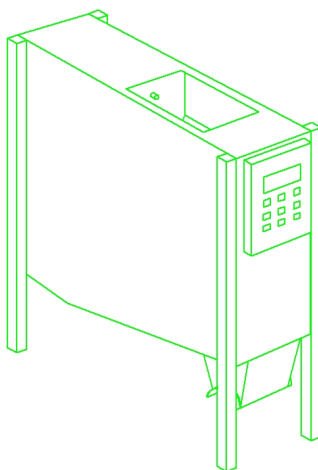




**FEEDPRO™
FLOWSCALE™
METERING UNIT**

**OPERATING and INSTALLATION
INSTRUCTIONS**



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OPERATING INSTRUCTIONS

SAFETY

Keep all access covers securely attached to the units at all times.

Disconnect power to the ingredient units whenever a control enclosure door is to be opened. High voltages are present inside the enclosure when power is applied. Wait at least 5 minutes before opening door to allow internal capacitors to discharge.

Keep hands out of the ingredient hoppers at all times.

Before working on any equipment connected to the FEEDPRO™, ALWAYS turn off the key switch to disconnect power to the automatically controlled relays. Remove the key to keep someone else from starting the system.

Keep access to the emergency stop switch clear of obstructions.

Although the electronic components in the FEEDPRO™ are highly reliable, **NEVER TRUST THESE COMPONENTS WITH YOUR LIFE**. Always shut off power when working on equipment.

Always keep children and pets away from the equipment.

Replace fuses with only identical value and type of fuse. Failure to do so will void any warranty.

Turn off the relay power when the unit is not in use by pushing the emergency stop switch or turning the key off. This will prevent the inadvertent starting of motor(s) due to component failure.

INTRODUCTION

These ingredient metering units were designed to meter dry flowable ingredients at a specified flow rate by weight. The units keep track of accumulated weight delivered. There are two types of units which operate by different techniques depending on the flow rate ranges to be covered:

1. Continuous flow (CF) units. The ingredient is weighed in a special auger as it flows through the auger. The auger speeds are controlled to deliver at the set flowrate. The CF unit is generally used for flows over 250 lb/hour, although lower flowrates are possible. A drawing showing the important components is shown in Figure 1.
2. Loss-In-Weight (LIW) units. The ingredient is dispensed from a weighed hopper via a bottom auger. The auger speed is controlled by the rate at which the hopper loses weight in comparison to the set flowrate. The LIW unit is generally used for low flowrates, typically less than 500 lb/hour (depending on material density). A drawing of this unit is shown in Figure 2.



The ingredient units are capable of starting and stopping other motors in the mixing system, and monitoring the operation of the system. Each unit can control up to two solid state relays, and sense up to two optically isolated inputs, up to a maximum of four relays and four inputs per system.

MODES OF OPERATION

These ingredient units operate in either of two modes of operation:

WEIGHT MODE: This is the normal mode of operation. The ingredients are weighed as they are dispensed from the units.

VOLUME MODE: Units run in volumetric mode (the delivery auger is run at a speed proportional to the set flowrate) using calibration information from recent operation in weight mode. This mode would normally be used only if a weight load cell is non-functional.

Press the  key to enter WEIGHT MODE and the  key to change to VOLUME MODE. The LED in the appropriate key will indicate the mode.

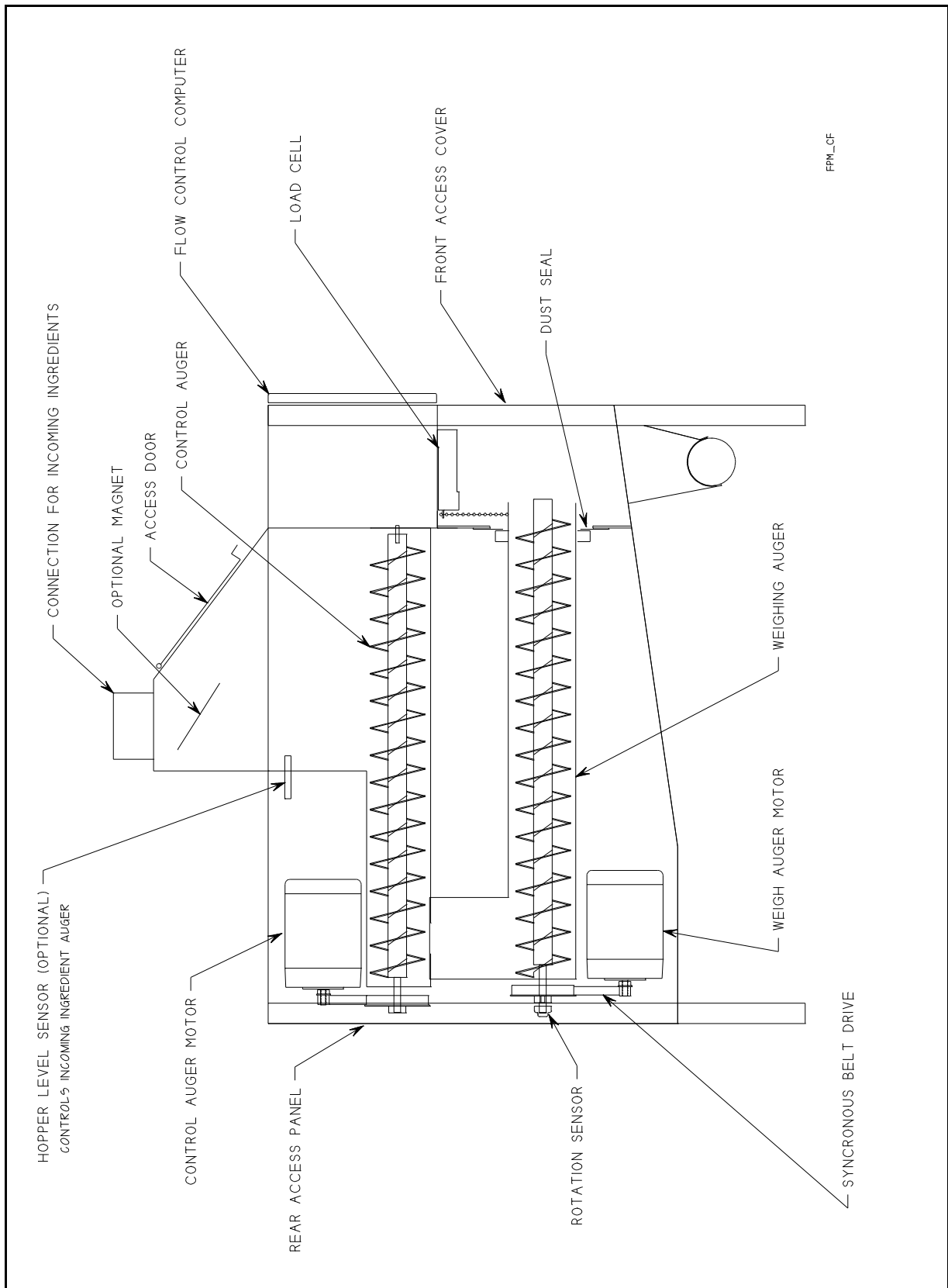


Figure 1. Continuous Flow Unit.

