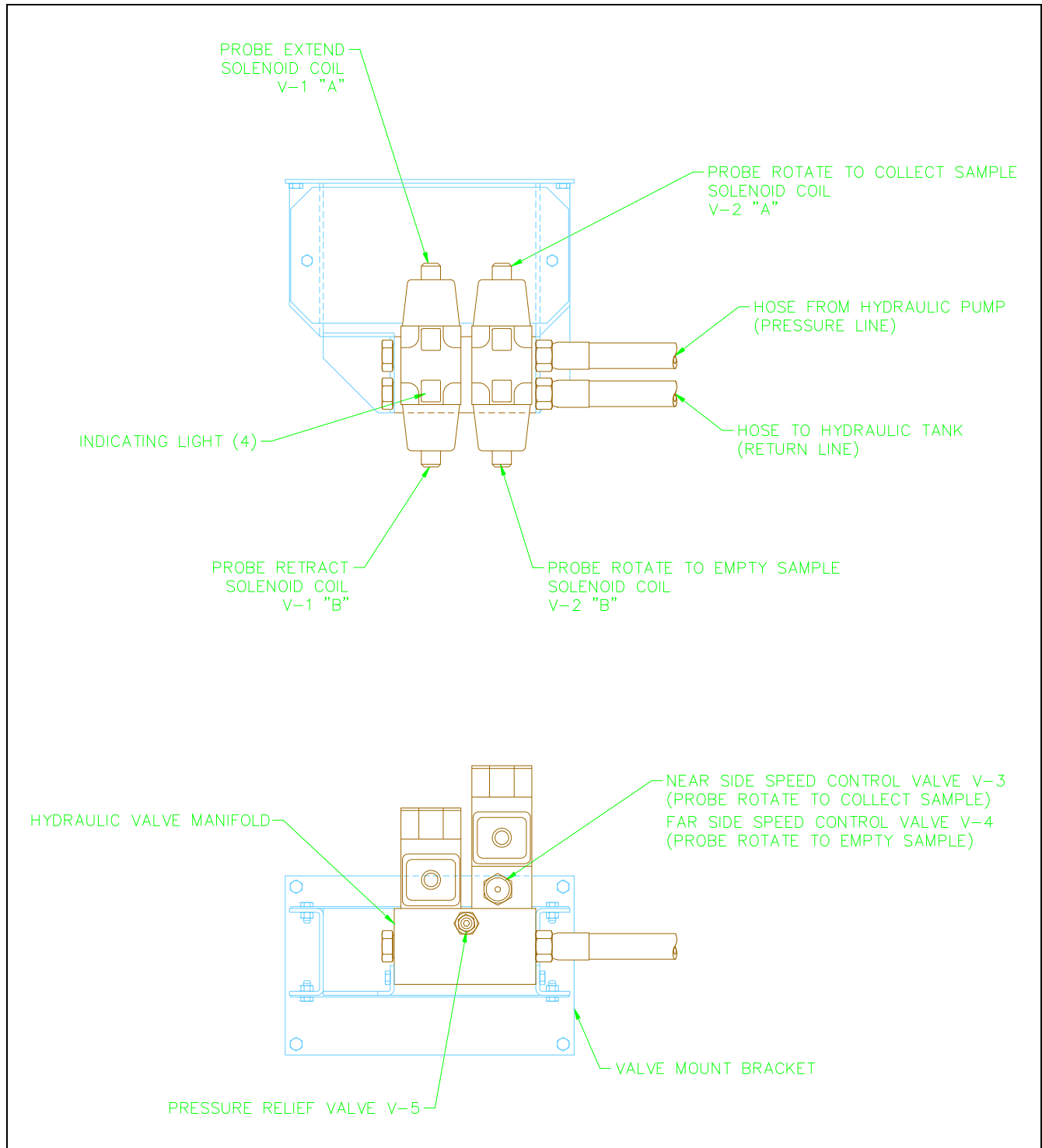


FIGURE 4-2, HYDRAULIC VALVES & MANIFOLD

4.4.1.1 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 retract, 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 extend, 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.

4.4.1.2 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 counter-clockwise (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.

4.4.2 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 in Figure 4-2. 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 counter-clockwise 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.

4.4.3 Relief Valve V-5

The relief valve has been set at the factory at 2750 PSI. No further adjustment should be necessary. Refer to Section 5.5 for adjustment instructions.

4.4.4 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.

4.4.5 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 counter-clockwise to dump samples. Solenoid valve V-2 controls rotary actuator motions.

4.4.6 Hydraulic Pump

This pump is horsepower compensated and was set at the factory. No further adjustment should be necessary. Refer to Section 5.5 for adjustment instructions.

V. MAINTENANCE AND REPAIR



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 sampler as it operates. Inspect for:

- A. Loose or missing hardware.
- B. Functioning and properly adjusted shock absorbers.
- C. Structural damage.
- D. Rust or corrosion.
- E. Damaged wiring, including exposed conductors and connections.
- F. Damaged hydraulic lines and components, hydraulic leaks.
- G. Keep the areas around the limit switches clear of accumulations of dirt and debris which might prevent the switches from functioning as intended.
- H. 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 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.

5.4 Hydraulic Power Unit Service

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.

