

## SECTION III

### OPERATION

#### POWER ON/OFF

To energize the drive, turn-on the AC supply voltage to the controller. When this occurs, the motor shunt field energizes with rated field voltage, and potentially hazardous voltage is present at the motor armature terminals. **These voltages can cause electric shock resulting in personal injury or loss of life.**

If the AC supply is interrupted, and the controller is **not** set up for line starting, the motor will not restart when the AC supply is restored until the controller is reset by initiating a Stop command and then a Start command. If the controller is set up for line starting, and the AC supply is interrupted, the motor will restart when the AC supply is restored.

#### CAUTION

**LINE STARTING IS NOT RECOMMENDED FOR APPLICATIONS WHERE PERSONNEL MAY BE EXPOSED TO THE MOTOR AND CONNECTED DRIVE EQUIPMENT. PERSONAL INJURY OR LOSS OF LIFE CAN OCCUR DUE TO THE MOTOR STARTING UNEXPECTEDLY WITHOUT WARNING.**

#### RUN

If a RUN/STOP/JOG switch is used, place the switch in RUN position. Otherwise, initiate a Run command. A Run command will accelerate the motor to the setting of the MOTOR SPEED potentiometer or external speed reference signal, as applicable. The rate of acceleration is preset by the ACCEL potentiometer on the controller control board.

**STOP**

If a RUN/STOP/JOG switch is used, place the switch in STOP position. Otherwise, initiate a Stop command. A Stop command will stop the motor at a rate proportional to the stopping rate of the motor load.

If the controller has dynamic braking, the motor stopping time will be reduced. Dynamic braking provides exponential rate braking of the motor armature, which occurs when the circuit is opened between the controller and the motor armature, and one or more resistors connect across the motor armature.

The dynamic braking resistors provide initial braking torque as shown in Table 3-1.

**TABLE 3-1. DYNAMIC BRAKING CHARACTERISTICS<sup>a</sup>**

COMPONENT	MODEL	RATED VOLTAGE	RATED HORSEPOWER									
			1/6	1/4	1/3	1/2	3/4	1	1-1/2	2	3	5
BRAKING TORQUE (%)	2231 & 2235	115V	180	129	103	66	44	34	NA	NA	NA	NA
		230V	NA	NA	400	278	200	138	93	66	NA	NA
	2232 & 2236	115V	300	214	171	111	74	57	NA	NA	NA	NA
		230V	NA	NA	NA	462	316	218	146	103	79	NA
	2242	115V	600	429	343	222	148	114	NA	NA	NA	NA
		230V	NA	NA	NA	923	632	436	293	207	159	96
STOPS PER MINUTE	2231 & 2235	115V	15	12	11	8	6	2	NA	NA	NA	NA
		230V	NA	NA	12	8	6	1	1	1	NA	NA
	2232 & 2236	115V	9	6	5	5	4	4	NA	NA	NA	NA
		230V	NA	NA	NA	5	4	4	3	3	2	NA
	2242	115V	15	12	10	10	7	7	NA	NA	NA	NA
		230V	NA	NA	NA	10	7	7	5	5	3	2

a. HIGH INERTIA LOADS MAY EXTEND BRAKING TIME AND CAUSE THE WATTAGE RATING OF THE DYNAMIC BRAKING RESISTORS TO BE EXCEEDED.

An antiplug feature is included with dynamic braking. This feature prevents restarting the motor before the motor has braked to a stop.

**JOG**

When a RUN/STOP/JOG switch is used, place the switch in JOG position. Otherwise initiate a Jog command. Jog is momentary, causing motor rotation only while the switch is held in JOG position or while a Jog command is active. Release the switch to stop the motor.

Jog speed is directly proportional to the setting of the MOTOR SPEED potentiometer.

## **SPEED CONTROL**

Motor speed is directly proportional to the setting of the MOTOR SPEED potentiometer or the magnitude of an external speed reference signal, as applicable. This potentiometer or the speed reference signal may be adjusted while the motor is running or may be preset before the motor is started.

The rates of acceleration and deceleration are preset by the ACCEL and DECEL potentiometers, respectively, located on the controller control board.

Maximum speed is preset by the MAX SPD potentiometer, located on the control board.

## **REVERSE**

When a bidirectional (zero center) MOTOR SPEED potentiometer is used, turning it in one direction past zero rotates the motor in a particular rotating direction at a speed directly proportional to the potentiometer setting. Turning the potentiometer in the opposite direction past zero rotates the motor in the opposite direction at a speed directly proportional to the potentiometer setting. If the motor is running when the potentiometer is turned in the opposite direction, the motor will first brake to a stop by means of regenerative braking before reversing rotation. When the potentiometer is in center (zero) position, motor speed is zero.

The rates of acceleration and deceleration (braking) are preset by the ACCEL and DECEL potentiometers, respectively, located on the controller control board.

Maximum speed is preset by the MAX SPD potentiometer, located on the control board. Forward and reverse maximum speeds are identical.

## **INOPERATIVE MOTOR**

If the motor stops and/or won't start, turn-off the AC supply to the controller, remove the controller cover (if used), and check the AC line fuse(s) on the controller control board. For the location of the fuse(s), see Figure 9-4 (page 9-5) or Figure 9-5 (page 9-6), as applicable. If a fuse is blown, refer to the Troubleshooting Table (Table 5-1).

Note: An LED glows red on the controller control board when motor armature current is being limited by the controller current limit circuit. This LED glows green when armature current is not being limited.

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