Micro Ingredient Systems

Model: MS1 and MS2

Installation and Operation Manual

PNEG-2131

Version: 1.0

Date: 01-06-17

PNEG-2131

Micro Ingredient Systems Model:

- Weight Gain Micro Ingredient Weighing Systems (MS1)
- Weight Loss Micro Ingredient Weighing Systems (MS2)
- Micro Ingredient Motor Control Systems

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

Contents

This manual covers the installation and operation for the Micro Ingredient control systems. This manual provides guidelines for installing the product. You must retain a qualified contractor to provide on-site expertise. INTERSYSTEMS IS NOT RESPONSIBLE FOR THE INSTALLATION OF THIS PRODUCT.

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

General Safety Statements

1. The Micro Ingredient control systems is designed and manufactured with operator safety in mind. However, residual hazards remain due to the nature of material handling, and specific material hazards. Use extreme caution at all times.
2. Modifications to equipment may cause extremely dangerous situations that could result in damage to the equipment as well as serious injury or death. Never modify the equipment.
3. Intersystems recommends that you contact the local power company to have a representative survey the installation to ensure wiring is compatible with their system and adequate power is supplied to the unit.
4. Consult Intersystems before making any changes to the microsystem or its operating environment. Careless changes could result in death or serious injury to people and reduce the performance and service life of the equipment.
5. Never perform any service on this equipment or any 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 includes electrical, fluid, mechanical or pneumatic energy.
6. Never perform any service on this equipment without utilizing the required PPE (Personal Protective Equipment). Refer to the MSDS (s) (Material Safety Data Sheet (s)), on all products to which this equipment is in contact to determine what PPE is required.

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

Compressed air can cause severe injury. Shut off and lock out compressed air source to the microsystem and bleed off any and all present compressed air within the microsystem pneumatics before attempting any service on this microsystem.

Replacement Parts

The Intersystems microsystem 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. It is also necessary to check the certified drawings, which will list any special or custom components utilized on this equipment.

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

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

Intersystems, Inc.
9575 No. 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 microsystem is INSTALLED.

Spare Parts List

The following tables contain common spare parts for each microsystem and the control.

Weight Gain (MS1) Spare Parts List

Product Code	Description
650037	MS Bin Assembly 5.7 mm Up SS
650444	MS Bin Assembly 5.7 mm Down SS No Motor
650008	MS Bin Weldment 5.7 CUFT SS
650018	MS Bin Lid Weldment SS
34792	MS Motor Mount Up Weldment SS
650033	Bearing Flange 4 Bolt 1 SC
650030	Rotary Actuator 180° Counter Clockwise P1000
650031	Load Cell 200 LB Tension S-Beam RL
650107	Clevis Pin 1-1/2" x 5/8" Dia. Zinc
650108	Cotter Pin Hair 2-1/2" x 1/8" Dia. Zinc
650135	MS Shroud WIndow 3/16 Plexiglass
650150	Latch Cam Turn Arrowhead
650152	MS Seal Ring AUG Tube-Shroud NEOPR

Weight Loss (MS2) Spare Parts List

Product Code	Description
650158	MS2 Bin/Frame Assembly 5.7 mm Up
650441	MS2 Bin/Frame Assembly 5.7 mm Down No Motor
650157	MS2 Bin Assembly 5.7 mm Up
650399	MS2 Bin Assembly 5.7 mm Down No Motor
650155	MS2 Bin Frame Weldment 5.7 CUFT
650386	MS2 Bin Lid Weldment SS
650186	Switch, Proximity Inductive 18 mm Dia. 5 mm Ring
650184	Load Cell 500 Lbs. Single End Beam RL
650185	Load Cell Wire Rope 1/2" 1400 Lbs.
650159	MS2 Canvas Dust Seal Discharge Boot
650445	MS2 Dust Seal Boot Flange

Common Spare Parts for Both MS1 and MS2 Microsystems

Product Code	Description
650036	Auger MS 304SS Standard High ACCY Assembly
650421	Auger MS 304SS Ultra High ACCY Assembly
650422	Auger MS 304SS Ultra High Volume Assembly
650006	MS Discharge End Bearing UHMW
650014	MS Motor Mount Up Weldment SS
650395	MS Motor Mount Down Weldment SS
650021	MS Motor Mount Gasket NEOPR
650026	Bearing Flange 2 Bolt 1 Bore
35020	Spider L090 Rubber
302245	CPLG Lovejoy L090 1 B Body Half
523189	CPLG Lovejoy L090 7/8 B Body Half
650440	MS Motor/Cordset Assembly 1HP 230/460V
650025	Reducer Gear 40:1 Ratio Dodge 17

Microsystem Control Spare Parts List

Product Code	Description
650291	Motor VFD PF-40 2 HP 480V

Safety Guidelines

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

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

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

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

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

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

ST-0001-3

Cautionary Symbol Definitions

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

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

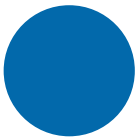
WARNING — This symbol indicates a potentially hazardous situation which, if not avoided, **can result in serious injury or death.**

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

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

This symbol indicates a general hazard.

This symbol indicates a prohibited activity.



This symbol indicates a mandatory action.

ST-0005-2

Safety Cautions

Use Personal Protective Equipment

- Use appropriate personal protective equipment:

Eye Protection

Respiratory Protection

Foot Protection

Hearing Protection

Head Protection

Fall Protection

Hand Protection

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

ST-0004-1

Follow Safety Instructions

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

ST-0002-1

Maintain Equipment and Work Area

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

ST-0003-1

Stay Clear of Hoisted Equipment

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

ST-0047-1

Sharp Edge Hazard

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

ST-0036-2

Install and Operate Electrical Equipment Properly

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

ST-0027-4

Stay Clear of Moving Parts

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

ST-0070-1

Stay Clear of Rotating Parts

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

ST-0072-1

Rotating Auger Hazard

- Keep clear of rotating augers and moving parts.
- Do not remove or modify guards or covers.
- Lock-out power source before making adjustments, cleaning, or maintaining equipment.
- Failure to follow these precautions will result in serious injury or death.