NAME	VISCOSITY, SSU @ 1000 F
Mobile DTE 13 (Summer)	150
McCollister 3062 Hydraulic Oil (All Season)	155

HYDRAULIC FLUID RECOMMENDATION: Use petroleum-based fluids ONLY.

5.4.1 Hydraulic Oil Inspection (Daily)

- A. 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.
- B. Check fluid temperature after the sampler 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. 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.

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.

5.4.4 Hydraulic Oil & Filter Replacement, Annually

- A. Operate the sampler until the fluid temperature has stabilized.

- B. Shutoff and lockout all power to the probe.
- 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 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.
- 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" NPT drain plug is threaded securely in the reservoir drain. Then refill the reservoir with fifteen gallons of approved hydraulic fluid.
- J. Operate the sampler 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.

5.5 Hydraulic Relief Valve, Horsepower Limiter & 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.

- A. Shut off the hydraulic pump motor.
- B. Loosen the jam nut on the relief valve on the sampler manifold and turn the set screw all the way in.
- C. Loosen the jam nut on the compensator and turn the hex screw all the way out.
- D. Loosen the jam nut on the horsepower limiter and turn the hex screw all the way in.
- E. Start the hydraulic motor.
- F. Open the shut off valve to the pressure gauge.
- G. Turn the compensator hex screw in until the gauge reads 3000 PSI.
- H. Turn the horsepower limiter hex screw out until gauge falls to 2900 PSI.
- I. Turn the relief valve set screw out until pressure drops to 2750 PSI and tighten the jam nut.

- J. Turn the compensator hex screw out until the gauge reads 2500 PSI and tighten the jam nut.
- K. 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.

5.6 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.

- A. Shut off and lockout all power (electrical and pneumatic).
- B. Shut down the conveying line or conveyor when empty and lockout.
- C. Remove the top cover(s) of the sampler and the access cover on the sample hopper.
- D. Remove the 1/4-20UNC hex head bolts attaching the shear nose, bearing & locator.
- E. Rotate the serrated shear nose 180 degrees.
- F. Re-install the 1/4-20UNC hex head bolts and tighten.
- G. Remove the four 1/2-13UNC hex head nuts and washers attaching the drive bearing to the probe, and slide the drive bearings off the probe.
- H. Without moving the square drive tube rotate the probe 90 degrees clockwise (as viewed from the actuator end).
- I. Re-install the drive bearing, washers and nuts and tighten.
- J. Re-install the top covers and the sample hopper access cover.
- K. Reverse the electrical wiring from the control to the two rotation solenoids.
- L. Reverse the electrical wiring from the control to the two rotation limit switches.
- M. Make notations in this manual and on the electrical drawings that the limit switches and the solenoids are reversed and re-designate.
- N. 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 Section 4.4.2.

VI. TROUBLESHOOTING

6.1 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 LOCKOUTS.

SYMPTOM	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. Refer to Section 4.1.9.
	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 Sections 4.2.1 to 4.2.4.
	No or low hydraulic pressure.	Check pressure gauge.
	Defective control valve.	Refer to Section 6.2.
Sampler timer T-1 digital display does not illuminate but sampler works in manual mode.	Limit switch LS-3 not actuated.	Inspect.
	Defective auto/manual switch S-2.	Replace switch if line voltage is absent across #1 & #2 on timer T-1.
	Defective timer T-1.	Replace timer if line voltage is present across #1 & #2 on timer T-1.
Sample Size too small or large.	Rotational speed of the sample probe too fast or too slow.	Adjust needle valve V-3. Refer to Section 4.4.2. See location as noted on Fig 6-2.

General HD-PRT-HYD Sampler Troubleshooting (continued)

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Sampler sluggish (Operates too slowly).	Relief valve set too low.	Reset. Refer to Section 4.4.4
	Cylinder seal leakage.	Refer to Section 6.3.1
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 & 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 & 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.
	Sample probe jammed.	Inspect and correct.

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 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, 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.

7.2 Ordering Parts

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

InterSystems, Inc.
13330 "I" St.
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.

7.3 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 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
35691	Oil filter cartridge
35649	Hydraulic oil 3062 all season

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7.4.1 Sampler Parts Listing HD-PRT-HYD w/ 5.50" dia Probe (see Figures 7-1 & 7-2)

