SAFETY

INSTALLATION

OPERATION

MAINTENANCE

M A N U A L

SAMPLER
Model BCE & BD

No. PC 543919A

Revised 2012-12-31

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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.

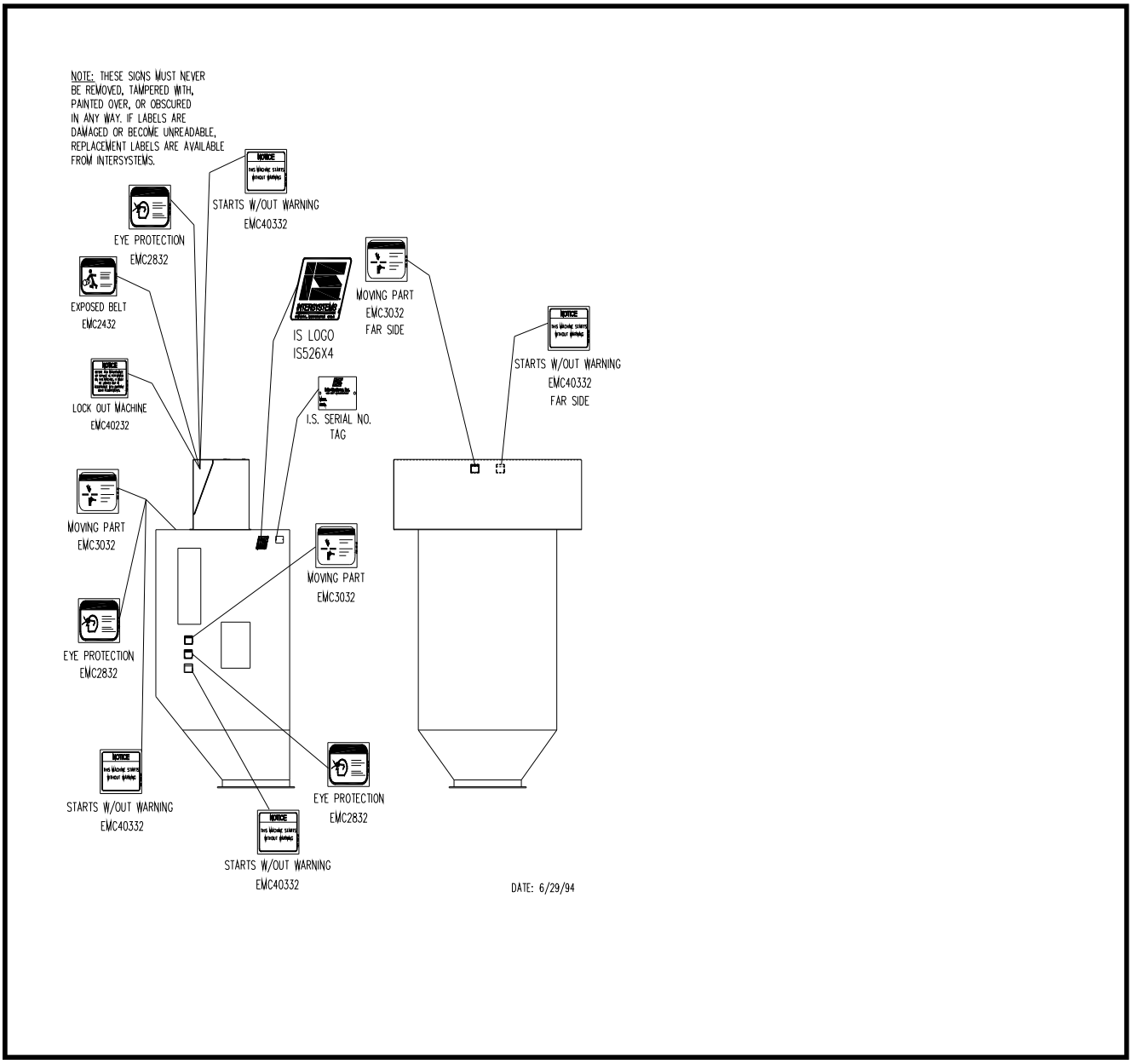
Consult InterSystems, Inc. before making any changes to the sampler or its operating environment. Careless changes could result in death or serious injury to people, and reduce the performance and service life of the equipment.

