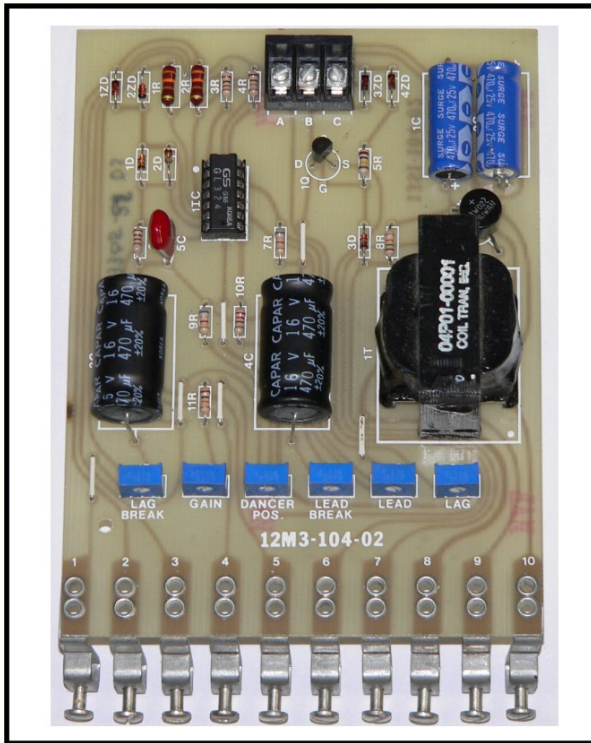


MODEL 204 DANCER POSITION REGULATOR

PART NUMBER 12M03-00104



GENERAL DESCRIPTION

The MODEL 204 DANCER POSITION REGULATOR is used to regulate the steady-state position of a process dancer by measuring its position with a potentiometer or other position transducer and comparing this position to the desired position as selected by an on-board "Dancer Position" potentiometer.

Derivative and Integral Stability Adjustments allow the user to establish a gain-versus-frequency characteristic for stable operation over a wide range of operating conditions and with drives of most manufacturers.

Advanced circuit design insures a high level of accuracy, noise immunity and reliability in industrial environments. A field-proven mounting arrangement provides reliable connection, but allows easy removal without disturbing permanent wiring. Front access and detailed technical manual makes installation and service easy.

The MODEL 204 DANCER POSITION REGULATOR can be used with other REFLEX® SERIES 200 CONTROL MODULES and POWER CONVERTERS for smooth, stepless control in many applications. It is compatible with equipment of other manufacturers.

FEATURES

- COMPACT, SELF-CONTAINED
- MODERATELY PRICED
- WIDE RANGE OF ADJUSTMENT
- COMPATIBLE WITH PACKAGED DRIVES OF MOST MANUFACTURERS
- POSITIVE FRONT-ACCESS CONNECTION
- EASILY REMOVED, REPAIRED OR REPLACED
- CONSERVATIVELY RATED FOR RELIABILITY
- DETAILED TECHNICAL MANUAL

TYPICAL APPLICATIONS

- DC, AC AND EDDY CURRENT DRIVES
- PROCESS LINES
- WINDERS AND SPOOLERS
- UNWINDERS AND PAYOFFS

SPECIFICATIONS

SUPPLY: 120V AC $\pm 10\%$
50/60 Hz, Single Phase

AMBIENT TEMPERATURE: 0° to 40°C
(32°-104°F) 50°C in Cabinet

INPUT: Potentiometer (1K to 50K Ohms or 0 to +6V DC)

