

Minarik Electric Company  
Masters of Control

Glendale, CA 91201

## Installation and Connection Guide

### Models MM21036A and MM22036A

### Speed Controls for Dancer Pot Applications

These controls are designed for applications that call for dancer pot control. They feature electronic adjustment of offset and span, to replace the cumbersome linkage adjustment common to installations of this type.

## Specifications

Drive	MM21036A	MM22036A
Line voltage (-5% + 10%)	115 VAC	230 VAC
Line frequency	50/60 Hz	50/60 Hz
Line current, maximum	8A	8A
Horsepower	1/8-1/2*	1/2-1**
Armature output	0-90 VDC	0-180 VDC
Armature current, maximum	5 ADC*	5 ADC**
Ambient temperature range	10° C - 55° C	10° C - 55° C
Approximate weight	0.5 lb	0.5 lb

\* Maximum horsepower = 1 and maximum armature current = 10A when mounted on a suitable heatsink, e.g., Minarik Kit Number 223-0156.

\*\* Maximum horsepower = 2 and maximum armature current = 10A when mounted on a suitable heatsink, e.g., Minarik Kit Number 223-0156.

## Wiring instructions

Refer to Figure 1 (page 3) for an illustration of all connections.

### Motor connections

Connect the motor armature to Terminals A1 and A2. If using a shunt-wound field motor, connect the field to Terminals F1 and F2; otherwise, make no connections to Terminals F1 and F2.

### Dancer potentiometer connections

Connect the dancer pot CCW end to terminal S1, its wiper to S2, and its CW end to S3. Use shielded cable unless the pot leads are less than 18 inches (0.5m) long.

### Power and line fusing connections

Connect line power to Terminals L1 and L2. Fuse the live AC leg(s) with fuse(s) sized at least 150% of the motor rating. Do not add a line fuse to L2 unless the line voltage is 230 VAC.

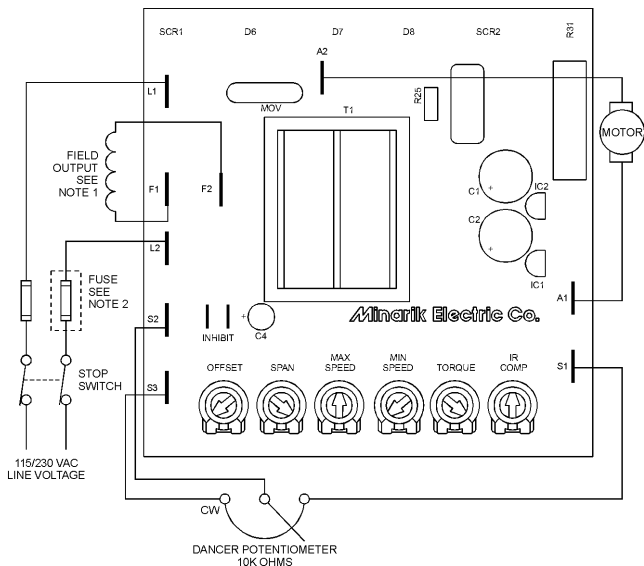
### Field output connections



#### Warning

The field output is for shunt wound motors only. Do not make any connections to F1 and F2 when using a permanent magnet motor.

Use 18 AWG wire to connect the field output to a shunt wound motor. Connect the motor field to terminals F1 and F2.



## NOTES

1. DO NOT CONNECT FIELD OUTPUT IF USING A PERMANENT MAGNET MOTOR.
2. DO NOT ADD A LINE FUSE TO L2 UNLESS LINE VOLTAGE IS 230 VAC.

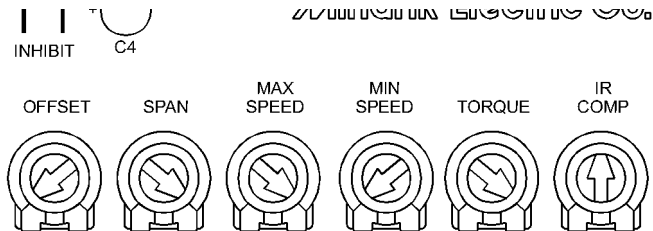
**Figure 1. MM21036A/MM22036A Connections**

## Calibration

The control is factory calibrated with OFFSET at 0° and SPAN at 300°. The MAX SPD trimpot is adjusted to 85V DC (MM21036A) and 170V DC (MM22036A), at no load.

