SAFETY

INSTALLATION

OPERATION

MAINTENANCE

M A N U A L

SAMPLER
Model GRES

No. PC 519820C

Revised 2006-08-24

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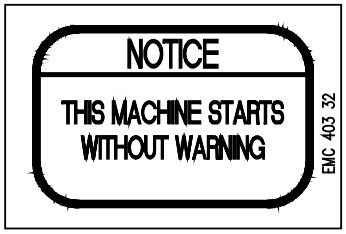
Table of Contents

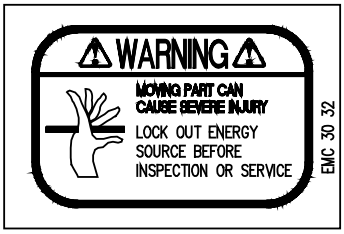
List Of Illustrations & Drawings

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.

DANGER

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

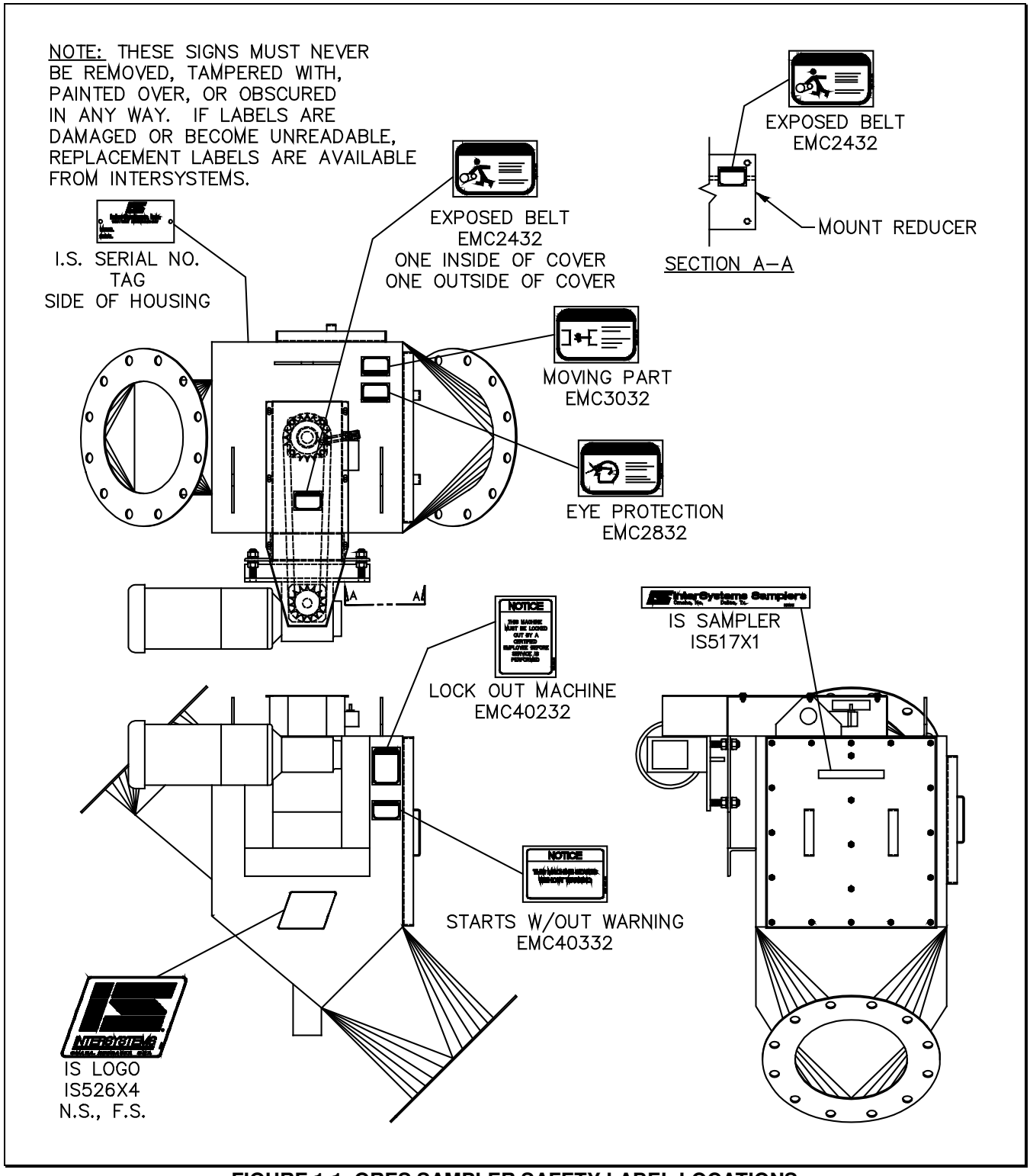


FIGURE 1-1, GRES SAMPLER SAFETY LABEL LOCATIONS

II. GENERAL INFORMATION

2.1 System Description

The GRES Sampler is designed to collect a representative sample of granular, flake, pellet, or other materials in a gravity conveying line. Figure 2-1 illustrates a typical GRES 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 an electric motor pivots the slotted sample cutter through the product flow to collect a sample of the material. The sample flows through the sample cutter and out the discharge as it swings through the material flow. The sample cutter, when at rest, is situated under a dust seal that seals the sample cutter. The sample from the sample cutter falls down and out the 3.00" (76mm) OD discharge tube to the desired sample collection point, at which point an InterSystems SCS Sample Collection System (optional) may be installed.

