SAFETY

INSTALLATION

OPERATION

MAINTENANCE

M A N U A L

SAMPLER
Model GS

No. 522318C

Revised 2013-08-15

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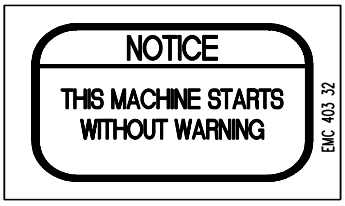

STARTS W/OUT WARNING
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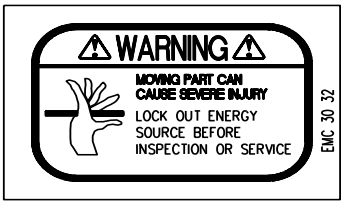

MOVING PART
EMC3032

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.

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.

DANGER

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

WARNING

COMPRESSED AIR CAN CAUSE SEVERE INJURY. SHUT OFF AND LOCK OUT COMPRESSED AIR SOURCE TO THE SAMPLER AND BLEED OFF ANY AND ALL PRESENT COMPRESSED AIR WITHIN THE SAMPLER PNEUMATICS BEFORE ATTEMPTING ANY SERVICE ON THIS SAMPLER.

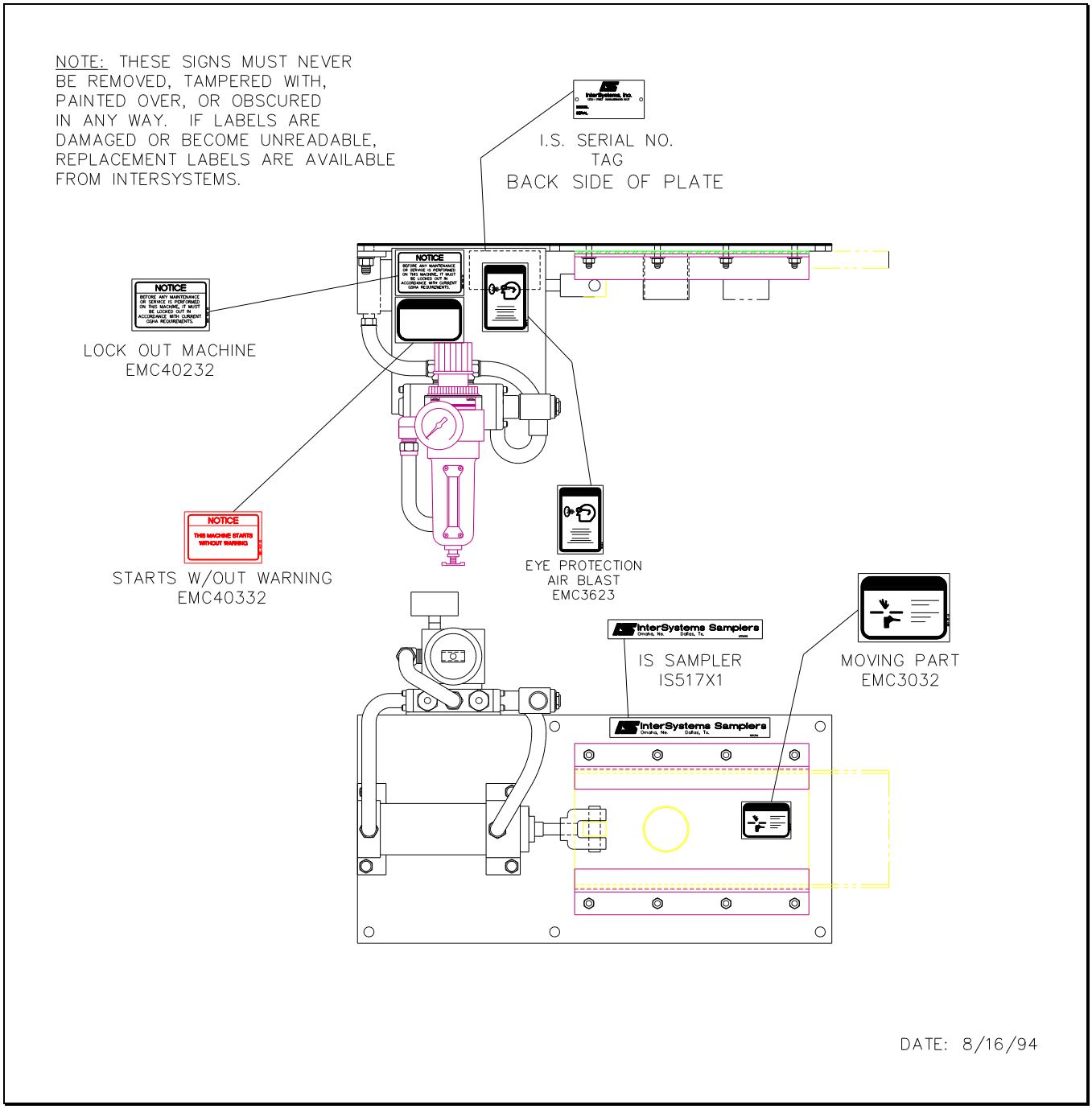

FIGURE 1-1, GS SAMPLER SAFETY LABEL LOCATIONS

II. GENERAL INFORMATION

2.1 System Description

The GS Sampler is designed to collect a representative sample of granular, flake, pellet, or other materials in a gravity conveying line or from a hopper tank or vessel. Figure 2-1 illustrates a typical GS Sampler application.

