P/N 6812
6800 Series Control Constant Feed Rate Option

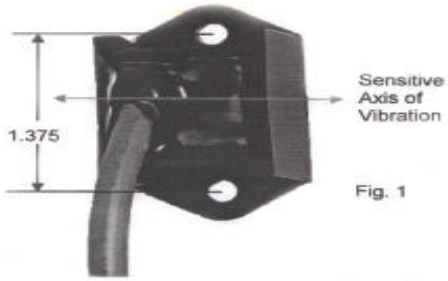


Fig. 1

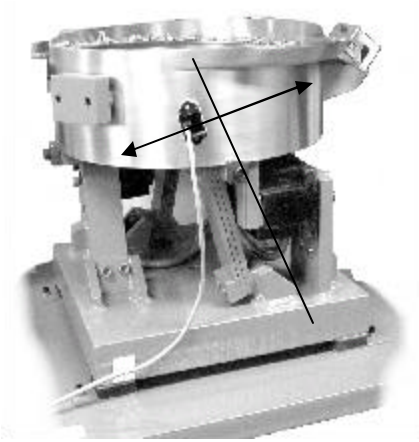


Fig. 2 The arrow shows the direction of vibration which is at a right angle to the spring pack.

Warning: Avoid bumping the sensor before installation. Bumping the sensor could damage it and void the warranty.

Installation and Operation

1. General Description

Vibratory feeders are inherently unstable and are very susceptible to changes in part load and power line voltage fluctuations. These changes can cause part jams or very few parts to be fed to the machine. The Constant Feed Rate control corrects for fluctuations in the vibratory feeder speed by using a sensor attached to the feeder to monitor the vibration level. The control then keeps the vibratory feeder operating with a constant amount of vibration and thus a constant part feed rate.

When something has caused a large change in vibration, an approximate feed rate is restored almost immediately. Then, the preferred feed rate can be fully restored within 12 seconds. Small changes in vibration are usually corrected without the operator even knowing that a change has occurred.

The Constant Feed Rate feature is sold as a factory-installed option for any model of the 6800 Series controls. This option includes a sensor as well as special software for the control.

The sensor design incorporates a 4-20mA style of output to provide immunity to electrical noise. Because the sensor connects to the 4-20mA input, a separate 4-20mA circuit board assembly is available from ADI when 4-20mA speed control is needed.

2. Installing the Sensor

Note: Failure to adequately prepare the feeder's surface properly may result in a sensor that will not bond to the feeder. The sensor will not be mounted until step C-6.

A. ORIENT THE SENSOR so that its sensitive axis is in the same direction as the vibration of the feeder. The double-ended arrow in figure 1 shows the sensor's sensitive axis. Align the sensitive axis of the sensor in the same direction as the vibration (see figure 2). The sensor must be oriented correctly for proper operation.

B. CHOOSE A LOCATION for mounting the sensor on the feeder that is smooth and that will allow the adhesive on the sensor to bond. Avoid mounting the sensor over ridges and bumps which can reduce the ability of the adhesive to stick to the feeder. The correct location will also have enough space for the sensor's cable to hang straight down without touching anything else.

C. SURFACE PREPARATION of the feeder is crucial for proper bonding between the sensor and the feeder. Please follow these steps completely.

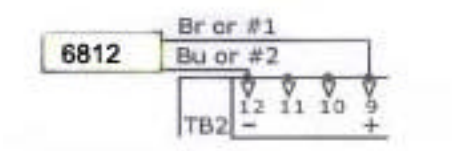
1) The feeder should be kept between 70° and 100° F for ideal tape application.
2) Clean a three and one-half inch circular area with a solvent like isopropyl alcohol that will not leave a residue. As a rule of thumb, the area can be considered clean after cleaning the area with a solvent-saturated, white paper-towel the towel is as clean as it was before wiping.
3) Using a good amount of pressure, polish the cleaned, circular area of the feeder using a scratch pad or steel wool. Repeat step 2, and then go to step 4.
4) Wipe the cleaned surface with an alcohol wipe or with a 50/50 isopropyl alcohol/water combination.
5) Dry the surface thoroughly using a low lint cloth or a clean paper towel.
6) Remove the vibration sensor from its protective packaging. Remove the liner from the adhesive backing. Avoid touching the tape. Apply the vibration sensor to the prepared area of the feeder. Press the sensor very firmly onto the feeder surface for at least 10 seconds.
7) Allow the vibration sensor at least 20 minutes to cure before operation. Note: It takes 72 hours for the adhesive to fully cure at 70° F.

Alternatively, #8 or M4 screws can be used to mount the sensor to the feeder. The hole centers are 1.375" apart.

