



# Optidrive Applications Support Library

<b>Application Note</b>	<b>AN-ODE-2-057</b>
<b>Title</b>	<b>Switching Frequency Derating Information</b>
<b>Related Products</b>	<b>Optidrive E2</b>
<b>Level</b> <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

The Optidrive E2 product range has been designed to operate in an ambient temperature up to 50°C for IP20 models and 40°C for IP66 models, at default switching frequency and drive rated output current. Operating at higher switching frequencies sometimes results in the drive continuous output current needing to be reduced. This document provides information regarding the maximum permissible continuous output current at different ambient temperatures and switching frequencies for all Optidrive E2 models.

The derating curves are based on the results obtained from extensive internal tests that are carried out to measure the temperatures of various components at the various operating conditions.

The limiting factor is not always the heatsink temperature of the drive that can be observed in the parameter P00-09, but can be one or more of the following internal components:

- Aluminium Heatsink
- Input Bridge rectifier
- IGBT module
- DC bus capacitors
- Various capacitors, resistors and semiconductor components

**For this reason it is important that these de-rating curves are observed.**

The default drive switching frequency is highlighted in **BOLD** on the following rating tables.

## Thermal Management

The Optidrive E2 (ODE-2) product range has an integrated Thermal Management function. This function allows the drive to automatically reduce the output switching frequency when operating at higher heatsink temperatures to avoid the risk of an over temperature trip.

Table 1 below shows the heatsink temperature threshold points at which thermal management occurs.

Table 1.1 – Thermal Management Thresholds

Temperature Threshold	Action
70 °C	Auto reduce from 32kHz to 24kHz
75 °C	Auto reduce from 24kHz to 16kHz
80 °C	Auto reduce from 16kHz to 12kHz
85 °C	Auto reduce from 12kHz to 8kHz
90 °C	Auto reduce from 8kHz to 4kHz
97 °C	Over temp trip