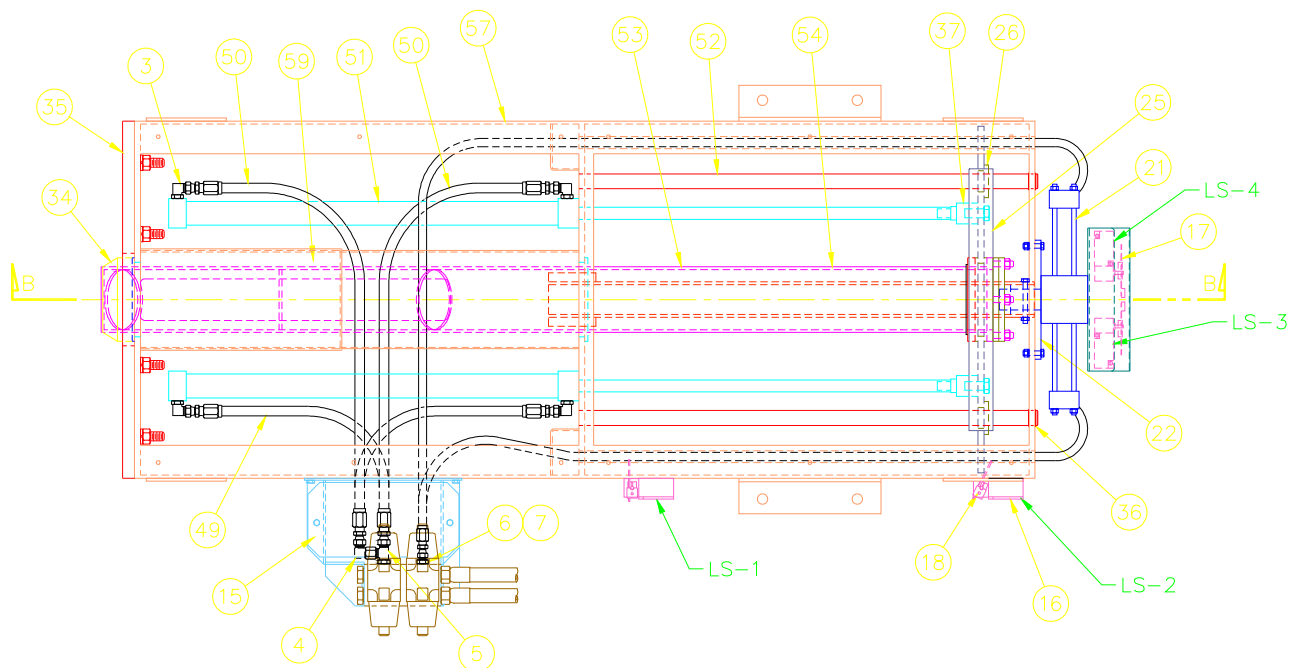
ITEM NO.	PART NO	DESCRIPTION	QTY
1	35960	PLUG 1-1/16 SAE O-RING	2
2	535964	HD-PRT HYD VALVE MOUNT	1
3	36659	7/8 M SAE O-RING TO 3/4 JIC ELBOW	4
4	522408	ELBOW 3/4 JIC 90 SWIVEL NUT	2
5	522409	3/4 M SAE O-RING RUN TEE 3/4 M JIC	2
6	518990	ADAPTER 3/4 M SAE O-RING 9/16 JIC	2
7	516845	9/16 F JIC TO 3/8 RUBBER HOSE END	2
8	518883	9/16 M SAE O-RING TO 3/8 RUBBER HOSE END	2
9	529283	3/4 ID HYDRAULIC HOSE ASSY 15 FT LG	2
10			
11	523181	MANIFOLD HYD 2 STATION PARALLEL W/ RELIEF	1
12	523180	CARTRIDGE RELIEF VALVE 30 GPM	1
13	527979	SUB PLATE MOUNT FLOW CONTROL FOR D03	1
14	527978	3 POSITION HYD 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 HYD 1 RACK	1
22	518888	HD-PRT HYD ACTR MOUNT PLATE (5.50 PROBE)	1
23	523124	HD-PRT HYD ACTUATOR PROBE COUPLER	1
24	512471	HD-PRT DRIVE BEARING (5.50 PROBE)	2
25	523062	HD-PRT HYD DRIVE PLATE (5.50 PROBE)	1
26	519461	HD-PRT GUIDE ROD BUSHING 1.25 DIA	2
27	516548	HD-PRT DRIVE PL FLG BEARING (5.50 PROBE)	2
28	516768	HD-PRT LOCK COLLAR (5.50 PROBE)	1
29	516549	5.50 SHAFT RETAINING RING (5.50 PROBE)	1
30	512470	HD-PRT DRIVE TUBE SUPPORT BEARING	2
31	523112	HD-PRT DRIVE SEAL (5.50 PROBE)	1
32	518979	HD-PRT SHEAR NOSE LOCATOR (5.50 PROBE)	1
33	518980	HD-PRT SHEAR NOSE BEARING (5.50 PROBE)	1
34A	518875	HD-PRT SHEAR NOSE(WOOD CHIPS) (5.50 PROBE)	A/R
34B	522449	CHISEL NOSE (HARD MATERIALS) (5.50 PROBE)	A/R
35	519462	HD-PRT MOUNT PLATE (5.50 PROBE)	1
36	519463	1.250 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	HYD HOSE 3/8 ID 4000 PSI	A/R

