Application Note AN-VTC-03

Selecting the required stop mode

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- ***General:***

This feature determines the way in which the motor comes to standstill either when the drives enable signal is removed or in the event of mains supply voltage loss.
Some applications require that in the event of mains supply loss, the drive stops as quickly as possible. Others require that the drive remains operational as long possible, resuming normal operation if the mains supply returns. Other applications may require the drive to decelerate at a constant ramp rate, coast to stop, or perform an emergency stop when the drive enable signal is removed.
This application note describes how P1-05 can be used to configure the Optidrive VTC for these different operational modes.

- ***Parameters:***

P1- 05 Stop mode select

P1-05 = 0, (default value), controlled ramp to stop with mains loss ride through

Removing the drives enable signal will decelerate the motor to stop at a rate defined by the first deceleration ramp time (P1-04), if first deceleration ramp is selected or by the second deceleration ramp time (P2-25) if second deceleration ramp is selected (via digital inputs).

In the event of the mains supply being lost, the drive will automatically attempt to keep itself operating by braking (regenerating) at a rate controlled by the rotational energy stored in the motor and load (Mains loss ride through). If the mains supply returns, the drive will ramp back to its requested operational speed.

The drive will only be disabled if the drive output frequency reaches zero before the mains supply returns. The time span that can be bridged in this mode of operation depends on load inertia and speed of rotation when the supply is lost.

P1-05 = 1, coast-to-stop

In this case, the drives output will be disabled as soon as the enable signal is removed, leaving the motor to coast to stop, braked only by the system frictional losses. This mode is often used in conjunction with a mechanical brake.

P1-05 = 2, controlled ramp to stop with no mains loss ride through

Whenever the drives enable signal is removed, the motor will be ramped down to zero at a rate determined by the selected deceleration ramp rate (normally P1-04) unless the second deceleration ramp rate is selected via digital inputs.
However, in the event of mains loss, the drive will ramp the output down to zero at the rate defined by the second deceleration ramp (P2-25) if this parameter value larger than 0. This provides an emergency stop function where the braking time is much shorter than the normal ramp time.

If P2-25 = 0, the drive will implement a coast to stop. This provides support for a mechanical brake that must engage immediately if the mains supply is lost, yet still provides a controlled ramp to stop for a normal stopping condition.

Once the mains supply has been lost, the ramp-to-stop process will continue even if the supply returns during the ramp interval. Once the drive has reached stop, it will need to be re-enabled before it will restart. This can be carried out via the hardware enable input or via the keypad when in keypad mode.

If the mains supply returns during the ramp-to-stop interval before the drive has reached stop, removing and re-applying the hardware enable signal or issuing a run signal either from the keypad or via serial communications will have no effect. The drive will continue to ramp to stop.

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