

## SECTION IV

### ADJUSTMENT INSTRUCTIONS

#### ACCELERATION

1. Set the MOTOR SPEED potentiometer at 100% or set the external speed reference signal at maximum, as applicable.
2. Initiate a Run command and observe the time required for the motor to reach maximum speed.
3. Adjust the ACCEL potentiometer for the desired rate. Full clockwise rotation is the fastest acceleration (0.2 second), and full counterclockwise rotation is the slowest acceleration (30 seconds).

#### DECELERATION

1. With the motor running at maximum speed, quickly reset the MOTOR SPEED potentiometer to zero, or quickly decrease the speed reference signal to minimum, as applicable, and observe the time required for the motor to reach minimum speed.
2. Adjust the DECEL potentiometer for the desired rate. Full clockwise rotation is the fastest deceleration (0.2 second), and full counterclockwise rotation is the slowest deceleration (30 seconds).

#### IR COMPENSATION

IR compensation is recommended when the controller is using armature feedback. When tachometer feedback is used, the IR compensation potentiometer must be set at zero (full counterclockwise rotation).

The IR COMP potentiometer is factory set at zero for satisfactory operation with most motors. If improved speed regulation is desired, readjust IR compensation as follows:

1. Be sure DIP Switch S3 is set correctly. See Table 4-1, page 4-4.
2. Be sure Jumpers J1, J2, and J3 are in the correct positions. See step 5 on page 2-3.
3. If the motor is shunt-wound, run it at rated base speed. If the motor is a permanent-magnet type, run it about 1/3 speed.
4. Turn the IR COMP potentiometer clockwise slowly until the motor speed becomes unstable. Then turn the potentiometer counterclockwise until motor speed stabilizes.

**MAXIMUM SPEED (ARMATURE FEEDBACK)**

The MAX SPD potentiometer adjusts maximum speed by setting maximum armature voltage. The voltage range is from 50% to 100% of rated armature voltage.

1. Be sure DIP Switch S3 is set correctly. See Table 4-1, page 4-4.
2. Be sure Jumpers J1, J2, and J3 are in the correct positions. See step 5 on page 2-3.
3. Initiate a Run command.
4. Turn the MOTOR SPEED potentiometer to 100% or increase the external speed reference signal to maximum, as applicable.
5. Adjust the MAX SPD potentiometer as required to attain 90 VDC armature voltage with a 115 VAC line, or 180 VDC armature voltage with a 230 VAC line, as applicable.

Note: If the MAX SPD potentiometer is turned too far counterclockwise, speed instability may occur.

**MAXIMUM SPEED (TACHOMETER FEEDBACK)**

1. Set Jumper J2 and Segment 5 of DIP Switch S3 as shown in the following table.

JUMPER J2 POSITION	SWITCH S3-5 POSITION	MOTOR ARMATURE VOLTAGE RANGE	TACHOMETER VOLTAGE RANGE	TYPICAL TACHOMETER VOLTS/1000 RPM @ 1750 RPM
90V	OFF	75 - 120 VDC <sup>a, b</sup>	5.5 - 15 VDC	7 VDC
180V	OFF	135 - 210 VDC <sup>a, b</sup>	75 - 120 VDC	50 VDC
90V	ON	NA	15 - 75 VDC	35 VDC
180V	ON	NA	120 - 200 VDC	100 VDC

a. Motor speed may be unstable if maximum speed is set substantially below rated motor armature voltage. To limit maximum speed below rated armature voltage, limit the speed reference signal instead of turning down the MAX SPD potentiometer.

b. Speed regulation may be adversely affected if maximum speed is set substantially above rated motor armature voltage.

2. Turn the IR COMP potentiometer fully counterclockwise (0%).
3. Initiate a Run command.
4. Turn the MOTOR SPEED potentiometer to 100% or increase the external speed reference signal to maximum, as applicable.

