PERFORMANCE FEEDERS, INC.

FEED SYSTEM CONTROLLER

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SAFETY INSTRUCTIONS

The following safety instructions are provided for the safety of operators and also for the protection of the products described in this manual and any connected equipment.

This manual is intended to be used by technically qualified personnel

Performance Feeders reserves the right to make changes to this manual and/or any product discussed in this manual at any time without notice and without any obligation. Not all features discussed in this manual may be available in product models mentioned in this manual.

Warning!
Hazardous Voltage.
Failure to observe can cause serious injury, damage or death.
Read this manual thoroughly before using any feeder controllers.

⚠ Disconnect AC power before installing, modifying, dismantling, changing fuses or performing any maintenance on any of the equipment described in this manual.

⚠ Before connecting AC power, check if rated voltage of the unit confirms to the supply voltage.

⚠ Follow all applicable local and national codes during the installation and operation of your equipment.

⚠ As codes may vary from area to area, it is not Performance Feeders' responsibility to determine which codes should be followed.

⚠ Be sure to verify that the installation and operation of the equipment is in compliance with the latest revision codes.

The units described in this manual are electrical controllers designed for controlling vibratory feeders.

Table of Contents

1. Performance Feeders System Controllers, Rev. 0.1

The Performance Feeders' system controllers, PFN Rev 0.1, were designed with features to operate as stand-alone, plug-n-play feeder controllers with options to interface with a PLC.

The controllers are available in three standard sizes including single channel, dual channel and three channel output. Each standard controller is available in various models to best meet each specific feeder application. See Table-1 below.

All PFN controllers meet IP52 rating and NFPA 79 Electrical Standard for Industrial Machinery.

PFN-1.1

PFN-2.1

PFN-3.1

Model	24VDC	Sensor Input	Enable Input	Solenoid Output	Status Output	Dual Track	Sensor Delay	Output Channels	Controller Dimensions	IP52
PFN-1.1	✓	✓	✓	✓	✓	—	✓	1	8x6x4	✓
PFN-1.1-I	—	—	✓	—	—	—	—	1	8x6x4	✓
PFN-1.1-H	✓	✓	✓	—	—	—	✓	1	8x6x4	✓
PFN-1.1-A	✓	✓	✓	✓	✓	✓	✓	1	10x8x4	✓
PFN-1.1-CI	—	—	✓	—	—	—	—	1	8x6x4	✓
PFN-1.1-CI-I	—	—	✓	—	—	—	—	1	8x6x4	✓
PFN-1.1-CI-H	—	—	✓	—	—	—	—	1	8x6x4	✓
PFN-2.1-I	✓	✓	✓	✓	✓	—	✓	2	10x8x4	✓
PFN-2.1-IA	✓	✓	✓	✓	✓	✓	✓	2	10x8x4	✓
PFN-2.1-H	✓	✓	✓	✓	✓	—	✓	2	10x8x4	✓
PFN-2.1-HA	✓	✓	✓	✓	✓	✓	✓	2	12x10x5	✓
PFN-2.1-CI	—	—	✓	—	—	—	—	2	10x8x4	✓
PFN-2.1-CI-H	—	—	✓	—	—	—	—	2	10x8x4	✓
PFN-3.1	✓	✓	✓	✓	✓	—	✓	3	12x10x5	✓
PFN-3.1-A	✓	✓	✓	✓	✓	✓	✓	3	12x10x5	✓
PFN-3.1-CI	—	—	✓	—	—	—	—	3	12x10x5	✓

Table-1

2. PFN Control Boards

A PFN controller may have more than one control board. These boards are available in two different formats; a Sensor-Ready Board and a Basic Board. See Figures 1 & 2 on next page. Each control board must be set to meet feeder specifications.

Depending on the model, a PFN controller may include a combination of both Sensor-Ready and Basic Boards.