Sample collection is initiated in response to either an operator's manual command or a signal automatically generated by controller logic, usually time-based but which could also be volume or quantity based. A sample cycle begins when a double-acting pneumatic cylinder forces the slotted sampling tube (probe) into the product line to collect a sample of the material. The sample flows through the sample tube and out the discharge for as long as the sample slot is in the material conveying line. Next, the sample tube probe is withdrawn into the seal housing isolating the sample and sample tube cavity from the conveying line. The remaining sample in the sample tube then falls down and out the 1.50" (38mm) OD discharge tube to the desired sample collection point, at which point an InterSystems SCS Sample Collection System (optional) may be installed.

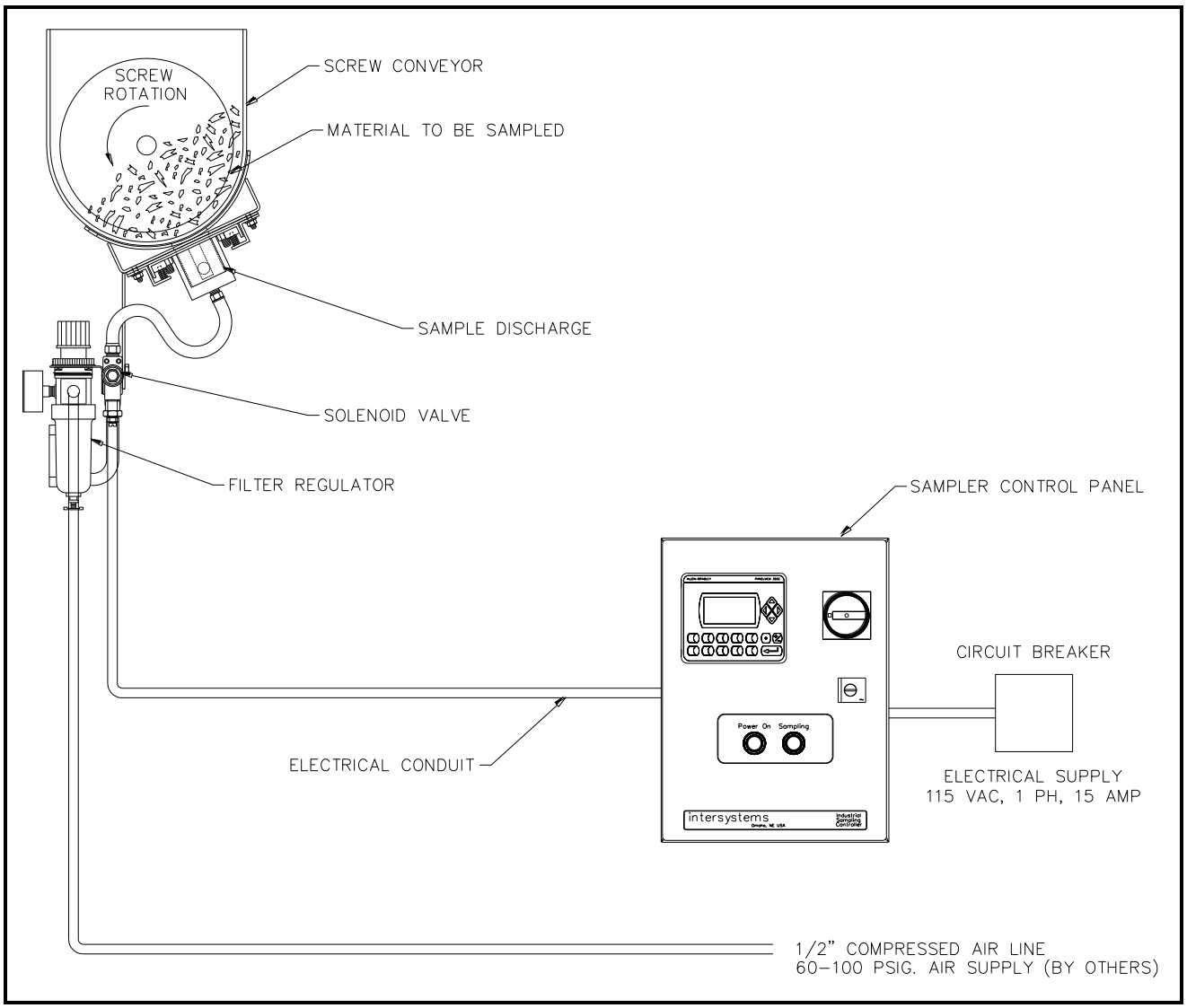

FIGURE 2-1, TYPICAL INSTALLATION, MODEL GS SAMPLING SYSTEM

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

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.