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.

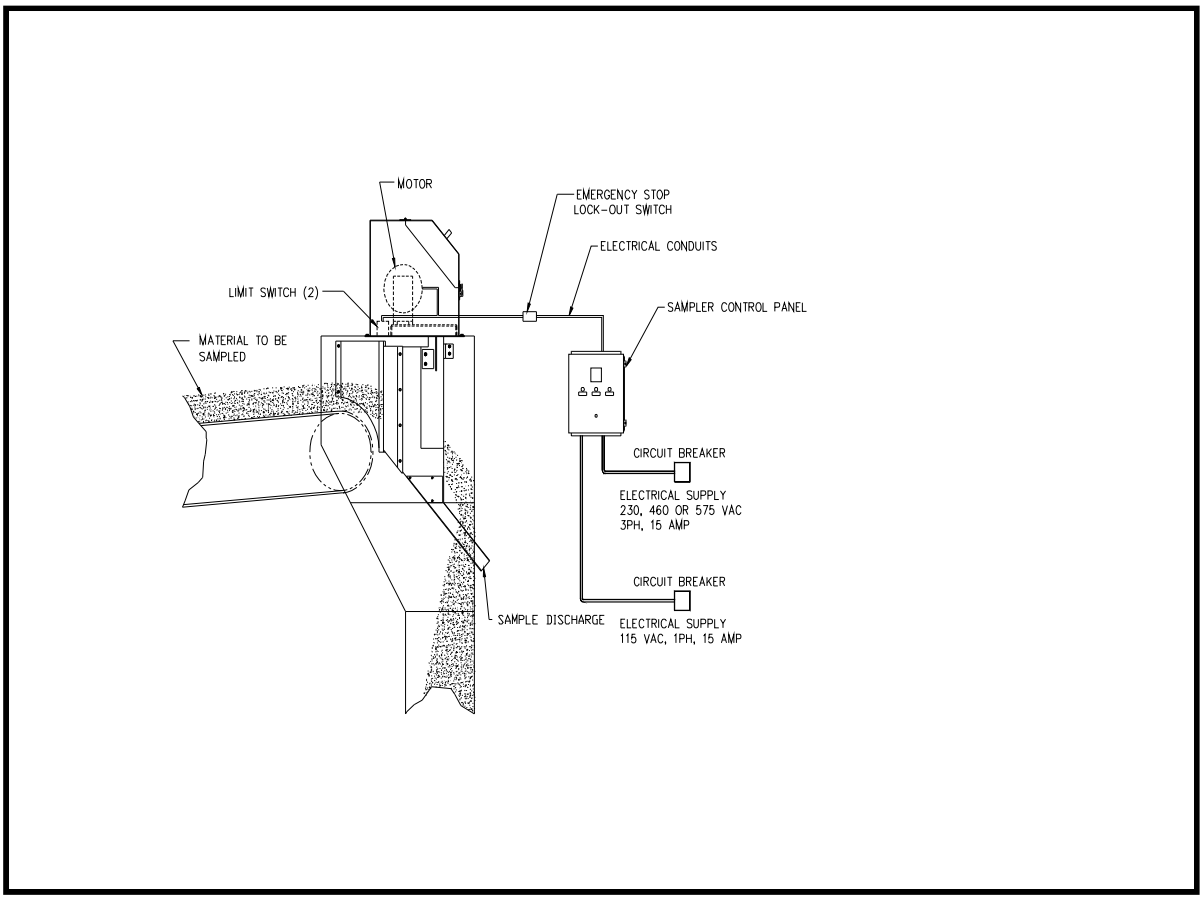

NOTE: THESE SIGNS MUST NEVER BE REMOVED, TAMPERED WITH, PAINTED OVER, OR OBSCURED IN ANY WAY. IF LABELS ARE DAMAGED OR BECOME UNREADABLE, REPLACEMENT LABELS ARE AVAILABLE FROM INTERSYSTEMS.
STARTS W/OUT WARNING EMC40332
EYE PROTECTION EMC2832
EXPOSED BELT EMC2432
IS LOGO IS526X4
MOVING PART EMC3032 FAR SIDE
STARTS W/OUT WARNING EMC40332 FAR SIDE
LOCK OUT MACHINE EMC40232
I.S. SERIAL NO. TAG
MOVING PART EMC3032
MOVING PART EMC3032
EYE PROTECTION EMC2832
STARTS W/OUT WARNING EMC40332
EYE PROTECTION EMC2832
STARTS W/OUT WARNING EMC40332
DATE: 6/29/94

II. GENERAL INFORMATION

2.1 System Description

The BCE & BD Sampler is designed to collect a representative sample of granular, pellet, or other materials from the end of a belt conveyor. Figure 2-1 illustrates a typical BCE Sampler application. BCE & BD sampler installations are designed per 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 drives the slotted sample cutter through the product flow to collect a sample of the material. The sample is discharged via gravity to a sample collection point.



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. An 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 stainless steel or nedox coatings.

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

E. 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, pellets.

2.4 Sampler Construction

Standard sampler construction is of painted carbon steel.

Explosion-proof limit switches with the rating of:
Class 1, Groups C & D, Division 1 & 2
Class 2, Groups E, F & G, Division 1 & 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

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 Belt End sampler is typically mounted on the end of a belt conveyor carrying the product to be sampled as in Figure 2-1. Install the sampler as it is shown and noted on the certified drawings. The sampler may or may not be supplied with a partial or a whole conveyor discharge hood. Provide necessary access and maintenance platforms for ease of 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.

The sampler needs to be installed, as shown and noted on the certified drawings.

A. Locate and mark the desired mounting location of the sampler.

B. Position the sampler. Weld and/or fasten in place.

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 OD flexible tubing is directly connected to the sample outlet and routed directly to the sample collection container.

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.

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

Refer to the certified electrical drawing(s) to determine if other voltages or a larger service is required.

3.7.1.1 Controller

110/120 VAC, 50/60 Hz, Single Phase, 10 Amp Max. (does not include motor power requirements).
Optional - 220/240 VAC, 50/60 Hz, Single Phase, 5 Amp Max. (does not include motor power requirements).

3.7.1.2 Drive Motor

Refer to the certified drawing(s) of the BCE & BD 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