ST-0037-1

Flying Material and High Pressure Air Hazard

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

ST-0071-1

Safety Sign-Off Sheet

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

Date	*Employee Name*	*Supervisor Name*

ST-0007

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

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

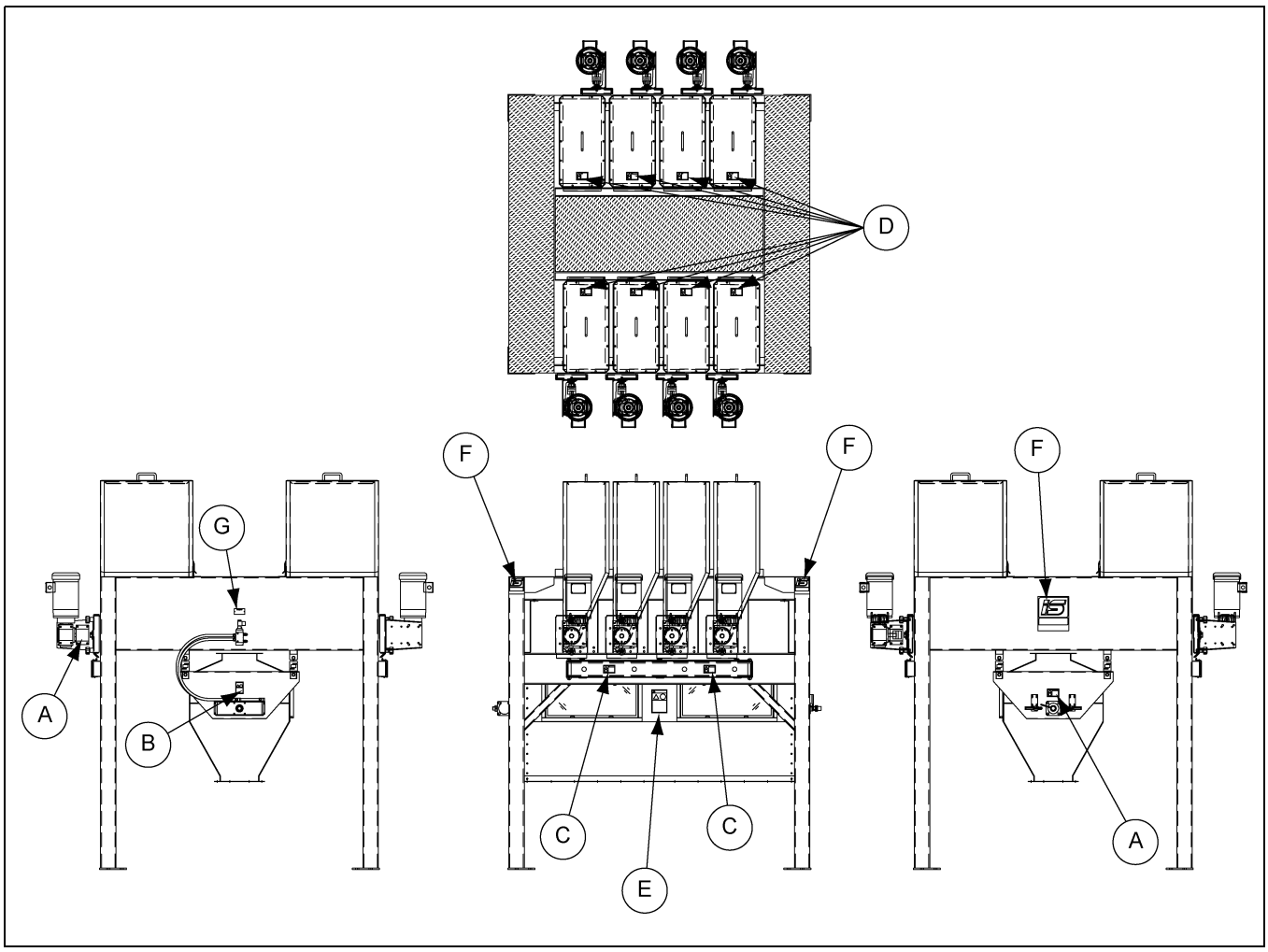


Figure 3A *MS1 MIcrosystem Weight Gain Safety Label Locations*

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

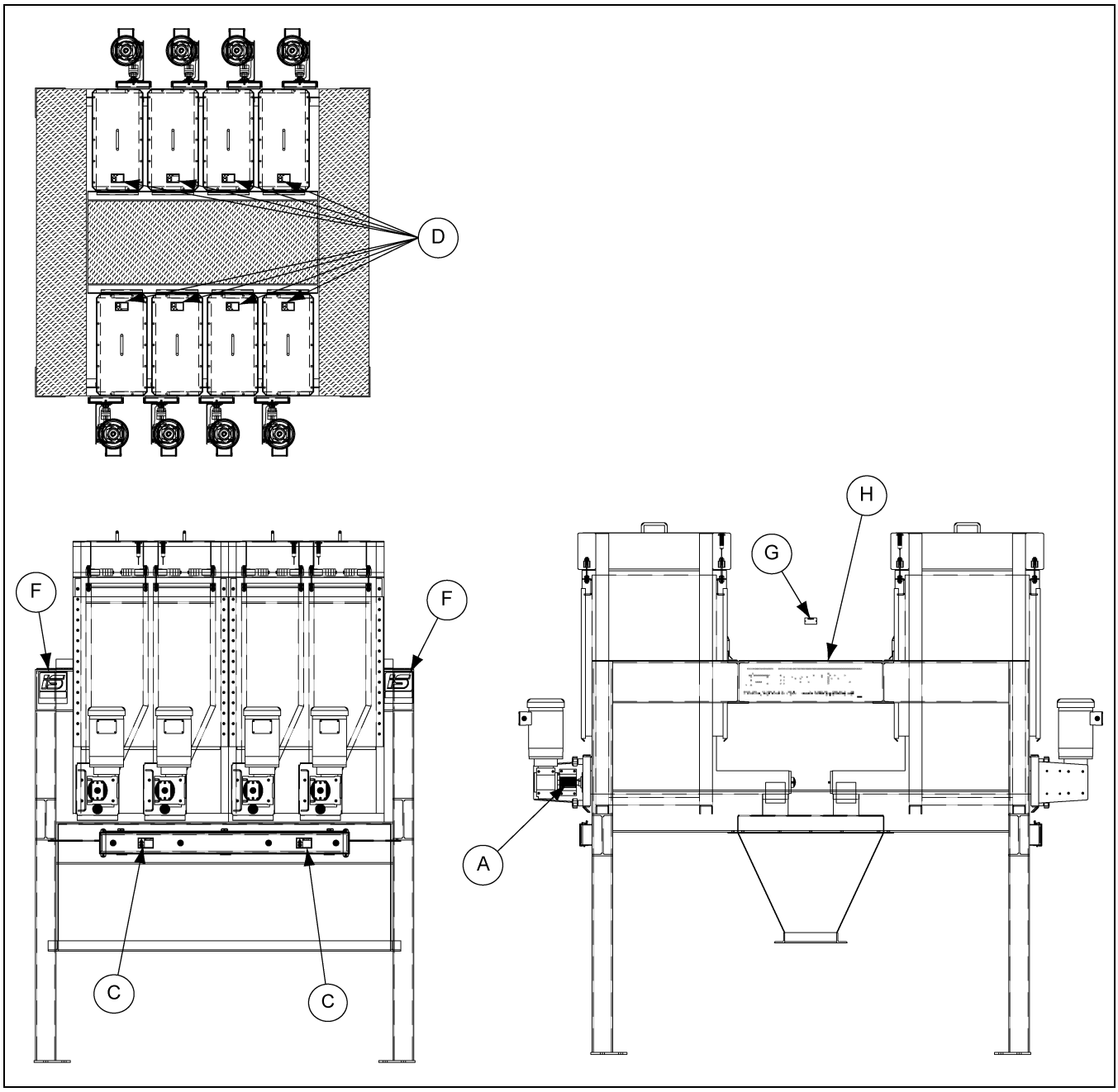


Figure 3B *MS2 Microsystem Weight Loss Safety Label Locations*

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

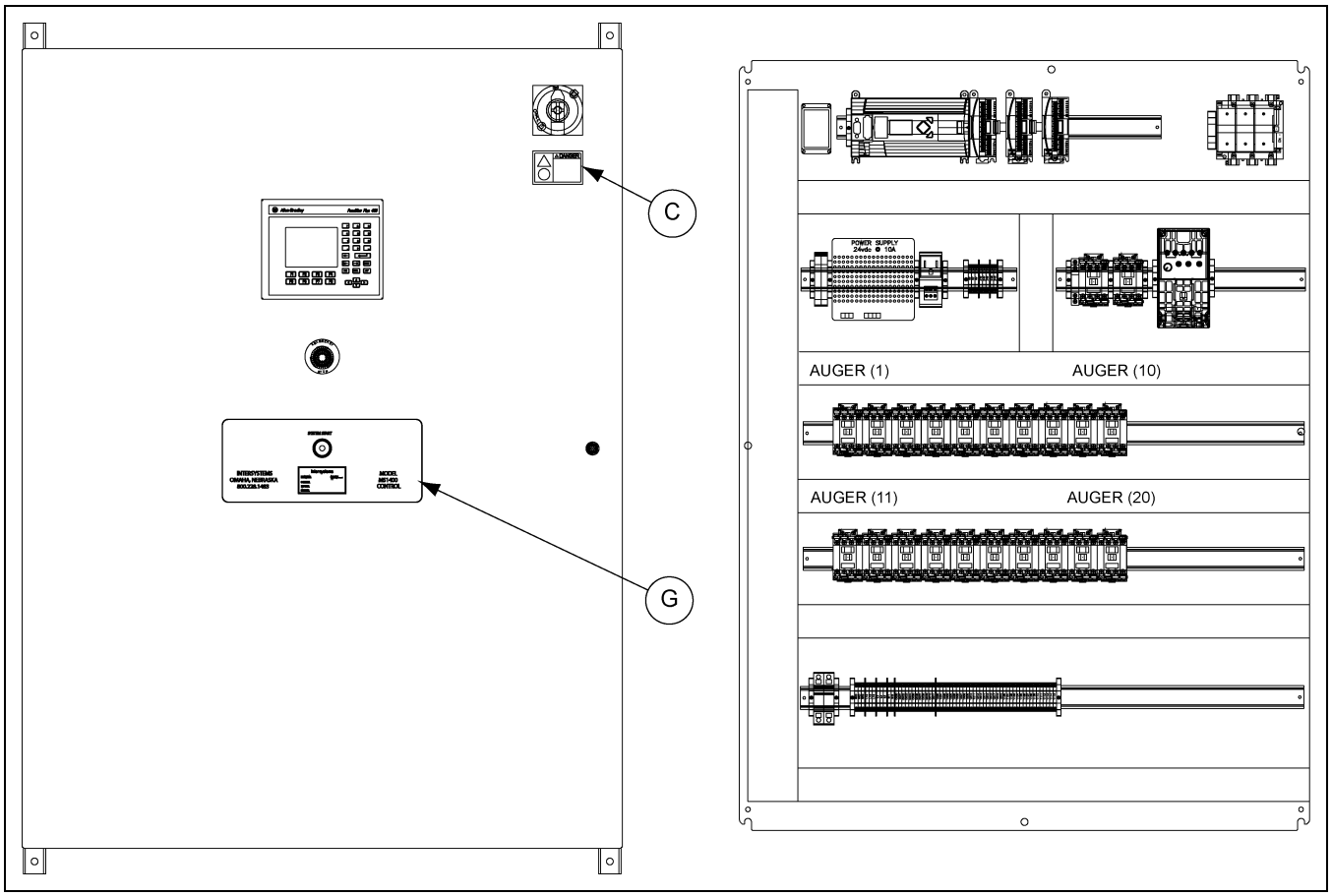
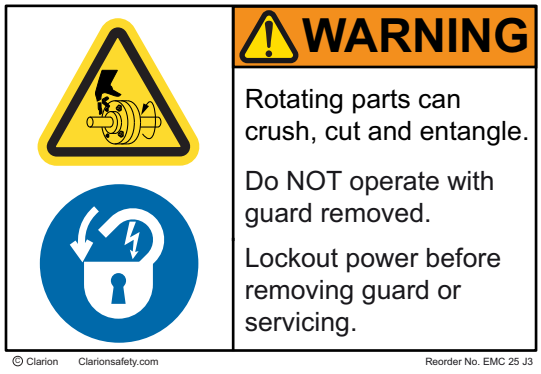
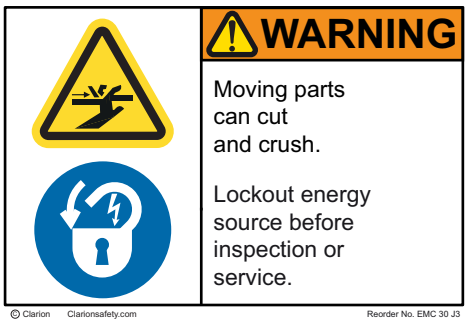
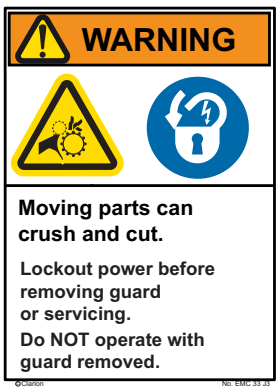


Figure 3C *MS2 Microsystem Control Safety Label Locations*

Ref #	Decal #	Decals	Description
A	EMC 25 3J		Rotating Parts

Ref #	Decal #	Decals	Description
B	EMC 36 34		Air Blast
C	EMC 11 34		Hazardous Voltage
D	EMC 30 34		Hand Clear
E	EMC 30 J3		Moving Parts

Ref #	Decal #	Decals	Description
F	IS 526X4		Intersystems Logo
G	IS Tag		Serial Number Tag
H	IS 5517X4		Intersystems Strip

System Description

The weight gain microsystem is designed to accurately add the desired micro ingredients to the system. The microsystem will help to reduce labor costs and material costs due to reduction of bad batches and increase plant capacity.

Weight Gain (MS1) *(See Figure 4A on Page 19.)*

The microsystem bins are each filled with a micro ingredient. These ingredients can be added by hand, bulk bag, feeder screw, etc. The microsystem control is connected to the control room's batch control. The desired ingredient bin is initiated in response to either an operator's manual command or a signal automatically generated by the batch controller logic. When triggered, the motor will turn ON, turning the auger of the bin. The auger discharges the ingredient into the weigh hopper. The weigh hopper is on four (4) load cells which send a signal back to the control logic to tell how much of the product has been added. When the product gets within a percentage of the projected amount, the microsystem control's variable frequency drive (VFD) will slow down the motor to add the ingredient slower, making the system more accurate. When the weight gets close to the