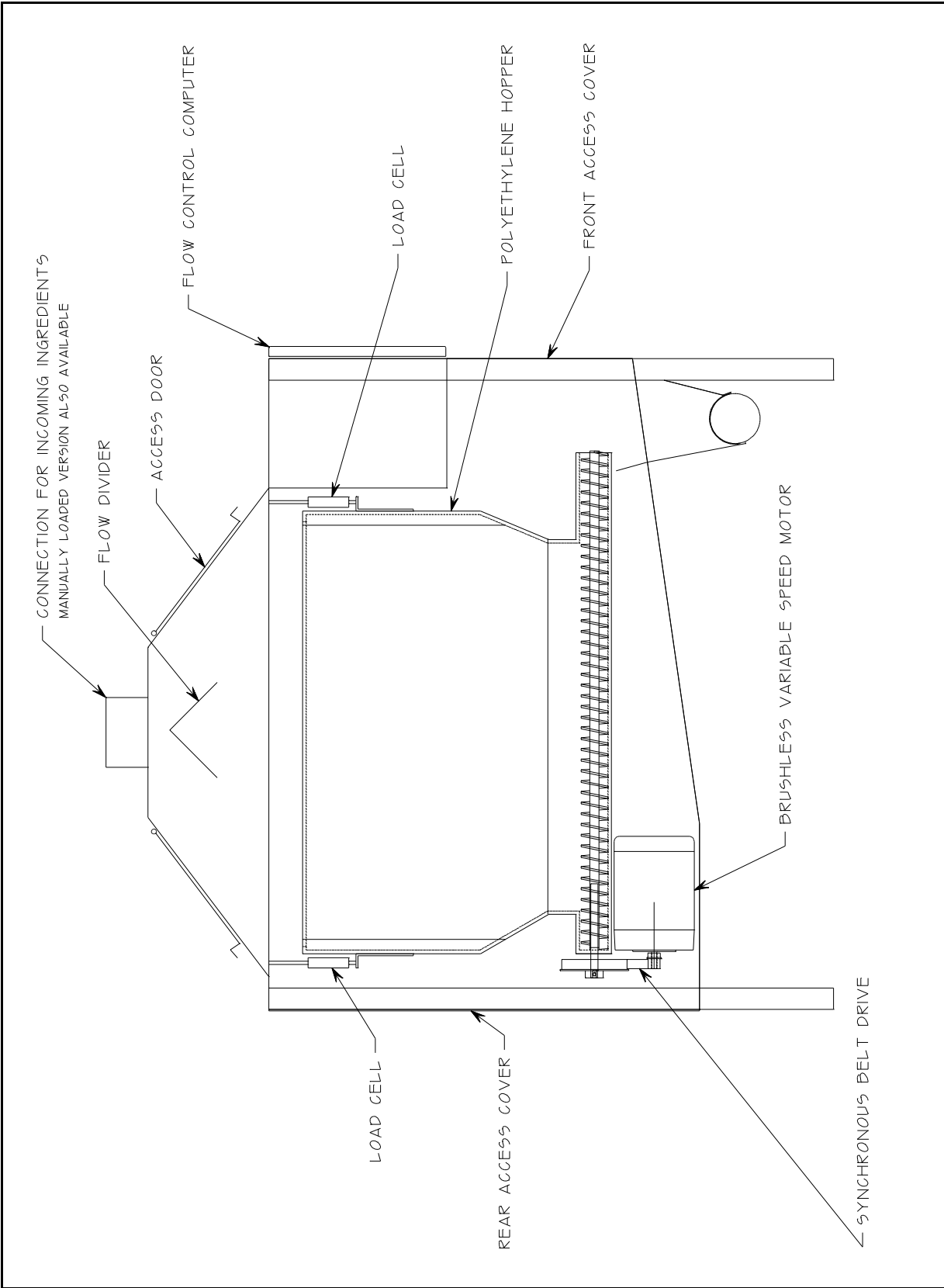







Figure 2. Loss-In-Weight Unit.

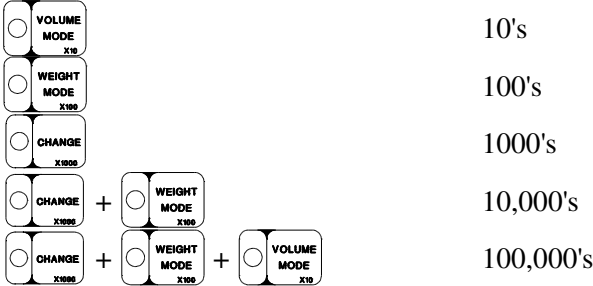
KEYBOARD/DISPLAY INSTRUCTIONS


The keyboard and numeric display on the front panel of the unit is used to enter operating information into the ingredient unit computer. For example, the desired flowrate and an optional preset weight can be entered. The keyboard is also used to enter a list of parameters (loadcell calibration, and other configuration information) into the unit, and to display flowrates and error codes.

The display will normally show either the actual flowrate (lbs/hour) or accumulated weight. Selection is made with the  key. Pushing this key toggles the display back and forth between the actual flowrate and accumulated weight with the appropriate LED indicating the displayed variable. For the loss-in-weight units only, a third variable, the weight of material in the hopper, is displayed when both LED's are off.






TARGET FLOWRATE

When started, each unit will attempt to run at a 'desired flowrate'. The actual flowrate will fluctuate slightly above and below this target as the computer continuously varies the auger speeds attempting to maintain this flowrate. To display the desired flowrate of a unit, push the  key until the FLOWRATE LED is on, and the actual flowrate is displayed. Then push the  key to display the desired flowrate. Repeatedly push either the  or  key momentarily to increase or decrease the desired flowrate. To accelerate the process, the left 3 keys cause the display to count by 10's, 100's, 1000's, 10,000's, or 100,000's:








When the target flowrate is set as desired, push the  key to store the target flowrate and return the display to the actual flowrate.

PRESET WEIGHT

A preset weight can be entered so that the unit(s) can automatically shut down when a given amount of ingredient has been dispensed. To display the preset weight of a unit, push the  key until the TOTAL LED is on, and the actual accumulated total weight is displayed. Then push the  key to display the preset weight. Push either the  or  keys momentarily to increase or decrease the preset weight. Again, to accelerate the process, the left 3 keys cause the display to count by 10's, 100's, etc. When the required preset weight is set, push the  key to store the preset weight and return the display to accumulated weight.