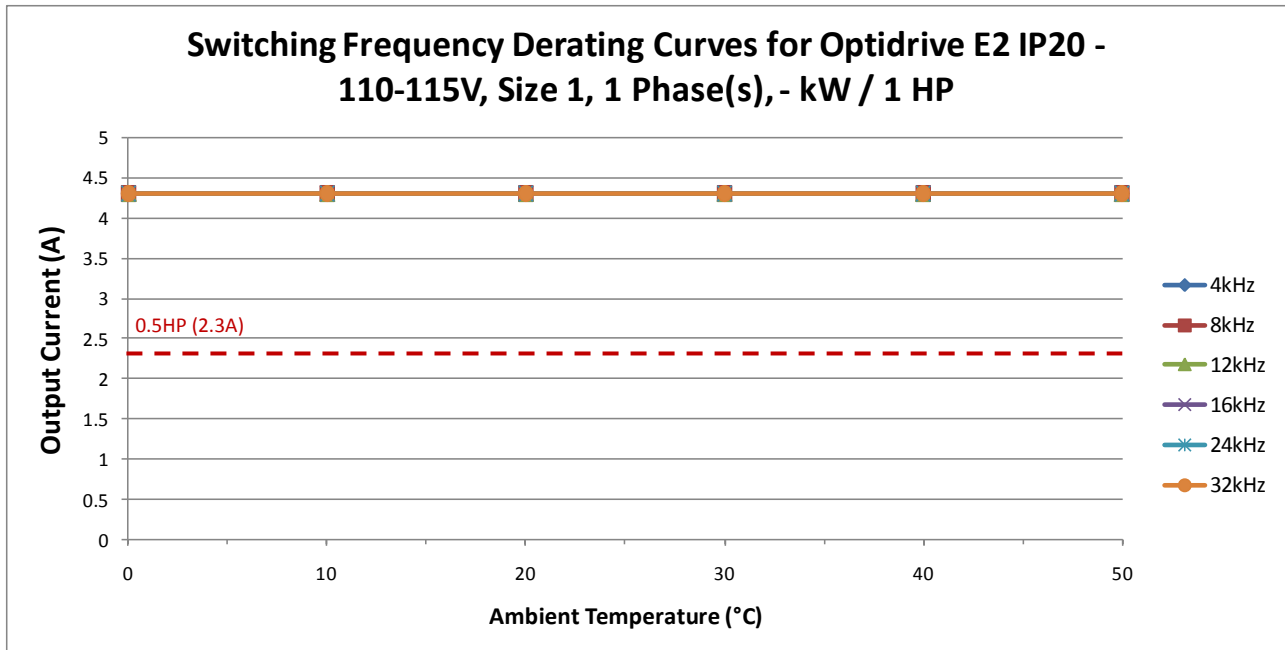
### NOTE

The available range of switching frequencies is subject to the drive frame size, power rating and voltage rating.

