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## INSTRUCTION MANUAL MODEL FAD FOLLOWER ARM – DANCER CONTROL

### 1.0 INTRODUCTION

The MAGPOWR FAD Follower Arm Dancer Control is a single board solution for follower arm or dancer control applications. A complete closed loop dancer control system can be built using only the FAD control with a MAGPOWR magnetic particle clutch or brake, and a MAGPOWR DFP sensor. A remote dancer position pot may also be used.

For follower arm applications, an external potentiometer is used for tension adjustments. Terminal strip connections are provided for its connection.

A reverse current feature has been included to reduce the minimum drag torque of the clutch or brake. Also, since the control circuits are electrically isolated from the power circuits, an isolation transformer is not required.

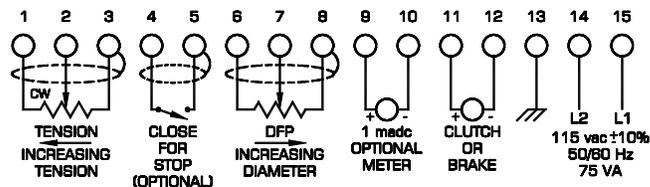
See Figure 1 for location of pots, jumpers, etc.

Refer to Section 3.0 for Dancer Applications.

### 2.0 FOLLOWER ARM APPLICATIONS

#### 2.1 INSTALLATION AND SETUP

1. Mount the FAD in a protected environment with an operating temperature range between 0 and 40° C.
2. Connect wiring as indicated below. Use shielded cable for all signal inputs. Route signal leads away from all power leads.



3. Adjust the DFP sensor shaft so that its keyway is pointing toward its cover when the follower arm is half way through its travel. This is an approximate adjustment, and is intended to center the sensor position to allow maximum rotation in both directions.

- Select the output current range by installing the jumpers on JP2 as indicated:

<u>CURRENT RANGE (adc)</u>	<u>JP2 JUMPER POSITIONS</u>
0.125	2-3, 4-5
0.25	1-2, 4-5
0.5	1-2, 3-4

For MAGPOWR magnetic particle clutches and brakes, the recommended JP2 settings are:

<u>MAGPOWR MODEL</u>	<u>JP2</u>
C-1, B-5, B-50, C-1B, GBA, GCA	2-3, 4-5
C-3, C-10, B-25, C-3B, C-10B, GBB, GBC, GCB, GCC	1-2, 4-5
C-50, C-100, C-50B, C-100B, GBD, GCD	1-2, 3-4

- For Follower Arm applications, a jumper must be installed at JP1(2-3).

## 2.2 CALIBRATION

- Set the following 22-turn potentiometers to their factory settings:

<b>ZERO</b>	Full CCW
<b>CORE</b>	Full CCW
<b>FULL ROLL</b>	Full CW
<b>STOP MULT</b>	Full CCW
<b>STAB</b>	Full CCW

- Set the external TENSION pot to Full CW.
- If a 0 to 1 mADC meter is connected to TB1 (9-10), a full scale meter reading will indicate that the maximum output current flows to the clutch or brake. The output range is determined by JP2 jumper positions (section 2.1.4). If a display meter is not connected to the FAD, use a multimeter to read the actual output current.
- Position the follower arm on an empty core and apply power to the FAD.
- Adjust the CORE pot to obtain zero on the meter.
- Adjust the ZERO pot CW until the output current just starts to increase, and then adjust it CCW to return the output current to zero.
- From published torque verses current data, adjust the CORE pot for the desired output current at core.
- Set the FULL ROLL pot to full CCW.
- Place the follower arm at the full roll position, and adjust the FULL ROLL pot for the desired output current at full roll.

Calibration is complete, and the FAD is ready for operation

## 2.3 OPERATION

Tension is adjusted using an external 10 kohm potentiometer (not included).

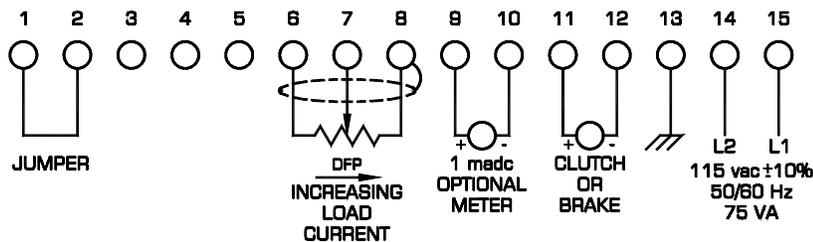
Rewind taper can be adjusted using the FULL ROLL pot. The tension will decrease as the roll diameter increases without changing the remote TENSION pot setting. CCW rotation of the FULL ROLL pot will decrease the tension at FULL ROLL, thereby increasing the amount of taper.