If the preset weight function is not used, set the preset weight to 0 lbs.

INGREDIENT INVENTORY


The flowscale can keep track of how much ingredient is in storage. To display the current inventory of ingredient in storage, push the  key until both LED's are off, and the current inventory in pounds (or kilograms) is displayed. To change the current inventory, push the  key. Push either the  or  keys momentarily to increase or decrease the current inventory weight. Again, to accelerate the process, the left 3 keys cause the display to count by 10's, 100's, etc. When the required inventory weight is set, push the  key to store the inventory weight.


For example, if 20,000 lbs of ingredient is purchased, 20,000 should be added to the current inventory. The current inventory amount will decrease as material is metered by the flowscale.

CLEARING ACCUMULATED WEIGHT











To clear the accumulated total weight, push the  key until the TOTAL LED is on, and the actual accumulated total weight is displayed. Then hold the  key in while pushing .

STARTING AND STOPPING

Push the  key to start the ingredient unit operation. If the system includes more than one unit, all units will start when the start key on any one is pushed. The CF units will begin by running only the weigh auger for a few seconds to rezero the load cell weight. Then both augers will start and ingredient metering will begin.

Push the  key to stop operations. Note that the units will go through a normal cleanout mode before stopping. If an emergency exists, push the Emergency Stop switch on the motor contactor enclosure to immediately kill all power.

INGREDIENT UNIT SETUP PARAMETERS

Each ingredient unit contains a list of parameters which define its operation. These should rarely need to be changed. To access the parameters hold the  key in while pushing . The display will show ' 1: ' indicating parameter number 1. Press the  or  keys to increment to the next or decrement to the previous parameter. Holding the  key will make it increment or decrement by 10's. When the number of the desired parameter is shown, press the  key to display the value of the parameter. Again press the  or  keys to increment or decrement the value. The left mode keys can again be used to accelerate the changes by 10's, 100's, etc. When the value has been set as desired press  to toggle back to the next parameter number, or  to end the parameter entry mode.

A list of these parameters is given on the next two pages for both the continuous flow and the LIW units. The values of these parameters should be written in the blanks provided after installation startup for future reference.

CONTINUOUS FLOW INGREDIENT UNIT PARAMETERS

| | | |
|----|--------------|--|
| 1 | _____ | Unit address |
| 2 | _____ | Resolution: 0=Unit, 1=0.1 Unit (default: 0) |
| 3 | _____ | Extra fill time after ingredient touches hopper sensor |
| 4 | _____ | Hopper capacity, lbs. Increase to reduce infeed cycling. |
| 5 | _____ | Start time: maximum empty+zero+fill time |
| 6 | _____ | Max clean time: maximum emptying time after run |
| 7 | <u> 0 </u> | (unused) |
| 8 | _____ | Gather Time: start of gathering auger to this unit |
| 9 | _____ | Suspend restart time |
| 10 | _____ | Calibration preset weight |
| 11 | _____ | Zero Scale Num (default: 6) |
| 12 | _____ | KFF Recalc Num (default: 9) |
| 13 | _____ | Scale gain (typical: 12000-15000) |
| 14 | _____ | Auger K (typical: 4000-8000) |
| 15 | _____ | KP (default: 1000) |
| 16 | _____ | KI (default: 500) |
| 17 | _____ | KD (default: 25) |
| 18 | _____ | KFF (default: 25000 for corn, 50000 for protein units) |
| 19 | <u> 0 </u> | (unused) |
| 20 | <u> 0 </u> | (unused) |
| 21 | _____ | Weigh auger turns (default: 24) |
| 22 | _____ | Scale smoothing (default: 1) |
| 23 | _____ | Flow smoothing (default: 1) |
| 24 | _____ | Max flowrate |
| 25 | _____ | Fill speed (1800 for 1800 RPM, 2700 for 1200 RPM motors) |
| 26 | _____ | Motor speed ratio (see page 11) |
| 27 | _____ | Options (default: 12, see description) |
| 28 | _____ | Display address (default: 0) |
| 29 | <u> 0 </u> | (unused) |
| 30 | _____ | Transmit delay time (20 mS units) |
| 31 | _____ | Relay 1 start delay |
| 32 | _____ | Relay 1 stop delay |
| 33 | _____ | Relay 2 start delay |
| 34 | _____ | Relay 2 stop delay |
| 35 | _____ | Input 1 type: 0=not used, 1=normal stop, 2=quick stop |
| 36 | _____ | Input 1 start delay |
| 37 | _____ | Input 2 type: 0=not used, 1=normal stop, 2=quick stop |
| 38 | _____ | Input 2 start delay |

The following can be displayed, but not changed:

| | | |
|----|-------|----------------------------|
| 39 | _____ | Software version |
| 40 | _____ | Software type |
| 41 | _____ | Hardware type |
| 42 | _____ | Last EPROM sum |
| 43 | _____ | Valid EPROM sum |
| 44 | _____ | Machine hours |
| 45 | _____ | Machine tons |
| 46 | _____ | Nominal empty auger weight |
| 47 | _____ | New KFF |
| 48 | _____ | Normal auger weight |
| 49 | _____ | Weight offset |
| 50 | _____ | Loadcell ADC counts |

LOSS-IN-WEIGHT UNIT PARAMETERS

| | | |
|----|---------------|--|
| 1 | <u> 0 </u> | (unused) |
| 2 | <u> </u> | Resolution: 0=Unit, 1=0.1 Unit (default: 1) |
| 3 | <u> </u> | Refill falling weight, lb or 0.1 lb units (same as resolution) |
| 4 | <u> 0 </u> | Hopper capacity, lb |
| 5 | <u> </u> | Start time: Maximum empty+zero+fill time |
| 6 | <u> </u> | Max clean time: Max. emptying time after run |
| 7 | <u> 0 </u> | (unused) |
| 8 | <u> </u> | Gather time: Start of gathering auger to this unit |
| 9 | <u> 0 </u> | (unused) |
| 10 | <u> 0 </u> | Enable auto-fill (if 1), or disable (if 0) |
| 11 | <u> 0 </u> | Fill timeout, sec. Stop filling if no weight gain. |
| 12 | <u> </u> | KFF Recalc Num (default: 6) |
| 13 | <u> </u> | Scale gain (typical: 160000-180000) |
| 14 | <u> </u> | Empty ADC counts |
| 15 | <u> </u> | KP (default: 5000) |
| 16 | <u> </u> | KI (default: 10) |
| 17 | <u> 0 </u> | (unused) |
| 18 | <u> </u> | KFF (default: 1500) |
| 19 | <u> </u> | Integral limit (default: 1000) |
| 20 | <u> 0 </u> | (unused) |
| 21 | <u> 0 </u> | (unused) |
| 22 | <u> </u> | Scale smoothing (default: 3) |
| 23 | <u> </u> | Flow smoothing (default: 5) |
| 24 | <u> </u> | Max flowrate |
| 25 | <u> 0 </u> | Refill threshold, lbs. Stop to refill when hopper wt. less. |
| 26 | <u> 0 </u> | (unused) |
| 27 | <u> </u> | Options (default: 108, 109 if discharge sensor installed) |
| 28 | <u> </u> | Display address (default: 0) |
| 29 | <u> 0 </u> | (unused) |
| 30 | <u> 0 </u> | (unused) |
| 31 | <u> </u> | Relay 1 start delay |
| 32 | <u> </u> | Relay 1 stop delay |
| 33 | <u> </u> | Relay 2 start delay |
| 34 | <u> </u> | Relay 2 stop delay |
| 35 | <u> </u> | Input 1 type: 0=not used, 1=normal stop, 2=quick stop |
| 36 | <u> </u> | Input 1 start delay |
| 37 | <u> </u> | Input 2 type: 0=not used, 1=normal stop, 2=quick stop |
| 38 | <u> </u> | Input 2 start delay |