E. Programmable Controls to sequence the sampler and the sample collection equipment.

2.3 Material Sampled

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

2.4 Sampler Construction

Standard sampler construction 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 GS sampler is typically mounted onto a screw or drag conveyor bottom carrying the product to be sampled as in Figure 2-1. The sampler axis is typically installed at a 25 degree angle from vertical when mounted to a screw conveyor. When installed on a flat bottom conveyor the sampler will typically be located along the centerline. 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

DANGER

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.

3.4.1 Field Mounting Sampler

The GS sampler is furnished with mounting holes for bolting the sampler to the conveying line.

A. Locate and mark the desired mounting location on the conveying line.

B. Cut and deburr a hole 1/4” larger in diameter than the sample discharge in the conveying line for the sample port.

C. Drill 5/16 diameter holes for the mounting fasteners.

D. Weld the (8) 5/16-18 UNC x 1” long mounting studs in place and grind the welds on the inside of the conveying line smooth.

D. Make sure the 1/16" thick Neoprene gasket is in place inside the sampler mounting adapter.

E. Install the sampler on the mount surface and tighten the mounting fasteners to insure proper sealing between the sampler mounting adapter and the product line.

F. Verify that the slide plate extends and retracts without binding or interference.

3.5 Material Sample Transport Lines

The tubing used to transport material samples must be compatible with the operating environment and the material sampled. Typically a flexible hose is slipped over the discharge tube and held in place by a worm clamp. The hose is then routed to allow material to flow via gravity to a convenient collection point. At that point the hose may be connected to a collection jar bracket or a Sample Collection System cabinet.

If rigid tubing is desired for the sample transport line a short length (5 foot minimum) of flexible hose will still be needed to connect the sample line to the discharge of the sampler that will permit movement of the sample discharge tube. The discharge tube on the sampler is actually part of the moving slide plate.

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. Air leaks can interfere with the pressure or vacuum conveying and sampling system. 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 4.1.6, the 19-position barrier terminal strip on the circuit board 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, 10 Amp Service.
Optional - 220/240 VAC 50/60 Hz, Single Phase, 5 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, 2 Amp Max.
Optional - 220/240 VAC, 50/60 Hz, Single Phase, 1 Amp Max.

3.7.1.2 Solenoid Valve Coil

110/120 VAC, 50/60 Hz, Single Phase, 7 Watts.
Optional - 220/240 VAC, 50/60 Hz, Single Phase, 7 Watts.

3.8 System Piping

NOTE: USE ONLY CLEANED, PICKLED, DESCALED, AND OILED PIPE FOR AIR SUPPLY LINES. DIRT, SCALE, AND DEBRIS USUALLY FOUND IN STANDARD PIPE QUICKLY CLOGS FILTER/REGULATORS, VALVES, ETC. USE ONLY TEFLON TAPE TO SEAL PIPE JOINTS. CAREFULLY APPLY THE TAPE TO PIPE AND FITTINGS SO NO FRAGMENTS ENTER THE SYSTEM.

The pneumatic 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.

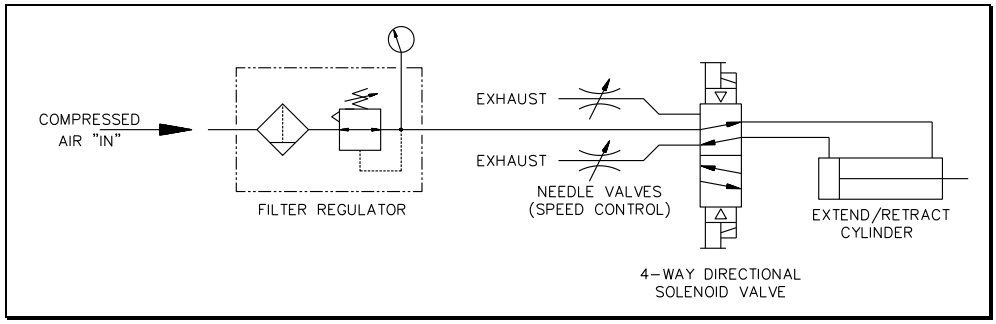

FIGURE 3-1, PNEUMATIC SCHEMATIC

As shown on the certified drawing(s), the solenoid valves and filter/regulator (F/R) were mounted on the sampler at the factory. The user or installer must pipe the compressed air supply to the F/R. Minimum pipe size for the air supply to the filter/regulator is 1/2" NPT, reduced to 3/8" NPT at sampler. Larger piping to the sampler, and/or a surge tank located at the sampler, will be required on installations where the compressed air source is further than 200 feet from the sampler to prevent excessive drop in air pressure.

InterSystems recommends installing a shutoff valve upstream of the filter/regulator. The shutoff valve facilitates maintenance as it allows the sampler's pneumatic system to be maintained and repaired without shutting down other equipment supplied from the same air source.