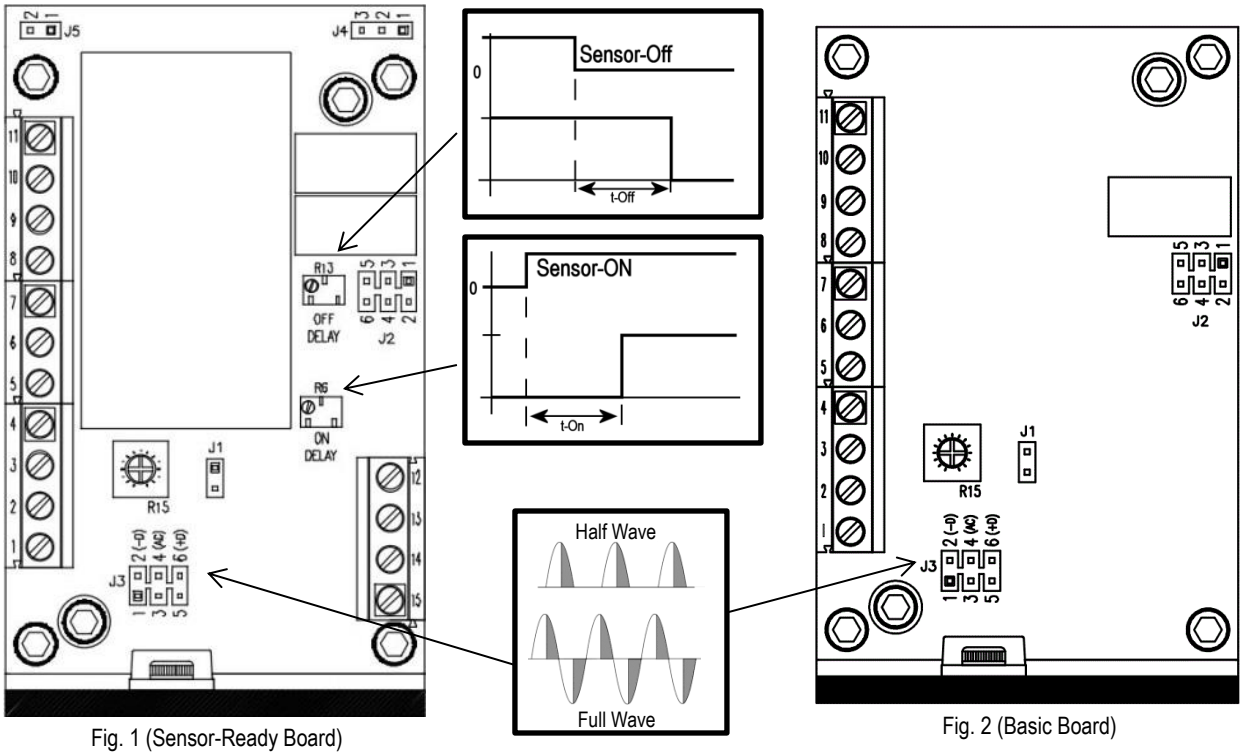


Fig. 1 (Sensor-Ready Board)

Fig. 2 (Basic Board)

2.1 **Sensor-Ready Board:** The Sensor-Ready Board includes a Phase Angle Triac circuit to operate a feeder coil and a 24Vdc power source to control various sensors and air solenoids up to 400ma Max. The board also includes a time delay circuit with a timing range from 0.25ms to 12sec allowing the PFN controller to accept any 24Vdc PNP sensors. When paired with a second Sensor-Ready Board, the controller will also have the ability to perform dual track air blow-off.
(Note: Refer to Table-1 on Page 3 for controller models that include Sensor Inputs.)

2.2 **Basic Board:** The Basic Board is a simpler version of the Sensor-Ready Board. It includes only the Phase Angle Triac circuit and the Enable input option.

3. Setting The AC Output - J3:

Jumper J3 sets the AC output rectification. Each AC output channel of a controller can be independently set for full wave, positive half wave or negative half wave rectification.
(NOTE: This option is available on all controller models.)

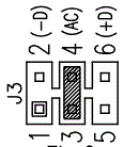


Fig. 3

3.1 **Full Wave:** For full wave non-rectified output (100/120Hz), move the jumper on J3, across pins 3 & 4 (AC) as shown in Fig. 3.

