



Optidrive Applications Support Library

Application Note	AN-ODE-2-003
Title	Setting the Required Stopping Mode
Related Products	Optidrive E2
Level 1	1 – Fundamental - No previous experience necessary 2 – Basic – Some Basic drives knowledge recommended 3 – Advanced – Some Basic drives knowledge required 4 – Expert – Good experience in topic of subject matter recommended

Overview

This feature determines the way in which the motor comes to standstill, either when the drive enable signal is removed or in the event of mains supply voltage loss.

For loss or removal of the drive enable input, applications may require the drive to decelerate at a constant ramp rate, to coast to a stop, or to perform an emergency stop of the motor (stop as quickly as possible).

In the event of mains supply loss the application might require the drive to stop the motor as quickly as possible. Other applications might require that the drive remains operational as long as possible, resuming normal operation if the mains supply is returned.

This application note describes how the Optidrive E2 can be used to perform for these different operational modes.

Optidrive E2 Behaviour on loss of Enable Signal (Normal Stop Condition)

Normal stopping occurs when the enable signal is removed from the Optidrive. The mains power supply must always be maintained on the Optidrive for a normal stop to be performed.

When P-05 is set to 0 (default value), the motor is ramped to a controlled stop with the stopping time determined by:-

- the output frequency at the time the stop command is received
- the motor rated frequency set in P-09
- the ramp down time programmed in P-04 (or P-24)

With some settings of P-15 (digital input configuration) it is possible to select the 2nd deceleration ramp time, so that (depending on the status of the digital inputs) the ramp down time will be controlled by P-24 as opposed to P-04. This can be utilised in applications which occasionally require a faster stopping time than the normal ramp down time. See the relevant Optidrive E2 User Guide for details on how to select this function.

When P-05 = 1 (coast to stop selected), the Optidrive output is immediately disabled following loss of the enable command, and the motor and connected load will decelerate depending on the inertia and friction in the system (Uncontrolled or coasting to stop). This mode can be useful on high inertia applications where the stopping time is not important, or very high friction loads such as extruders whereby the motor will stop quickly, without assistance from the drive.

It is important when this setting is used in applications with high inertia loads such as fans, which may continue to rotate after the drive has been disabled, and may still be rotating when the drive is re-started, that the spin start function is also enabled (P-33 = 1).

Parameters

P- 05 Stop mode Selection

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

Removing the drive enable signal will decelerate the motor to stop at a rate defined by the first deceleration ramp time P-04 (if first deceleration ramp is selected) or by P-24 (if second deceleration ramp is selected). The two ramps rate values are selected via digital inputs – see the range of settings for digital inputs in parameter P-15 (Optidrive E2 User Guide).

In the event of the mains supply being lost, the drive will automatically attempt to keep itself operating by using the rotational kinetic energy stored in the motor and load (Mains loss ride through). Providing the mains supply is lost for only a short time, and the load has sufficient inertia to maintain the internal electronics supply on the Optidrive, the drive will ramp back to its requested operational speed when the supply returns. If the load does not have sufficient inertia, or the supply is lost for an extended period of time, the drive will trip, and then disable the output.

P - 05 = 1, coast-to-stop with no mains loss ride through

In this case, the drive 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.

For loss of mains supply the same coast to stop as when removing the enable will be performed.

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

Whenever the drive enable signal is removed, the motor will be ramped down to zero at a rate determined by the selected deceleration ramp rate (P-04) unless the second deceleration ramp rate (P-24) 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 (P-24). This provides an emergency stop function where the braking time is much shorter than the normal ramp time.

If P-24 = 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 provide controlled ramp to stop for a normal stopping condition.

P1-04 and P2-25 Ramp settings

If P-04 = 0, the drive will use the 2nd ramp rate for controlled deceleration.

If P-24 = 0, the drive will implement a coast to stop whilst stopping when 2nd ramp rate is selected.

Appendix:

Revision History			
Version	Comments	Author	Date
01	Document Creation	JP	08/02/12
02	Revised to new format	KB	24/4/14