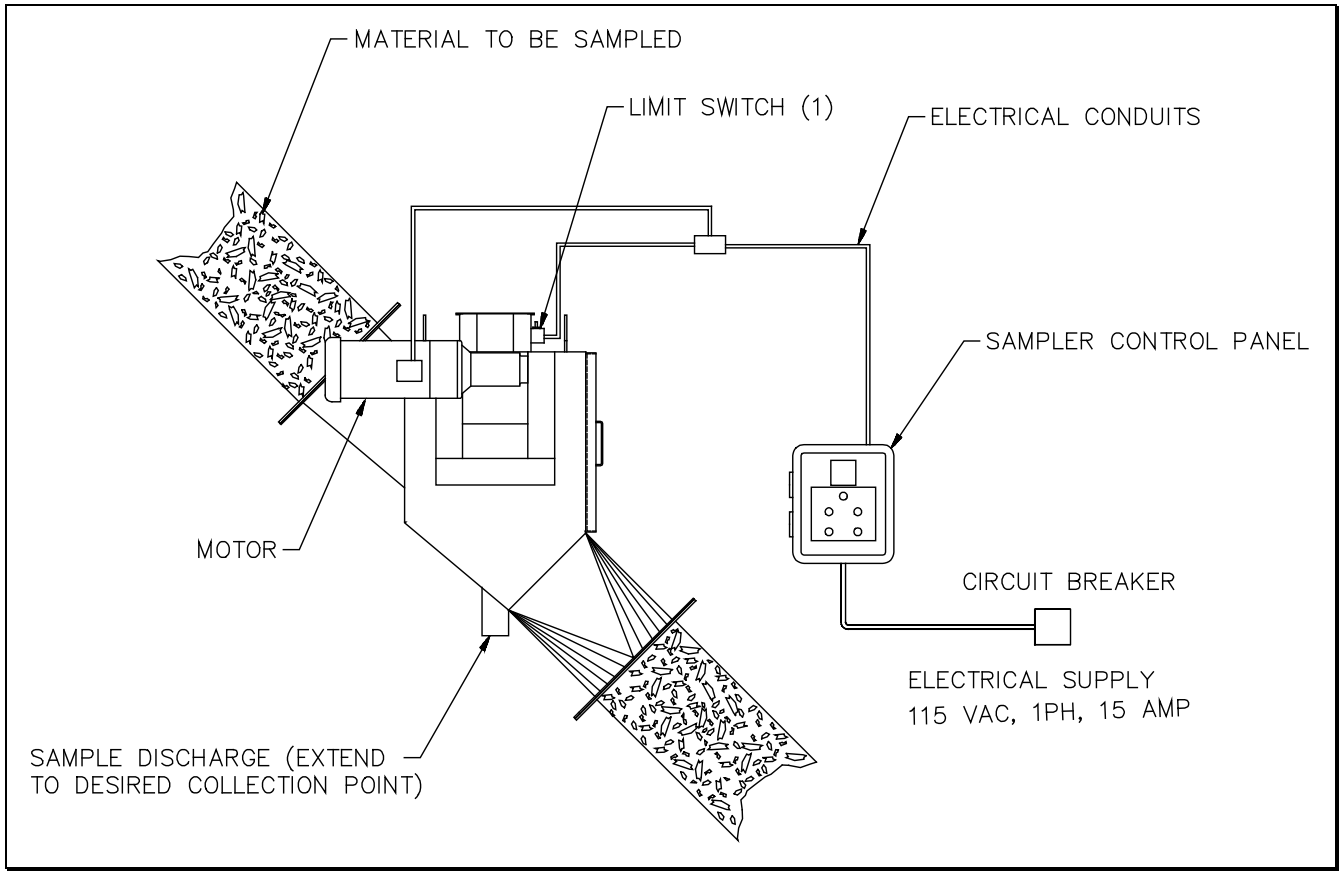


FIGURE 2-1, TYPICAL INSTALLATION, MODEL GRES SAMPLING SYSTEM

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 limit switch 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 motor with the rating of:
   Class 1, Groups 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. Positive mechanical seals for sealing the sample cutter when slight conveying line pressures are present.

D. 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.

F. Abrasion resistant linings of urethane, AR carbon steel plate, 304 stainless steel or ceramic tile.

2.3 Material Sampled

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

2.4 Sampler Construction

Standard sampler construction is of painted carbon steel or 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 GRES sampler is typically mounted onto a sloping, gravity flowing conveying line carrying the product to be sampled as in Figure 2-1. The sampler axis is installed at a 45 degree angle to the axis of the product line. Additionally, the sampler should be located where the product has a non-turbulent flow pattern. 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.

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

B. Cut out the section of conveying line 1/16" to 1/8" longer than the length of the sampler.

C. Slip a companion flange over each end of the conveying line.

D. Locate the sampler in the desired position and adequately brace. Braces are to be permanent.

E. Bolt the companion flanges to the sampler and weld companion flanges to the chute.

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 3.00" ID 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.

Rigid tubing may also be used if desired for the sample transport line.

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 4.1.9.9, the 20-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. (does not include motor power requirements).
Optional - 220/240 VAC, 50/60 Hz, Single Phase, 1 Amp Max. (does not include motor power requirements).

3.7.1.2 Drive Motor

Refer to the certified drawing(s) of the GRES sampler for motor size, horsepower, voltage, and current rating.

