

LOAD BALANCE RESISTOR SETUP PROCEDURE FOR MULTIPLE-MOTOR APPLICATIONS

GENERAL

Load balance resistors are used to equalize the loading of two or more motors coupled to a common mechanical load and powered by a single electrical source. Adjustable resistors in series with the motor armatures are used to balance static resistances (motor IR drops and wire resistance) between the armature circuits of each motor. Armature resistors are therefore set up at low or stall speeds. Rheostats in series with the motor fields are used to counteract unequal load sharing that is due to unequal counter EMF (back voltage) between motors. Field rheostats are therefore set up at rated speed.

Before performing this procedure, a **TECHNICALLY QUALIFIED** individual familiar with this type of equipment and the hazards involved, should **READ** this entire procedure.

WARNING

MOTOR AND DRIVE PANEL VOLTAGES CAN CAUSE SEVERE INJURY OR DEATH. REMOVE ALL SOURCES OF POWER BEFORE MAKING ANY CONNECTIONS OR RESISTOR ADJUSTMENTS.

PROCEDURE

1. Verify that motor armature ammeters are properly calibrated or that some other accurate means is used for measuring armature current.
2. Remove input power.
 - A. Set each **ARMATURE** resistor to zero ohms.

- B. Disconnect each motor's shunt field. This must be done at the drive (DC power) panel.
- C. Temporarily disable Tach Loss Trip and Field Loss Trip if these protective relays have been installed.
- D. Block motors so that their shafts can not turn.
- E. Set **CURRENT LIMIT** pot to 100% FLA. See drive manual for instructions. Input power must be reconnected to make this adjustment to most drives.

WARNING

MOTOR COMMUTATOR DAMAGE CAN OCCUR VERY RAPIDLY WHEN POWER IS APPLIED UNDER THESE CONDITIONS. SHUNT FIELD MUST BE RECONNECTED AND MOTOR SHAFT MUST BE ROTATED AFTER EVERY 60 SECONDS OF CUMMULATIVE USE.

WARNING

MOTOR DESTRUCTION CAN RESULT IF THE MOTOR SHAFT IS ALLOWED TO TURN WHEN THE SHUNT FIELD IS DISCONNECTED. (MOTOR WILL ATTEMPT TO RUN AT DESTRUCTIVE SPEEDS.) DO NOT ALLOW MOTOR SHAFT TO TURN WHEN FIELD IS NOT ENERGIZED.

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3. Apply input power. Run the drive and quickly record armature current of each motor. Do not run for longer than 60 seconds. Do not allow any motor's shaft to turn.

4. Remove input power. The motor with the lowest armature current is the reference and therefore its armature resistor setting need not be changed. Increase the resistance of all other motor armature resistors by an appropriate amount.

5. Reconnect the fields and unblock the motors. Reapply input power and run the drive for a few minutes. This will recondition the motor commutators. Remove input power and again disconnect the fields and block motors.

6. Reapply input power. Run the drive and quickly record armature current of each motor. Do not run for longer than 60 seconds. Do not allow any motor's shaft to turn.

7. Remove input power. Re-adjust the armature resistor of any motor whose armature current is more than 3% above or below the value of the reference

motor. Increase the resistance for motors with currents greater than the reference motor's current. Decrease the resistance for motors with currents smaller than the reference motor's current.

8. Repeat steps 5 thru 7 until all motor armature currents are within 3% of the reference motor's current. This completes slow speed balancing. Remove input power.

9A. Set all FIELD resistors and rheostats to their midpoint.

9B. Reconnect motor shunt fields.

9C. Enable Tach Loss Trip and Field Loss Trip, if previously disabled.

9D. Unblock motors.

9E. Readjust CURRENT LIMIT pot to desired set point (usually 150% FLA). See drive manual for instructions.

10. Apply input power. Run drive at rated system speed. Adjust field rheostats until all motor armature currents are equal.

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