The following can be displayed, but not changed:

| | | |
|----|---------------|---------------------|
| 39 | <u> </u> | Software version |
| 40 | <u> </u> | Software type |
| 41 | <u> </u> | Hardware type |
| 42 | <u> </u> | Last EPROM sum |
| 43 | <u> </u> | Valid EPROM sum |
| 44 | <u> </u> | Machine hours |
| 45 | <u> </u> | Machine tons |
| 46 | <u> 0 </u> | (unused) |
| 47 | <u> </u> | New KFF |
| 48 | <u> 0 </u> | (unused) |
| 49 | <u> 0 </u> | (unused) |
| 50 | <u> </u> | Loadcell ADC counts |

PARAMETER DETAILS

A more detailed explanation of some of these parameters is given below:

1. Unit address. Needed only if multiple units.
- 3: Extra Fill Time (CF)
Run infeed auger specified seconds after sensor touched.
Refill Falling Weight (LIW)
Stop infeed auger specified weight before hopper capacity reached.
- 4: Hopper Weight (CF)
If the infeed ingredient is augered into the unit hopper, parameters 3 & 4 control the cycling of the infeed auger. When the auger turns on, it will run until the ingredient touches the hopper level sensor, and will then turn off after the number of seconds specified by 'extra fill time' (parameter 3).
The infeed auger will turn on after the sensor is no longer touched, and then the specified weight of product is metered.
Hopper Capacity (LIW)
Maximum fill weight of the hopper.
- 5: Start Time
Used for startup synchronization. Should be set to the longest start-up time of all the units in a system. All the units will then wait to start dispensing until the slowest unit is ready.
- 6: Max. Clean Time
Used for shutdown synchronization. Should be set to the number of seconds for the slowest CF unit to shut down.
- 8: Gather Time
Used for startup synchronization. This should be set to the number of seconds from when the first ingredient drops into the gathering auger until it travels to this unit in the gathering auger.
9. Suspend restart time.
Used only if a proximity sensor is installed under unit to suspend metering if sensor is touched. When sensor is no longer touched for specified time (seconds), the unit will re-start. See also Parameter 27.
- 13: Scale Gain
Load cell calibration constant. Should not be changed from factory setting unless a loadcell is changed.
- 14: Auger K (CF units only)
Weigh auger calibration constant.
- 25: Refill threshold (LIW)
If auto-fill is enabled, when the hopper weight is reduced to this threshold, metering will stop for the hopper to refill. Metering will then resume.

- 26: Motor Speed Ratio (CF units only)
Used to check for excessive motor slip and missing rotation sensor pulses.
Setting depends on nominal weigh auger motor speed and motor pulley size:
- 2926 for 1800 RPM (4 Pole) motors, 14 tooth pulley
 - 3413 for 1800 RPM (4 Pole) motors, 12 tooth pulley
 - 4389 for 1200 RPM (6 Pole) motors, 14 tooth pulley
 - 5120 for 1200 RPM (6 Pole) motors, 12 tooth pulley
- 27: Options (default: 13 for CF4/CF5, 269 for CF6/CF8)
- Stop the system with error 361 if optional discharge sensor is touched. (for installation, see p.18). Subtract 1 from this parameter to disable.
 - Normally when an ingredient weight reaches the preset weight, all units will stop. Add 2 to this parameter if only this unit should stop.
 - To suspend metering if sensor is touched, and restart when no longer touched (after delay set by parameter 9), add 512 to this parameter.
 - To disable error 453 (low voltage), subtract 8 from the above parameter values.
- 30: If communicating with a PLC, this parameter sets a response delay time. Units are in 20 millisecond increments.
- 31: Relay 1 start delay
- 33: Relay 2 start delay
If the solid state relays are used to operate system motors (augers, mill, etc.), set these parameters to the number of seconds from when the start switch is pushed until the motor should turn on.
- 32: Relay 1 stop delay
- 34: Relay 2 stop delay
If the solid state relays are used to operate system motors (augers, mill, etc.), set these parameters to the number of seconds from when the last unit to shut down is stopped until the motor should turn off.
- 35: Input 1 type
- 37: Input 2 type
Set to 0 if an input is not used. Set to 1 if the system should stop if input turns off.
- 36: Input 1 start delay
- 38: Input 2 start delay
These parameters control when the inputs begin to be monitored by the computer. Time begins when the start switch is pushed. Example: if a mill starts 8 seconds after the start switch is pushed, set this input parameter to at least 8 to allow the mill to run before checking.

INGREDIENT UNIT ERROR CODES

If a problem is detected by an ingredient unit, the units will stop operation. The unit with the error will display an error code on its display. The following error code list describes the meaning of each code.