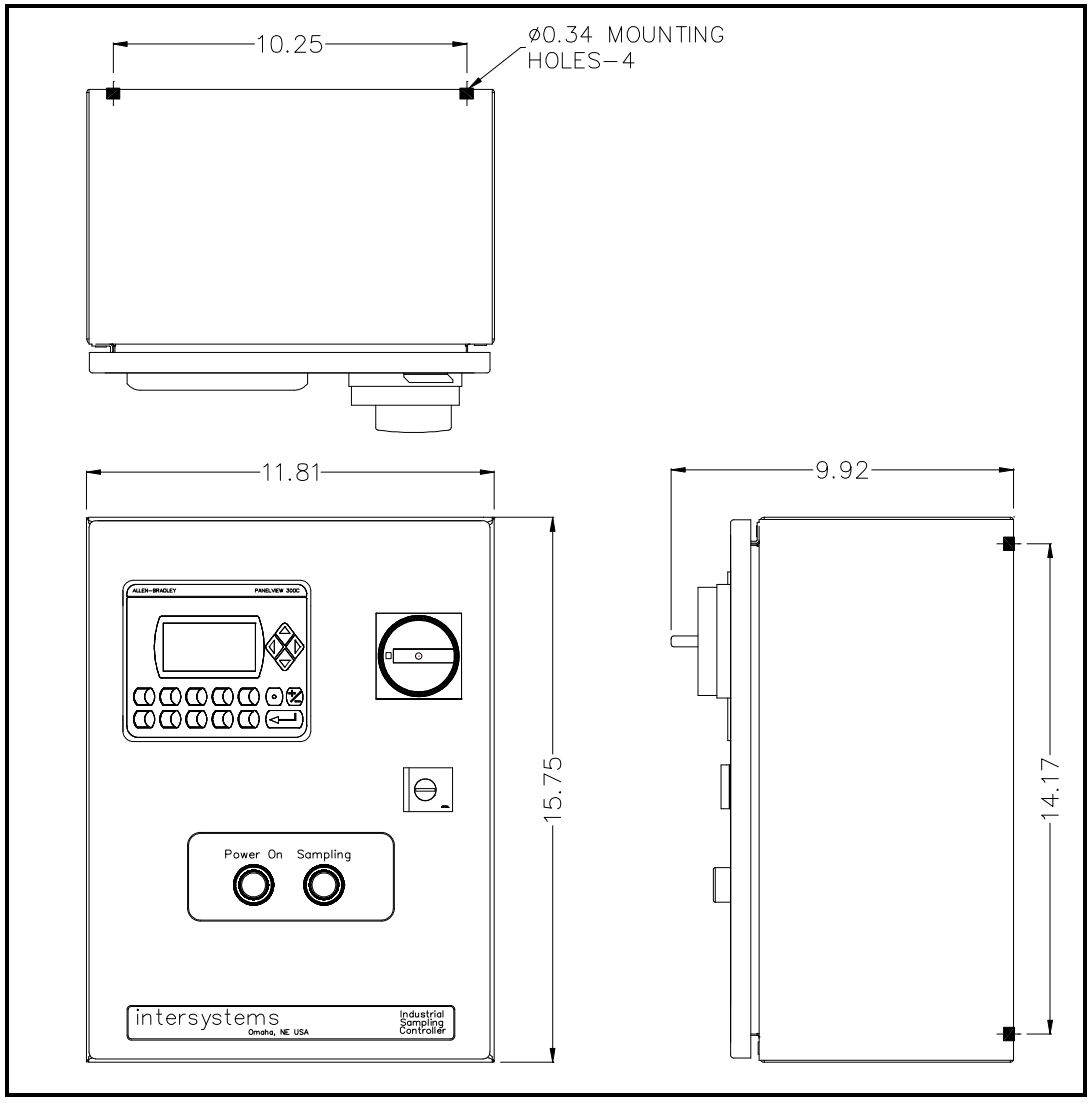


FIGURE 4-1, STANDARD NEMA 4 CONTROL PANEL DETAIL

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

4.1.1 POWER OFF/ON SWITCH (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.

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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

4.2.1 Limit Switches, LS-1 & LS-2

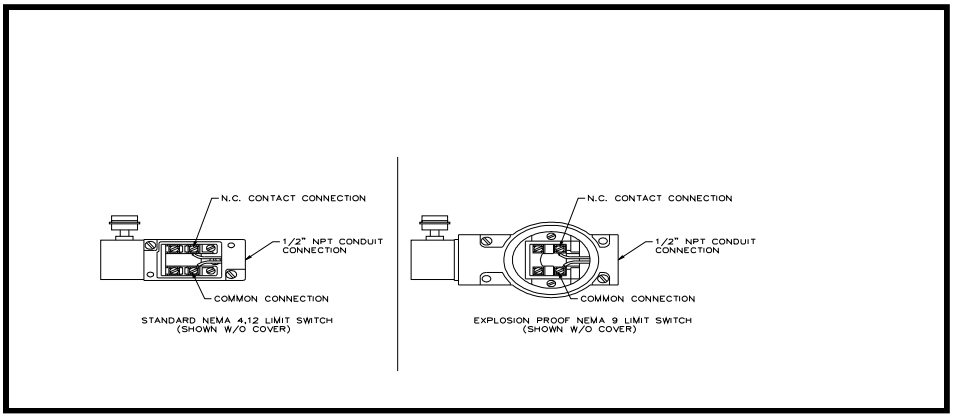

FIGURE 4-2, LIMIT SWITCH CONNECTIONS

One of these switches is actuated when the sample cutter is in a rest position. Upon initiation of a sample cycle the power is routed through the normally closed contacts of the opposite limit sample to the drive motor starter. The drive motor starts and the sample cutter traverses through the material flow towards the other side. Upon reaching the opposite side the limit switch is tripped. The opening of the normally closed contacts removes power to the drive motor starter thus stopping the sample cutter rotation. The sample cutter remains on this side until another signal to sample is given by the controller.