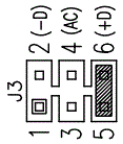


Fig. 4

3.2 **Positive Half Wave:** For positive half wave rectified output (50/60Hz), move the jumper on J3, across pins 5 & 6 (+D) as shown in Fig. 4.

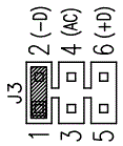


Fig. 5

3.3 **Negative Half Wave:** For negative half wave rectified output (50/60Hz), move the jumper on J3, across pins 1 & 2 (-D) as shown in Fig. 5.

4. Setting Input Options - J1, J2 & J5:

A controller may have more than one input port and up to five total input options. These options include Bypass, Enable Ready, Sensor Input, Inverted Sensor Input and Dual Track Sensor input. Jumpers J1, J2 and J5 set the controller's input mode of operation.

4.1 **Bypass Option - J1:** Commonly used on Basic Boards or feeders that do not need to be controlled by an external input option.
To set the output channel for continuous operation and bypass the input option, place a jumper on J1 across pins 1 & 2 as shown in Fig. 6.
(NOTE: The Bypass/Continuous Operation option is available on all models.)

Fig. 6

4.2 **Remote Enable Option - J2 & J5:** To enable the feeder from an external device such as a PLC, remove the internal (Enable) jumper J5 and move the jumper on J2 across pins 1 & 2 (Remote). See Fig. 7 & 8. In this mode the feeder can be remotely enabled by applying a 24Vdc signal to the designated pins of the Enable port CN6. See Fig. 9-A, 9-B and Fig. 10 below. [J5 is the internal enable jumper.]
(NOTE: Refer to Table-1 on page 3 for available controllers with Enable input option.)

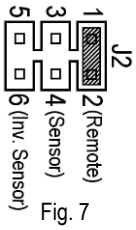


Fig. 7

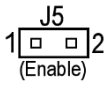


Fig. 8

Pinout of CN6 on Standard controller models

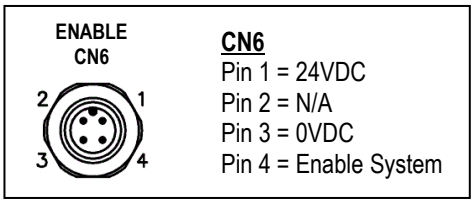


Fig. 9-A

Pinout of CN6 on single or dual channels CI controller models

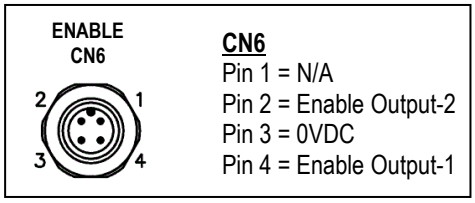


Fig. 9-B

Pinout of CN6 and CN8 on controller model PFN-3.1-CI

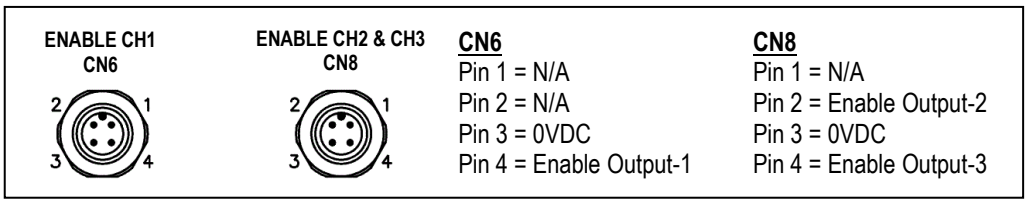


Fig. 10

Fig. 11

4.3 **Bowl Level Sensor Setting - J2:** This setting is used to control the operation of a hopper feeder when using a Bowl Level Sensor. To set for Bowl Level sensor and utilize the on-board time delays, move the jumper J2 across pins 3 & 4 (Sensor) on the Hopper Sensor-Ready Board. See Fig. 11. For CN4.2 connector pin assignments refer to Fig. 13 below.