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

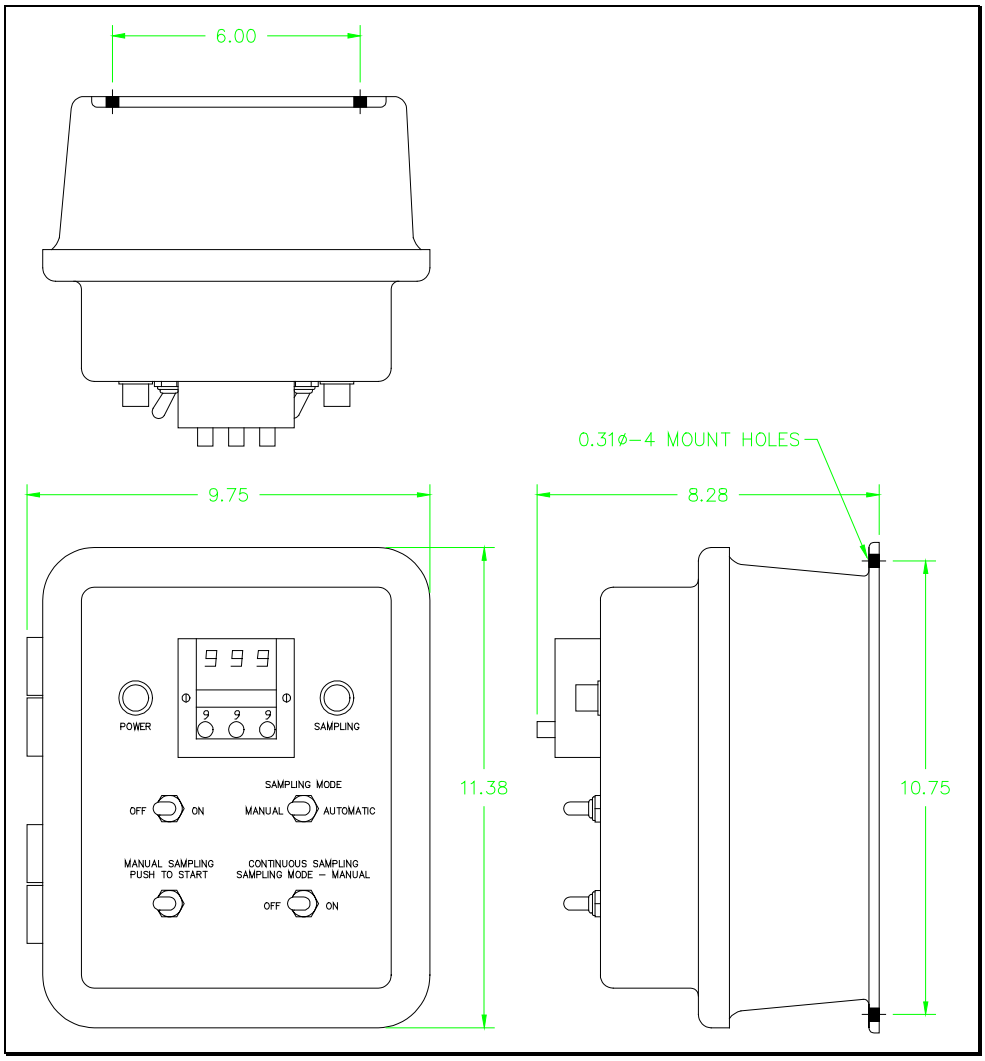


FIGURE 4-1, STANDARD NEMA 4 CONTROL PANEL DETAIL

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

4.1.1 POWER OFF/ON Switch S-2

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

WARNING

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

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 CONTINUOUS SAMPLING Switch S-5

This switch functions ONLY when the AUTO/MANUAL switch has been set to the Manual Mode position. Setting the Continuous Sampling switch S-5 to the ON position causes the sample cutter to rotate as long as the switch is left in the ON position. When the switch is set to OFF the sample cutter will return to its home position and end the sampling cycle.

4.1.5 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.

4.1.6 SAMPLING Pilot Light

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

4.1.7 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 cutter rotates to collect a 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.