5. Adjust the MAX SPD potentiometer as required for the motor to run at rated base speed.

Note: If the motor is not controllable when the MOTOR SPEED potentiometer is set low, check for incorrect voltage polarity.

### **CURRENT LIMIT**

1. Turn the FWD CUR LMT and REV CUR LMT potentiometers fully clockwise (100%) to limit motor armature current at 150% of rated.
2. Turn the FWD CUR LMT and REV CUR LMT potentiometers counterclockwise as required to reduce maximum motor armature current.

Notes: a. An LED glows red on the controller control board when motor armature current is being limited.

- b. External 10K ohm Current (Torque) Limit potentiometers can be used as shown in Figure 2-15 on page 2-14. If an external Forward Current (Torque) Limit potentiometer is desired, Segment 2 of DIP Switch S3 must be in OFF (Open) position. If an external Reverse Current (Torque) Limit potentiometer is desired, Segment 7 of DIP Switch S3 must be in OFF (Open) position.

### **DEAD BAND**

If motor creeping is a problem when the speed reference signal is set at zero, a dead band can be enabled which allows a 2% range around zero through which the speed reference can be varied without initiating a motor response. To enable the dead band, set Segment 3 of DIP Switch S3 to ON (Closed) position.

### **APPLICATION PROGRAMMING**

An 8-position DIP Switch (S3), located on the control board, can be used to program the controller for various applications and operations as shown in Table 4-1, page 4-4.

TABLE 4-1. DIP SWITCH S3 SETTINGS

S3 SEGMENT	SEGMENT POSITION		DESCRIPTION
	ON (Closed)	OFF (Open)	
1	X <sup>a</sup>		Prevents the drive from restarting automatically after an AC power interruption.
		X	Enables line starting. Allows the drive to start automatically when AC power is applied to the controller. Terminals TB2-8 and TB2-9 must be jumpered to activate this function. For connection diagrams see Figure 2-11 (page 2-13) and Figure 2-16 (page 2-15).
2	X <sup>a</sup>		Enables the internal forward current limit, adjustable with the FWD CUR LMT potentiometer.
		X	Allows the use of an external Forward Current Limit potentiometer. The internal FWD CUR LMT potentiometer is then used to scale the external potentiometer. For a connection diagram, see Figure 2-15, page 2-14.
3	X		Enables a dead band of 2% around zero to prevent motor creeping. This may be required for tachometer feedback.
		X <sup>a</sup>	Disables dead band.
4	X		Enables the torque mode which allows the drive to operate as a current regulator instead of a speed regulator. S3-2 and S3-7 must be set to OFF (Open) position to activate this function, and the internal FWD and REV CUR LMT potentiometers must be set at the same positions and above 40%. For a connection diagram, see Figure 2-18, page 2-15.
		X <sup>a</sup>	Enables the speed mode and disables the torque mode.
5	X		Allows the use of a tachometer generator with a non-standard output (5.5 - 75 VDC or 120 - 200 VDC @ 1750 RPM) for tachometer feedback <sup>b</sup> .
		X <sup>a</sup>	Allows the use of armature voltage feedback, or a tachometer generator with a standard output (5.5V - 15V or 75V - 120V @ 1750 RPM) for tachometer feedback <sup>b</sup> .
6	X <sup>a</sup>		Sets the controller to operate from a 60 Hz supply.
		X	Sets the controller to operate from a 50 Hz supply.
7	X <sup>a</sup>		Enables the internal reverse current limit, adjustable with the REV CUR LMT potentiometer.
		X	Allows the use of an external Reverse Current Limit potentiometer. The internal REV CUR LMT potentiometer is then used to scale the external potentiometer. For a connection diagram, see Figure 2-15, page 2-14.
8	X <sup>a</sup>		Reserved for future use. <b>S3-8 must remain in ON position.</b>
		X	Reserved for future use. <b>Do not use this position.</b>

a. Factory preset position.

b. See Maximum Speed adjustment instructions, page 4-2.