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## APPLICATION NOTE

### Drive Applications Support Library

Application Note	AN-P2-003
Title	Selecting the Required Stopping Mode
Related Products	P2 Series AC Drives
Level: <b>1</b>	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 when the drive enable signal is removed.

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

This application note describes how the P2 can be configured for these different operational modes.

### P2 Series Behavior on loss of Enable Signal (Normal Stop Condition)

Normal stopping occurs when the enable signal is removed from the drive. The mains power supply must always be maintained on the drive for a normal stop to be performed, and the STO circuit must also be closed (opening the STO circuit will always result in a coast stop).

When P1-05 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 P1-09.
- The ramp down time programmed in P1-04 (or P2-25).

With some settings of P1-13 (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 P2-25 as opposed to P1-04. This can be utilized in applications which occasionally require a faster stopping time than the normal ramp down time. See the relevant P2 User Guide for details on how to select this function.

When P1-05 = 1 (coast to stop selected), the drive 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, the spin start function is also enabled (P2-26 = 1).

## Parameters:

### P1- 05 Stop mode Selection

#### ***P1-05 = 0, (default value), Controlled Ramp to Stop***

Removing the drive enable signal will cause the drive to decelerate the motor to stop at a rate defined by the first deceleration ramp time (P1-04). The second deceleration ramp time (P2-25) can be used if selected via the digital inputs (see settings for parameter P1-13 in the User Guide).

#### ***P1-05 = 1, Coast-to-Stop***

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.

#### ***P1-05 = 2, Controlled Ramp to Stop with Dynamic Braking***

Whenever the drive enable signal is removed whilst the drive is in this mode, 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).

This setting behaves as per setting 0, except that the drive internal brake transistor (if fitted) will be activated in this mode, so that excess energy will be dumped into a connected brake resistor.

#### ***P1 - 05 = 3, Coast-to-Stop, Dynamic Braking Active on Speed Change Only***

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. The drive internal Brake Transistor (if fitted) will not be activate when the drive is stopping, but will be used as required during speed changes, e.g. decelerating from a high speed to a low speed, whilst the drive enable signal remains present.

## P1- 05 Stop mode Selection

If P1-04 = 0, the drive will implement a quickest possible stop whilst preventing an over-voltage trip when using that ramp rate.

If P2-25 = 0, the drive will implement a coast to stop whilst stopping when 2nd ramp rate is selected.

## Appendix:

Revision History			
Version	Comments	Author	Date
1	Application Note Creation / Release	JP	08/02/12
2	Revised to new format	KB	06/15/15

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