3.8.1 Compressed Air Consumption

A complete sampling cycle requires that the cylinder extend and retract. To determine the compressed air requirements to operate the sampler, multiply the consumption per cycle (a std. GS sampler requires 0.07 SCF @ 80 PSI) by the number of cycles per minute. The number calculated is the SCFM (Standard Cubic Feet per Minute) of air required. A typical cycle takes between 1-15 seconds, depending on the control settings.

The pneumatic system on the sampler, consisting of the filter/regulator, directional control valve and air cylinder was pre-plumbed and tested at the factory. The regulator is factory set at 80 PSI.

The regulator cannot increase downstream outlet pressure above the upstream inlet pressure. If the pressure from the regulator is not sufficient to operate the cylinder, some means must be found to increase the inlet pressure to the regulator. Recommended air supply pressure is 80-100 PSI.

IV. OPERATIONS AND ADJUSTMENTS

DANGER

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

4.1 Control Components And Their Functions

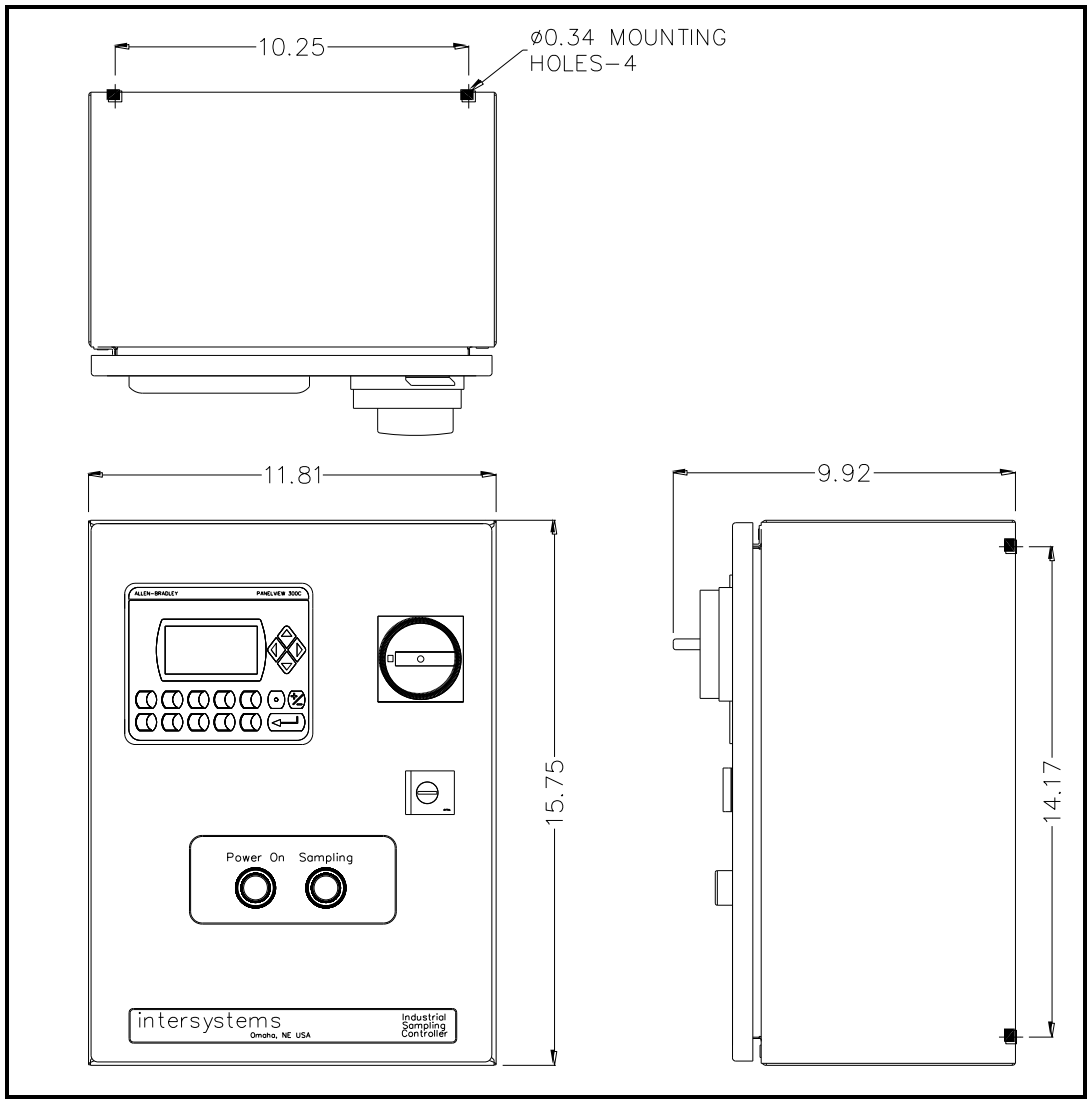

FIGURE 4-1, STANDARD NEMA 4 CONTROL PANEL DETAIL

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

4.1.1 POWER OFF/ON SWITCH (S1)

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

WARNING

THIS MACHINE STARTS WITHOUT WARNING. MOVING PARTS CAN CAUSE SEVERE INJURY. CLEAR AREA PRIOR TO CONTROLLER START-UP.