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.

4.1.8 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 cutter rotates to collect a 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.

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.

4.1.9 Printed Circuit Board

The circuit board mounted inside the controller enclosure controls the motor and serves as the connection point for all sampling system circuitry. Figure 4-2 illustrates a typical board. Depending upon the options selected there may be minor differences. The following paragraphs describe the major components of the printed circuit board, their functions, and adjustments.

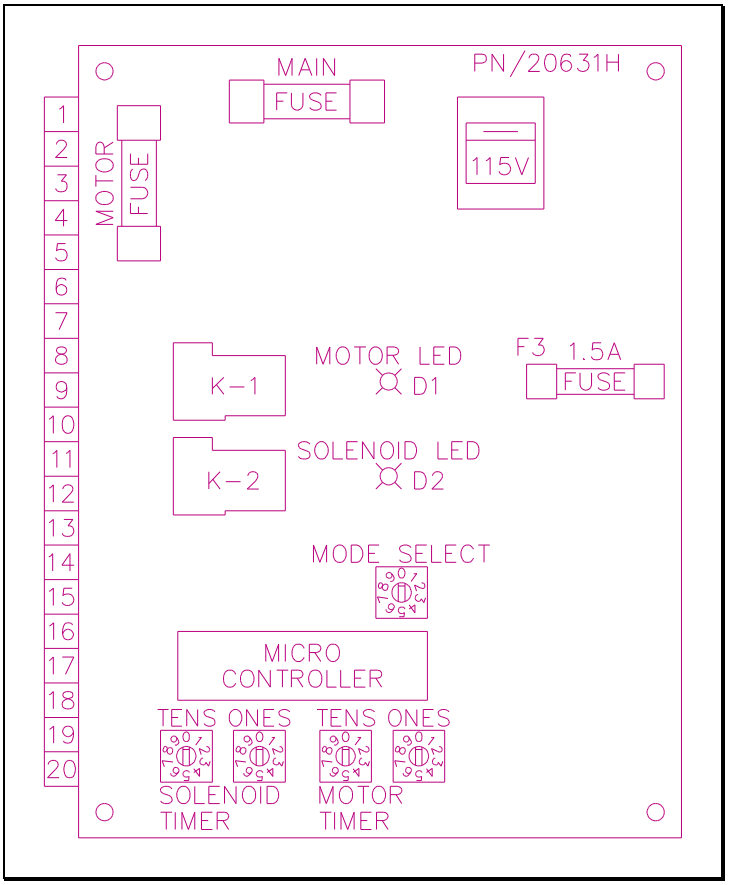


FIGURE 4-2, PRINTED CIRCUIT BOARD

4.1.9.1 Main Fuse

This fuse, located along the top center of the board, 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 Volt Slo-Blo fuse or equal.
For 220/240 VAC, 1PH operation use ONLY a Buss Type FNM, 1 Amp, 250 Volt Slo-Blo fuse or equal.