Calibrate the drive using the following procedure:

1. Set the MIN SPD and OFFSET trimpots to zero (full CCW).
2. Set the SPAN, MAX SPD and TORQUE trimpots to maximum (full CW).
3. Set the IR COMP trimpot to midrange (approximate 12 o'clock position).
4. Set the dancer potentiometer wiper to minimum.
5. Apply power to the drive.
6. Calibrate the trimpots as follows:



**Figure 2. Calibration Trimpot Layout**

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## OFFSET

OFFSET sets the dancer pot wiper position at which the motor begins to run. This is expressed as the angle of the wiper relative to its fully CCW position. With these controls, the offset of the wiper may be set as high as 290° before the motor will run. To calibrate OFFSET:

1. Set the dancer wiper to the desired offset position.
2. Apply line voltage.
3. Adjust the OFFSET trimpot until the motor shaft just begins to rotate. Back off the adjustment slightly until the motor has stopped rotating.

## MINIMUM SPEED (MIN SPD)

The MIN SPD setting determines the motor speed at the point when the OFFSET trimpot allows the motor to run. It is factory set for zero rated speed.

To calibrate, set the MIN SPD trimpot full CCW. Set the dancer potentiometer to the point where the motor just begins to rotate. Adjust the MIN SPD trimpot until the desired minimum motor speed is reached.

## **SPAN**

SPAN is the angle through which the dancer pot wiper must rotate to cover the full speed range that the application requires. The motor will not increase speed at any setting past this angle. The minimum span of the wiper to obtain rated output from these controls is 10°. To adjust SPAN:

1. Set the dancer wiper to the desired maximum position.
2. Adjust the SPAN trimpot until the desired maximum motor speed has been reached.

## **MAXIMUM SPEED (MAX SPD)**

The MAX SPD setting determines the motor speed when the dancer potentiometer wiper is at the maximum cutoff point set by the SPAN trimpot. It is factory set for maximum rated speed.

To calibrate, set the MAX SPD trimpot to maximum (full CW). Set the dancer potentiometer wiper to maximum. Adjust the MAX SPD trimpot CCW until the desired maximum motor speed is reached.

## **REGULATION (IR COMP)**

The IR COMP trimpot setting determines the degree to which motor speed is held constant as the motor load changes. It is factory set for optimum motor regulation.

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**To calibrate IR COMP (exact calibration):**

1. Turn the IR COMP trimpot full CCW.
2. Set the dancer potentiometer until the motor runs at midspeed without load (for example, 900 RPM for an 1800 RPM motor) A hand held tachometer may be used to measure motor speed.
3. Load the motor armature to its full load armature current rating. The motor should slow down.
4. While keeping the load on the motor, rotate the IR COMP trimpot until the motor runs at the speed measured in step 2.

**Approximate calibration:**

If the motor does not maintain set speed as the load changes, gradually rotate the IR COMP trimpot CW. If the motor oscillates (overcompensation), the IR COMP trimpot may be set too high (CW). Turn the IR COMP trimpot CCW to stabilize the motor speed.

## TORQUE LIMIT (TORQUE)



### Warning

Although TORQUE is set to 120% of maximum drive current rating, continuous operation beyond that rating may damage the motor. If you intend to operate beyond the rating, contact your Minarik representative for assistance.

The TORQUE setting determines the maximum torque for accelerating and driving the motor. TORQUE is factory set at 120% of maximum drive current. You must recalibrate the TORQUE setting if using a lower current rated motor.

1. With no power applied to the drive, connect a DC ammeter in series with the motor armature.
2. Set the TORQUE trimpot to full CCW.
3. Carefully lock the motor armature. Ensure that the motor is firmly mounted.
4. Apply line power. The motor should be stopped.
5. Set the dancer potentiometer to maximum speed. The motor should remain stopped.
6. Slowly rotate the TORQUE trimpot clockwise (CW) until the ammeter reads 120% of maximum motor armature current.



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7. Set the dancer potentiometer to the OFFSET position.
  8. Remove power from the drive.
  9. Remove the lock from the motor shaft.
  10. Remove the ammeter in series with the motor armature.

The control is now calibrated.

## Notes

## Notes



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