projected weight, the system will turn OFF the motor to account for the run off and the distance the ingredient falls. Once this is finished, the next ingredient bin is initiated and the process repeats. When all of the desired ingredients are added to the weigh hopper, the air valve, located on one end of the frame, energizes. When energized, the rotary actuator turns the weigh hopper 180°, dumping the ingredients out of the weigh hopper and shroud. These ingredients could be dumped directly into the mixer or could be taken to the mixer via an Intersystems Kleen-Drag Conveyor. Once the ingredients are out, the weigh hopper is rotated back in the upright position and the entire process repeats.

Weight Loss (MS2) *(See Figure 4B on Page 20.)*

The microsystem bins are each filled with a micro ingredient. These ingredients can be added by hand, bulk bag, feeder screw, etc. The microsystem control is connected to the control room's batch control. When adding ingredients, a proximity switch on the lid allows for the weight of the ingredients to be recorded before adding material to the system. This system will help to reduce errors and is able to provide traceability. The desired ingredient bin is initiated in response to either an operator's manual command or a signal automatically generated by the batch controller logic. When triggered, the motor will turn ON, turning the auger of the bin. In the weight loss system, each bin is weighed individually on three (3) load cells. As the auger discharges the ingredient, the load cells weigh the loss in product. With each bin weighing itself, multiple variable frequency drives (VFD) can be provided to run more than one bin simultaneously. This will cut the batch time down significantly. When the product gets within a percentage of the projected amount, the microsystem control's VFD will slow down the motor to add the ingredient slower, making the system more accurate. When the weight gets close to the projected weight, the system will turn OFF the motor to account for the run off of product. Once this is finished, the next ingredient bin is initiated and the process repeats. The weight loss ingredient bins can discharge directly into the mixer or could be discharged into a hopper which is connected to an Intersystems Kleen-Drag Conveyor which transports the ingredients to the mixer. After the batch is complete, the process repeats.