7.4.1 Sampler Parts Listing HD-PRT-HYD w/ 5.50" dia Probe (see Figures 7-1 & 7-2)

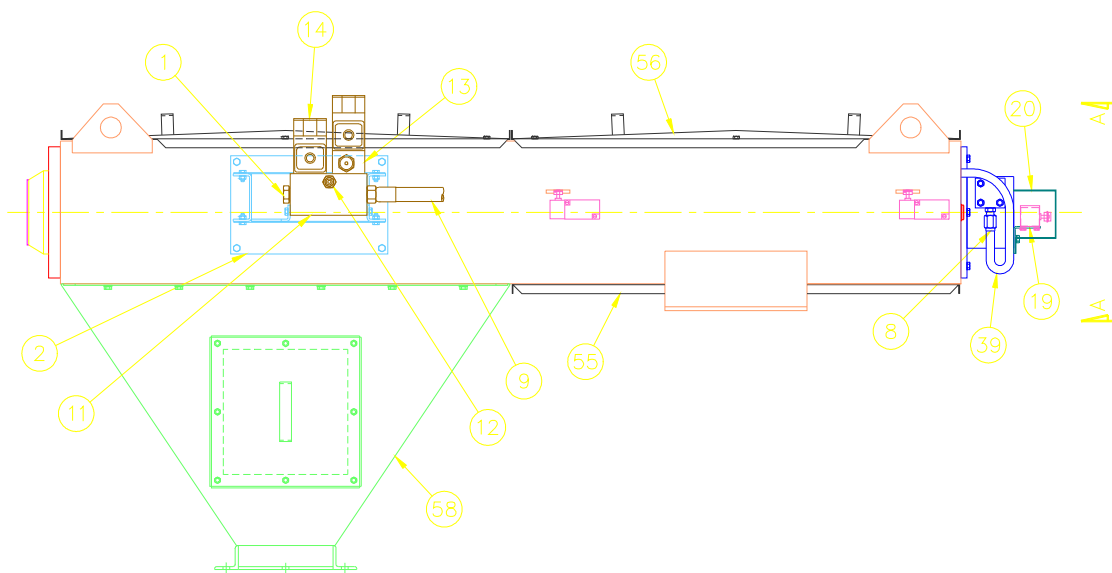
ITEM NO.	DESC	QTY	HD-PRT-12	HD-PRT-18	HD-PRT-24
			(12" STROKE)	(18" STROKE)	(24" STROKE)
49	HYD HOSE 1/2 ID SHORT	2	529447 (18")	529448 (21")	529449 (24")
50	HYD HOSE 1/2 ID LONG	2	529453 (36")	529454 (39")	529455 (42")
51	1.5 BORE HYD CYLINDER	2	526477	526478	526479
52	HD-PRT SS GUIDE ROD	2	519509	519510	519511
53	HD-PRT DRIVE TUBE	1	519517	519518	519519
54	HD-PRT PROBE	1	519525	519526	519527
55	HD-PRT COVER BOTTOM	1	519533	519534	519535
56	HD-PRT COVER TOP	2	519541	519542	519543
57	HD-PRT HOUSING	1	535941	535942	535943
58	HD-PRT HOPPER	1	519464	519465	519466
59	HD-PRT PROBE COVER	1	535965	535966	535967

ITEM NO.	DESC	QTY	HD-PRT-30	HD-PRT-36	HD-PRT-42
			(30" STROKE)	(36" STROKE)	(42" STROKE)
49	HYD HOSE 1/2 ID SHORT	2	529450 (27")	529451 (30")	529452 (33")
50	HYD HOSE 1/2 ID LONG	2	529456 (45")	529457 (48")	529458 (51")
51	1.5 BORE HYD CYLINDER	2	526480	526481	526482
52	HD-PRT SS GUIDE ROD	2	519512	519513	519514
53	HD-PRT DRIVE TUBE	1	519520	519521	519522
54	HD-PRT PROBE	1	519528	519529	519530
55	HD-PRT COVER BOTTOM	1	519536	519537	519538
56	HD-PRT COVER TOP	2	519544	519545	519546
57	HD-PRT HOUSING	1	535944	535945	535946
58	HD-PRT HOPPER	1	519467	519468	519469
59	HD-PRT PROBE COVER	1	535968	535969	535970

ITEM NO.	DESC	QTY	HD-PRT-48	HD-PRT-54
			(48" STROKE)	(54" STROKE)
49	HYD HOSE 1/2 ID SHORT	2	529453 (36")	529454 (39")
50	HYD HOSE 1/2 ID LONG	2	529459 (54")	529460 (57")
51	1.5 BORE HYD CYLINDER	2	526483	526484
52	HD-PRT SS GUIDE ROD	2	519515	519516
53	HD-PRT DRIVE TUBE	1	519523	519524
54	HD-PRT PROBE	1	519531	519532
55	HD-PRT COVER BOTTOM	1	519539	519540
56	HD-PRT COVER TOP	2	519547	519548
57	HD-PRT HOUSING	1	535947	535948
58	HD-PRT HOPPER	1	519470	519471
59	HD-PRT PROBE COVER	1	535971	535972



PLAN VIEW
(WITH TOP COVERS REMOVED)