4.1.2 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.

4.1.3 SAMPLING Pilot Light

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

4.1.4 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 550791A for further information on the sampler control.

4.1.5 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, 1PH operation, use ONLY a BUSS Type FNM 2 Amp, 250 VAC Slo-Blo fuse or equivalent.
For 220//240 VAC, 1PH operation, use ONLY a Buss Type FNM, 1 Amp, 250 VAC Slo-Blo fuse of equivalent.

4.1.6 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).

4.1.7 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).

4.1.8 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).

4.1.9 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.

4.1.10 Manual Sampling

The operator may choose to run the sampler in Manual Mode by selecting manual mode in the Panel-View menu (Refer to manual 550791A). After selecting manual mode, each time F1 is pressed on the PanelView, a manual sample is initiated.

4.1.11 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 550791A). 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 550791A for sampling automatic sampling options.

DANGER

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.

4.2 Pneumatic Components

4.2.1 Solenoid Valve V-1

This valve is a 4-way, 2 position, spring return, single solenoid operated control valve. This valve controls the air cylinder, alternately pressurizing the cap end and rod end of the cylinder to extend and retract the sampler slide plate.

When the valve's solenoid is energized, the internal valve spool shifts, pressurizing the cap end of the cylinder. The cylinder extends, pushing the slide plate thus opening the sampling port. When the solenoid is de-energized, the valve spring forces the valve spool to return to the retracted position, pressurizing the rod end of the cylinder. The cylinder retracts, pulling the slide plate thus closing the sampling port.

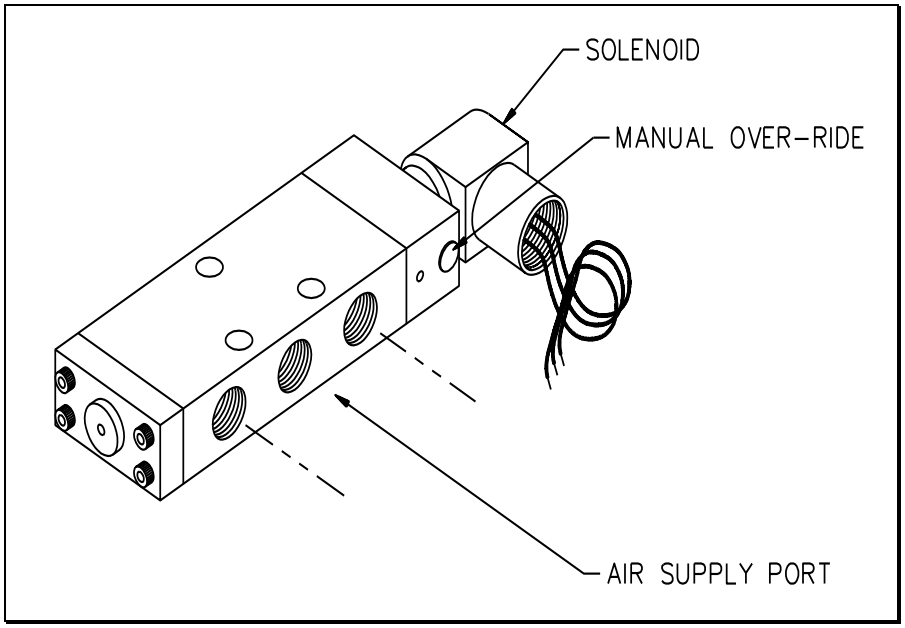

FIGURE 4-3, SOLENOID VALVE

The valve has a manual over-ride button that allows the operator to cycle the sampler air cylinder without the aid of the controller. By pushing the manual over-ride button, the internal valve spool is positioned manually and the sampler air cylinder will extend and remain there until the button is released. When the over-ride button is released the cylinder will return to its home position.

4.2.2 Air Filter/Pressure Regulator

The air filter/regulator assembly provides a clean and regulated air supply to the samplers pneumatic components. A pressure gauge gives the operator an accurate reading of the downstream air pressure. The regulator is equipped with an adjustment knob for controlling the outlet pressure and a manual "pet-cock" type drain for draining the filter bowl.

Prior to introduction of air supply, turn the adjustment knob counter-clockwise until all load is removed from the regulating spring. Turn on system air pressure. Turn adjustment knob clockwise until desired outlet pressure is reached.