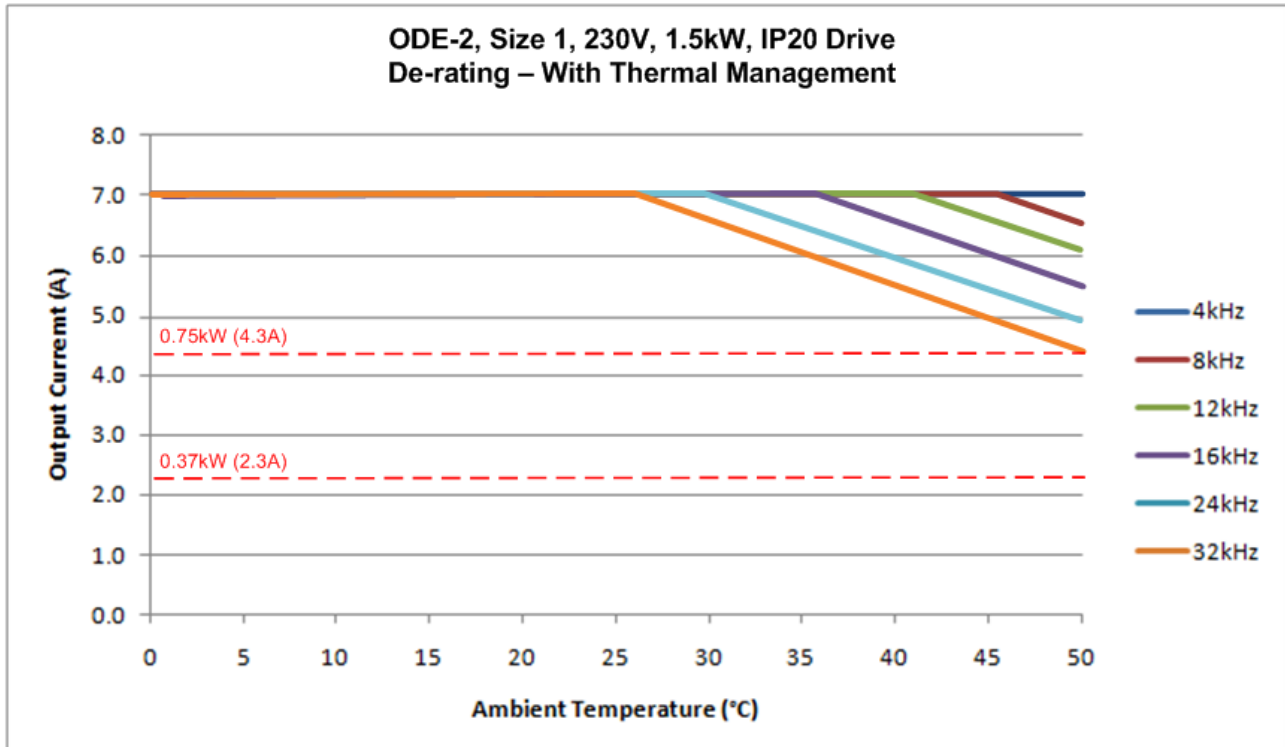
## De-rating Curves Explained

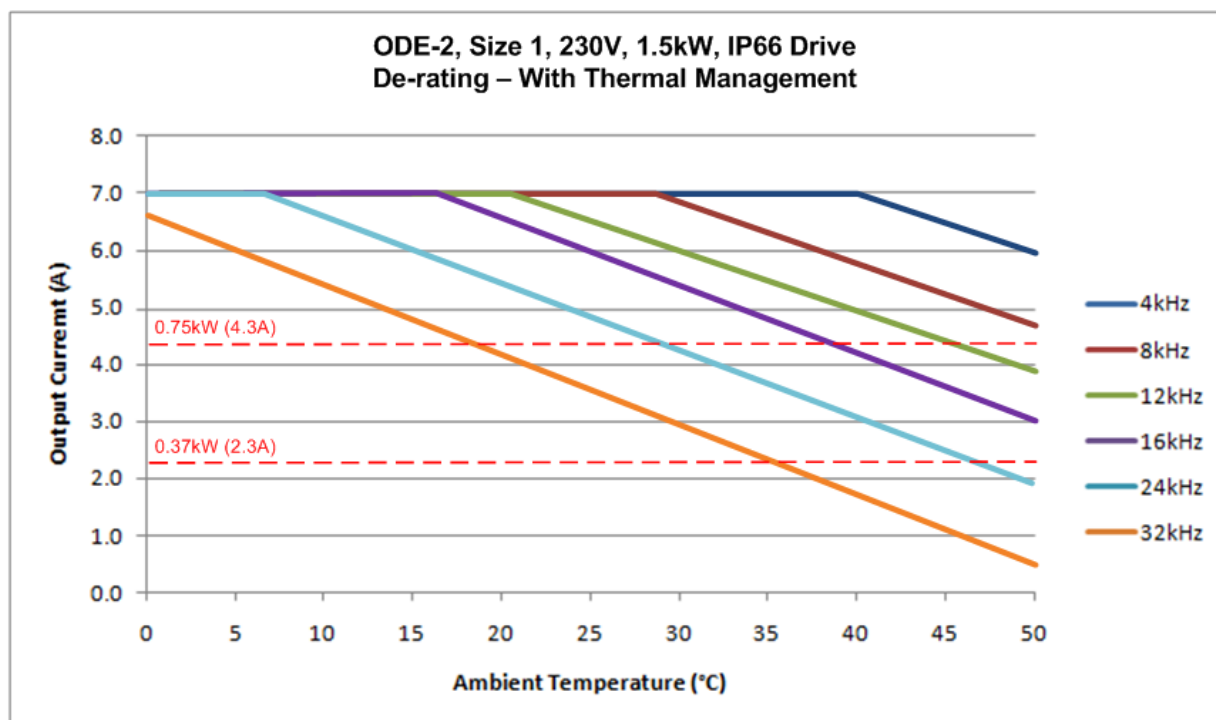
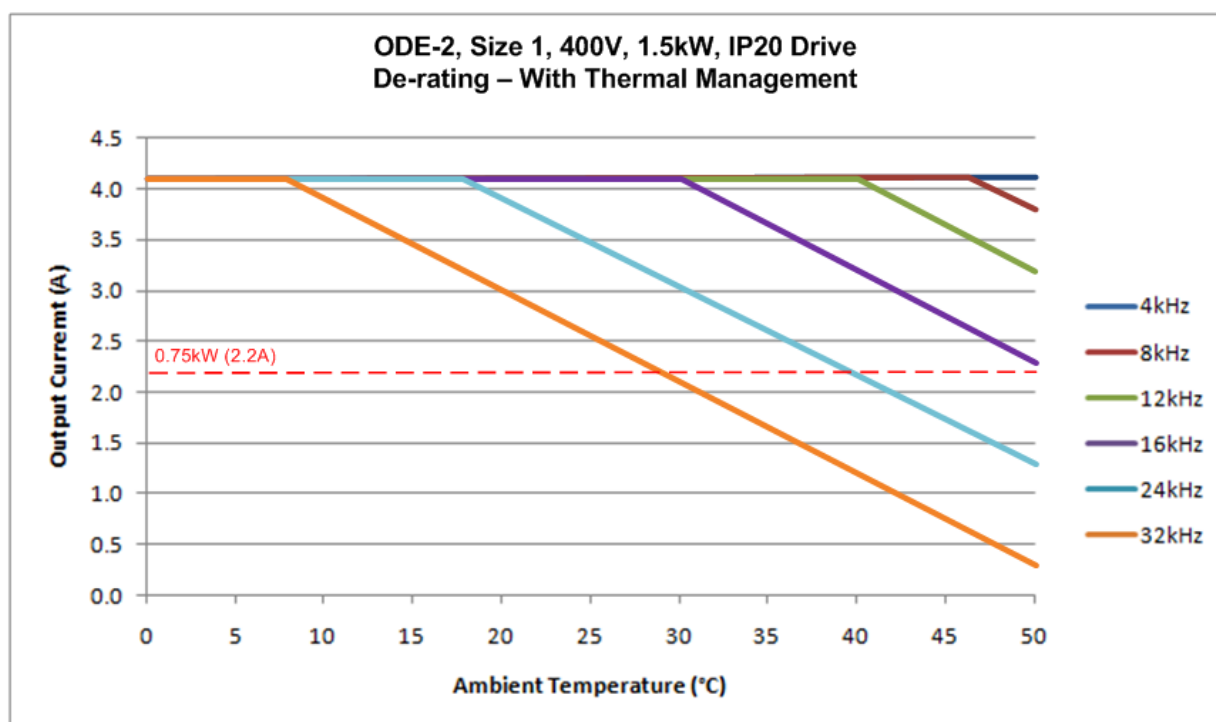
The following de-rating curves each show the maximum continuous output current against drive ambient temperature. In each graph the curves represent the performance of the largest rated drive for that frame size and rated voltage for each available switching frequency. Where lower power rating variants are available their limits are shown as dotted lines to intersect the curves.