Correct wiring termination is essential to proper sampler operation. Refer to figure 4-2, it shows the limit switch utilized on the Exporter sampler and the physical orientation of the proper wiring connections.

4.2.2 Drive Motor

This motor drives the sample cutter through a right angle gear reducer and a set of sprockets and chain. 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.

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 and conduit, 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 & Idler Shaft

The drive chain, sprockets & idler shaft have been greased at the factory. The chain should be thoroughly cleaned and re-greased once a year using a multi-purpose grease. The idler shaft 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 chain is attached to the sample pelican drive nose by means of two eye bolts. Loosen, adjust and re-tighten the eye bolt nuts to increase or decrease chain tension. The chain only needs to be tight enough to prevent any sag or slack. As the chain wears it will stretch to a point where the adjustment of the eye bolts will no longer permit further tightening. Replace the chain. Inspect the sprockets and replace them if they show signs of wear.

5.4.2 Limit Switch Adjustment

Loosen and adjust the limit switch arm if required. The limit switches trip on the drive nose of the sampler and signal the control to remove power from the motor. They should trip before the sample pelican completes its traverse. When a limit switch trips the sample pelican should gently coast to a stop under the dust seal and up against the bumper.

5.4.3 Sample Cutter Blade Replacement

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

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

B. Shut down and lock out the conveying line.

C. Open the seal door near the sample cutter.

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. Close, re-install the inspection cover on the housing.

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

5.4.4 Sample Cutter Seals Replacement

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

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

B. Shut down and lock out the conveying line.

C. Open the seal doors on the side of the housing.

D. Remove the 5/16-18UNC wing nuts fastening the sample cutter seal brackets to the baffle. Avoid dropping the assemblies inside the sampler.

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

F. Check to see that the cutter fits snugly under the pelican seals.

G. Close the seal doors.

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

5.4.5 Drive Clutch Adjustment (if used)

The drive clutch may need adjustment if it starts to slip. When following the instructions below, refer to the clutch drawing page 16.

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

B. Shut down and lockout the conveying line.

C. Open the drive cover access panel.

D. Fully loosen the three (3) tension screws (items 10F).

E. Loosen the adjusting nut set screw (item 10E) at least nine turns.

F. Turn the adjusting nut (item 10D) clockwise to finger tightness. Tighten an additional 1/2 to 3/4 turn.

G. Turn the adjusting nut to position the adjusting nut set screw (item 10E) in the nearest spline on the clutch hub (item 10A) and tighten the set screw. Do not tighten the set screw on the threads of the hub.

H. Tighten the three (3) tension screws (items 10F) and close the drive cover access panel.

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

5.4.6 Drive Clutch, Facings, Bushing & Sprocket Replacement (if used)

The drive clutch may need to be replaced if adjustment fails to prevent slippage. When following the instructions below, refer to the clutch detail figure 5-1 on page 16.

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

B. Shut down and lockout the conveying line.

C. Open the drive cover access panel.

D. Fully loosen the three (3) tension screws (items 10F).

E. Loosen the adjusting nut set screw (item 10E) at least nine turns.

F. Remove the adjusting nut (item 10D), splined plate (item 10B), friction facing (item 10C), sprocket (item 12) & bushing (item 11).