4.1.9.2 Motor Fuse Holder

The fuse holder, located at the top left corner of the board, does not require a fuse to be installed for the GRES sampler.

4.1.9.3 PC Board Fuse F3

This fuse, located to the right on the middle of the board, protects the printed circuit board against overloads and short circuits. Use ONLY a Buss Type AGC, 1-1/2 Amp, 250 Volt fast acting fuse or equal.

4.1.9.4 Motor Timer Switches (Tens & Ones)

These rotary switches can be adjusted to vary the length of time the motor is energized and rotating the sample cutter during each sampling cycle to a collected sample.

NOTE: THE MOTOR TIME IS ADJUSTED SO THAT THE SAMPLE CUTTER MAKES ONE REVOLUTION. WHEN THIS TIMER TIMES OUT THE MOTOR WILL STAY ENERGIZED VIA THE FIELD WIRING THRU THE LIMIT SWITCH. WHEN THE LIMIT SWITCH IS ACTIVATED POWER TO THE MOTOR WILL CEASE AND THE SAMPLE CUTTER WILL STOP. IF ADDITIONAL REVOLUTIONS ARE DESIRED: INCREASE THE TIME SETTING.

Utilizing a small screw driver turn the slotted rotor of the tens and/or ones switches to desired length of time the motor is energized during a cycle. The time period can be adjusted from 1 to 99 seconds. The timer is factory set at 1 second.

The ones switch is in increments of one second and the tens switch is in increments of ten seconds. As an example, to set the motor timer to 2 seconds, turn the tens rotor to setting 0 and turn the ones setting to 2.

4.1.9.5 Solenoid Timer Switches (Tens & Ones)

These rotary switches serve no function on the GRES sampler.

4.1.9.6 Motor LED Indicator

This LED (D1) is illuminated when power is present to K-1 relay coil on the PC board. It is a visual signal showing when the motor should be running.

4.1.9.7 Solenoid LED Indicator

This LED (D2) serves no function on the GRES sampler.

4.1.9.8 Mode Select Switch

The switch, located at the lower center of the circuit board, determines the sequencing of certain internal controller events.

As this board is used in controllers for several different samplers, MODE switch settings allow the board's functions to be tailored to the requirements of the various samplers.

NOTE: GRES SAMPLERS REQUIRE THE MODE SWITCH TO BE POSITIONED ON SETTING "2" (TWO). IF THE MODE SETTING IS NOT CORRECTLY SET, TURN POWER OFF TO THE CONTROL PRIOR TO RE-SELECTING. THE PC BOARD WILL ONLY CHANGE MODES WHEN POWER IS INITIALLY APPLIED.

4.1.9.9 Terminal Strip

This 20-position barrier terminal strip is located along the left edge of the circuit board. It serves as the controller's interface and connection point for all external circuits and for the components mounted on the enclosure's front panel. Refer to the certified electrical drawing(s).

4.1.9.10 115V/230V Switch

This switch is factory set to allow a common PC board to be operated on either 115 vac, 50/60 hz or 230 vac, 50/60 hz. The printed circuit board operating voltage can only be switched after all electrical components connected to it are changed. To field convert the control and sampler operating voltage, determine what components will need to be replaced. Typically this includes, but is not limited to: the digital display timer, power lamp & socket, fuse(s), solenoid coil(s), and possibly the motor. Refer to the name plate and wiring diagram on the motor to determine if the motor is rated for the desired voltage. If it is, change the wiring connections in the motor junction box for operation on the new voltage.

