

APPENDIX A

A Using Non-Compumotor Motors

IN THIS APPENDIX

- Configuring DIP Switches
 - Connecting Motor Phase Wires and Hall Effect Wires
-

Using Motors other than Compumotor SM or NeoMetric Series Motors

Test all motors carefully. Verify that the motor temperature in your application is within the system limitations. *The motor manufacturer's maximum allowable motor case temperature must not be exceeded.* You should test the motor over a 2-to-3 hour period. Motors tend to have a long thermal time constant, but can still overheat, which results in motor damage.

Configuring the TQ10 Drive's DIP Switches

Set the TQ10's 12 DIP switches located on top of the drive, and three DIP switches located on the bottom of the drive. The following drawing shows DIP switch settings for selected motors.

TQ10 DIP SWITCH SETTINGS

off ↑

1 SW 1 6

1 2 3 4 5 6

off ↑

1 SW 2 6

1 2 3 4 5 6

Shown Configured for SM161A Motor* →

PEAK CURRENT				LOOP GAIN			
(amps)	1	2	3	setting number	4	5	6
0	off	off	off	0	off	off	off
1.5	on	off	off	1	on	off	off
3.0	off	on	off	2	off	on	off
4.4	on	on	off	3	on	on	off
6.0	off	off	on	4	off	off	on
7.4	on	on	on	5	on	off	on
8.9	off	on	on	6	off	on	on
10.0	on	on	on	7	on	on	on

TIME AT PEAK				FOLDBACK		
(seconds)	4	5	6	3	2	1
1.0	on	on	on	off	Foldback Disabled	on
1.2	on	on	off	on	Foldback Enabled	off
1.4	on	off	on	off	High Threshold	on
1.6	on	off	off	on	Low Threshold	off
3.3	off	on	on	off	FOLDBACK FAULT	on
5.0	off	on	off	on	Fault on Foldback	off
10.0	off	off	on	off	No Fault on Foldback	on

DIP Switch Settings for Motors other than Compumotor SM or NeoMetric Motors (with foldback enabled)

off ↑

C. S. M.
MPM8924-BPE

off ↑

C. S. M.
MPM6644-APE

off ↑

OEM3401; Initial Setting for Other Motors

DIP Switch Settings – Non-Compumotor SM or NeoMetric Motors

62

TQ10 User Guide

If you are unsure of which settings to use for your motor, start with the setting shown above for the OEM3401 motor. If the motor gets hot when it is stopped, reduce the loop gain setting (DIP SW2 — #4, #5, #6).

The DIP switch settings shown above will enable foldback—after approximately three seconds at full current, the drive will fault due to foldback. These settings will help protect your motor while you prototype your system. To disable the foldback fault, to adjust time until foldback, or to disable foldback entirely, adjust the DIP switches.

If you have further questions, *first consult your motor vendor* to obtain a full and complete motor specification sheet. Consult your Automation Technology Center (ATC) if you have questions regarding the use of a non-Compumotor motor with Compumotor equipment. If you still need further information, call Compumotor's Application Engineering Department at (800) 358-9070.

Connecting Motor Phase Wires and Hall Effect Wires

If you use a motor from another vendor, obtain information from the motor's manufacturer about its phase wire color code, sequence of Hall states, commutation scheme, etc. Use the information below for guidance on how to connect your motor's phase and Hall wires to the TQ10.

Improper Wiring Can Result in Poor Performance

Assume that you arbitrarily connect your motor's three Hall wires to the TQ10's Hall inputs. For any particular Hall wiring pattern, there are six different ways you can connect wires to Phase A, Phase B, and Phase C.

Of these six possible phase wiring combinations, only one will work properly. Three will not work at all. The other two deserve particular attention: if the motor is wired in one of these two configurations, the motor will turn, but its performance will be severely impaired.

How can you tell if your motor is wired improperly? If it is in one of the two poor-performance configurations, its torque will be much lower than the torque level of a properly wired motor. Also, torque ripple will be very pronounced as the motor turns.

The best way to determine whether or not your motor is wired correctly is to find the three wiring configurations that enable the motor to turn. Compare the motor's torque in each configuration. The configuration with the most torque will be the proper configuration.

Trial and Error Method

WARNING

Motor shaft rotation may be opposite than you expect. Do not connect a load to the shaft until you first determine the direction of shaft rotation.

You can use a trial and error method to connect your motor to the TQ10. Follow these steps:

- ① Arbitrarily assign numbers to your motor's three Hall output wires, and connect them to **HALL 1**, **HALL 2**, and **HALL 3** on the TQ10.
- ② Connect **HALL +5V** and **HALL GND**.
- ③ Arbitrarily assign letters (A, B, C) to your motor's phase wires, and connect them to Phase A, Phase B, and Phase C on the TQ10.
- ④ If the motor turns, find the best phase wiring configuration:
 - Move each phase wire over one position (A B C → C A B). Compare torque and torque ripple.
 - Move each phase wire one position further (C A B → B C A). Compare torque and torque ripple.
 - Use the wiring configuration that gives highest torque and lowest torque ripple.

- ⑤ If the motor does not turn, exchange two of the phase wires. The motor should now turn. Go to Step ④, compare the three wiring configurations that make the motor turn, and use the proper one.
- ⑥ If your motor turns in the opposite direction than you want, you can reverse it using one of several methods.
 - Reverse the appropriate encoder connections.
 - Exchange two Hall input wires, then follow steps 2 through 5 above.