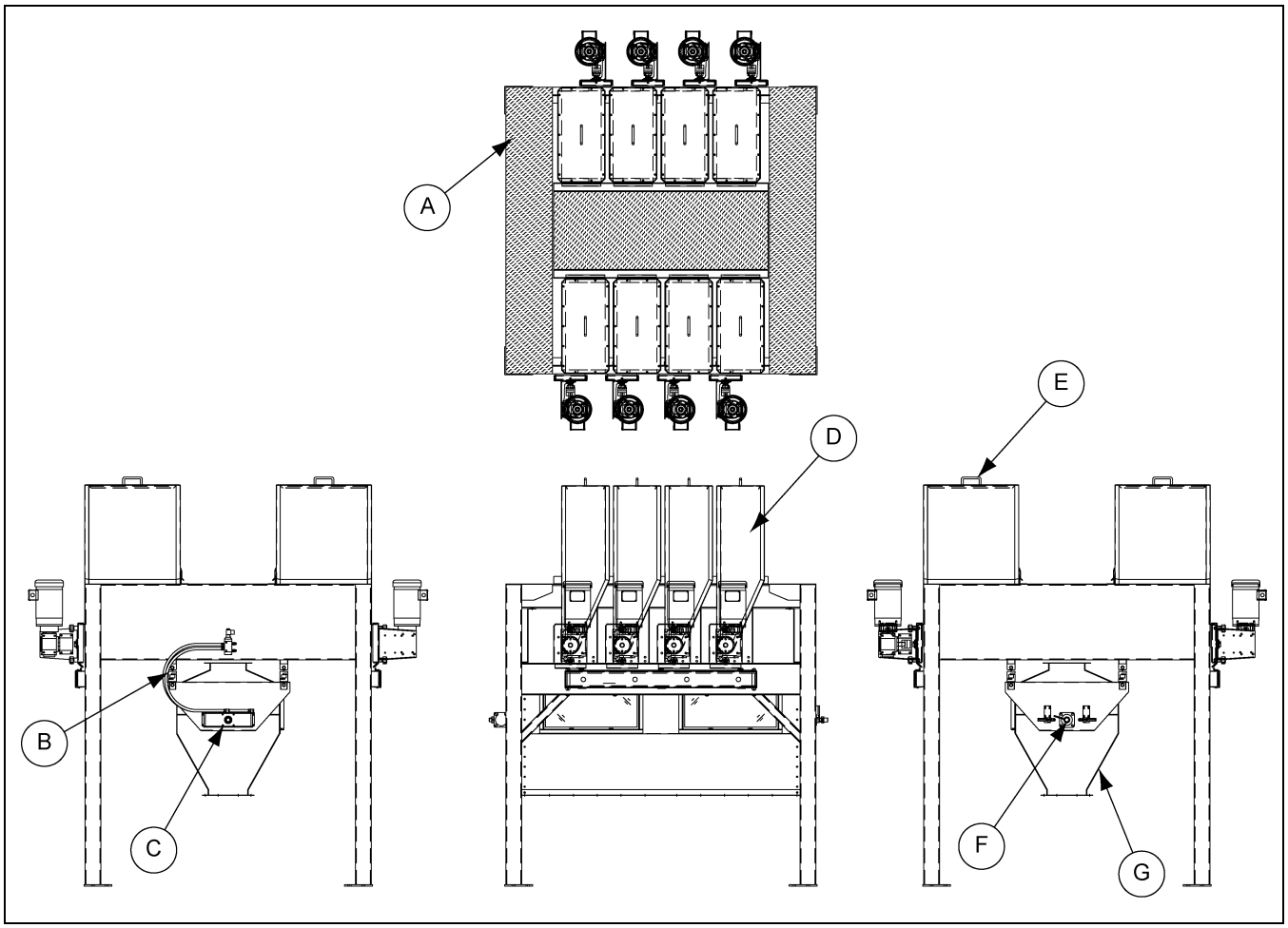


Figure 4A *Typical Weight Gain (MS1) Microsystem*

Ref #	Description
A	Frame with Tread Plate
B	Load Cell
C	Actuator End Plate
D	Bin
E	Lid
F	Limit Switch End Plate
G	Shroud

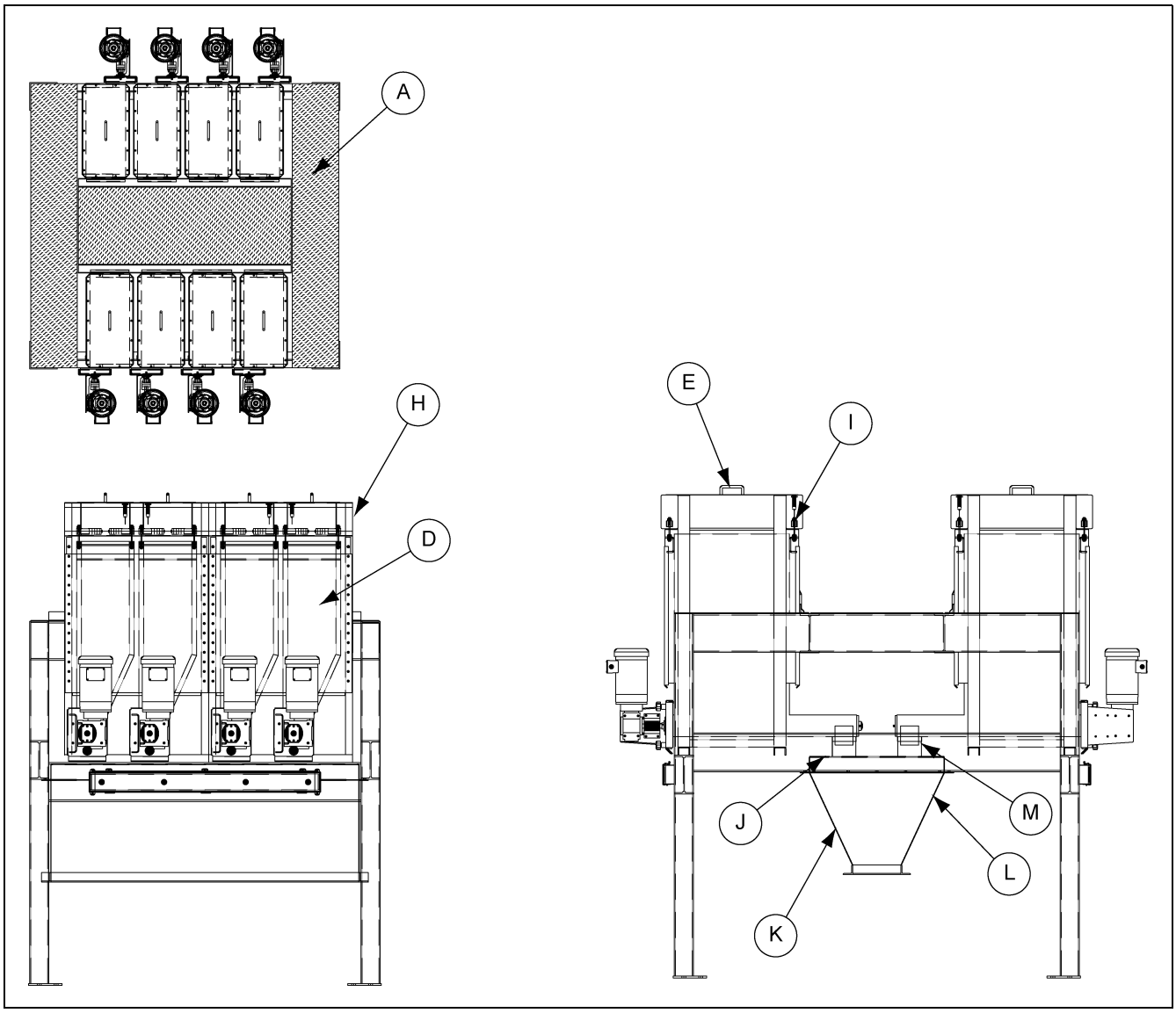


Figure 4B *Typical Weight Loss (MS2) Microsystem*

Ref #	Description
A	Frame with Tread Plate
D	Bin
E	Lid
H	Bin Frame
I	Proximity Switch
J	Hopper Cover
K	Discharge Hopper
L	Hopper Transition
M	Canvas Dust Seal Boot

Optional Features

Some of the more frequently specified optional features are briefly described in the following list:

1. Dust-hood lid. This lid allows for dust removal when adding ingredients to the bin.
2. Hinged lid. This lid allows the lid to stay with the bin.
3. Inlet grate. This grate helps prevents utility knives, parts of bags and other things from falling into the bin and getting into the auger, which could cause damage to the equipment and possibly lose the integrity of the mix.
4. High Volume Auger. This auger moves the ingredients through the bin quicker but sacrifices some accuracy.
5. High Accuracy Auger. This auger is more accurate, but sacrifices some speed.