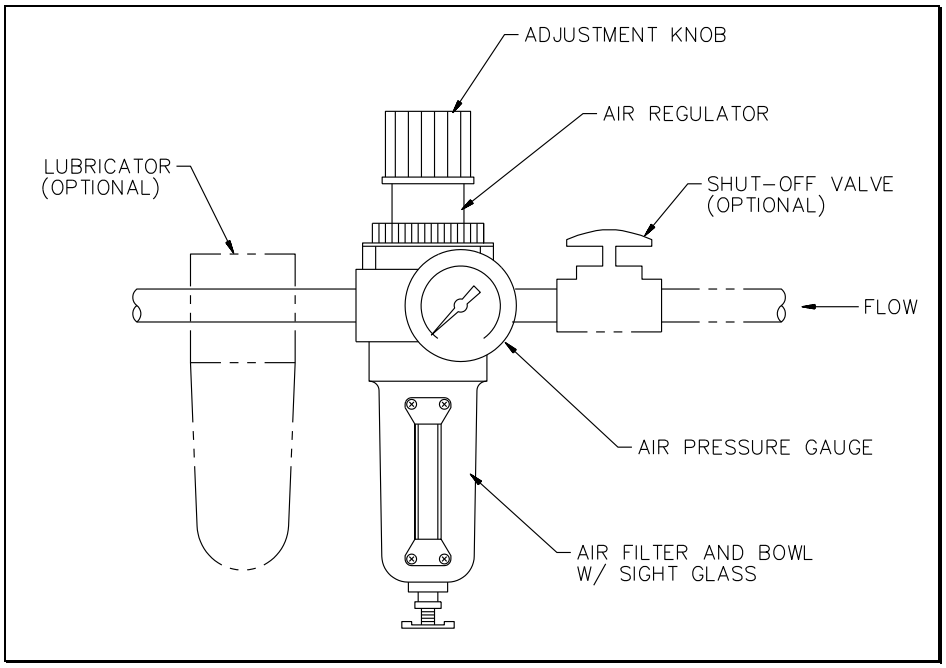

FIGURE 4-4, FILTER/REGULATOR

To avoid minor re-adjustments after making a change in the pressure setting, always approach the desired setting from a lower pressure. When reducing from a higher setting to a lower setting, first reduce to a pressure setting lower than desired and then adjust upward.

To "lock-in" the pressure setting on the regulator, push the lockring on the adjustment knob down until it snaps into place. To release pull the lockring upward. The pressure setting can be made tamper resistant by installing a seal wire in the groove above the lockring.

4.2.3 Pneumatic Cylinder

This double-acting air cylinder extends and retracts the slide plate. Standard sampler stroke length is 3.50". The cylinder rod is connected to the slide plate by means of rod clevis and pin. Solenoid valve V-1 controls extension and retraction of the cylinder.

V. MAINTENANCE AND REPAIR

DANGER

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

5.1 General Maintenance

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

5.2 Periodic Inspection

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

A. Loose or missing hardware

B. Adequate lubricant in lubricator

C. Structural damage

D. Rust or corrosion

E. Damaged wiring, including exposed conductors and connections

F. Damaged airlines or pneumatic components

G. 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 Airline Lubricator

An airline lubricator is not required. The cylinder is of a non-lube design requiring NO lubrication. If the use of a lubricator is desired, it must be field mounted between the Filter/Regulator and the directional control valve. If a lubricator has been added to the system, the user must determine the appropriate lubricant and the proper intervals for refilling the reservoir. Refer to the lubricator manufacturer's technical literature. Note that by introducing oil into the airline, it will be discharged into the surrounding environment near the air exhausts of the directional control valve(s) on the sampler.

5.4 Draining and Servicing the Filter

CAUTION

ESCAPE OF PRESSURIZED AIR, FLUIDS, AND CONTAMINANTS AT HIGH VELOCITY CAN CAUSE INJURY TO UNPROTECTED EYES. ALWAYS WEAR EYE PROTECTION WHEN DRAINING A FILTER.

Drain the accumulated fluid whenever the fluid level in the reservoir (quiet-zone) rises to the lower baffle. Filters have either a screw-type drain or a push-type drain. If the filter requires frequent draining, consider installing an automatic drain or an air drying system. Periodically, the bowl may need to be removed to clean out accumulated moisture and contaminants.

A. Shut off and lock out the air supply.

B. Operate a valve or loosen an airline connection to relieve all pressure downstream from the filter/regulator.

C. Remove and clean the bowl; various types of clamp rings or threaded collars are used to retain bowls.

NOTE: THE BOWLS OF FILTER/REGULATORS CAN NOT BE REMOVED WHILE PRESSURIZED! INTERNAL PRESSURE PREVENTS THE CLAMP RING OR THREADED COLLAR FROM TURNING.

D. Clean or replace the filter element.

E. If the bowl seal is damaged or brittle replace it. In any event lightly coat the seal with petroleum-based grease to help hold it in position.

F. Reinstall the bowl. Turn on pressure and make sure the bowl is seated and sealed.

VI. TROUBLESHOOTING

6.1 General GS Sampler Troubleshooting

DANGER

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

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
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 4.1.5.
	Faulty supply wiring.	Correct. Refer to certified electrical schematic.
	Defective power switch. (S1)	Replace switch.
Sampler does not cycle in either auto or manual modes (Power light On).	Faulty system wiring.	Correct. Refer to certified electrical schematic.
	No or low air pressure.	Turn air supply on and set regulator to 80-100 PSI.
	Defective control valve.	Refer to Section 6.2.
Sampler cycles in manual but not in automatic	Jumper between controller terminals 1 and 2 not installed	Install jumper or switch between controller terminals 1 and 2
Sample size too small or large.	Solenoid time on setting too low or high.	Adjust time setting. Refer to Manual 550791A.
Sampler sluggish (Operates too slowly).	Inadequate air supply.	Increase line size or add surge tank.
	Regulator set too low.	Reset. Refer to Section 4.2.2.
	Filter clogged.	Clean as outlined in Section 5.4.
	Airline from filter regulator blocked or damaged.	Inspect and correct.
	Cylinder seal leakage.	Refer to Section 6.3.