- 341 A configuration parameter is less than minimum. This error should not occur frequently. Check ingredient unit parameters.
- 342 A configuration parameter is greater than maximum. See above.
- 343 Bad configuration error check code. One or more parameters has been inadvertently changed. See above.
- 350 Bad sequence number. Computer error, should rarely occur.
- 359 Weight gain timeout (LIW only with autofill enabled).
- 360 Hopper fill timeout. The hopper did not fill to the sensor within the allowed time at startup. Ensure that infeed auger is operational and that bin is not empty.
- 361 Discharge area is plugged (requires optional sensor). Clean out mill and augers before restarting. Probable causes: mill overload shutdown or plugged augers downstream of the ingredient units.
- 370 Timeout on auger rotation sensor (LIW: A/D timeout). Indicates that the weighing auger is not turning. Remove back from offending unit. Check weigh auger for easy rotation. If it doesn't turn freely, determine reason. Other possible causes: blown fuse on motor drive circuit board inside of ingredient unit electronic enclosure, or bad rotation sensor.
- 371 Bad EPROM checksum. Indicates a program memory problem.
- 390 Input 1 shutdown. Voltage not present at input 1 while running.
- 391 Input 2 shutdown. Voltage not present at input 2 while running.
- 395 The unit was started with an accumulated weight equal to the preset weight. Clear the accumulated weight or disable the preset function by clearing the preset weight.
- 401/403 Actual flowrate is too low. Possible causes: attempting to run faster than the unit is capable of running, infeed hopper not refilling soon enough.
- 402 Actual flowrate is too high. Possible cause: attempting to run slower than the unit is capable of running.
- 405 Excessive motor slip or missing rotation sensor pulses. Possible causes: hard turning auger, low power line voltage.
- 411 Target flowrate greater than maximum. The target flowrate is higher than the maximum for the unit as determined by ingredient unit parameter 24.
- 415 Empty weight too low. The empty auger weight has changed significantly from previous empty weights. Possible causes: dust, etc. has collected on the auger, shifting it's weight; loadcell or loadcell amplifier stability problem. The new empty 'weight' can be read from parameter 49. If this has changed drastically from the 'nominal' weight (parameter 46), the loadcell and amplifier should be checked. To clear the error and also change the 'nominal' weight, hold the 'Weight Mode' key while pushing 'Error ack'.
- 416 Empty weight too high. See error 415 above.
- 417 Empty weight too low (parameter 50 < -25000 counts). Possible bad loadcell.
- 418 Empty weight too high (parameter 50 > 25000 counts). Possible bad loadcell.
- 450 Low +12 volts. Check fuse F1 on ingredient unit computer circuit board (on door, behind sheet metal computer shield) and F6 on motor drive board (inside enclosure).
- 451 Low -5 volts. Check F7 on motor drive board (inside enclosure).
- 452 Motor current trip. Excessive motor current, possibly due to hard turning auger(s). Remove back access cover and make sure augers are easy to turn by hand. Also check for debris in transition boot between top (control) auger and the weigh auger.
- 453 Low motor rail voltage. Line voltage is low, motor has overheated, or fuse F1 or F2 on motor drive board is blown. To disable this error (208 VAC power is marginal), see parameter 27.
- 454 High motor drive temperature. The power transistors that control the motor power are too hot. Should very rarely occur.

INSTALLATION INSTRUCTIONS

SAFETY

Since this system requires that electrical connections be made to motor starters, etc., a qualified electrician should be employed to safely install the electrical wiring. All wiring must conform to the requirements of the National Electrical Code and any other applicable codes.

An Emergency Stop switch, key switch, and dropout relay to shutdown all motors MUST be installed as shown on the wiring diagram in Figure 3. If the feed handling equipment is spread out over a large area, two or more Emergency Stop switches should be installed. Momentarily pushing an Emergency Stop switch should immediately stop all motors, and leave them off when the switch is released. The Emergency Stop should meet the requirements of ISO 13850.

The key in the key switch should be removable only in the off position. It should be turned off, and removed when working on equipment to prevent accidental starting of that equipment.

Under normal circumstances, the units will power-up in a standby condition (no motors running). The dropout relay will ensure that any running motors will not re-start after a power outage until they are deliberately started.

Safety warning decals have been provided and should be installed in several locations to warn that the equipment is started automatically. If additional decals are needed, contact your dealer or Pella Electronics Co., Inc.

A wiring diagram for a basic FEEDPRO™ system is shown in Figure 3. It shows the incoming 240 VAC power, a key switch with dropout relay, an emergency stop switch, manual motor control switches, and motor starters.

The FEEDPRO™ system must not be installed in locations requiring equipment approved for hazardous (classified) locations as defined by the National Electrical Code or other applicable codes.

SPECIFICATIONS

Voltage: 208 - 240 VAC, 1-phase, 50 or 60 Hz
Current: CF4/CF5 units: 3A typical, 5A maximum
CF6/CF8 units: 4A typical, 6A maximum
Weight with typical accessories:
CF4/CF5 units: 180 lb.
CF6/CF8 units: 575 lb.
Temperature range: -20 to +110 °F
Dimensions:
CF4/CF5 units: 9"W x 47"L x 30"H
CF6/CF8 units: 13"W x 82"L x 30.5"H

INSTALLATION PROCEDURE

1. Situate unit(s) in the intended location. Install the ingredient units with at least 3 feet of clearance behind the units to permit removal of the augers. Level the units by adjusting the leveling screws in the bottom of the legs.
2. Install infeed augers and downstream augers.
3. Install the electrical wiring to the units, motors, motor contactors, solid state relay board, etc. Power to the metering unit(s) should be protected with a 15 amp (or smaller) 2-pole circuit breaker.
4. Remove the front and back access covers from all ingredient units. Remove red shipping brackets from front and back (CF4 & CF5 only) of weigh auger. Remove packing material from LIW unit.
5. Verify that the front weigh auger support chains are positioned correctly -- the chain should hang vertical, both front-to-back and side-to-side. Verify that the weigh augers move freely on their pivots. Verify that the black rubber front dust seal lies flat against the white dust seal ring attached to the weigh auger, and that there is clearance between the edges of the rubber and the weigh auger tubes.
6. Verify that the LIW hopper can swing freely both side-to-side and front-to-back.
7. Check the voltage of the power to be applied to the ingredient units. It should be 208-240 VAC.
8. Turn power on to the Feedpro ingredient units. Check the displays for errors and if so, correct the causes.
9. Set each ingredient unit to WEIGHT MODE. Set the target flowrate to zero for all but one unit. If the unit is a LIW unit, load a small amount of ingredient in its hopper.
10. Press the START button on any ingredient unit. The unit with the nonzero target flowrate should start. Watch the outlet end of the auger from the front of the unit. CF units will go through cleanout, rezero, and fill cycles. When the auger begins to discharge ingredient, press the STOP button on any unit.

This step checks for correct operation of the infeed auger on continuous flow units, and correct operation of the ingredient unit motors. It is not uncommon to get errors 415 or 416 on a newly installed system. Hold the WEIGHT MANUAL key while clearing these errors. (See error codes).

11. Repeat the previous two steps for each ingredient unit.
12. Verify operation of the control circuit safety interlocks (such as the door on a mill). When the interlock switch is opened, power to the ingredient units

should go off. Power should only be restored by closing the interlock switch and then pushing the START switch on the motor contactor enclosure.