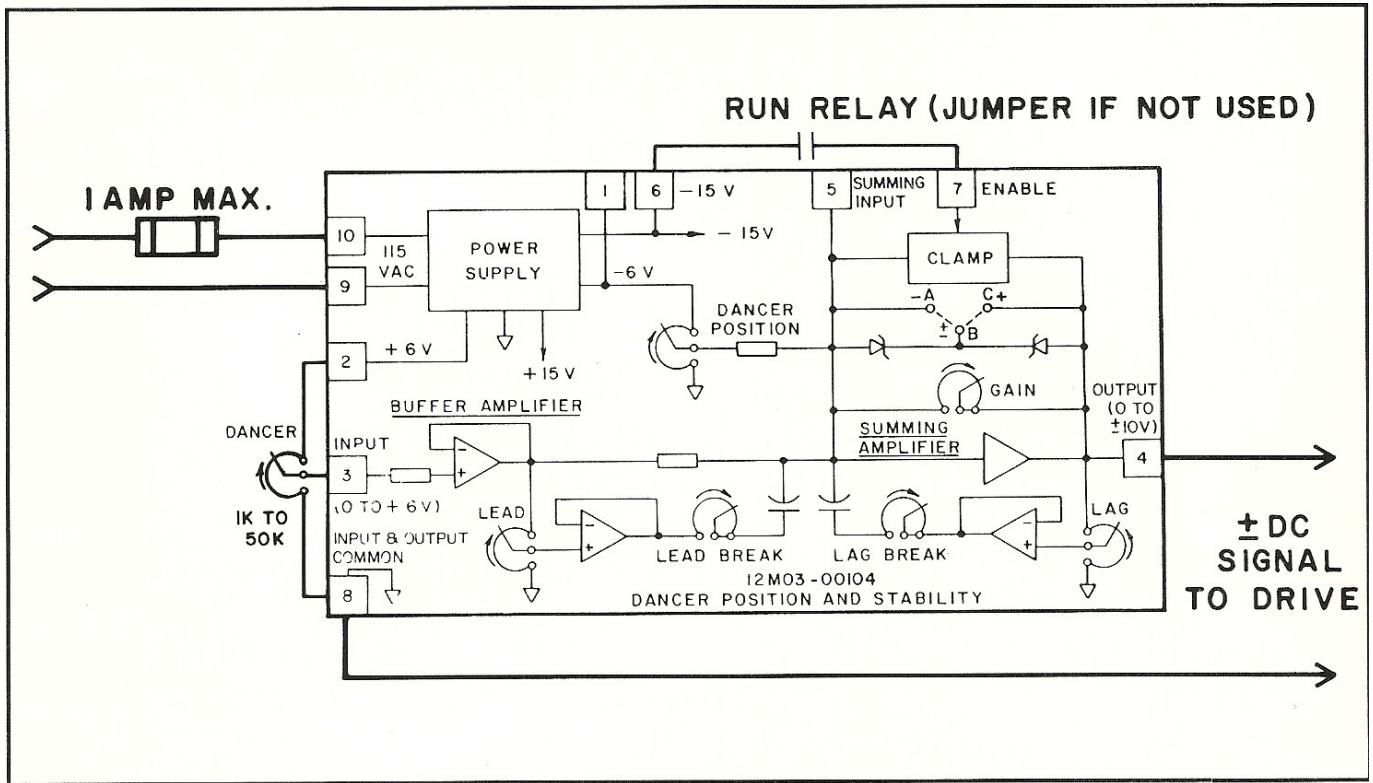
OUTPUT: 0 to $\pm 10V$ DC @ 5mA maximum depending on position and motion of sensing element.

ADJUSTMENTS: Position, Gain, Stability

OPTIONS

- REMOTE POSITION ADJUSTMENT
- SHORT STROKE REACTOR
- COMPATIBLE WITH OTHER SERIES 200 CONTROLS (See Bulletin SB-200)
- SYSTEM APPLICATION DRAWINGS AVAILABLE

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APPLICATION NOTES

1. The Dancer Position Regulator is designed to control an electric motor drive in response to the position and motion of a potentiometer coupled to a process dancer roll.

Adjustments are included to insure stability over a wide-range of operating conditions. As a general rule, at speeds up to 4000 FPM the system can be stabilized if there is at least 1 second of storage in the dancer. In most cases 1/2 second of storage is adequate.

EXAMPLE: Machine operating at 600 FPM
$$\frac{600 \text{ FPM}}{60 \text{ SEC/MIN}} = 10 \text{ Feet per second}$$

10FPS x 1/2 second = 5 feet total storage
(with 180 degrees wrap on dancer roll,
total movement +/- 1 1/4 feet.)