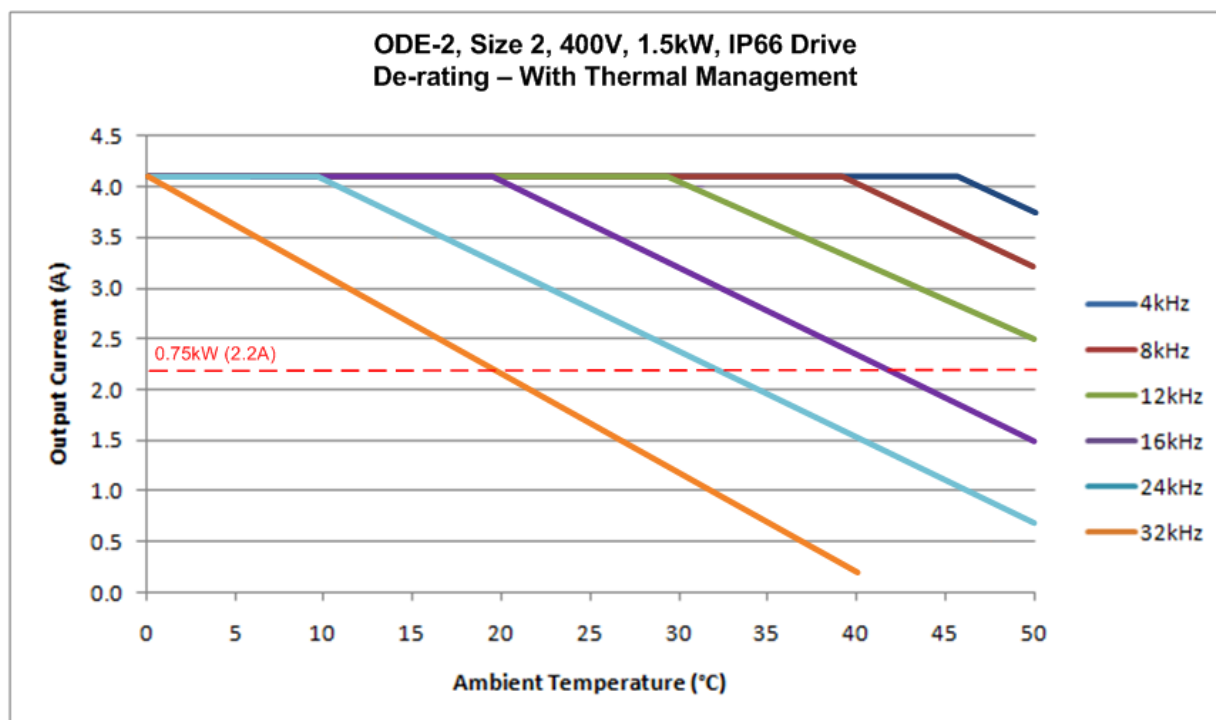
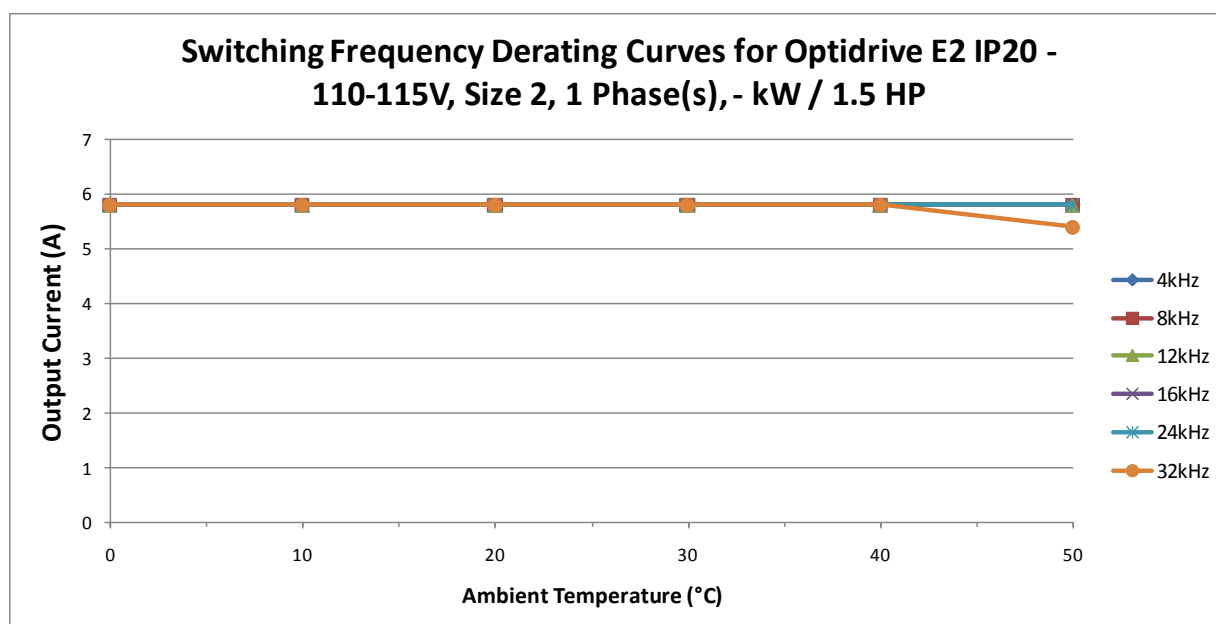
### Size 1, 110 - 115 Volt, IP20, 0.5 – 1HP