13. Verify operation of input signals to solid state relay board. The red LED next to the yellow input modules should be on only when the appropriate voltage to be monitored is on.
14. Set ingredient unit parameters 31 to 38 as required to operate the solid state relays, and monitor the input modules. See pages 7-11.
15. Set flowrates on the units to a suitable rate. Press a START switch on one of the units. The entire system should start up, with the external motors starting after the programmed delays (parameters 31-38).
16. After allowing the units to run for at least a few minutes to 'settle in', they may be stopped. The calibration of each CF unit should be verified by catching a sample and weighing the sample. See instructions on page 21. LIW unit calibration can be checked either by dispensing a sample and weighing the sample or by simply placing a test weight in the hopper (first front and then the back) and reading the hopper weight on the display.

GENERAL WIRING INSTRUCTIONS

A wiring diagram of an example system is shown in Figure 3. It shows a basic system with one ingredient unit and controls for an infeed auger, mill, and mill discharge auger.

Two holes have been punched on each side of the ingredient unit assembly. Choose the most convenient side for wire entry. The top hole is for electrical power to the units and infeed auger control. The bottom hole is for wiring to the solid state relay circuit board mounted on the side of the unit.

To minimize the possibility of electrical noise interfering with the ingredient units, maintain at least 3 feet from the motor starter/contacter enclosure. Electrical wiring should be run in metal conduit (EMT with compression fittings or rigid metallic).

All wires entering the ingredient units should pass through one of the ferrite electrical transient suppressors supplied with the unit.

A ground wire should connect to the ground lug in the bottom of the control box of one of the units.

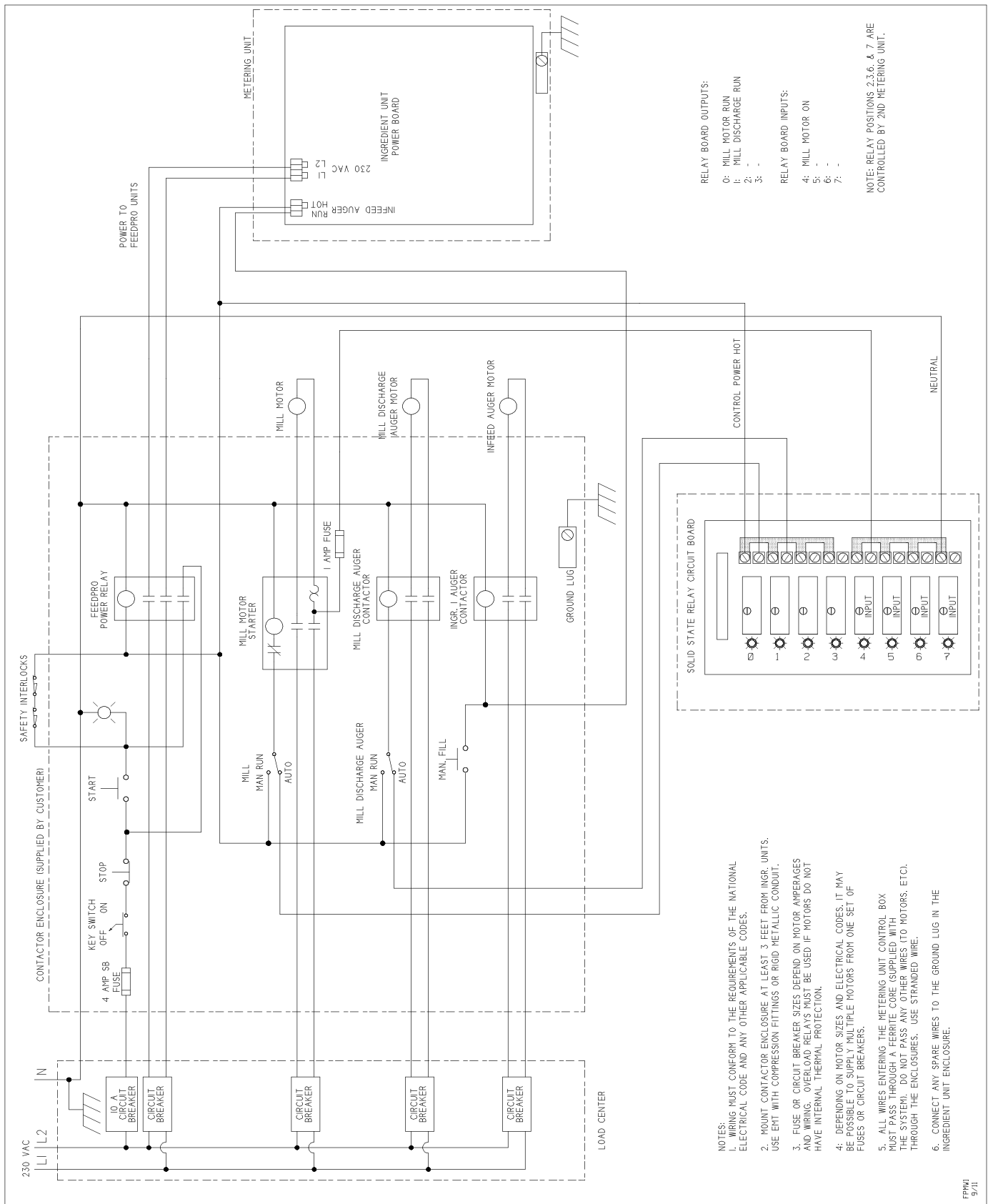


Figure 3. Example system wiring diagram.

MOTOR CONTROL

An optional solid state relay (SSR) circuit board (shown in Figures 3 and 6) can be mounted on the side of one of the units. This board can hold up to two solid state relays and up to two input modules per unit (maximum of four each if two or more units are installed). The ingredient units control these SSR's with programmable time delays and modes of operation (parameters 31-38). These can be used to run the augers, a mill, etc. via motor starters or contactors. As shown on the wiring diagram in Figure 1, it is suggested that each motor starter be wired through a manual control switch and then to the appropriate solid state relay, since there may be times when it will be desirable to manually run some of the equipment.

Each black colored solid state relay (SSR) is rated at 120 VAC and 3 amps. The appropriate relay will turn on and stay on whenever the particular motor is to run. It will turn off when the motor is to turn off. The yellow input modules will sense the presence of a 115 VAC input signal.

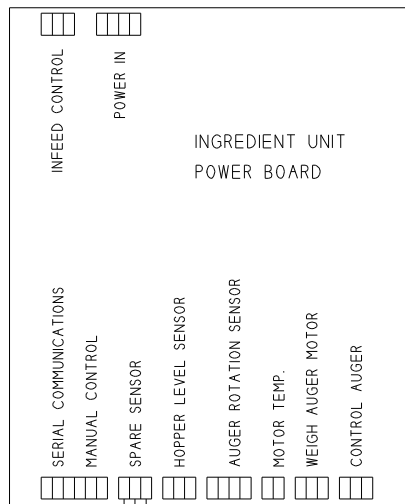
Note that the SSR's are not required for controlling the incoming ingredients into the Feedpro™ ingredient units. The incoming ingredients are directly controlled by relays contained in the ingredient units.