2. When making the initial start-up, be sure the dancer potentiometer is properly installed mechanically. There must be greater movement of the potentiometer than the dancer, otherwise the dancer will break the potentiometer at one end or the other. The resistance of the dancer potentiometer is not critical but should not be less than 1K nor more than 50K.
3. Run the drive without material in the machine and move the dancer manually to establish that the drive will move the dancer in the proper direction under normal operating conditions.

If the sense is reversed, reverse the two outer leads to the dancer potentiometer. On a winder, a slack web condition will require an increase in drive speed. On an unwind, a slack web condition will require a decrease in drive speed.

4. With an empty core on the winder, thread up the machine with a string or light web that will break if the drive is not operating properly and adjust the Lead and Lag adjustments so that with the dancer in range with no slack, the drive can be started and establish dancer position without hunting or overshoot with the main machine at standstill.

CAUTION: MAKE SURE ALL SLACK IS REMOVED BEFORE ENERGIZING THE DRIVE.

5. Adjustments are provided to set a gain-versus-frequency characteristic for stable operation over a wide range of conditions. Initially the adjustments should be set as follows (100% = full clockwise):

POSITION = 50%
GAIN = 20% (cw makes dancer sensitive)
LEAD = 50% (cw makes dancer slow)
LEAD BREAK = 0% (cw kills lead signal)
LAG = 50% (cw makes drive sluggish)
LAG BREAK = 50% (ccw makes drive sluggish)

6. With the line at standstill, and the Dancer at one end of its travel, but no slack in the web, turn on the Dancer Controlled Drive. It should pick up and position the dancer near the center of it's travel without overshoot.

These adjustments should prove satisfactory for most applications. For more critical (high speed, large roll diameter change) some additional adjustment may be required.

The control cannot be damaged for any combination of adjustment. Satisfactory operation of the system can be obtained in the least amount of time, if the nature of the adjustment is understood and the effects observed and noted. Don't hesitate to put all adjustments back to initial settings and start over, if operation is not satisfactory.

7. If the dancer overshoots, turn the Lead Potentiometer clockwise 5% at a time and repeat step 7. If the "Lead" potentiometer does not correct the problem by the time it is turned to 85%, try adjusting the Lag and Lag Break potentiometers.

If "Lead" is set too high it may make the Dancer too slow to respond to process changes.

The "Lead" circuit tends to inject electrical "Noise" into the system. The "Lead Break" is used to provide a high frequency cutoff (above 10 Hz) to limit the noise. Too much "Lead Break" (above 10%) will nullify the effect of "Lead".

8. The "Lag" network will filter out some of the "Noise" and may have to be readjusted if the "Lead" network adjustments are changed.

Turning the "Lag" adjustment clockwise filters out noise but makes the drive sluggish. This may be desirable in applications where the process causes unnecessary movement of the dancer (as when winding an eccentric roll).

For fastest response the "Lag" adjustment should be turned counter clockwise and the "Lag Break" turned clockwise (20% and 80% are typical).

9. With REFLEX Power Converters, satisfactory performance is normally achieved when the peak-to-peak ripple on the output of the assembly (terminals 4 and 8) as measured with an oscilloscope is between 1 and 2 volts.
10. If greater accuracy (less movement of the dancer) is required, turn the "Gain" potentiometer clockwise. Sometimes accuracy must be poor to allow the dancer to move to provide additional storage as when transferring from one roll to another.

As the "Gain" is increased, readjust the "Lead" and "Lag" networks to maintain stability.

11. Repeat steps 8 through 11 with a full roll. Increase the gain until the dancer begins to overshoot, then back off slightly. If the drive tends to be unstable with a full roll turn the "Lead" clockwise.
12. A DC signal of up to 6 volts positive from a LVDT or the REFLEX Demodulator Part Number 12MO3-00103 may be connected to the input terminals 3 and 8 if an LVDT or Short-Stroke Reactor is used in place of the Dancer Position potentiometer.