Microsystem Construction

Standard microsystem construction: bin, shroud and end plates are of polished 304 stainless steel; weigh hopper is of 304 stainless steel; frame is of painted carbon steel. The construction of 304 stainless steel provides more protection against pitting and corrosion.

Receiving Inspection

1. Carefully inspect the microsystem 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.
2. Report any damage or shortage to the delivering carrier as soon as possible. Intersystems responsibility for damage to the equipment ended with acceptance by the delivering carrier.
3. Refer to the bill of lading. Save all paperwork and all documentation furnished with the microsystem and its components.

Pre-Installation Preparation

Before starting microsystem 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).

Assembly Weight Gain (MS1)

Where the microsystem is installed (above the floor or in the floor) determines how much assembly will take place.

Above Floor Assembly

If the microsystem is above the floor, the frame, shroud with weigh hopper and end plates will come pre-assembled. The end plates are connected to the frame with load cell dummy plates during shipping.

1. The seal rings will go around the auger tube and the bins will be placed on the frame. Once the bins are in place, with the auger tube inside the shroud, the seal rings are to be pushed tightly against the shroud sealing the hole in the shroud around the auger tube.
2. Verify that the speed control valves on the exhaust ports of the air solenoid valve are completely closed by turning the adjustment knob fully clockwise.
3. Verify that all airline connections between the air solenoid valve and the rotary actuator are connected properly and the fittings are tightened securely. Manually rotate the weigh hopper into the upright or “fill” position.
4. Slowly open the air supply valve feeding the air solenoid valve of the weigh hoppers rotary actuator until the airlines are fully charged. Adjust the input air supply between 80 PSI and 100 PSI.
5. Slowly adjust the speed control valve on the exhaust port of the air solenoid valve, a quarter turn at a time, counterclockwise, until the weigh hopper begins to rotate from the closed/fill position to the open/dump position. When properly adjusted, the weigh hopper movement should take approximately 3-5 seconds.
6. Slowly adjust the speed control valve on the other exhaust port of the air solenoid valve, a quarter turn at a time, counterclockwise, until the weigh hopper begins to rotate from the open/dump position to the closed/fill position. When properly adjusted, the weigh hopper movement should take approximately 3-5 seconds.
7. Replace the dummy plates with the four (4) load cells and eight (8) eye bolts.
8. Place or bolt the lids on top of the bins to complete assembly.

In-Floor Assembly

If the microsystem is in the floor, it is recommended to put down isolation pads between the frame and the angle to reduce the vibrations onto the frame which could affect the accuracy of the weighing process. All other assembly is the same as the above floor microsystem. The in-floor assembly will be sent with extended bolt on legs for shipping purposes. Once the microsystem is installed, these can be removed if desired.

Typically an Intersystems Kleen-Drag conveyor is placed under the microsystem to transport the ingredients to a mixer. The Kleen-Drag will bolt directly to the microsystem shroud. The shroud will not support the Kleen-Drag so there must be additional support off of the floor.

Assembly Weight Loss (MS2)

Above Floor Assembly

If the microsystem is above the floor, the frame, hopper cover, hopper transition and discharge hopper will come pre-assembled.

1. The canvas dust seal discharge boot will need four (4) holes in its base to fit around the weld bolts on the hopper cover.
2. The dust seal boot flange fits over the canvas and weld bolts and needs to be fastened down with nuts.
3. Place all of the bins on top of the frame with the hanger bracket on the front of the bin frame hanging from the angle on top of the frame and the bottom of the bin frame resting on the I-beam
4. Zip-tie the top of the canvas dust seal boot to the discharge of the auger tube.
5. Place or bolt the lids on top of the bins to complete assembly.

In-Floor Assembly

If the microsystem is in the floor, it is recommended to put down isolation pads between the frame and the angle to reduce the vibrations onto the frame which could affect the accuracy of the weighing process. All other assembly is the same as the above floor microsystem. The in-floor assembly will be sent with extended bolt on legs for shipping purposes. Once the microsystem is installed, these can be removed if desired.

Typically an Intersystems Kleen-Drag conveyor is placed under the microsystem to transport the ingredients to a mixer. The Kleen-Drag will bolt directly to the discharge hopper. The discharge hopper will not support the Kleen-Drag so there must be additional support off of the floor.

Controller Location

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

System Wiring

1. Refer to the certified electrical drawing(s) for specific wiring requirements.
2. The controller was completely assembled and tested with the microsystem 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
3. If wiring between the controller and the microsystem unit is run through rigid conduit, use a short length of flexible conduit to connect wiring to the microsystem. This will isolate the rigid conduit from any vibration originating from the microsystem or conveyor beneath.

Electrical Power Requirements

1. 380/460 VAC, 50/60 Hz, 3 Phase, 30 Amp (includes motor and solenoid power requirements).
2. Refer to the certified electrical drawings for specific wiring requirements. Intersystems strongly recommends that electrical service to the microsystem be an isolated line. Voltage fluctuations and line noise can affect the controller's PLC and VFD, thus causing the microsystem to malfunction.
3. No power will need to be supplied to the systems motor or solenoid if the controller is purchased. All power goes to controller and the controller powers the microsystem.

Failure to observe all safety rules, written and implied, and those suggested by common sense, can result in death, serious injury, and/or equipment damage. Lock out power before performing any maintenance.

Operators Control Components and their Functions

Refer to the certified electrical drawings(s) for dimensions on control panels with optional features. The microsystem controller is an Allen Bradley Micrologix-1400 PLC based control system. It is interfaced through Ethernet IP to Allen Bradley PanelView plus 400 HMI and through Modbus RTU to Allen Bradley PowerFlex40 variable frequency drive (VFD). The microsystem controller controls all motors and gates of the batching system. Signals to control all motors and gates can be received as hard wired or Ethernet inputs from customer based controls.

The weight gain controller will only energize one motor at a time. If the system receives more than one signal to start a motor, the first signal received will be processed to start a motor and all other signals will be ignored until the first signal is turned OFF.

The weight loss controller can energize multiple motors by having multiple VFDs. The system will monitor the lid for every bin and the corresponding motor will be de-energized any time the lid is opened.

ON/OFF Switch

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

SYSTEM START - Push Button/Pilot Light

This push button will send the electrical power from the controller to the microsystem. If the push button has been pushed, a green pilot light will be illuminated indicating power to the microsystem.

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

Emergency Stop

This twist and pull E-STOP will cut power to the microsystem. All motors and output devices will stop and all gates will close. When this occurs, there will still be power to the control panel and the PanelView will still be illuminated. If service is needed, the ON/OFF switch should also be turned to the OFF position.

