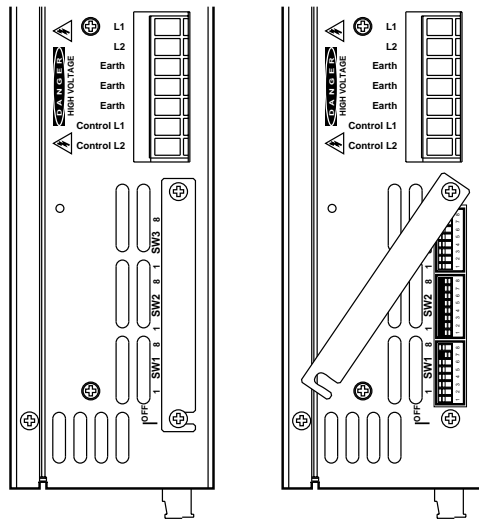


Appendix F

Configuring DIP Switches

APEX6151 DIP Switches

The APEX6151 has three 8-position DIP switches. The switches are located behind a small metal cover on top of the APEX6151. Loosen the two screws that hold the access cover, and move the cover to expose the DIP switches.



DIP Switch Location, with Cover Closed and Open

The default setting for all DIP switches when the APEX6151 ships from the factory is off. You must set these switches to configure the drive for your particular application. Use a small screwdriver to set the switches. The next section summarizes the function of each switch.

A diagram showing DIP switch functions shown on page 7.

Switch 1 (SW 1)

REGEN FAULT — #1: Set this switch in the OFF position for normal operation of the APEX6151's internal regeneration circuit. For most applications, this switch should be OFF. If you construct your own *external* regeneration circuit, set this switch ON to disable the APEX6151's regeneration fault. For more information, see the discussion of regeneration in Chapter 5.

HALL SENSOR DEGREES — #2: Set this switch in the OFF position if you use a motor with 120° Hall effect sensors. Set this switch in the ON position if you use a motor with 60° Hall effect sensors.

RESERVED — #3: Set this switch in the OFF position.

MOTOR POLE PAIR NUMBER — #4 & #5: Set these two switches according to the number of pole pairs your motor has. APEX and SM Series motors, which have two pole pairs (four poles) require switches #4 & #5 to be OFF.

RESOLVER SPEED — #6: For a motor with a single speed resolver, turn #6 OFF. (This switch should be OFF if you use an APEX or SM motor, all of which have single-speed resolvers.) For a motor with a two-speed resolver, turn #6 ON.

CURRENT LOOP COMPENSATION — #7 & #8: These two switches control the dynamics of the APEX6151's current feedback loop. Use these switches to match the drive's performance to your particular motor's characteristics. For Compumotor APEX and SM motors, set the switches according to the table below. If you use a motor from another vendor, call Compumotor's Applications Department for instructions on setting these two DIP switches for your motor. (see toll-free number on inside front cover)

APEX or SM MOTOR	#7	#8
SM233B	OFF	OFF
APEX602, SM231A, SM232A	OFF	ON
APEX603	ON	OFF
RESERVED	ON	ON

Switch 2 (SW 2)

CONTINUOUS CURRENT — #1, #2, #3: If the APEX6151 goes into current foldback, it reduces its output current down to the continuous current level set by these three switches.

MOTOR	SET CONTINUOUS CURRENT TO	#1	#2	#3
SM231A, SM232A	3.4 amps	OFF	ON	OFF
APEX603	4.0 amps	OFF	ON	ON
SM233B, APEX602	6.0 amps	ON	OFF	ON

PEAK CURRENT — #4, #5, #6: These three switches set the peak current that the APEX6151 will produce.

MOTOR	SET PEAK CURRENT TO	#4	#5	#6
SM231A, SM232A	9.5 amps	OFF	ON	OFF
APEX603	14 amps	ON	OFF	ON
APEX602, SM233B	16 amps	ON	ON	ON

TIME CONSTANT — #7 & #8: These two switches set the motor thermal time constant, which the foldback circuit uses to estimate motor behavior. Consult your motor specifications to determine your motor's thermal time constant. The following table shows switch settings for time constants of 10, 20, 30, and 40 minutes. The table also shows the switch settings to use for APEX and SM motors.

TIME CONSTANT	MOTOR	#7	#8
10 Minutes	APEX602	OFF	OFF
20 Minutes	APEX603	OFF	ON
30 Minutes	SM231A, SM232A	ON	OFF
40 Minutes	SM233B	ON	ON

The time constant is **NOT** the time until foldback occurs. It is a parameter based upon the motor's physical characteristics, with the motor mounted to a suitable heatsink.