If the stop multiplier function is used, CW rotation of the STOP MULT pot will increase the stopping torque. Connect TB1(4-5) while stopping to engage the stop multiplier.

## 3.0 DANCER APPLICATIONS

### 3.1 INSTALLATION AND SETUP

1. Mount the FAD in a protected environment with an operating temperature range between 0 and 40° C.
2. Connect wiring as indicated below. Use shielded cable for all signal inputs. Route signal leads away from all power leads.



3. Adjust the DFP so that its keyway is pointing toward its cover when the dancer is half way through its travel. This is an approximate adjustment, and is intended to center the sensor position to allow maximum rotation in both directions.
4. Select the output current range by installing jumpers on JP2 as indicated:

<u>CURRENT RANGE (adc)</u>	<u>JP2 JUMPER POSITIONS</u>
0.126	2-3, 4-5
0.26	1-2, 4-5
0.6	1-2, 4-6

For MAGPOWR magnetic particle clutches and brakes the recommended settings are:

<u>MAGPOWR MODEL</u>	<u>JP2</u>
C-1, B-5, B-50, C-1B, GBA, GCA	2-3, 4-5
C-3, C-10, B-25, C-3B, C-10B, GBB, GBC, GCB, GCC	1-2, 4-5
C-50, C-100, C-50B, C-100B, GBD, GCD	1-2, 3-4

5. Insure that a jumper is installed at JP1(2-3) if the FAD position pot (POS) will be used. Refer to Section 4 for connection of a remote position pot.

### 3.2 CALIBRATION

1. Set the following pots to the indicated position:

<b>CORE</b>	Full CCW
<b>(GAIN)</b>	Full CW
<b>STOP MULT</b>	Full CCW
<b>STAB</b>	Mid rotation (10 turns from either end)

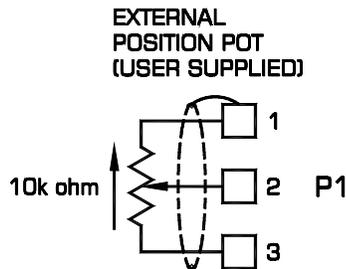
2. With the machine running with web, adjust the position pot (POS) to center the dancer roll.
3. Adjust the stability pot (STAB) to minimize hunting.
4. If hunting cannot be eliminated, turn the gain pot CCW (GAIN), and repeat step 3.

See Section 5 for a method of increasing gain while maintaining stability.

### 4.0 REMOTE DANCER POSITION POT

With a jumper installed at JP1(2-3) dancer position is set by the position pot (POS) on the FAD printed circuit board.

With a jumper installed at JP1(1-2) dancer position is set by a user supplied external pot connected as shown below.



Rotation in the direction of the arrow will cause the length of web in the dancer to increase. If the web is pulling up on the dancer, then the dancer will move down.

### 5.0 DANCER STABILIZATION

The following method will usually produce a stable dancer. The method begins by reducing gain to a level which the user may consider unacceptable. Gain will subsequently be increased to a more desirable level. The adjustment should be made with the unwind / rewind roll diameter near core. However, it may be necessary to make a preliminary adjustment at a larger roll diameter, and then refine the adjustment near core.

1. Run the machine and adjust the position pot (POS) to center the dancer roll.
2. Decrease the gain pot (GAIN) by rotating CCW until the dancer stabilizes. The position pot (POS) may require readjustment several times in order to keep the dancer roll centered.

DEFINITION: In the following steps the user will have to determine if the dancer will overshoot. To do this, move the stable dancer away from its set position by pushing on the dancer, by bumping the unwind / rewind roll, or by some similar means. If the dancer goes past the set position before settling to the set position, it is overshooting. If the dancer goes straight to the stable position without going past it, the dancer is not overshooting.

3. Increase the gain pot (GAIN) in small steps checking for dancer overshoot at each step. Do this until overshoot is obtained.
4. Adjust the stability pot (STAB) in small steps checking for dancer overshoot at each step. Do this until the overshoot is eliminated.
5. Repeat steps (3) and (4) until the overshoot cannot be eliminated using the stability pot (STAB), or until the gain pot (GAIN) is full clockwise.
6. Decrease the gain pot (GAIN) by the amount necessary to eliminate the overshoot.

Adjustment is now complete.

## 6.0 SPECIFICATIONS

Input:	115 vac $\pm$ 10%, 50/60 Hz
Output	-3.6 to 90 vdc in three jumper selectable current ranges of .125, .250 and .500 adc
Dancer / Follower Pot:	1 to 10 kohm
Remote Position Pot:	10 kohm
Temperature Range:	0 to 40° C operating -30 to 65° C storage