Pinout of CN4.1 on Standard controller models

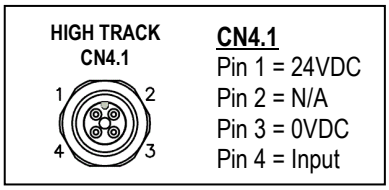


Fig. 12

Pinout of CN4.2 on Standard controller models

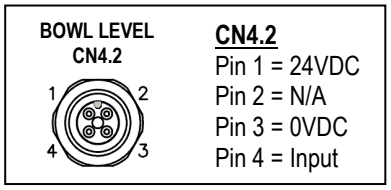
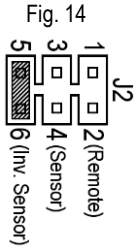


Fig. 13

Fig. 14



4.4 **High Track Sensor Setting - J2:** This setting is used to control the operation of a bowl feeder when using a high track sensor. To set the high track sensor and utilize the on-board time delays, move the J2 jumper across pins 5 & 6 (Inv. Sensor) on the Bowl Sensor-Ready Board. See Fig. 14. For pin assignment of Track Sensor Input connector CN4.1, refer to Fig. 12 above.
(NOTE: Track sensors must be set for (DO), Dark Operate or (N.O.), Normally Open. This option is not available on controllers with model numbers ending in 1.1-I, 1.1-H and CI.)

5. <u>On-Board Time Delay:</u>

The Sensor-Ready board includes two adjustable time delay circuits, Delay-On and Delay-Off. These circuits are connected in series with the sensor input. Time delay ranges between 0.002 to 12 seconds, adjustable via two small precision potentiometers; R6 and R13. See Fig. 15. [Potentiometer ratio vs time: 1 full rotation = approx. 1 second delay]

(NOTE: This option is not available on controllers with model numbers ending in 1.1-I, 2.1-I and CI.)

5.1 **Adjusting the On-Delay Timer:** Before setting the On-Delay timer it is better to start at the lowest delay point. To set the timer at the lowest delay point: using a 1.5mm flat screwdriver, rotate potentiometer R6 counterclockwise until the lowest delay is reached, approximately 5 to 6 full revolutions. To set a time for the On-Delay: rotate the potentiometer R6 clockwise until the desired time delay is reached.

5.2 **Adjusting the Off-Delay Timer:** Before setting the Off-Delay timer it is better to start at the lowest delay point. To set the timer at the lowest delay point: using a 1.5mm flat screwdriver, rotate potentiometer R13 counterclockwise until the lowest delay is reached. Approximately 5 to 6 full revolutions. To set a time for the Off-Delay: rotate the potentiometer R13 clockwise until the desired time delay is reached.

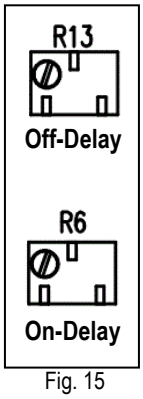


Fig. 15

6. <u>Setting for Single or Dual Track Air Blow-Off:</u>

The Sensor-Ready Board can be set for single or dual track air blow-off. Single Track Air Blow-Off can be achieved using only one Sensor-Ready board. However, dual track air blow-off requires two Sensor-Ready boards linked together. Single track air blow-off uses the High Track Sensor to control track back pressure. When parts move at a high rate across the track, it is better to keep the bowl running and blow back the excessive parts. This minimizes the wear and tear of starting and stopping the bowl too often. Dual Track Air Blow-Off is used when the feeder includes two individual tracks with two High Track Sensors. When both tracks are full, the bowl stops. If only one track is full, air comes on for that track to relieve back pressure.

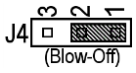


Fig. 16

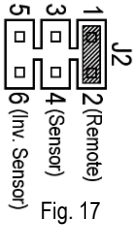


Fig. 17

6.1 **Single Track Air Blow-Off Setting:** Controllers with single track air blow-off are custom specified for each feeder and may have a unique part number. Refer to specific feeder drawings for connector pinout. To set for Single Track Air Blow-Off, place a jumper on J4 across pins 1 & 2, and move jumper on J2 across pins 1 & 2. See Fig. 16 & 17.