ELEVATION VIEW

FIGURE 7-1, HD-PRT-HYD SAMPLER w/ 5.5"od PROBE

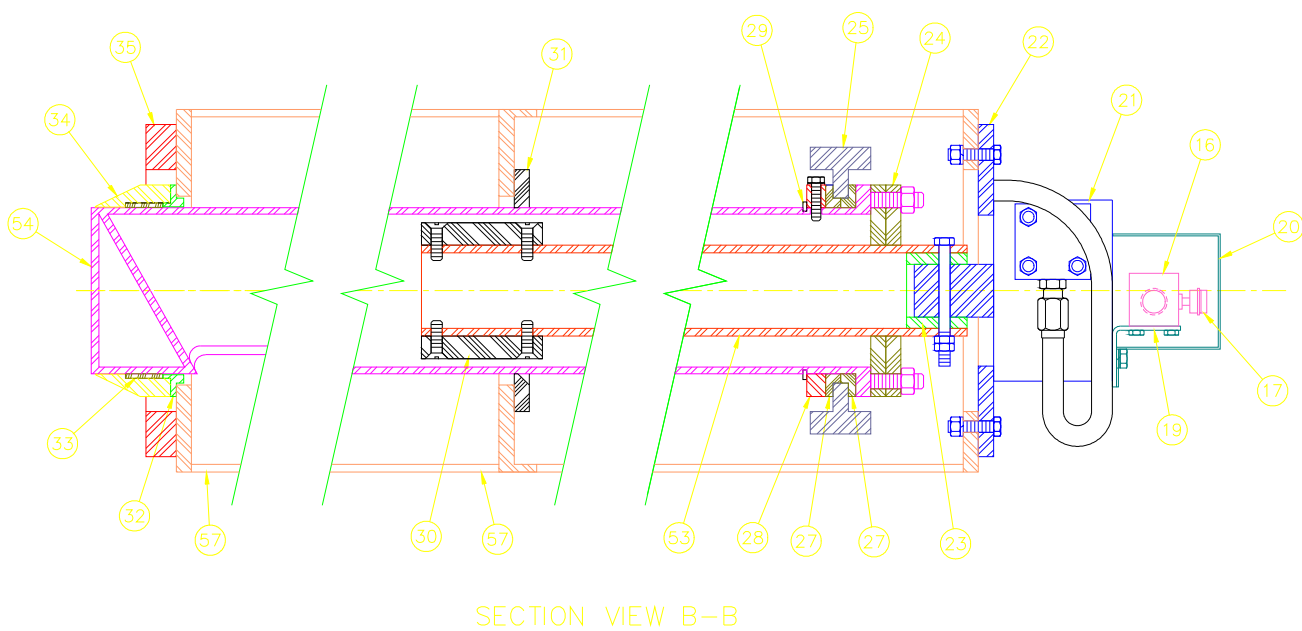
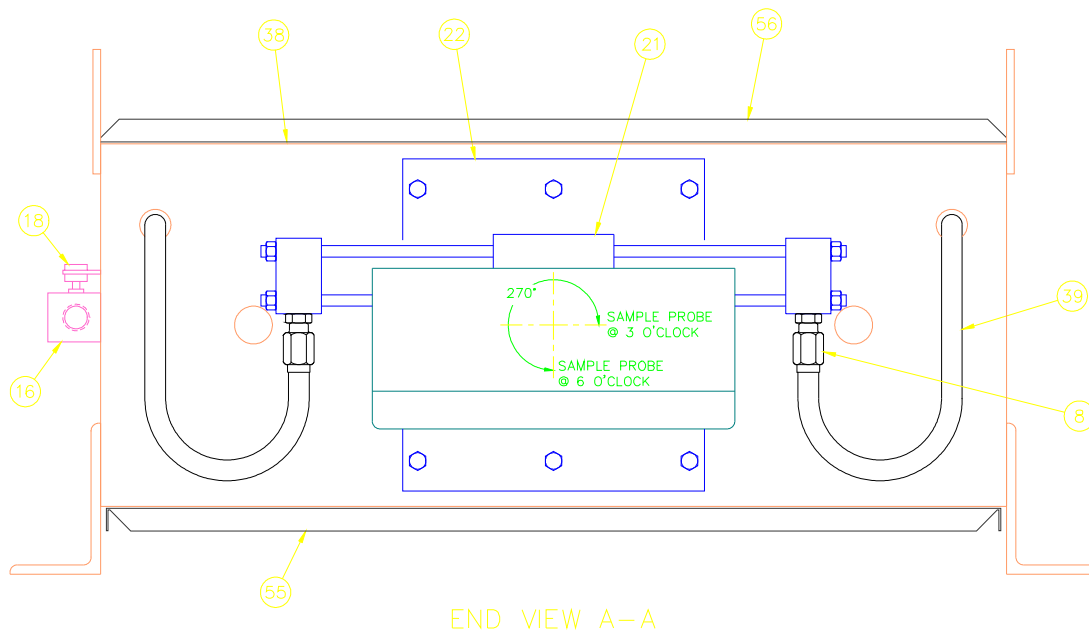


