

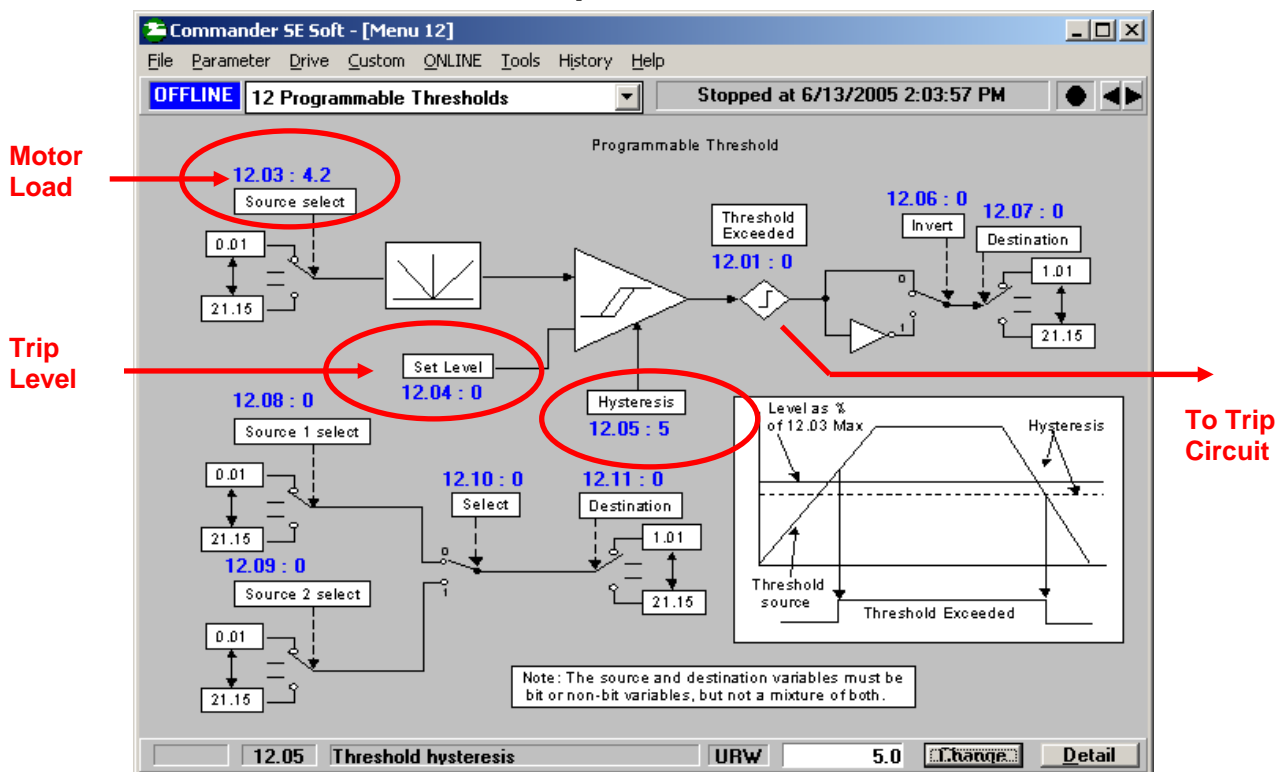
The Application Note is pertinent to the Commander SE and SK Family

### Shear Pin Trip Circuit

In some applications, in lieu of the typical timed overload trip (150% overload for 30 seconds), it is more appropriate to have an instantaneous trip at a specific load level for machine protection. This is commonly called a “Shear Pin” trip which is analogous to a mechanical shear pin that breaks in order to protect a piece of machinery during a jam or high torque situation. This application will describe how to implement this function in a **Commander SE** Drive. In order to make the required parameter changes, the CT-Comms cable option and SEsoft are required. Click here for SEsoft and other information [CTAN236](#) . The exact same function can be programmed into the **Commander SK**. The only difference is the drive programming software, [CTSoft](#) and one difference in parameter values. A table for the parameter changes can be found on page 3 of this document.

The comparator in menu #12 will be used to detect the load threshold level where the trip should occur. The comparator will look at the motor load parameter #4.20. When this parameter exceeds the threshold set by parameter #12.04, the output will toggle to a 1. This signal will be used to cause an Et trip ( External Trip ) in the drive which will cause the motor to coast to rest.