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 Sampler Mounted Electrical Components

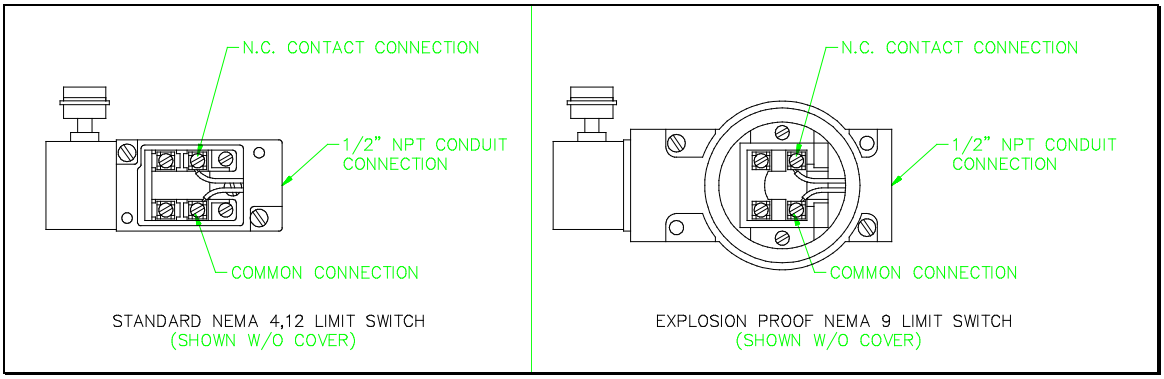


FIGURE 4-3, LIMIT SWITCH CONNECTIONS

4.2.1 Limit Switch LS-1

This switch is actuated when the sample cutter is in its home position. Upon initiation of a sample cycle the sample cutter rotates the cam tripping the limit switch. The normally closed contacts on the limit switch close and power is supplied directly to the drive motor starter. When the limit switch is actuated the opening of the normally closed contacts removes power to the drive motor starter thus stopping the sample cutter rotation.

Correct wiring termination is essential to proper sampler operation. Refer to figure 4-3, it shows the limit switch utilized on the GRES sampler and the physical orientation of the proper wiring connections.

4.2.2 Drive Motor

This motor drives the sample cutter rotation through a right angle gear reducer and a set of sprockets and chain. A label is located on the motor designating the correct direction of rotation (reference Figure 1-1). Verify that the motor is turning the proper direction of rotation when wiring the system. On initial setup, jog the motor to insure proper rotation.

NOTE: DO NOT RUN THE MOTOR THE WRONG DIRECTION. DAMAGE TO THE LIMIT SWITCH ARM AND/OR INADEQUATE SAMPLE CUTTER SEALING MAY RESULT.

4.2.3 NEMA 4 C-Face Magnetic Brake

The magnetic brake is mounted between the gear reducer and the drive motor. The brake ensures accurate stopping of the sample cutter under the dust seal and prevents it from rotating in installations that are subject to high vibration. It is spring engaged when at rest and releases when power is applied. The brake is wired in parallel with the drive motor wiring. Refer to certified electrical schematic for proper wiring.

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. Noisy motor or motor/reducer bearings

C. Overheated motor or reducer

D. Adequate lubricant in gear reducer

E. Loose drive chain

F. Structural damage

G. Rust or corrosion

H. Damaged wiring, including exposed conductors and connections

I. 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 Drive Chain, Sprockets & Flange Bearing

The drive chain, sprockets & flange bearing have been greased at the factory. The chain should be thoroughly cleaned and re-greased once a year using a multi-purpose grease. The flange bearing should also be greased at the same time.

5.3.2 Gear Reducer

The gear reducer is shipped filled with oil. Check the oil level every six months and add oil if required. Under normal sampler operating conditions the oil should be changed once every two years.

Use a gear lubricant with an AGMA #8 rating for normal operating conditions. Use a synthetic gear lubricant such as "Mobil SHC 634" for extreme operating conditions.

5.4 Mechanical Repair Procedures

5.4.1 Drive Chain Adjustment

The drive chain will need adjustment periodically to maintain proper tension. The gear reducer is mounted to the sampler by means of an adjustment plate. Loosen, adjust and re-tighten the mounting nuts to increase or decrease chain tension. The chain only needs to be tight enough to prevent any sag or slack. At each corner of the adjustment plate, measure the distance between the adjustment plate and the mounting angles on the sampler. All four measurements must be within 0.06" of each other for proper alignment.

5.4.2 Limit Switch Adjustment

Loosen and adjust the limit switch arm if required. The limit switch trips on a tripper attached to the shaft of the sample pelican and signals the control to remove power from the motor. It should trip as the sample cutter moves under the dust seal. The magnetic brake on the motor will prevent any coasting.

5.4.3 Sample Cutter Blade Replacement

When following the instructions below, refer to the certified drawing(s) of the sampler.

