

Figure 17. RG60U Calibration Trimpot Locations

## MINIMUM SPEED (MIN SPD)

The MIN SPD trimpot setting determines the minimum speed when the speed adjust potentiometer is turned full CCW. It is factory set to zero speed. The minimum speed feature applies only when the drive is operating in unidirectional mode.

To calibrate MIN SPD:

1. Set the speed adjust potentiometer to full CCW.
2. Adjust the MIN SPD trimpot until the desired minimum motor speed is reached.

## MAXIMUM SPEED (MAX SPD)

The MAX SPD trimpot setting determines the maximum forward and reverse speed. It is factory set for maximum rated motor speed.

To calibrate MAX SPD:

1. Set the MAX SPD trimpot full CCW.
2. Turn the speed adjust potentiometer CW so that the motor is running at full speed.
3. Adjust the MAX SPD trimpot until the desired maximum motor speed is reached.

**Caution!** Do not attempt to run motor above 90 VDC on 115 VAC or above 180 VDC on 230 VAC.

## FORWARD TORQUE (FWD TQ)



### Warning

Although FWD TQ can be set to 120% of motor nameplate current rating, continuous operation beyond this rating may damage the motor. If you intend to operate beyond this rating, contact your Minarik representative for assistance.

The FWD TQ setting determines the maximum current limit for accelerating and driving the motor in the forward direction. It is factory set at 120% of maximum rated drive current.

See Figure 19 (page 39) for typical FWD TQ calibration settings or use the following procedure to recalibrate FWD TQ:

1. With the power disconnected from the drive, connect a DC ammeter in series with the armature.
2. Set the FWD TQ trimpot to minimum (full CCW).
3. Set the speed adjust potentiometer to maximum (full CW).
4. Carefully lock the motor armature. Be sure that the motor is firmly mounted.
5. Apply line power. The motor should be stopped.
6. Slowly adjust the FWD TQ trimpot CW slowly until the armature current is 120% of motor rated armature current.
7. Set the speed adjust potentiometer to minimum.
8. Remove the power from the drive.
9. Unlock the motor shaft.
10. Remove the ammeter in series with the motor armature if it is no longer needed and re-apply power to the drive.

## REVERSE TORQUE (REV TQ)



### Warning

Although REV TQ can be set to 120% of motor nameplate current rating, continuous operation beyond this rating may damage the motor. If you intend to operate beyond this rating, contact your Minarik representative for assistance.

The REV TQ setting determines the maximum current limit for accelerating and driving the motor in the reverse direction. It is factory set at 120% of maximum rated drive current.

See Figure 19 (page 39) for typical REV TQ calibration settings or use the following procedure to recalibrate REV TQ:

1. With the power disconnected from the drive, connect a DC ammeter in series with the armature.
2. Set the REV TQ trimpot to minimum (full CCW).
3. Set the speed adjust potentiometer to maximum (full CW).
4. Carefully lock the motor armature. Be sure that the motor is firmly mounted.
5. Apply line power. The motor should be stopped.
6. Slowly adjust the REV TQ trimpot CW slowly until the armature current is 120% of motor rated armature current.
7. Set the speed adjust potentiometer to minimum.
8. Remove the power from the drive.
9. Unlock the motor shaft.
10. Remove the ammeter in series with the motor armature if it is no longer needed and re-apply power to the drive.

## IR COMPENSATION (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.

See Figure 19 (page 39) for typical IR COMP calibration settings or use the following procedure to recalibrate the IR COMP setting:

1. Set the IR COMP trimpot to minimum (full CCW).
2. Rotate the speed adjust potentiometer until the motor runs at mid-speed 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. 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.
5. Unload the motor.

## **FORWARD ACCELERATION (FWD ACC)**

The FWD ACC setting determines the time the motor takes to ramp to either a higher speed in the forward direction or a lower speed in the reverse direction, within the limits of available torque. The FWD ACC setting is factory set for its fastest forward acceleration time.

Turn the FWD ACC trimpot CW to increase the forward acceleration time, and CCW to decrease the forward acceleration time.

## **REVERSE ACCELERATION (REV ACC)**

The REV ACC setting determines the time the motor takes to ramp to either a higher speed in the reverse direction or a lower speed in the forward direction, within the limits of available torque. The REV ACC setting is factory set for its fastest reverse acceleration time.

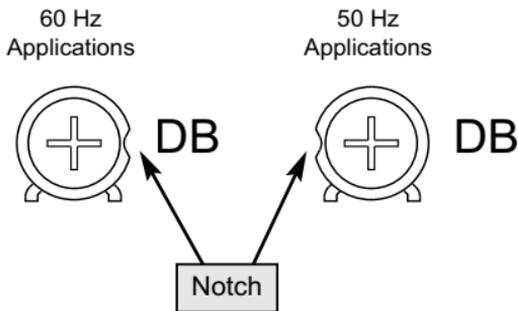
Turn the REV ACC trimpot CW to increase the reverse acceleration time, and CCW to decrease the reverse acceleration time.