FIGURE 7-2, HD-PRT-HYD SAMPLER w/ 5.5"od PROBE

7.4.2 Sampler Parts Listing HD-PRT-HYD w/ 8.50" dia Probe (see Figures 7-3 & 7-4)

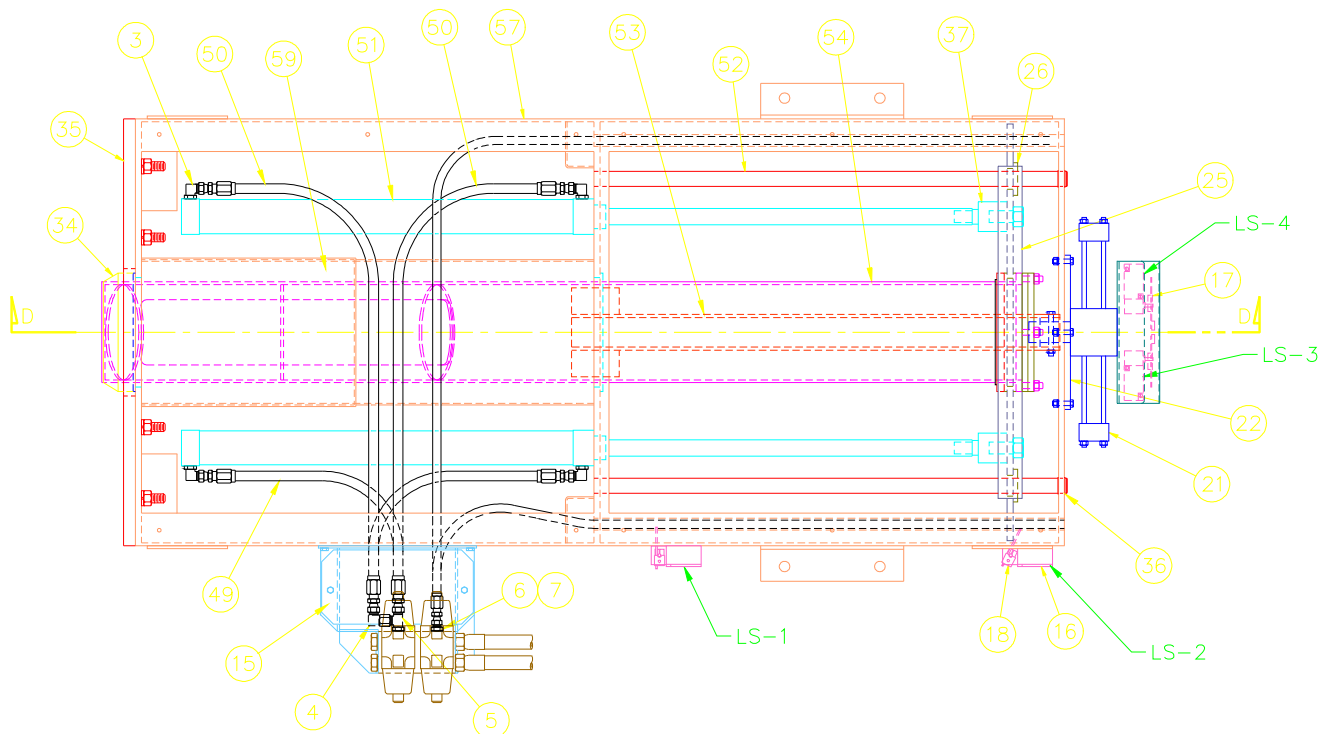
ITEM NO.	PART NO	DESCRIPTION	QTY
1	35960	PLUG 1-1/16 SAE O-RING	2
2	535964	HD-PRT HYD VALVE MOUNT	1
3	36659	7/8 M SAE O-RING TO 3/4 JIC ELBOW	4
4	522408	ELBOW 3/4 JIC 90 SWIVEL NUT	2
5	522409	3/4 M SAE O-RING RUN TEE 3/4 M JIC	2
6	518990	ADAPTER 3/4 M SAE O-RING 9/16 JIC	2
7	516845	9/16 F JIC TO 3/8 RUBBER HOSE END	4
8			
9	529283	3/4 ID HYDRAULIC HOSE ASSY 15 FT LG	2
10			
11	523181	MANIFOLD HYD 2 STATION PARALLEL W/ RELIEF	1
12	523180	CARTRIDGE RELIEF VALVE 30 GPM	1
13	527979	SUB PLATE MOUNT FLOW CONTROL FOR D03	1
14	527978	3 POSITION HYD 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	531947	270 ROTARY ACTUATOR HYD 2 RACK	1
22	527992	HD-PRT HYD ACTR MOUNT PLATE (8.50 PROBE)	1
23	523124	HD-PRT HYD ACTUATOR PROBE COUPLER	1
24	524590	HD-PRT DRIVE BEARING (8.50 PROBE)	2
25	527991	HD-PRT HYD DRIVE PLATE (8.50 PROBE)	1
26	519461	HD-PRT GUIDE ROD BUSHING 1.25 DIA	2
27	524592	HD-PRT DRIVE PL FLG BEARING (8.50 PROBE)	2
28	524593	HD-PRT LOCK COLLAR (8.50 PROBE)	1
29	522412	8.50 SHAFT RETAINING RING (8.50 PROBE)	1
30	512470	HD-PRT DRIVE TUBE SUPPORT BEARING	2
31	524595	HD-PRT DRIVE SEAL (8.50 PROBE)	1
32	524596	HD-PRT SHEAR NOSE LOCATOR (8.50 PROBE)	1
33	524597	HD-PRT SHEAR NOSE BEARING (8.50 PROBE)	1
34A	524598	HD-PRT SHEAR NOSE(WOOD CHIPS) (8.50 PROBE)	A/R
34B	524599	CHISEL NOSE (HARD MATERIALS) (8.50 PROBE)	A/R
35	524600	HD-PRT MOUNT PLATE (8.50 PROBE)	1
36	519463	1.250 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	HYD HOSE 3/8 ID 4000 PSI	A/R
40	524594	HD-PRT SUPPORT BEARING SPACER	4
41	531948	20.0 LG HYD 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