A. Shutoff and lockout all power (electrical and pneumatic).

B. Shut down conveying line and remove the large inspection cover on the sampler housing.

C. Move the sample pelican to the middle of its travel.

D. Remove the 1/4-20UNC hex head bolts fastening the sample cutter to the sample pelican.

E. Using a utility knife, cut the caulking seal around the bottom of the cutter blade and remove.

F. Install the new cutter blade on the sample pelican.

G. Re-install the 1/4-20UNC hex head bolts fastening the sample cutter to the sample pelican.

H. Re-caulk the joint between the cutter blade and the sample pelican to ensure a tight seal.

I. Move the sample pelican to its home position on each side and check to see that the cutter fits snugly under the pelican seal.

J. Re-install the inspection cover on the housing.

K. Restore power to the sampler and operate it through several collection cycles.

5.4.4 Sample Cutter Seal Replacement

When following the instructions below, refer to the certified drawing of the sampler.

A. Shutoff and lockout all power (electrical and pneumatic).

B. Shut down conveying line and remove the large inspection cover on the sampler housing.

C. Move the sample pelican to the middle of its travel.

D. Remove the 5/16-18UNC hex head nuts fastening the sample cutter seal bracket the sampler housing (avoid dropping the assembly inside the sampler).

E. Wrap the new seals around the seal bracket and re-install.

F. Move the sample pelican to its home position and check to see that the cutter fits snugly under the pelican seal.

G. Re-install the inspection cover on the housing.

H. Restore power to the sampler and operate it through several collection cycles.

VI. TROUBLESHOOTING

6.1 General GRES 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 4.1.9.1.
	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.
	PC board fuse blown.	Replace. Refer to Section 4.1.9.3.
	Motor power off.	Turn on.
	Motor starter heaters tripped.	Reset.
	Motor burnt out.	Replace.
Sampler timer T-1 digital display does not illuminate but sampler works in manual mode.	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.	Sample cutter opening too small or large.	Replace. Refer to Section 5.4.3.
	Sample interval timer or counter set too high or low.	Adjust sample interval timer T-1 or counter C-1. Refer to Section 4.1.7 or 4.1.8.

General GRES Sampler Troubleshooting (continued)

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Sampler cycles continuously.	Limit switch not activating.	Adjust limit switch. Refer to Section 5.5.
	Motor brake not wired properly.	Correct. Refer to certified electrical schematic.
Sampler leaks air or material continuously out the sample discharge.	Sample cutter seals torn or missing.	Replace. Refer to Section 5.4.4.
	Sample cutter not stopping under dust seal.	Adjust limit switch. Refer to Section 5.4.2.
	Sampler installed on a positive pressure line.	Remove pressure by venting sampler or consult InterSystems.
	Sample cutter worn.	Replace. Refer to Section 5.4.3.

6.2 PC Board Troubleshooting

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Sampler digital display timer T-1 does not illuminate when in auto mode.	No wire connecting PC board terminals #1 to #3.	Correct. Refer to the certified electrical schematic.
	Defective PC board.	Replace.
Motor time cannot be adjusted.	Defective PC board.	Replace.
Motor LED illuminates but no full line voltage signal at terminal #10.	No wire connecting PC board terminals #1 to #3.	Correct. Refer to the certified electrical schematic.
	Defective PC board.	Replace. Refer to Section 6.2.
	Improper ground wiring.	Correct. See note below.

NOTE: GRES SAMPLERS REQUIRE THE MODE SWITCH TO BE POSITIONED ON SETTING "2" (TWO). IF THE MODE SETTING IS NOT CORRECTLY SET, TURN POWER OFF TO THE CONTROL PRIOR TO RE-SELECTING. THE PC BOARD WILL ONLY CHANGE MODES WHEN POWER IS INITIALLY APPLIED.

NOTE: SAMPLER MAY FAIL TO OPERATE OR OPERATE IMPROPERLY IF THE DC GROUND TRACE ON THE PC BOARD IS NOT ISOLATED FROM THE AC GROUND OR NEUTRAL WIRING. REFER TO THE CERTIFIED ELECTRICAL DRAWING(S) FOR AC GROUND CONNECTIONS.

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
34769	Standard SAE 80W-90 EP Gear Lubricant Oil Quart (Pennzoil 4096)
529601	Optional Synthetic Gear Lubricant Oil Quart (Mobil SHC634)
35527	Limit Switch Contact Block 1 N.O. 1 N.C.

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.