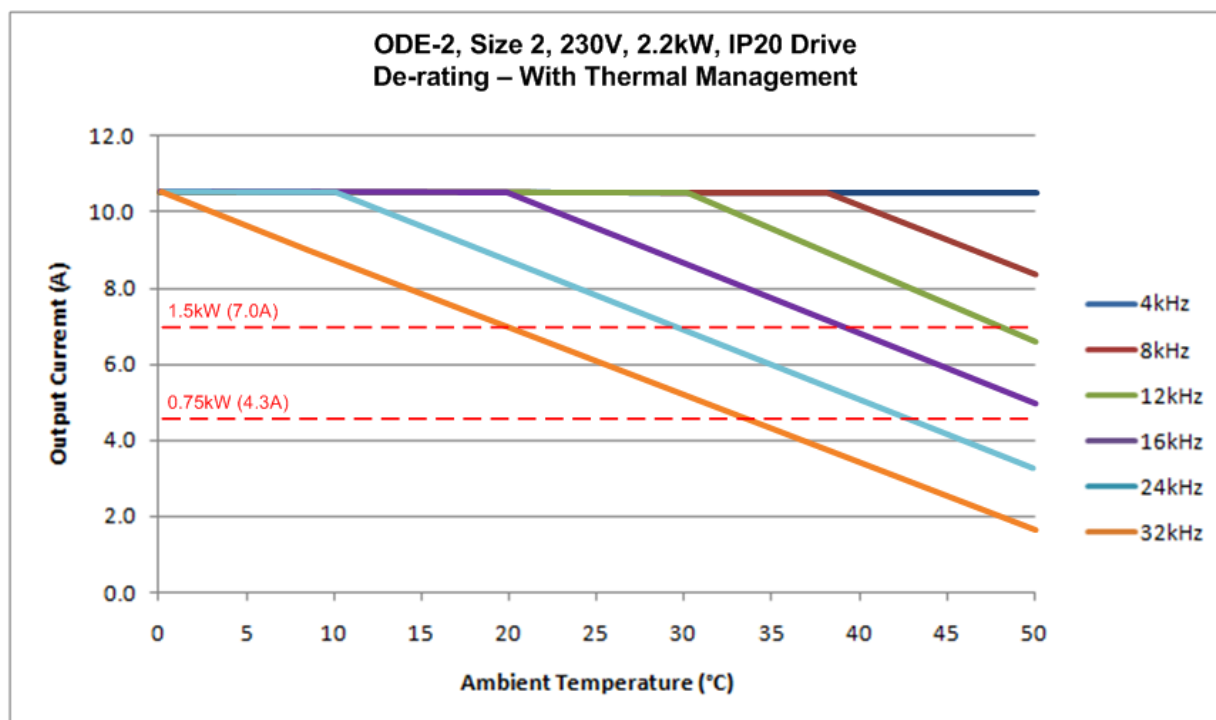
### Size 1, 200-240 Volt, IP20, 0.37 – 1.5kW