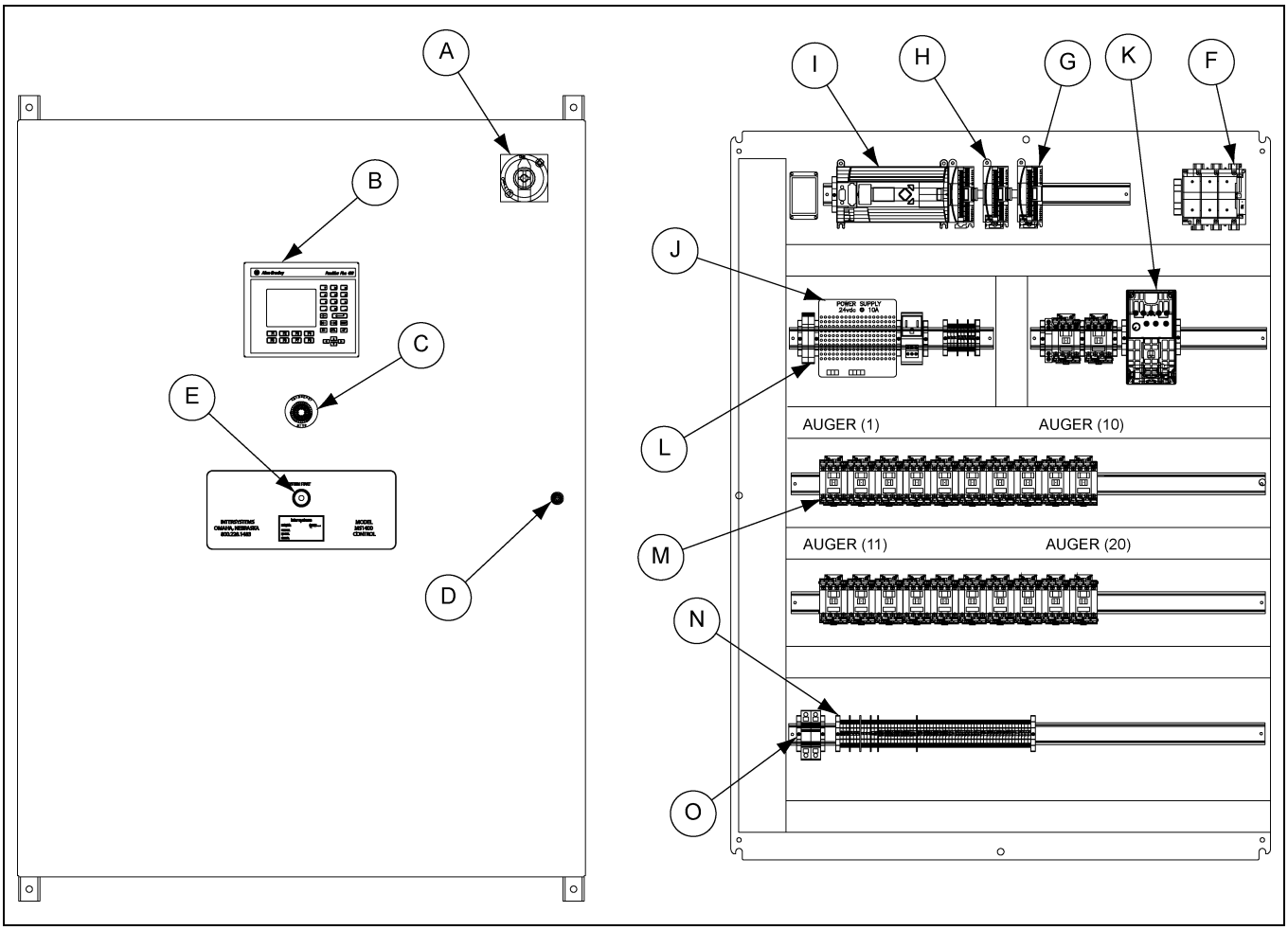


Figure 6A *Typical Microsystem Control*

Ref #	Description
A	On/Off Switch Disconnect
B	Panel View Plus 400
C	Pull and Twist Emergency Stop
D	Key Hole
E	System Start Push Button Pilot Light
F	Disconnect
G	Inputs
H	Outputs

Ref #	Description
I	MIcro Logix 1400
J	Power Supply
K	2 HP VFD
L	Fuse Box
M	Motor Contactors
N	Terminal Strip
O	Circuit Protector

Panel View Plus 400 Operator Interface

The “System Main” menu will be displayed on power up. The system can be operated in auto mode where all control signals are received as hard wired inputs from end user or in manual mode using PanelView plus 400 HMI. When manual mode is selected, all hard wired controls from the end user are ignored.

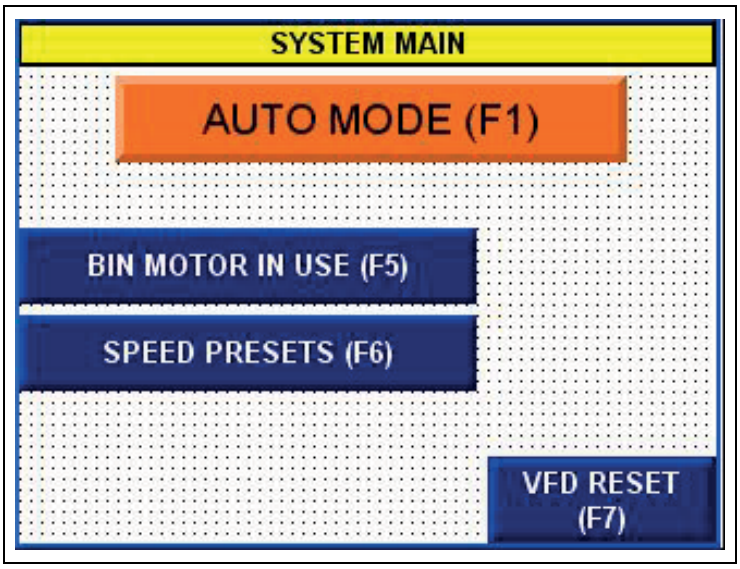


Figure 6B *System Main Screen in Auto Mode*

Auto mode is the default mode of operation. To operate the system in manual mode, press “Auto Mode” (F1) and the manual mode screen as shown in *Figure 6C* will be displayed.

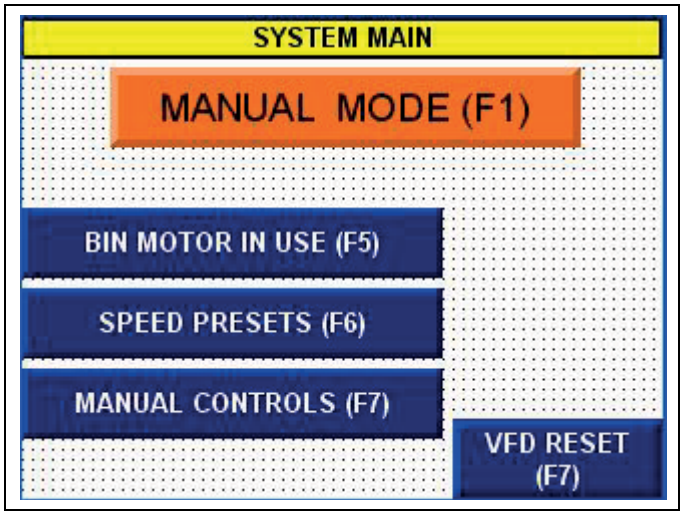


Figure 6C *System Main Screen in Manual Mode*

To switch back to auto mode, press “Manual Mode” (F1)

1. Press “Bin Motor in Use” (F5) to navigate to the screen that displays current active motor along with current speed. This screen is also used to adjust current motor speed.
2. Press “Speed Presets” (F6) to navigate to motors speed programming menu.
3. Press “Manual Controls” (F7) to navigate to manual controls screen.

Bin Motor in Use (F5)

When no motor is active or running, the screen as shown in *Figure 6D* will be displayed.