7.4.2 Sampler Parts Listing HD-PRT-HYD w/ 8.50" dia Probe (see Figures 7-3 & 7-4)

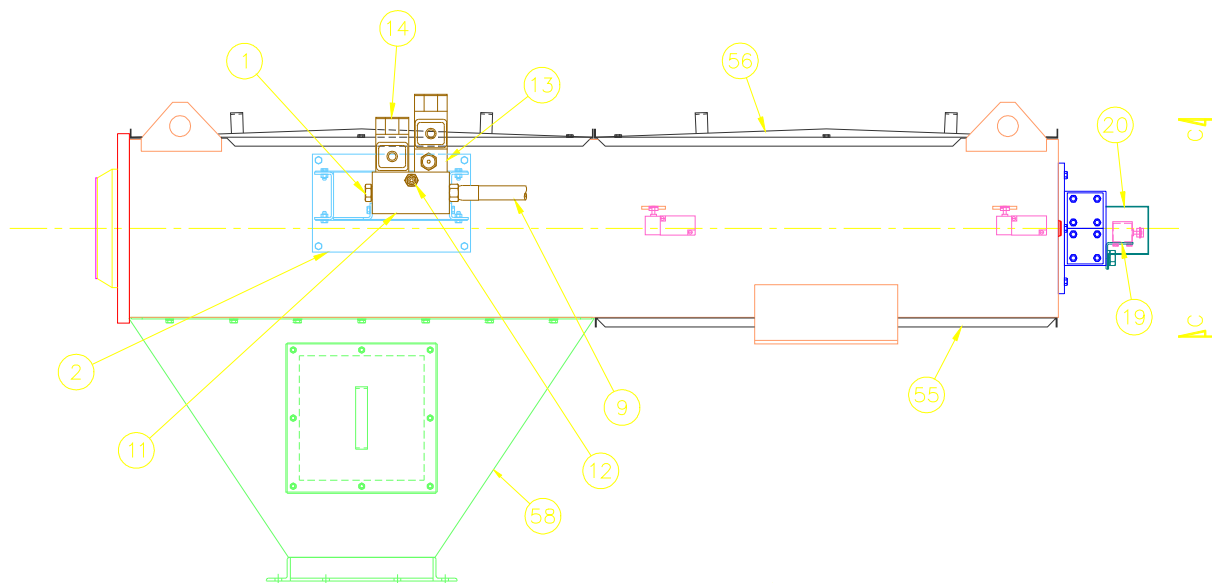
ITEM NO.	DESC	QTY	HD-PRT-12	HD-PRT-18	HD-PRT-24
			(12" STROKE)	(18" STROKE)	(24" STROKE)
49	HYD HOSE 1/2 ID SHORT	2	529447 (18")	529448 (21")	529449 (24")
50	HYD HOSE 1/2 ID LONG	2	529455 (42")	529456 (45")	529457 (48")
51	2 BORE HYD CYLINDER	2	527983	527984	527985
52	HD-PRT SS GUIDE ROD	2	524665	524666	524667
53	HD-PRT DRIVE TUBE	1	519517	519518	519519
54	HD-PRT PROBE	1	524609	524610	524611
55	HD-PRT COVER BOTTOM	1	524633	524634	524635
56	HD-PRT COVER TOP	2	524625	524626	524627
57	HD-PRT HOUSING	1	535949	535950	535951
58	HD-PRT HOPPER	1	524641	524642	524643
59	HD-PRT PROBE COVER	1	535973	535974	535975

ITEM NO.	DESC	QTY	HD-PRT-30	HD-PRT-36	HD-PRT-42
			(30" STROKE)	(36" STROKE)	(42" STROKE)
49	HYD HOSE 1/2 ID SHORT	2	529450 (27")	529451 (30")	529452 (33")
50	HYD HOSE 1/2 ID LONG	2	529458 (51")	529459 (54")	529460 (57")
51	2 BORE HYD CYLINDER	2	527986	527987	527988
52	HD-PRT SS GUIDE ROD	2	524668	524669	524670
53	HD-PRT DRIVE TUBE	1	519520	519521	519522
54	HD-PRT PROBE	1	524612	524613	524614
55	HD-PRT COVER BOTTOM	1	524636	524637	524638
56	HD-PRT COVER TOP	2	524628	524629	524630
57	HD-PRT HOUSING	1	535952	535953	535954
58	HD-PRT HOPPER	1	524644	524645	524646
59	HD-PRT PROBE COVER	1	535976	535977	535978

ITEM NO.	DESC	QTY	HD-PRT-48	HD-PRT-54
			(48" STROKE)	(54" STROKE)
49	HYD HOSE 1/2 ID SHORT	2	529453 (36")	529454 (39")
50	HYD HOSE 1/2 ID LONG	2	529470 (60")	529471 (63")
51	2 BORE HYD CYLINDER	2	527989	527990
52	HD-PRT SS GUIDE ROD	2	524671	524672
53	HD-PRT DRIVE TUBE	1	519523	519524
54	HD-PRT PROBE	1	524615	524616
55	HD-PRT COVER BOTTOM	1	524639	524640
56	HD-PRT COVER TOP	2	524631	524632
57	HD-PRT HOUSING	1	535955	535956
58	HD-PRT HOPPER	1	524647	524648
59	HD-PRT PROBE COVER	1	535979	535980



PLAN VIEW
(WITH TOP COVERS REMOVED)