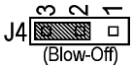


Fig. 18

6.2 **Dual Track Air Blow-Off Setting:** Controllers with model numbers ending in A are internally configured to operate feeders with dual line air blow-off. On these models, ports CN4.1 and CN7 are internally configured for dual operation. See Fig. 20. With the use of Tee couplers, CN4.1 will operate two track sensors while CN7 will operate two air solenoids. See Fig. 21 & 22 on next page. To set for Dual Track Air Blow-off place a jumper on J4 pins 2 & 3, and J2 pins 5 & 6 on control boards 1 and 2. See Fig. 18 & 19.

(NOTE: For Single or Dual Track Blow-Off, Track Sensors must be set for (DO), Dark Operate or (N.O.), Normally Open.)

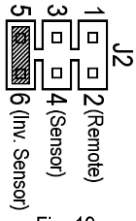


Fig. 19

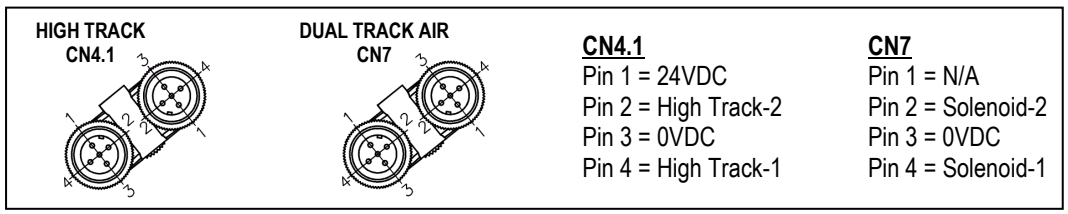


Fig. 20

CN4.1 T-Connector Pinout

CN4.1-A	CN4.1-B
Pin 1 = 24VDC	Pin 1 = 24VDC
Pin 2 = N/A	Pin 2 = N/A
Pin 3 = 0VDC	Pin 3 = 0VDC
Pin 4 = High Track-1	Pin 4 = High Track-2

Fig. 21

CN7 T-Connector Pinout

CN7-A	CN7-B
Pin 1 = N/A	Pin 1 = N/A
Pin 2 = N/A	Pin 2 = N/A
Pin 3 = 0VDC	Pin 3 = 0VDC
Pin 4 = Solenoid-1	Pin 4 = Solenoid-2

Fig. 22

7. Setting the Minimum AC Output:

Each controller board includes a minimum range control potentiometer to adjust the minimum throughput of the controller's AC output.
(NOTE: This option is available on all controller models.)

7.1 **Adjusting for Minimum AC Output:** Switch main power to the OFF position. Set front panel potentiometer to the zero mark. Using a 1.5mm flat screwdriver, rotate potentiometer R15 on the control board to the minimum position, fully counterclockwise. Switch main power to the ON position, slowly rotate potentiometer R15 on the control board clockwise until the feeder starts to vibrate. See Fig. 23.

Fig. 23

Special Notice to Customer

Prior to delivery, all Performance Feeders' controllers pass several quality and performance inspections to guarantee the product is free from defects during manufacturing. It is not likely for our product to fail when used in accordance with the operating instructions. However, if at any time you may feel that one of Performance Feeders' controllers may not be operating correctly, please contact Performance Feeders at (813) 855-2685 and ask for technical support. Our technical support engineers can help you determine the cause of the problems and also offer the proper solution.

All listed values indicated in this manual are standard values only and do not pertain to each specific application or special units. We reserve the right to make technical changes without notification and/or obligation.

Performance Feeders Limited Warranty

Performance Feeders, Inc. will repair or replace, at Performance Feeders' discretion, any Performance Feeders' controller which shows signs of defect in material, workmanship or fails to meet manufacturer specifications within 90 days from original date of shipment from Performance Feeders. Using or Operating a Performance Feeders' controller outside the rated specifications printed in this instruction manual will void the warranty.

Performance Feeders does not assume any liability for cost of removal, cost of installation, down time, production delays, return shipping, or damage to other items or equipment associated with a Performance Feeders' controller, for failures which occur during or after the warranty period.