## DEADBAND (DB)

The deadband trimmer potentiometer determines the time that will elapse between the application of current in one direction before current is applied in the opposite direction.

The deadband trimmer potentiometer affects the resistance that a motor has to changes in shaft position at zero speed. It does this by applying AC voltage to the motor armature.

Deadband is factory calibrated with the notch at approximately the 3 o'clock position for 60 Hz AC line operation. Recalibrate the deadband with the notch at the 9 o'clock position for 50 Hz AC line operation. If you hear motor noise (humming), the deadband might be set too high. Turn the deadband trimpot CCW until the motor noise ceases.



**Figure 18. Deadband Settings**

## TACH GENERATOR (TACH)

Calibrate the TACH setting only when a tachogenerator is used. The TACH setting, like the IR COMP setting, determines the degree to which motor speed is held constant as the motor load changes.

To calibrate the TACH trimpot:

1. Connect the tachogenerator to T1 and T2. The polarity is positive (+) for T1 and negative (-) for T2 with the motor running in forward direction.
2. Set SW503 to ARM for armature feedback.
3. Set the speed adjust potentiometer full CW. Measure the armature voltage across A1 and A2 using a voltmeter.
4. Set the speed adjust potentiometer to 0 (zero speed).
5. Set SW503 to TACH for tachogenerator feedback.
6. Set the IR COMP trimpot to full CCW.
7. Set the TACH trimpot to full CW.
8. Apply line power.
9. Set the speed adjust potentiometer to full CW.
10. Adjust the TACH trimpot until the armature voltage is the same value as the voltage measured in step 3.

Check that the tachogenerator is properly calibrated. The motor should run at the same speed when SW503 is set to either armature or tachogenerator feedback.

			1 HP 90 VDC 10 ADC				2 HP 180 VDC 9.2 ADC
FWD TQ	REV TQ	IR COMP		FWD TQ	REV TQ	IR COMP	
			3/4 HP 90 VDC 7.6 ADC				1 HP 180 VDC 5 ADC
FWD TQ	REV TQ	IR COMP		FWD TQ	REV TQ	IR COMP	
			1/2 HP 90 VDC 5 ADC				3/4 HP 180 VDC 3.8 ADC
FWD TQ	REV TQ	IR COMP		FWD TQ	REV TQ	IR COMP	
			1/4 HP 90 VDC 2.7 ADC				1/2 HP 180 VDC 2.5 ADC
FWD TQ	REV TQ	IR COMP		FWD TQ	REV TQ	IR COMP	

**Figure 19. Typical FWD TQ, REV TQ, and IR COMP Trimpot Settings**

## MAX (-PCM isolation card)

Determines the motor speed when the speed adjust potentiometer is turned to full CW, or voltage signal is set to maximum. It is factory set for maximum rated speed.

To calibrate, set the MAX trimpot to full CCW, or voltage signal to maximum. Turn the main speed adjust potentiometer to full CW. Adjust the MAX trimpot until the desired maximum motor speed is reached. See Figure 20 for MAX trimpot location.

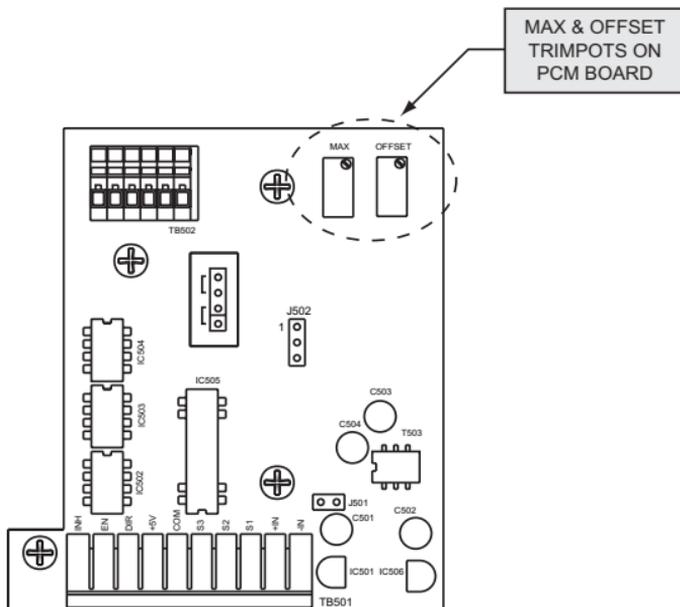


Figure 20. PCM Calibration Trimpot Locations

## OFFSET (-PCM isolation card)



### Warning

This trimpot is set at the factory and should not need adjustment. Do not adjust this trimpot unless you are experiencing drift problems. Contact your Minarik representative before attempting adjustment.

