

Objective

Provide information on feedback alarms for the customer to protect against motor overspeeding.

Equipment

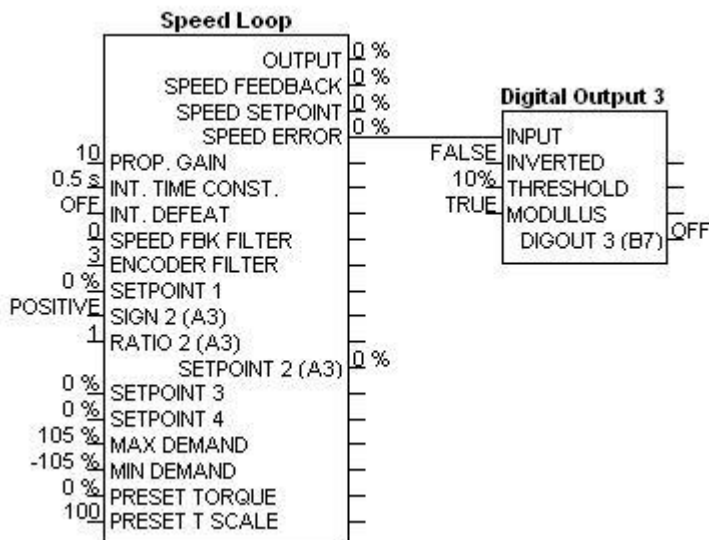
590+ DC Drive, computer with DSELite installed.

Additional Protection against loss of speed control

If excess speed can be hazardous to personnel or machinery under certain conditions, additional protection can be configured in the drive block diagram. The following sections provide details and an example for getting additional protection using digital outputs.

1. The *Speed Error*, in the Speed Loop function block can be monitored. If the *Speed Error* exceeds a preset *Threshold*, the drive is stopped. This *Threshold* is set by the parameter 'Threshold' which is located in the Digital Output block.

Note: The customer must use the digital output to interrupt the stop circuit.



Note: Regardless of feedback device $Speed\ Demand - Speed\ Feedback = Speed\ Error$.

If you have questions, please call the Product Support Group at (704) 588-3246.

Over Speed Alarm

The *Over Speed* alarm trips if the *Speed Feedback* exceeds 125% for 0.1 second. This should never occur in normal speed control, as the speed demand is limited to 105%. Over Speed may occur if the speed loop is disabled by the *Torque Demand Isolate* or due to speed loop overshoot when the speed loop is not tuned to the load.

Note: If the Speed Feedback is armature voltage, the Over Volts alarm may trip first as the Over Volts alarm trips when the armature volts exceeds 120% for 1.5 seconds.

Important: Torque control with field weakening and an analog tach feedback is not recommended without speed limiting.

Note: If the Speed Feedback is encoder, the Over Speed alarm trips when the encoder feedback reaches 125%.

If the *Speed Feedback* is analog tach, the *Over Speed* alarm will not trip, as the maximum value of the analog tach is 110%. The Over Volts alarm will still operate at 120% armature volts but this may be more than 120% speed.

Speed Feedback Alarm

Field Weakening Disabled

The *Speed Feedback Alarm* trips if the difference between the *Speed Feedback* and the *Armature Volts* exceeds the *SPDFBK ALM LEVEL*, parameter in the *Calibration* block.

The *Speed Feedback Alarm* will not trip with armature voltage feedback because the armature voltage and the feedback are the same. Field weakening is not permitted with armature voltage feedback.

The default *SPDFBK ALM LEVEL* is 50%, i.e. if the *Speed Feedback* is at zero the trip will occur 0.4/sec after the armature voltage exceeds 50%.

If the feedback is reversed, the trip will occur at a lower level as the *Speed Feedback* and *Armature Voltage* are in the opposite direction; for example, if *Speed Feedback* is 25% and *Armature Volts* is -25%.

Field Weakening Enabled - using 590+ firmware version 5.x, 7.1 & 7.2

FLD WEAK ENABLE is the parameter in the *FIELD CONTROL* menu that selects constant hp operation above base speed by field weakening. If field weakening is used the armature volts are no longer proportional to speed so comparing them is no longer valid for checking Speed Feedback. With field weakening enabled the Speed Feedback alarm is not disabled but its method is changed.

The *Speed Feedback Alarm* trips if the *Speed Feedback* is less than 10% when the field is weakened; that is when operating above base speed.

Notes: The Speed Feedback alarm delay is 0.4/sec.

With field weakening enabled. If the *Speed Feedback* is zero (due to failed or disconnected tach or encoder) the drive will trip 0.4 sec after the field starts to weaken above base speed. This could be as high as full speed with a base speed close to full speed.

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With a 3:1 field range, if the Speed Feedback is zero, the trip will occur above 33% speed. If the field range is only 1.1:1 the trip will occur above 90% speed.

Field Weakening Enabled - using 590+ firmware version 7.3 or greater.

FLD WEAK ENABLE is the parameter in the *FIELD CONTROL* menu that selects constant hp operation above base speed by field weakening.

The *Speed Feedback Alarm* trips if:

The *Speed Feedback* is $< 0.1\%$ while the *Armature Volts* feedback is greater than the *SPDFBK ALM LEVEL Threshold*. The default *SPDFBK ALM LEVEL* is 50%, i.e. if the *Speed Feedback* is $< 0.1\%$ the trip will occur 0.4/sec after the *Armature Voltage* exceeds 50%. (This trip will occur below base speed operation).

And

The *Speed Feedback* alarm trips if the *Speed Feedback* is less than 10% when the field is weakened; that is when operating above base speed.

Notes: The *Speed Feedback Alarm* delay is 0.4/sec.

With field weakening enabled. If the *Speed Feedback* is zero (due to failed or disconnected tach or encoder) the drive will trip 0.4 sec after the field starts to weaken above base speed. This could be as high as full speed with a base speed close to full speed.

With a 3:1 field range, if the *Speed Feedback* is zero, the trip will occur above 33% speed. If the field range is only 1.1:1 the trip will occur above 90% speed. (This trip will occur below base speed operation).

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