ELEVATION VIEW

FIGURE 7-3, HD-PRT SAMPLER-HYD w/ 8.5"od PROBE

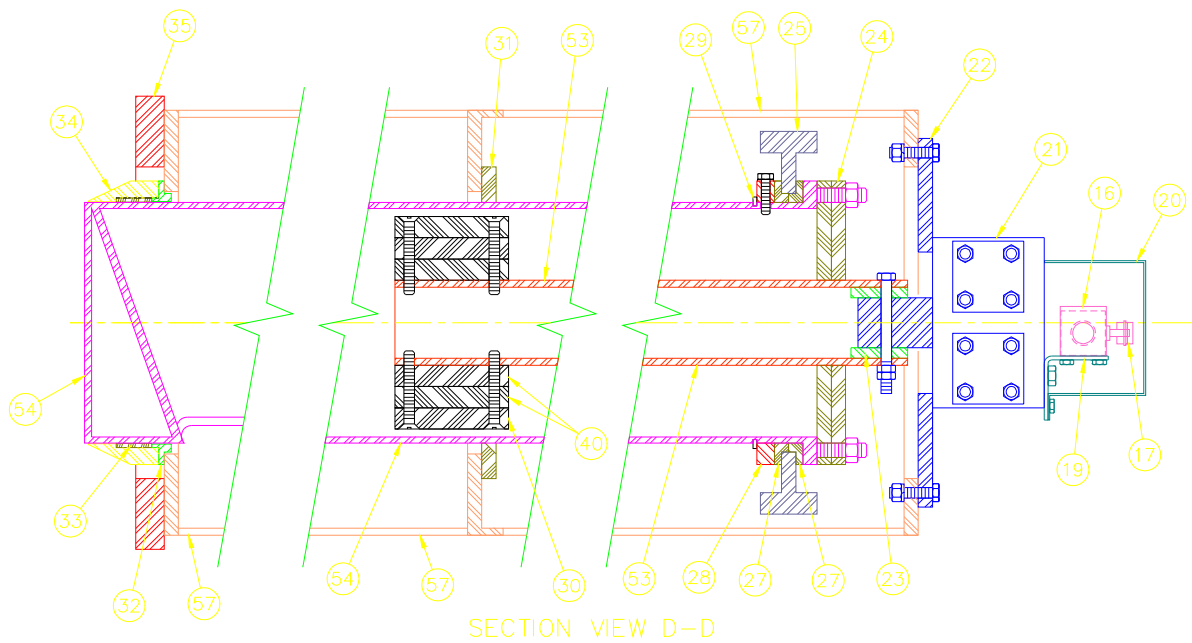
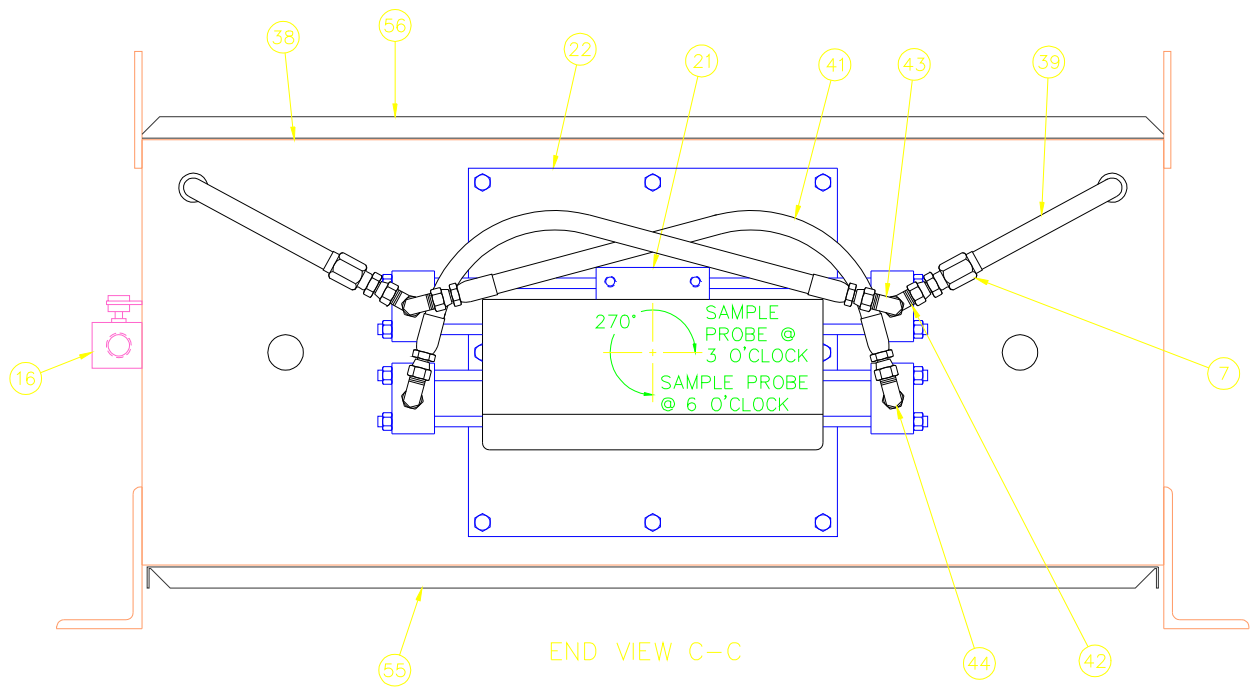


FIGURE 7-4, HD-PRT-HYD SAMPLER w/ 8.5"od PROBE

VIII. WARRANTY

InterSystems, Inc. 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.

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IX. PLC PROGRAM

The following pages are a printout of the Allen Bradley MLX1000 Programmable Controller Program.