### Comparator Menu



The more difficult part is calculating what the threshold setting should be -Parameter #12.04. This parameter ranges from 0 to 100% of the **Maximum value allowable** in the register the comparator is looking at (#4.20 in this case). The maximum value allowable in register #4.20 can be determined using the following equation.

$$\text{Max \%} = \frac{\text{drive rated current} \times 1.65 (165\%)}{\text{Motor rated current} \times \text{power factor}} \quad \text{Example: SE23400400 - 9.5 amps rated} \\ \text{5 HP motor - 6.8 amps, 0.85 PF}$$

$$\text{Max \%} = \frac{(9.5 \times 1.65)}{(6.8 \times 0.85)} \times 100 = \mathbf{271\%} \text{ of motor rated torque - } \mathbf{\text{Maximum value of \#4.20}}$$

Assume that we want the drive to “Shear Pin” trip at 120% motor torque. Since the maximum available motor torque is 271%, the value we need to put in the threshold parameter , #12.04 would be:

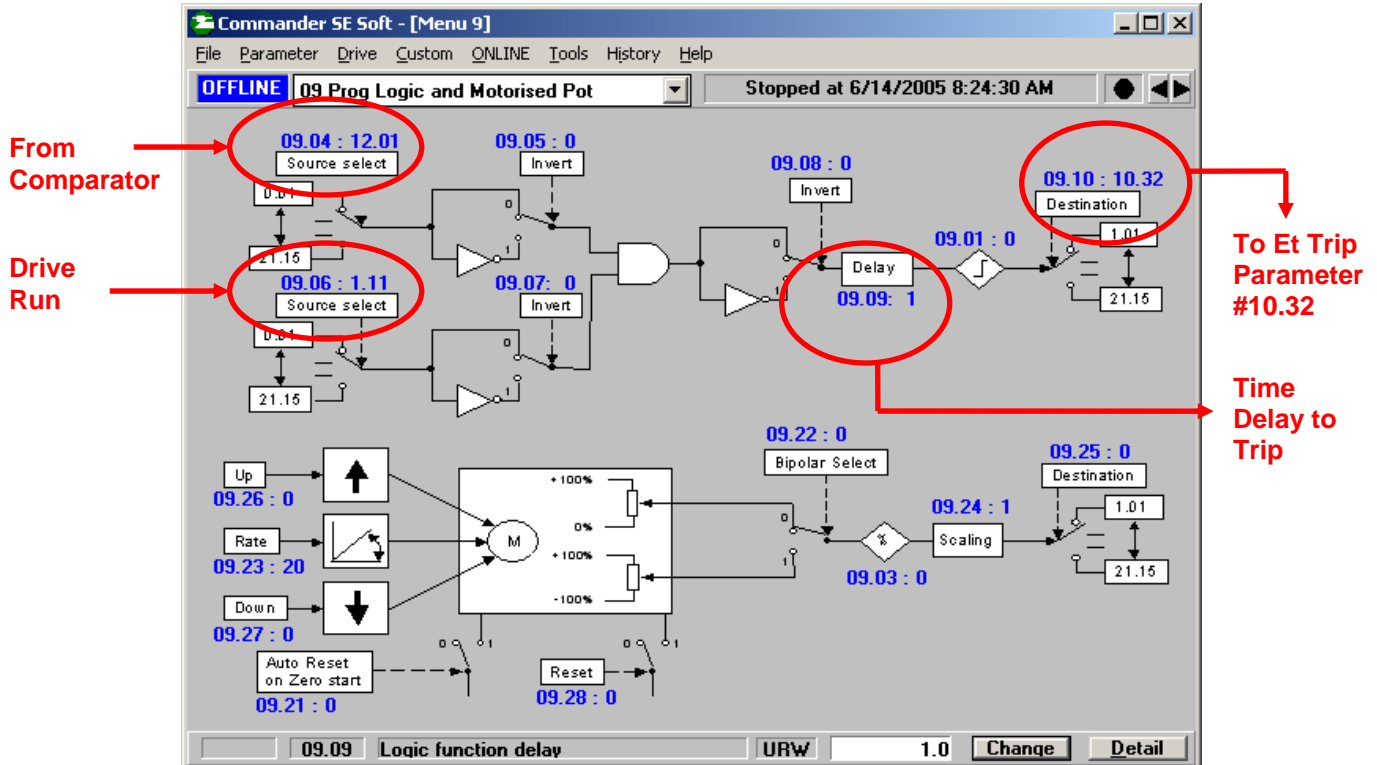
$$\mathbf{\#12.04} = \frac{120\% \text{ motor torque}}{271\% \text{ max available}} \times 100 = \mathbf{44\%}$$