G. Re-assemble the clutch using the new facings (items 10C), sprocket (item 12) & bushing (item 11).

H. Turn the adjusting nut (item 10D) clockwise to finger tightness. Tighten an additional 1/2 to 3/4 turn.

I. Turn the adjusting nut to position the adjusting nut set screw (item 10E) in the nearest spline on the clutch hub (item 10A) and tighten the set screw. Do not tighten the set screw on the threads of the hub.

J. Tighten the three (3) tension screws (items 10F) and close the drive cover access panel.

K. Close the drive cover access panel.

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

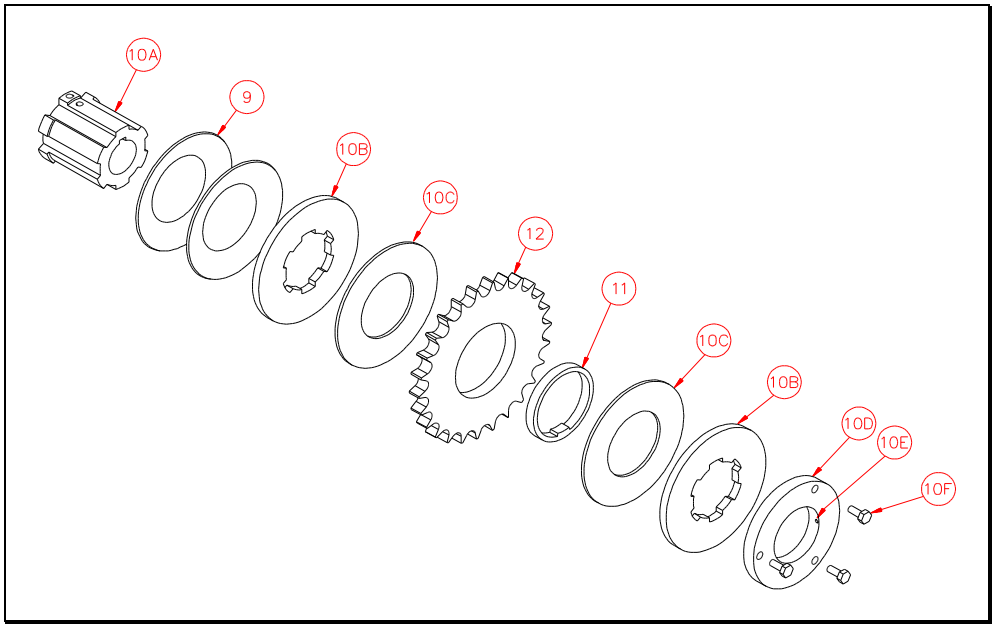

FIGURE 5-1, DRIVE CLUTCH DETAIL

VI. TROUBLESHOOTING

6.1 General BCE & BD 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 (Power light Off).	Power switch OFF.	Turn power switch ON.
	Circuit breaker is open.	Reset breaker.
	Main fuse is blown.	Replace.
	Faulty supply wiring.	Correct. Refer to certified electrical schematic.
	Defective power switch.	Replace switch.
Sampler does not cycle (Power light On).	Faulty system wiring.	Correct. Refer to certified electrical schematic.
	Motor power off.	Turn on.
	Motor starter heaters tripped.	Reset.
	Motor burnt out.	Replace.
	Motor thermal overload tripped.	Allow motor to cool & reset.
Sampler leaks air or material continuously out the sample discharge.	Sample cutter not stopping under the seals.	Adjust limit switch. Refer to Section 5.4.2.
	Sampler installed in a pressurized conveying line.	Eliminate pressure or relocate sampler.
	Sample cutter worn.	Inspect & replace. Refer to Section 5.4.3.
	Sample cutter seals deteriorated.	Inspect & replace. Refer to Section 5.4.4.
Sampler makes loud banging noises.	Limit switches not set properly.	Adjust limit switch. Refer to Section 5.4.2.

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
34769	Standard SAE 80W-90 EP Gear Lubricant Oil Quart (Pennzoil 4096)
529601	Optional Synthetic Gear Lubricant Oil Quart (Mobil SHC634)
35342	#50 Friction Facing (item #10C on figure 5-1) (Optional)
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.