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Optidrive Applications Support Library

Title	Optidrive Elevator Core – Absolute Encoders
Related Products	Optidrive Elevator Core - All Models
Level 3	<p>1 – Fundamental - No previous experience necessary</p> <p>2 – Basic – Some Basic drives knowledge recommended</p> <p>3 – Advanced – Some Basic drives knowledge required</p> <p>4 – Expert – Good experience in topic of subject matter recommended</p>

Contents

Overview	1
Why is an Absolute Encoder needed?	2
How does the Optidrive Elevator Core measure the Encoder offset value ?	2
Can I still run a Gearless Permanent magnet motor without an Absolute Encoder?	2
Encoder Offset Angle real-time value.	2

Overview

As the Elevator industry trend moves towards gearless (Permanent Magnet) motors then so does the requirement for Absolute Encoders, for closed loop operation of Permanent magnet motors the drive requires absolute position information of the rotor, this is where the role of the Absolute encoder comes in.

This application note is intended to complement the standard product user manual, the goal of the application note is to take a much deeper dive into absolute encoders and how they are used in conjunction with the Optidrive Elevator Core.

Why is an Absolute Encoder needed?

The drive requires an Encoder to measure the angular position (Encoder Offset) of the motors magnetic flux to allow the drive to accurately control the motor torque, the benefit of using an absolute encoder and not a standard incremental encoder is that the digital encoder stores the angular position so if the power is cycled to the drive the motor can immediately run without having to perform another Encoder offset measurement or motor movement.

How does the Optidrive Elevator Core measure the Encoder offset value ?

When parameter P4-08 is set to either 2, 3, 4 or 5 the encoder offset value is automatically measured by the drive.

The Optidrive Elevator Core has multiple options for the Encoder offset measurement, this is mainly down to the differences between the measurement method required for the differences in construction between an IPM (Interior Permanent magnet Motor) and SPM (Surface Mount Permanent Magnet) type motor.

The key differences between the measurements is summarised in the table below:

Motor Type	P4-08 Setting	Notes on Operation
IPM	2	This setting uses signal injection to measure the encoder offset value
	3 (recommended method for IPM Motors)	This method encompasses both the standard motor measurement of the electrical characteristic of the motor (Inductance etc..) as well as mode 2 signal injection method to measure the encoder offset value
	4	This alternative method for IPM motors uses current pulses to create a minimal movement against the brake to measure the encoder offset, this mode is audibly louder than the other measurements
	5	This setting is only suitable if the lift motor has no ropes fitted.
SPM	4	Method specifically for SPM type motors (no Saliency)
	5	This setting is only suitable if the lift motor has no ropes fitted.

Can I still run a Gearless Permanent magnet motor without an Absolute Encoder?

Yes, it is possible to run the motor using a standard incremental encoder (Pending)

Encoder Offset Angle real-time value.

When the motor is running the real-time encoder offset value is shown in parameter P0-20, this can be a useful checkpoint to ensure the encoder offset value is correct (P6-09), the more accurate the encoder offset value the more efficient the motor will run.

Revision History			
Version	Comments	Author	Date
0.1	First Release	JW	06/10/2023