General GS Sampler Troubleshooting (continued)

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Sampler leaks air or material continuously out the sample discharge.	Slide plate not retracting to its home position.	Inspect.
	Sampler installed on a pressurized conveying line.	Remove from pressurized conveying line.
Slide plate does not extend or retract.	No or low air pressure.	Turn air supply on and set regulator to 80-100 PSI.
	Defective control valve.	Refer to Section 6.2.
	Material caked up between the slide plate & bearing plate.	Inspect & clean.
	Defective air cylinder seals.	Inspect & replace. Refer to Section 6.3.1.
	Slide plate bent or jammed.	Inspect & replace. Refer to Section 5.5.3.

NOTE: GS SAMPLERS REQUIRE THE MODE SWITCH TO BE POSITIONED ON SETTING "1" (ONE). REFER TO CONTROLLER MANUAL 550791A.

6.2 Directional Solenoid Valve Troubleshooting

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Valve does not shift but full line voltage signal is present across terminal TB1-8	No or low air pressure.	Turn on air supply and set regulator to 80-100 PSI.
	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.
Valve leaks air continuously out an exhaust port.	Defective valve seals.	Refer to Section 6.3.2.
	Defective cylinder seals.	Refer to Section 6.3.2.

There must be at least 60 PSI pressure at the valve. The valve pilot operators are air assisted. If there is insufficient pressure the valve will not shift or may not shift completely.

Observe the pressure gauge. Assume the gauge indicates sufficient pressure when the sampler is idle, 85 PSI for example. If the pressure drops significantly to perhaps 55 PSI when the valve shifts, a blocked or damaged air line should be suspected.

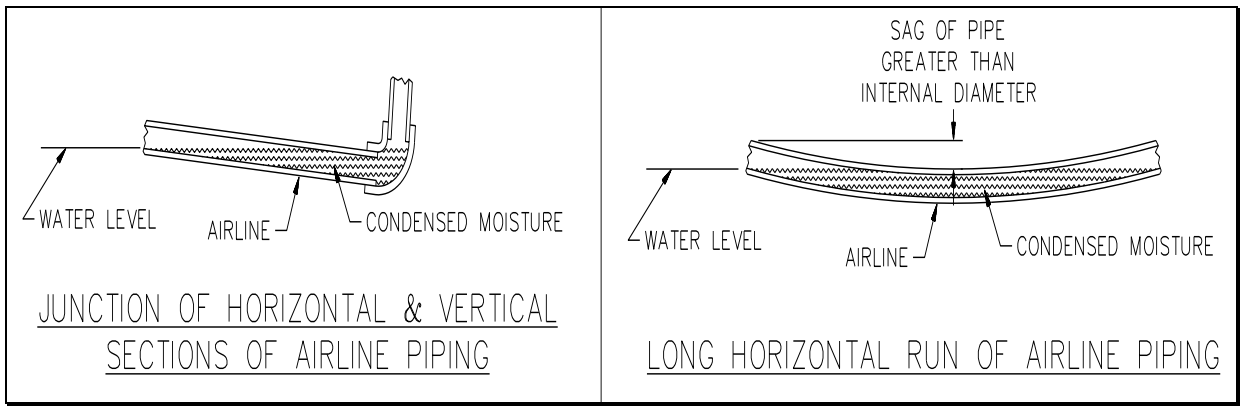

FIGURE 6-1, CONDENSED MOISTURE BLOCKING AIRLINE

One often overlooked cause of insufficient air flow is moisture condensing and collecting in a low spot in the supply line. Figure 6-1 illustrates an exaggerated example of such a problem. It can be seen that if the pipe sags only slightly over a long distance and water collects in the low spot over an extended period of time, the airline could be partially or completely blocked. A similar condition often occurs where there is a junction of horizontal and vertical sections of an air line.

This problem is particularly prevalent when there is high ambient humidity and the equipment operates infrequently and intermittently, as in the case of a sampler.

NOTE: ALL HORIZONTAL RUNS OF AN AIRLINE SHOULD HAVE A MOISTURE TRAP AND THE TRAPS SHOULD BE DRAINED FREQUENTLY; AT LEAST ONCE A DAY; ESPECIALLY, WHEN HUMIDITY LEVELS ARE HIGH.

6.3 Air 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.

2. Soft or gummy seals are evidence of incompatibility with some substance in the air supply. Evaluate the area where the air intake is located. If an airline lubricator is included in the system, check to see if the lubricant being used is compatible with the seal material.

B. Internal Leakage

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

2. Contaminants in the air 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 drained 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.