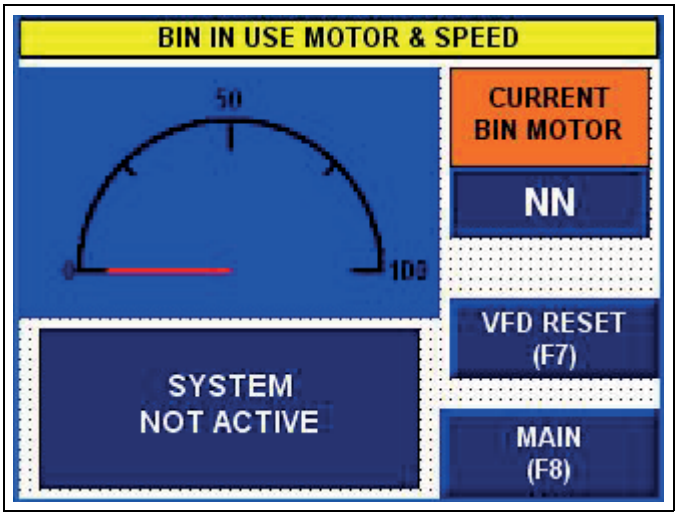


Figure 6D *Bin in Use Screen With No Motor Active*

When a motor is running or active, the screen as shown in *Figure 6E* will be displayed.

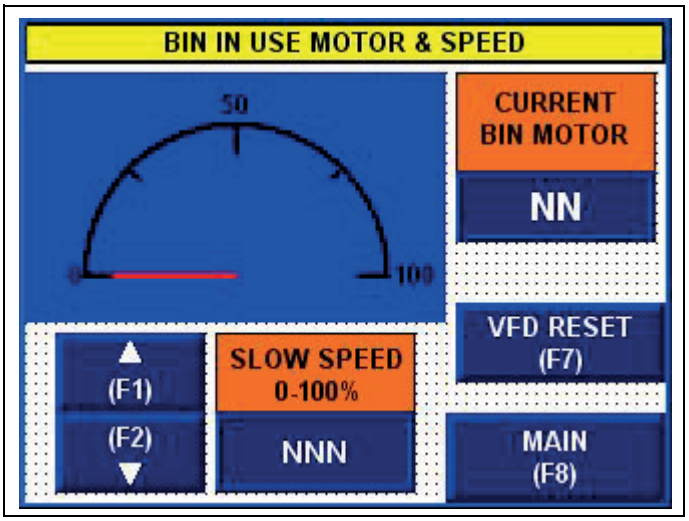


Figure 6E *Bin in Use Screen With A Motor Active*

1. The 0-100 dial will show motor speed as a percentage of its full speed frequency.
2. “Current Bin Motor” will show which motor is currently active or energized.
3. “VFD Reset” will be visible only when a VFD fault is present. Pressing (F7) will reset all VFD faults. This will be invisible when no VFD faults are present.
4. The bottom left section of the screen shows current motor speed preset. The display above the speed will display whether the motor is running in “Fast Speed” or “Slow Speed”. Displayed fast or slow speed motor can be increased or decreased using the “Up” (F1) and “Down” (F2) arrows. When current motor speed is changed, it is automatically saved as the new programmed fast or slow speed preset.

Speed Preset (F6)

To program the fast and slow speed presets for each motor, the screen showed in *Figure 6F* will be used.

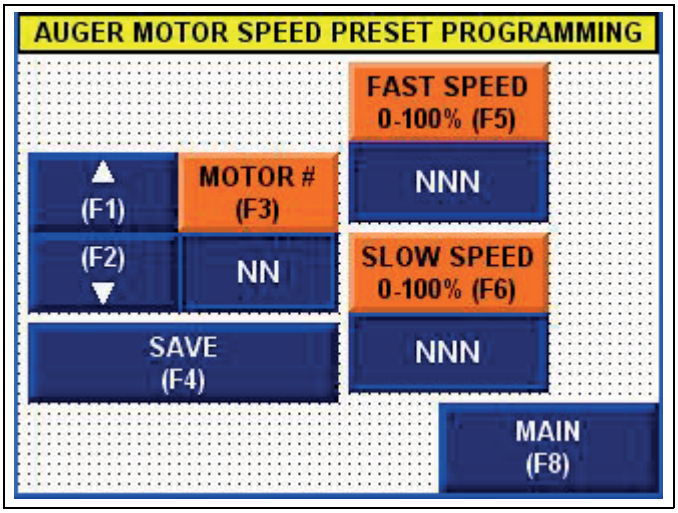


Figure 6F *Auger Motor Speed Preset Programming Screen*

1. Press “Motor #” (F3) to enter motor number or use “Up” (F1) and “Down” (F2) to increase or decrease the motor number to be programmed.
2. Press “Fast Speed” (F5) to enter the fast speed preset for the selected motor. As the button shows, preset number entered is a percentage of the full speed frequency of the motor.
3. Press “Slow Speed” (F6) to enter the slow speed preset for the selected motor.
4. Once all information is entered, press “Save” (F4) to save the speed presets for the selected motor.

Program all motors by entering the motor number or by increasing or decreasing the motor number.

Manual Controls (F7)

The “Manual Controls” screen shown in *Figure 6G* is used to operate the VFD and to operate each motor individually. When “Manual Mode” is selected from the “System Main” menu all hard wired controls from the end user are ignored.

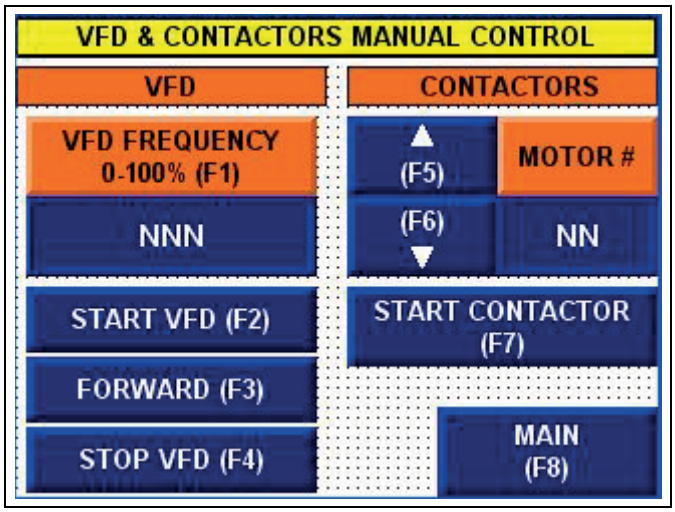


Figure 6G *VFD and Contactors Manual Control Screen*

1. Press “VFD Frequency” (F1) to enter VFD frequency.
2. Press “Start VFD” (F2) to start the VFD.
3. Press “Stop VFD” (F4) to stop the VFD.
4. Press “Forward” (F3) to change direction. This is a toggle switch and will switch between “Forward” and “Reverse”.
5. Press “Up” (F5) and “Down” (F6) to select the desired motor to operate.
6. Press “Start Contactor” (F7) to energize the selected motor contactor. This is a momentary push button, press and hold to keep the contactor energized.

Failure to observe all safety rules, written and implied, and those suggested by common sense, can result in death, serious injury, and/or equipment damage. Lock out power before performing any maintenance.

General Maintenance

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

Periodic Inspection

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

1. Loose or missing hardware.
2. Noisy motor or motor/reducer bearings.
3. Overheated motor or reducer.
4. Adequate lubricant in gear reducer.
5. Structural damage.
6. Rust or corrosion.
7. Damaged wiring, including exposed conductors and connections.
8. All guards in place and all warning labels in place and legible. GENERAL SAFETY INFORMATION from *Pages 7-17*, explains the purpose and intended location of the warning signs. Warning signs are an important part of any safety program; replace any missing signs IMMEDIATELY.