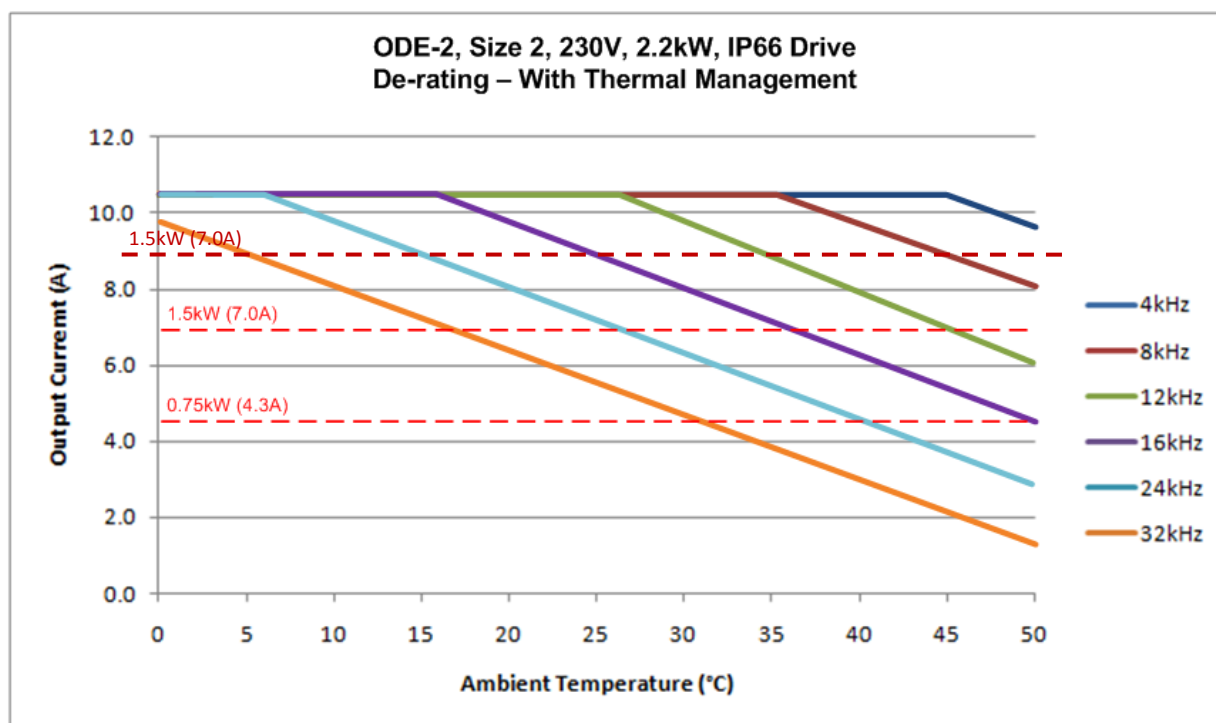
**Size 1, 200-240V, IP66, 0.37 – 1.5kW****Size 1, 380-480 Volt, IP20, 0.75 – 1.5kW**