DISCHARGE SENSOR

An optional capacitive sensor can be installed to detect a plugged discharge area and quickly stop the system. Details on its installation are shown in Figure 4. (page 18). An alternate use for this sensor is to suspend metering while the sensor is touched, and resume metering when sensor is no longer touched. See parameters 9 and 27.

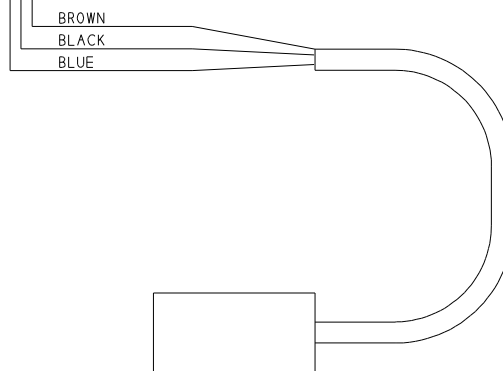
INGREDIENT UNIT POWER CIRCUIT BOARD

A pictorial diagram of the power printed circuit board in the ingredient units is shown in Figure 5. (page 19). This board is located inside the enclosure at the front of each ingredient unit. The function of each terminal block and fuse is shown.



INSTALLATION NOTES:

1. TURN ALL POWER OFF TO THE FEEDPRO SYSTEM.
2. DRILL HOLE IN OUTLET AS SHOWN.
3. MOUNT THE SENSOR THROUGH THE HOLE, AND BRING THE CABLE UP ALONG THE SIDE OF THE UNIT. ROUTE THE SENSOR CABLE INTO THE CONTROL ENCLOSURE THROUGH A GROMMET ON THE SIDE OF THE UNIT.
4. CONNECT THE SENSOR WIRES AS SHOWN IN THE SCHEMATIC DIAGRAM. USE A SMALL SCREWDRIVER TO PUSH GENTLY ON THE WHITE PLASTIC LEVER ON THE TERMINAL TO ALLOW A WIRE TO ENTER. PLACE THE WIRE IN THE TERMINAL AND RELEASE THE LEVER.
5. CLOSE THE CONTROL ENCLOSURE DOOR AND RE-APPLY POWER. ADD 'I' TO INGREDIENT UNIT PARAMETER #27 TO MAKE THE COMPUTER MONITOR THIS SIGNAL.



CAPACITIVE PROXIMITY SENSOR
USUALLY INSTALLED IN THE
HIGHEST FLOWRATE UNIT

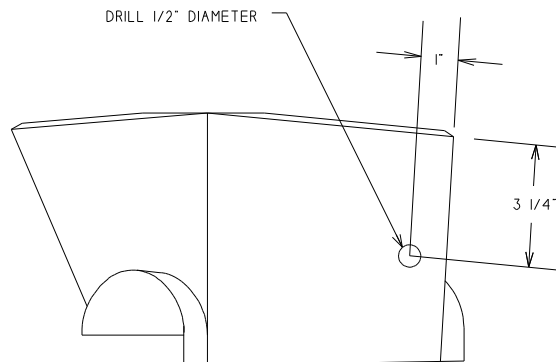


Figure 4. Optional Discharge Sensor Wiring Diagram.