D. ROUTE THE SENSOR CABLE to protect it from strain due to vibration. The cable that attaches to the sensor will not break from normal vibration; however, some care should be used when routing the wire from the sensor to the control. The cable should hang straight down from the sensor without touching the feeder bowl or anything else.

The sensor cable should bend towards the power control with a bend radius of 3 inches or greater. Use a tie wrap mounting-base (or a non-vibrating surface). See figure 2.

E. **CONNECT THE SENSOR** to the control. The sensor's brown wire connects to +12VDC at TB2-9. The blue wire connects the signal input at TB2-12.



3. TO LIMIT THE MAXIMUM OUTPUT OF CONTROL:

The MAX Output trimpot must be adjusted to keep the vibratory feeder from hammering when the control is turned up to full power. The feeder must not hammer regardless of whether it is full of parts or empty. Generally, a feeder is more prone to hammer when it is empty.

Please note: If the vibratory feeder shakes too violently to properly feed parts or if the feed rate slows down above a particular setting on the main control dial, then adjust the MAX pot counter-clockwise (CCW) to eliminate these conditions.

NOTE: Output to the feeder must be connected and the control set for proper output frequency (60 to 120 pulse) setting. The Run Contact input must be closed and the Part Sensor must be calling for parts.

A. Power input should be **OFF** or disconnected.
B. Rotate **MAIN CONTROL DIAL** on front cover to 0 or its minimum setting.
C. Open cover to allow access to printed circuit card.
D. Using **CAUTION,** turn power **ON** (no output should be present).
E. Rotate the **MAIN CONTROL DIAL** on front cover slowly to its highest setting.
F. Adjust the **MAX** Output trimpot so that the output to the feeder reaches its desired maximum level, when the **MAIN CONTROL DIAL** is turned fully clockwise. Turning the MAX Output trimpot clockwise increases the maximum output level.

To take full advantage of the Constant Feed Rate control's regulation, it is important not to set the normal operating feed rate to "10" on the dial; otherwise, the output power cannot be boosted above the MAX setting when the bowl slows down.

4. CONTROL OPERATION

To operate the control, simply turn "ON" the control and adjust the main control dial for the desired feed rate. It will then automatically maintain that feed rate until the power is removed from the control.

5. MAIN CONTROL DIAL

The feedback sensor automatically adjusts the output of the control. After a period of time, the number setting of the main control dial may no longer represent the power out of the control because the control may be regulating at a different power level than is indicated by the main pot.

If it is desirable to know "where on the dial" you are operating at, turn the dial to 0 or 10, and then readjust it for the desired speed. This will reset any feedback adjustments and reveal what is the real 60/120 switch will also reset the feedback adjustments.

When the main control dial is readjusted 1/64 of a turn or more, the control will automatically maintain this setting for the new feed rate. The main control dial may need to be re-adjusted whenever the power has been turned back on.

Note: there is a two-second power-up delay before the sensor circuit begins to regulate the control output.

6. APPLICATION TIPS

By nature vibratory feeder bowls are unstable. If there are audible changes in the sound of the bowl, this is normal. The feed rate should remain the same; however the changes in the sound of the bowl indicate that the feedback circuit is correcting for minor changes in the vibration level of the bowl. The changes are due to a changing part load, stuck parts, bunching up of parts, changes in back pressure or a line voltage fluctuation.

The sensor can monitor up to 50g of vibration. If the vibration level goes above 50g, the output of the control will automatically be reduced to protect against unmonitored levels of vibration and hammering. To determine if the vibration level for the sensor is too close to 50g in your application, monitor the output voltage of the sensor: TB2-12 is its maximum feed rate, the voltage across these terminals should be below the maximum voltage of 4.9VDC. If it is at very near that level, rotate the sensor about 15 degrees so that its sensitive axis receives less then 50g of vibration. Typically mounting the sensor vertically will put the sensor at a 15° angle from the spring packs.

In rare instances the ADI control may not maintain a tight enough tolerance of the vibration. If this is the case, the sensor should be repositioned further away from the center of the vibratory feeder. Ideally, the voltage across terminals TB2-12 and TB2-4 should be 1.5VDC or higher when the feeder is at its desired feed rate.

To determine the approximate g level of your bowl, request the acceleration formula sheet from ADI.

If the need arises to disable to feedback features of this control, remover power from the control and remove the sensor's wiring.

WARNING:

Mounting this control on a vibrating surface will void the warranty.

Care should be exercised when handling the sensor. Drops onto hard surfaces can cause shocks of greater than 2000g and exceed the absolute maximum rating of the device.

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