Lubrication

In all cases, the manufacturers of the individual components have precise recommendations for periodic lubrication of their products. Strict adherence to these procedures will result in minimum down time and maximum component life.

Gear Reducer

This gear reducer is lubricated for life at the manufacturer factory and periodic lubrication should not be required under normal conditions. If leakage is detected, repair as needed, clean gear case completely and refill with DODGE 334863 (in quarts). The gear case will require approximately 12 ounces to fill.

Flange Bearings

Mounted bearings require periodic lubrication at appropriate intervals. The amount and frequency depends in large extent upon the severity of the operating environment and the duty cycle.

Inject each mounted bearing with an NLGI #2 grease, Lubri-Plate “Multi-Lube A” for example. Inject only enough lubricant so that a slight bead can be seen to form around the seal. The appearance of the bead indicates that the bearing has been filled adequately and helps purge and exclude contaminants from the bearing cavity.

Mechanical Repair Procedures

Limit Switch Adjustment

Loosen and adjust the limit switch arms if required. The limit switches trip on the cam attached to the shaft of the weigh hopper and signal the control that the weigh hopper is closed and has dumped the material. After dumping, the rotary actuator will reverse. The limit switches trip on the cam going back and will signal the control that the weigh hopper is open and ready to receive product again.

Auger Replacement

When following the instruction below, refer to the applicable certified drawing(s) of the microsystem.

1. Shut off and lock out all power (electrical and pneumatic).
2. Unplug cord from receptacle.
3. Unscrew both star knobs from motor mounts.
4. Remove entire motor, reducer and auger assembly.
5. Remove the set screws on the bearing and coupling.
6. Insert new auger and tighten set screws on bearing and coupling.
7. Insert into bin auger tube, screw in star knobs and plug cord into receptacle.
8. Restore power and run to make sure that the auger does not rub on bin sidewalls.

General Microsystem Troubleshooting

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

General Microsystem Troubleshooting

Symptom	Possible Cause	Corrective Action
Weigh hopper does turn or seems sluggish	1. No or low air pressure.	1. Turn air supply on and set regulator to 80-100 PSI.
	2.Speed control is closed.	2. Refer to section weight gain above floor assembly *Steps 5-6 on Page 22* to reset.
Weigh hopper turns rapidly and slams	1. Speed control is too open.	1. Turn clockwise to turn OFF. Refer to section weight gain above floor assembly *Steps 5-6 on Page 22* to reset.
Motor will not run.	1. Motor wired improperly.	1. Correct. Refer to the certified electrical schematic.
	2. Weigh hopper position is open/ dump.	2. Cycle the rotary actuator so the weigh hopper is in the closed/fill position.
Motor Thermal Overload	1. Auger seized up in tube.	1. Inspect and remove anything that fell into screw. Push reset on control.
	2. Motor wired improperly.	2. Correct. Refer to the certified electrical schematic.
Motor fuse blows continuously.	1. Motor wired improperly.	1. Correct. Refer to the certified electrical schematic.
	2. Motor jammed.	2. Inspect and replace.
	3. Auger seized up in tube.	3. Inspect and replace. Refer to section auger replacement *on Page 32.*
Variable Speed Drive Fault	1. See Troubleshooting section of the PowerFlex40 users manual or the quick guide in Appendix A *on Page 34.*	1. See troubleshooting section of the PowerFlex40 users manual or the quick guide in Appendix A *on Page 34.*

A Powerflex40 VFD Users Manual was sent with the control. Table *below* contains the Fault Code section of the PowerFlex40 Quick Start guide. This does not replace the PowerFlex40 Users Manual. For complete troubleshooting descriptions refer to the Users Manual Troubleshooting Section *on Page 33.*

Fault Codes

PowerFlex40 Fault Codes

No.	Fault	Description
F2	Auxiliary Input(1)	Check remote wiring. Verify communications programming for intentional fault.
F3	Power Loss	Monitor the incoming AC line for low voltage or line power interruption. Check input fuses.
F4	Under Voltage(1)	Monitor the incoming AC line for low voltage or line power interruption.
F5	Over Voltage(1)	Monitor the AC line for high line voltage or transient conditions. Bus overvoltage can also be caused by motor regeneration. Extend the decal time or install dynamic brake option.
F6	Motor Stalled(1)	Increase (Accel Time x) or reduce load so drive output current does not exceed the current set by parameter A089 (Current Limit).
F7	Motor Overload(1)	An excessive motor load exists. Reduce load so drive output current does not exceed the current set by parameter P033 (Motor OL Current). Verify A084 (Boost Select) setting.
F8	Heatsink OvrTmp(1)	Check for blocked or dirty heat sink fins. Verify that ambient temperature has not exceeded 40°C (104°F) for IP 30/NEMA 1/UL Type 1 installations or 50°C (122°F) for open type installations. Check fan.
F12	HW OverCurrent	Check programming. Check for excess load, improper DC boost setting, DC brake volts set too high or other causes of excess current.
F13	Ground Fault	Check the motor and external wiring to the drive output terminals for a grounded condition.
F29	Analog Input Loss(1)	An analog input is configured to fault on signal loss. A signal loss has occurred. Check parameters. Check for broken/loose connections at inputs.
F33	Auto Rstrt Tries	Correct the cause of the fault and manually clear.
F38	Phase U to Gnd	Check the wiring between the drive and motor.
F39	Phase V to Gnd	Check motor for grounded phase.
F40	Pahse W to Gnd	Replace drive if fault cannot be cleared.
F41	Phase UV Short	Check the motor and drive output terminal wiring for a shorted.
F42	Phase UW Short	Condition.
F43	Phase VW Short	Replace drive if fault cannot be cleared.
F48	Params Defaulted	The drive was commanded to write default values to EEPROM. Clear the fault or cycle power to the drive. Program the drive parameters as needed.
F63	SW Over Current(1)	Check load requirements and A098 (SW Current Trip) setting.

PowerFlex40 Fault Codes (Continued)

No.	Fault	Description
F64	Drive Overload	Reduce load or extend accel time.
F70	Power Unit	Cycle power. Replace drive if fault cannot be cleared.
F71	Net Loss	The communication network has faulted. Cycle power. Check communications cabling. Check network adapter setting. Check external network status.
F80	SVC Autotune	The autotune function was either cancelled by the user of failed. Restart procedure.
F81	Comm Loss	If adapter was not intentionally disconnected, check wiring to the port. Replace wiring, port expander, adapters or complete drive as required. Check connection. An adapter was intentionally disconnected. Turn off using A105 (Comm Loss Action). Connecting I/O Terminal 04 to ground may improve noise immunity.
F91	Encoder Loss	Requires differential encoder. One of the 2 encoder channel signals is missing. Check Wiring. If P038 (Speed Reference) = 9 “Positioning” and E216 (Motor Fdbk Type] = 5 “Quad Check” swap the Encoder channel inputs (see page 13) or swap any two (2) motor leads. Replace encoder.
F100	Parameter Checksum	Restore factory defaults.
F111	Enable Hardware	DriveGuard Safe-Off Option (Series B) board is installed and the ENBL enable jumper has not been removed. Remove the ENBL enable jumper. Cycle power.
		DriveGuard Safe-Off Option (Series B) board has failed. Remove power to the drive. Replace DriveGuard Safe-Off Option (Series B) board.
		Hardware Enable circuitry has failed. Replace drive.
F122	I/O Board Fail	Cycle power. Replace drive if fault cannot be cleared.

(1)Auto-Reset/Run type fault. Configure with parameters A092 and A093.

NOTES

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.

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

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

InterSystems is a part of GSI, a worldwide brand of AGCO Corporation.

Printed in the USA

CN-327483