Three variables (continuous current, actual current, and time constant) affect the amount of time that the foldback circuit allows operations to continue before foldback occurs. For a full explanation of the foldback circuit, see *Chapter f Advanced Features*. The following equation gives an approximate time, in minutes, for a motor that operates from a cold start.

$$time_{(in\ minutes)} = Time\ Constant \left\{ -\ln \left[1 - \left(\frac{I_{continuous}}{I_{actual}} \right)^2 \right] \right\}$$

$I_{continuous}$ is the continuous current, which you selected when you set switches #1, #2, and #3. I_{actual} is the actual peak current, whose maximum value you selected when you set switches #4, #5, and #6.

Switch 3 (SW 3)

RESERVED — #1: Set this switch in the OFF position.

ALIGNMENT MODE — #2: Turn this switch OFF. If you need to align the resolver, you will turn this switch ON during the alignment procedure, and turn it OFF when you have finished aligning the resolver. This switch must be OFF during normal operating conditions. See *Chapter f Advanced Features* for more information.

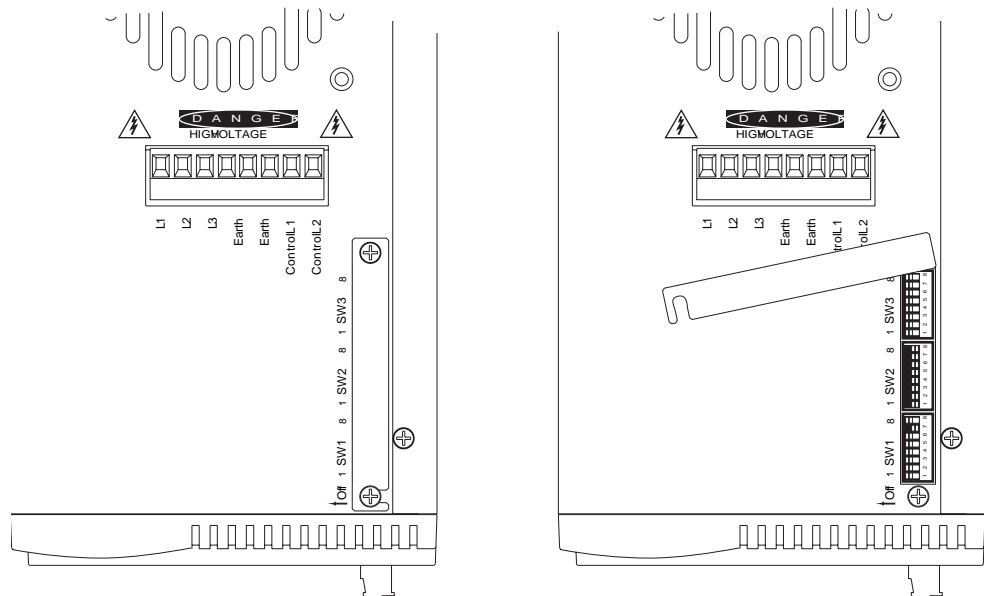
COMMUTATION TEST MODE — #3: Turn this switch OFF. If you need to operate the drive in commutation test mode during a troubleshooting procedure, you will turn this switch ON during the procedure, and turn it OFF when you are finished. This switch must be OFF during normal operating conditions. See *Chapter Δ Troubleshooting* for more information.

HALL SELECT — #4: Turn this switch OFF if your motor has a resolver. (This switch should be OFF if you use an APEX or SM Series servo motor, all of which have resolvers.) Turn this switch ON if your motor has Hall effect sensors instead of a resolver.

TACHOMETER SCALING — #5: This switch scales the tachometer output. If you use a motor that has a single speed resolver, turn this switch OFF to scale the tachometer output to equal 1 volt per 1,000 rpm. (This switch should be OFF if you use an APEX or SM Series servo motor, all of which have single-speed resolvers.) If you use a motor that has a two-speed resolver, turn this switch ON. This will adjust gains of the internal circuitry, so that the tachometer output is scaled to equal 1 volt per 1,000 rpm for two speed resolvers.

RESERVED — #6, #7, #8: Set these three switches in the OFF position.

APEX6152/6154 DIP Switches



APEX6152/6154 DIP Switch Location, with Cover Closed and Open

Switch 1 (SW 1)

RESERVED — #1, #2, #3: Set these three switches in the OFF position.

MOTOR POLE PAIR NUMBER — #4, #5: Set these two switches according to the number of pole pairs your motor has. All APEX motors have two pole pairs (four poles), except the APEX635 and APEX640, which have three pole pairs (six poles).