The RG60U-PCM has a factory-set offset to guarantee stability in a stopped motor. To calibrate the OFFSET trimpot:

1. Ensure that the input power is turned OFF.
2. Set the input signal to zero.
3. Set the OFFSET trimpot to the approximate midrange or 50%.  
Note: This is a 25-turn potentiometer. After setting the trimpot to zero full CCW, make 5 full rotations to reach midrange, or 50%.
4. Apply power and observe the motor.
5. If the motor shaft drifts, or slowly rotates with no signal applied, adjust the OFFSET trimpot until the motor shaft stops. The direction and amount of trimpot adjustment depends on the direction of the shaft rotation and connection of the motor leads.

See Figure 20 on page 40 for OFFSET trimpot location.

# Troubleshooting



## Warning

Dangerous voltages exist on the drive when it is powered. When possible, disconnect the drive while troubleshooting. High voltages can cause serious or fatal injury.

## Before applying power

Check the following steps before proceeding:

1. The AC line voltage must be connected to the proper terminals.
2. Check that the voltage switches and jumpers are set correctly.
3. The motor must be rated for the drive's rated armature voltage and current.
4. Check that all terminal block connections are correct.

For additional assistance, contact your local Minarik distributor, or the factory direct:

1-800-MINARIK (646-2745) or Fax: 1-800-394-6334

Problem	Possible Causes	Suggested Solutions
<p>Line fuse blows.</p>	<ol style="list-style-type: none"> <li>1. Line fuse is the wrong size.</li> <li>2. Motor cable or armature is shorted to ground.</li> <li>3. Nuisance tripping caused by a combination of ambient conditions and high-current spikes (i.e. reversing).</li> </ol>	<ol style="list-style-type: none"> <li>1. Check that the line fuse is correct for the motor size.</li> <li>2. Check motor cable and armature for shorts.</li> <li>3. Add a blower to cool the drive components; decrease FWD TQ and REV TQ settings, <b>or</b> resize motor and drive for actual load demand, <b>or</b> check for incorrectly aligned mechanical components or "jams".</li> </ol>

<b>Problem</b>	<b>Possible Causes</b>	<b>Suggested Solutions</b>
Line fuse does not blow, but the motor does not run.	<ol style="list-style-type: none"><li data-bbox="387 219 648 354">1. Speed adjust potentiometer or speed reference voltage is set to zero speed.</li><li data-bbox="387 385 648 602">2. Speed adjust potentiometer or speed reference voltage is not connected to drive input properly; connections are open.</li><li data-bbox="387 633 648 685">3. INHIBIT terminals are shorted.</li><li data-bbox="387 748 648 774">4. S2 is shorted to S0.</li><li data-bbox="387 805 648 856">5. Drive is in current limit.</li><li data-bbox="387 971 648 1023">6. Drive is not receiving AC line voltage.</li><li data-bbox="387 1054 648 1106">7. Motor is not connected.</li></ol>	<ol style="list-style-type: none"><li data-bbox="685 219 936 325">1. Increase the speed adjust potentiometer setting or speed reference voltage.</li><li data-bbox="685 385 946 491">2. Check connections to input. Verify that connections are not open.</li><li data-bbox="685 633 905 715">3. Remove the short from the INHIBIT terminals.</li><li data-bbox="685 748 871 774">4. Remove short.</li><li data-bbox="685 805 936 939">5. Verify that motor is not jammed. Increase FWD TQ or REV TQ setting if they are set too low.</li><li data-bbox="685 971 936 1023">6. Apply AC line voltage to L1 and L2.</li><li data-bbox="685 1054 936 1106">7. Connect motor to A1 and A2.</li></ol>

<b>Problem</b>	<b>Possible Causes</b>	<b>Suggested Solutions</b>
Motor runs too fast.	MAX SPD not calibrated.	Calibrate MAX SPD.
Motor will not reach the desired speed.	<ol style="list-style-type: none"> <li>1. MAX SPD setting is too low.</li> <li>2. IR COMP setting is too low.</li> <li>3. Motor is overloaded.</li> <li>4. Drive is in current limit.</li> </ol>	<ol style="list-style-type: none"> <li>1. Increase MAX SPD setting.</li> <li>2. Increase IR COMP setting.</li> <li>3. Check motor load. Resize the motor if necessary.</li> <li>4. Verify torque settings.</li> </ol>
Motor pulsates or surges under load.	<ol style="list-style-type: none"> <li>1. IR COMP is set too high.</li> <li>2. Motor bouncing in and out of current limit.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the IR COMP setting slightly CCW until the motor speed stabilizes.</li> <li>2. Make sure motor is not undersized for load; adjust FWD TQ and REV TQ trimpot CW.</li> </ol>