The trip level is therefore equal to 44% of 271% of maximum available motor torque or;

$$\mathbf{\text{Trip Level}} = 0.44 \times 271\% = 120\%$$

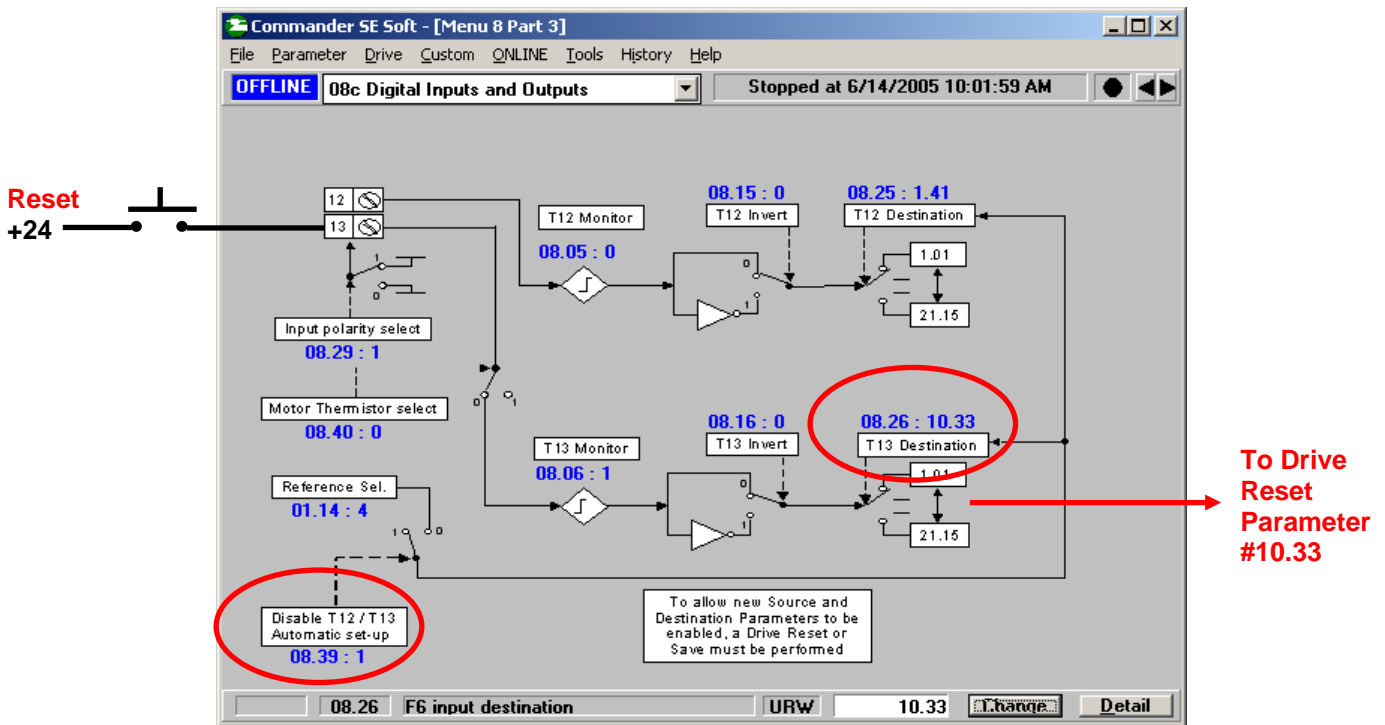
Therefore, anytime the motor torque exceeds 120% of motor rated torque, parameter #12.01 will toggle to a “1”.

## Programmable Logic Menu



The programmable logic menu is used to add a programmable time delay to the trip circuit. This can be used in applications where the machine can tolerate the instantaneous overload for a few seconds. If this time is not tolerable simply set this delay to zero (#9.09 = 0).

If a remote reset input is required to externally reset the fault (normally open push button, terminal #13 (default jog input) can be used.



## Commander SE

### Commander SE Parameter Changes

Parameter	Value	Description
#12.03	4.2	Comparator to read Motor Load Parameter
#12.04	XXX	Trip Level - calculated
#12.05	5	Hysteresis amount
#9.04	12.01	AND Gate #1 input – Comparator Output
#9.06	1.11	AND Gate #2 input – Drive in RUN bit
#9.09	1	Time delay until trip x.x seconds
#9.10	10.32	AND Gate Output – external trip
#8.39	1	Disables automatic set up of terminal #12 and #13
#8.26	10.33	Programs terminal #13 for external reset



## Commander SK

### Commander SK Parameter Changes

Parameter	Value	Description
#12.03	4.2	Comparator to read Motor Load Parameter
#12.04	XXX	Trip Level - calculated
#12.05	5	Hysteresis amount
#9.04	12.01	AND Gate #1 input – Comparator Output
#9.06	1.11	AND Gate #2 input – Drive in RUN bit
#9.09	1	Time delay until trip x.x seconds
#9.10	10.32	AND Gate Output – external trip
#8.25	10.33	Programs terminal #B7 for external reset

See [CTAN272](#) for information on how to make these programming changes to the Commander SK without using the programming software and serial communications cable.

In addition we have a short video example showing how to access parameters outside menu 0 for the Commander SK. Click the video icon below.



[CTVI101](#)

**Questions:** Ask the author ??

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