RESOLVER SPEED — #6: For a motor with a single speed resolver, turn #6 OFF. (This switch should be OFF if you use an APEX motor, all of which have single-speed resolvers.) For a motor with a two-speed resolver, turn #6 ON.

CURRENT LOOP COMPENSATION — #7 & #8: These two switches control the dynamics of the APEX615n's current feedback loop. Use these switches to match the drive's performance to your particular motor's characteristics. Based on the motor's inductance, set the switches according to the following table. The table also shows the switch setting for each APEX motor.

<u>MOTOR INDUCTANCE</u>	<u>APEX MOTOR</u>	<u>#7</u>	<u>#8</u>
25 mH to 40 mH	605, 606	OFF	OFF
5 mH to 15 mH	604, 610	OFF	ON
15 mH to 25 mH	620, 630, 635, 640	ON	OFF
Reserved		ON	ON

Switch 2 (SW 2)

CONTINUOUS CURRENT — #1, #2, #3: If the APEX615n goes into current foldback, it reduces its output current down to the continuous current level set by these three switches.

<u>MOTOR</u>	<u>DRIVE</u>	<u>CONTINUOUS CURRENT</u>	<u>#1</u>	<u>#2</u>	<u>#3</u>
APEX604	APEX6152	9.0 amps	ON	OFF	ON
APEX605,606	APEX6152	7.8amps	ON	OFF	OFF
APEX610-640	APEX6154	20 amps	ON	ON	ON

PEAK CURRENT — #4, #5, #6: These three switches set the peak current that the APEX615n will produce.

<u>MOTOR</u>	<u>DRIVE</u>	<u>PEAK CURRENT</u>	<u>#4</u>	<u>#5</u>	<u>#6</u>
APEX604,605,606	APEX6152	24 amps	ON	ON	ON
APEX610-640	APEX6154	40 amps	ON	ON	ON

TIME CONSTANT — #7 & #8: These two switches set the motor thermal time constant, which the foldback circuit uses to estimate motor behavior. Consult your motor specifications to determine your motor's thermal time constant. The following table shows switch settings for time constants of 10, 20, 30, and 40 minutes. The table also shows the switch settings to use for APEX motors.

<u>TIME CONSTANT</u>	<u>APEX MOTOR</u>	<u>#7</u>	<u>#8</u>
10 Minutes	604,605, 606	OFF	OFF
20 Minutes	610	OFF	ON
30 Minutes	620, 630	ON	OFF
40 Minutes	635, 640	ON	ON

The time constant is **NOT** the time until foldback occurs. It is a parameter based upon the motor's physical characteristics.

Three variables (continuous current, actual current, and time constant) affect the amount of time that the foldback circuit allows operations to continue before foldback occurs. For a full explanation of the foldback circuit, see *Chapter f Advanced Features*. The following equation gives an approximate time, in minutes, for a motor that operates from a cold start.

$$time_{(in\ minutes)} = Time\ Constant \left\{ -\ln \left[1 - \left(\frac{I_{continuous}}{I_{actual}} \right)^2 \right] \right\}$$

$I_{continuous}$ is the continuous current, which you selected when you set switches #1, #2, and #3. I_{actual} is the actual peak current, whose maximum value you selected when you set switches #4, #5, and #6.

Switch 3 (SW 3)

RESERVED — #1: Set this switch in the OFF position.

ALIGNMENT MODE — #2: Turn this switch OFF. If you need to align the resolver, you will turn this switch ON during the alignment procedure, and turn it OFF when you have finished aligning the resolver. This switch must be OFF during normal operating conditions. See *Chapter f Advanced Features* for more information.

COMMUTATION TEST MODE — #3: Turn this switch OFF. If you need to operate the drive in commutation test mode during a troubleshooting procedure, you will turn this switch ON during the procedure, and turn it OFF when you are finished. This switch must be OFF during normal operating conditions. See *Chapter Δ Troubleshooting* for more information.

HALL SELECT — #4: Turn this switch OFF if your motor has a resolver. (This switch should be OFF if you use an APEX motor, all of which have resolvers.) Turn this switch ON if your motor has Hall effect sensors instead of a resolver.

TACHOMETER SCALING — #5: This switch scales the tachometer output. If you use a motor that has a single speed resolver, turn this switch OFF to scale the tachometer output to equal 1 volt per 1,000 rpm. (This switch should be OFF if you use an APEX motor, all of which have single-speed resolvers.) If you use a motor that has a two-speed resolver, turn this switch ON. This will adjust gains of the internal circuitry, so that the tachometer output is scaled to equal 1 volt per 1,000 rpm for two speed resolvers.

RESERVED — #6, #7, #8: Set these three switches in the OFF position.