To determine if the cylinder piston is leaking (cylinder is bypassing), remove the cylinder retract hose from port 4 of the valve. This is the hose from the nose (piston rod) end of the cylinder. Use the valve's manual override to extend the cylinder. When the cylinder is fully extended, if air leaks from the retract port hose, the cylinders is bypassing. The cylinder will need to be repaired or replaced

6.3.2 Valve vs. Cylinder Leak Test

When there is continuous leakage out of a valve exhaust port, proceed as follows to determine if the leak is caused by defective valve seals or by defective cylinder seals.

A. Cylinder retracted as shown in Figure 6-2A

1. If there is continuous leakage out of Port "5", the valve seals are defective and must be replaced.

2. If there is continuous leakage out of Port "3", the problem can be with the valve seals or the cylinder seals. To determine which proceed as follows:
   a. Disconnect the line between Valve Cylinder Port "2" and the cylinder per Figure 6-2B.
   b. If leakage continues out of Port "3" and/or Cylinder Port "2", the valve seals are defective and must be replaced.
   c. If there is a leakage out of the line from the cylinder, the cylinder seals are defective and must be replaced.

B. Cylinder extended as shown in Figure 6-2C.

1. If there is continuous leakage out of Port "3", the valve seals are defective and must be replaced.

2. If there is continuous leakage out of Port "5", the problem can be either the valve seals or the cylinder seals. To determine which proceed as follows:
   a. Disconnect the line between Valve Cylinder Port "4", and the cylinder per Figure 6-2D
   b. If leakage continues out of Port "5" and/or Cylinder Port "4", the valve seals are defective and must be replaced.
   c. If there is a leakage out of the line from the cylinder, the cylinder seals are defective and must be replaced.

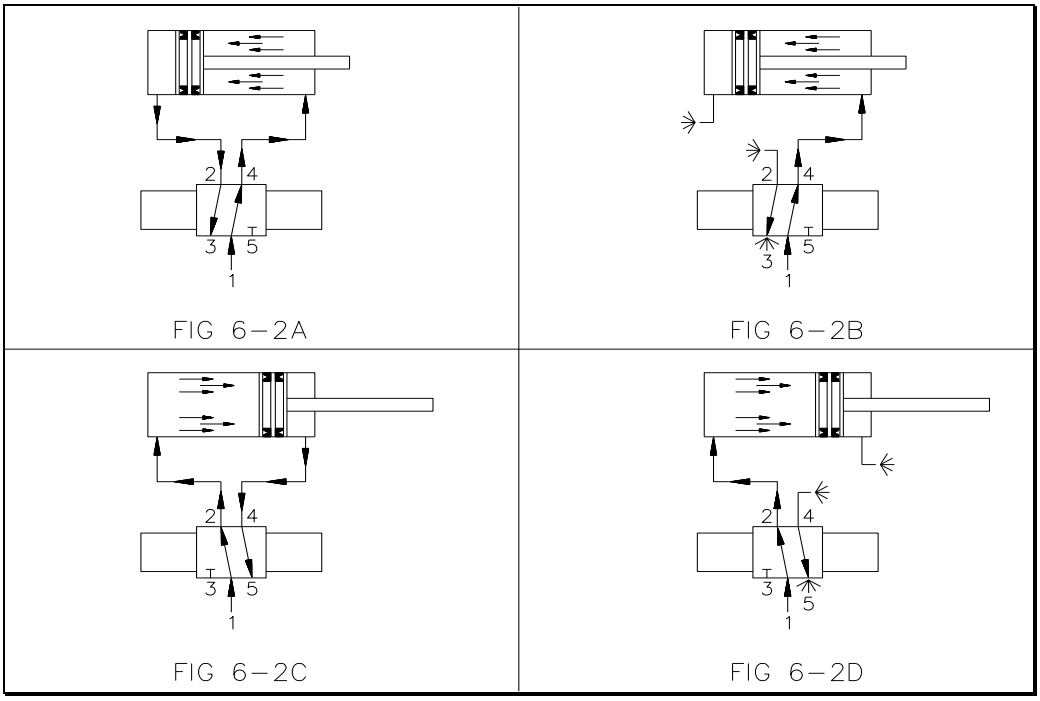

FIGURE 6-2, VALVE VS. CYLINDER LEAK TEST DIAGRAM

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.
9575 N. 109th Ave.
Omaha, NE 68142
Phone: (402) 330-1500
FAX: (402) 330-3350

Please have available the MODEL NUMBER, SERIAL NUMBER and CUSTOMER ORDER NUMBER of the equipment in question as well as the location where the 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
512762	Spool kit for 4-way directional valves (ISI 375 series)
28166	Standard 120 vac valve coil & housing (ISI 375 series)
515835	Optional 240 vac valve coil & housing (ISI 375 series)
519287	Optional 120 vac explosion proof coil & housing (ISI 375 series)
527132	Rod seal kit for 5/8” rod air cylinder (Parker 2MA series)
523997	Piston seal kit for 2" bore air cylinder (Parker 2MA series)
513963	Gauge for filter regulator
524011	Filter element for filter regulator (Norgren B08 series)

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.

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

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