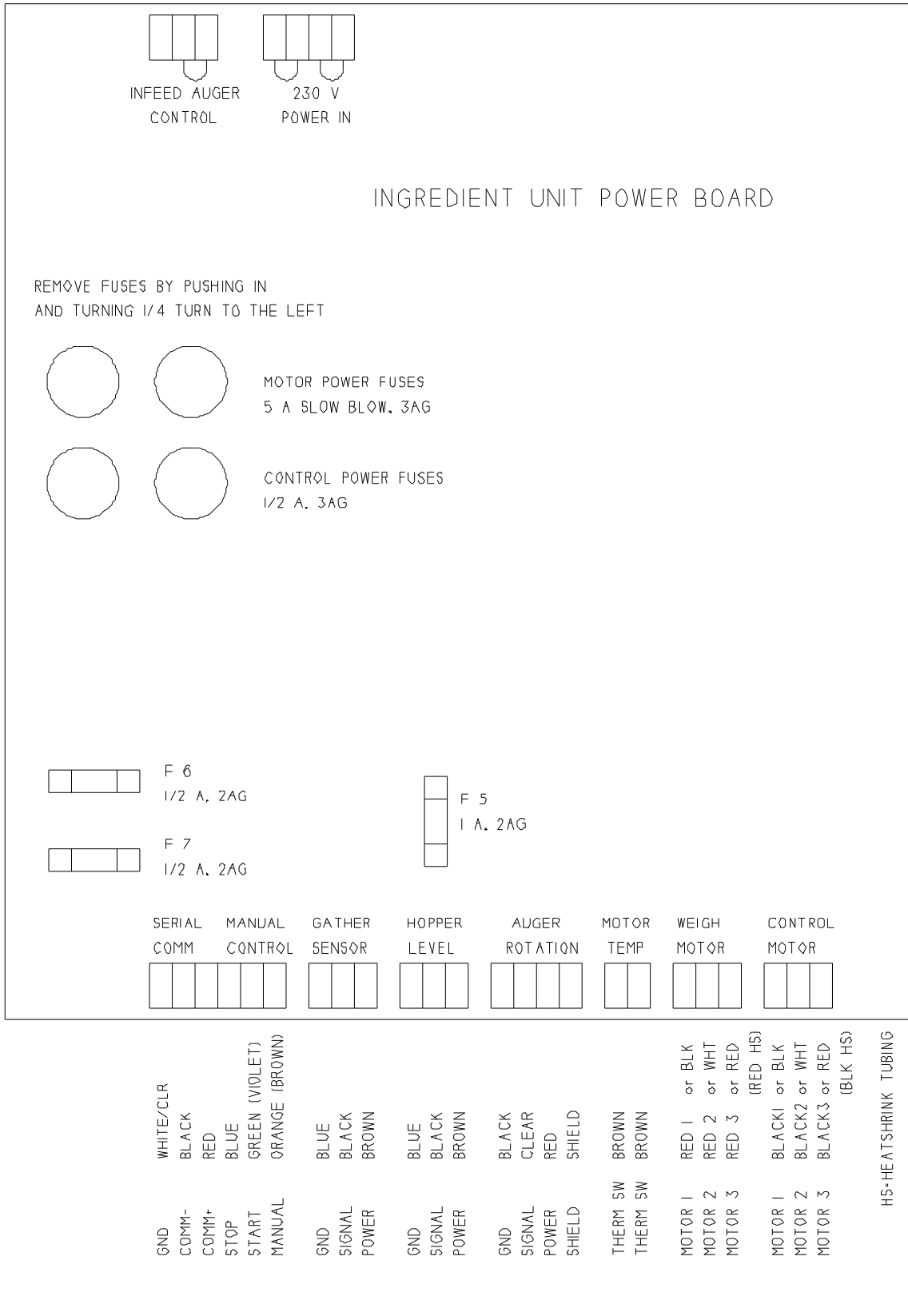
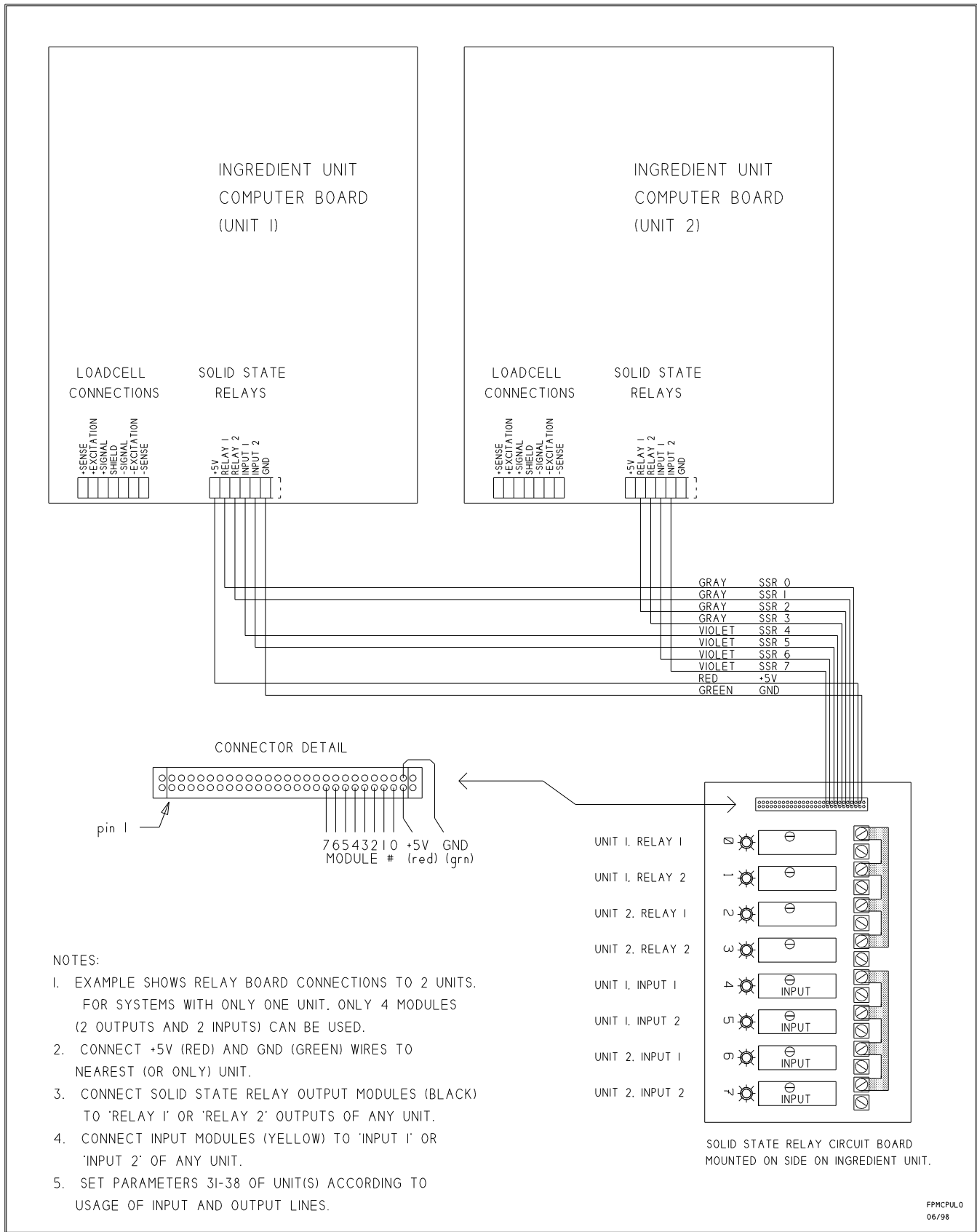


Figure 5. Ingredient Unit Power Circuit Board Layout.



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




Figure 6. Ingredient Units to Solid State Relay Board Wiring Diagram.

CALIBRATION VERIFICATION INSTRUCTIONS FOR CONTINUOUS FLOW INGREDIENT UNITS

EQUIPMENT REQUIRED

1. Sample collection container. Needs to be shallow enough to fit under the metering unit, and capable of holding at least 40 or 50 lb. of the sample.
2. Digital scale. Need capacity of at least 100 lb. and a resolution of 0.05 lb or better.

PROCEDURE

1. Open sample access door below the metering unit.
2. Select weight manual mode on all ingredient units.
3. Set target flowrate on the unit to be checked to a value similar to that at which it is typically run.
4. Set target flowrate on all other units to 0.
5. Hold  while pushing  to begin the calibration mode. The unit will empty the weighing auger, zero the loadcell, overflow the weighing auger, and stop.
6. Empty the sample collection container.
7. Push  to start the unit. Collect a sample of at least 40 or 50 lbs. (the weight will be displayed if  is set to 'TOTAL'). Push  to stop. The scale weight of the sample and the Feedpro weight should be recorded. To quit, go to step 9.
8. Push  to cleanout, zero, and refill the unit. Empty the sample collection container. Go to step 7 to collect another sample.
9. Hold  while pushing  to quit the calibration mode.
10. Calculate ratios of Feedpro weights / scale weights. Find average of ratios. If significantly different than 1.00, the calibration constant can be changed in the ingredient unit (Parameter 14 -- Auger K). Divide the old constant by the ratio and enter this value in Parameter 14. (See pages 7-9 for instructions on entering the parameters.
11. Close sample access door.

GUARANTEE

Pella Electronics Co., Inc. guarantees for a period of one year from the date of sale, to correct by repair or replacement, at Pella Electronics Co., Inc.'s option, any defect in the material or workmanship in any part of the product which was manufactured by Pella Electronics Co., Inc. In the event of replacement, Pella Electronics Co., Inc. sole obligation shall be to provide replacement product or parts. This guarantee does not apply to equipment used for rental to others, to parts or products requiring replacement because of natural wear and tear, improper installation or misuse, nor to products, accessories, parts or attachments which were not manufactured by Pella Electronics Co., Inc.

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