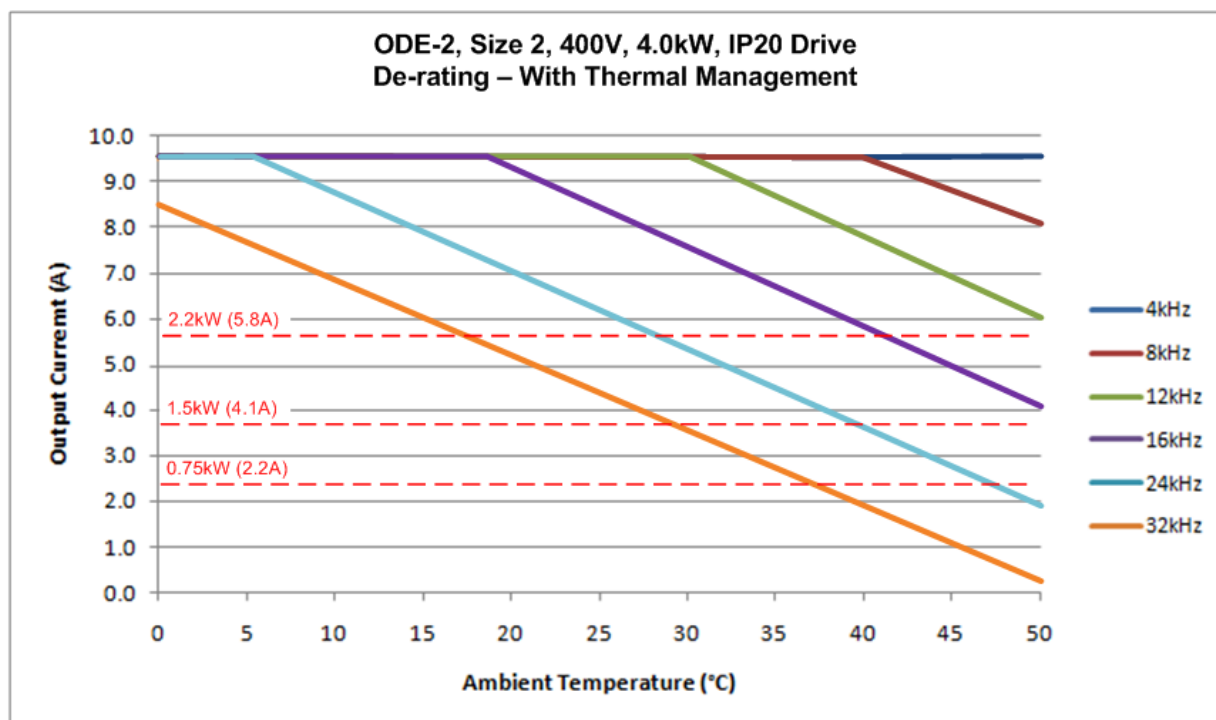
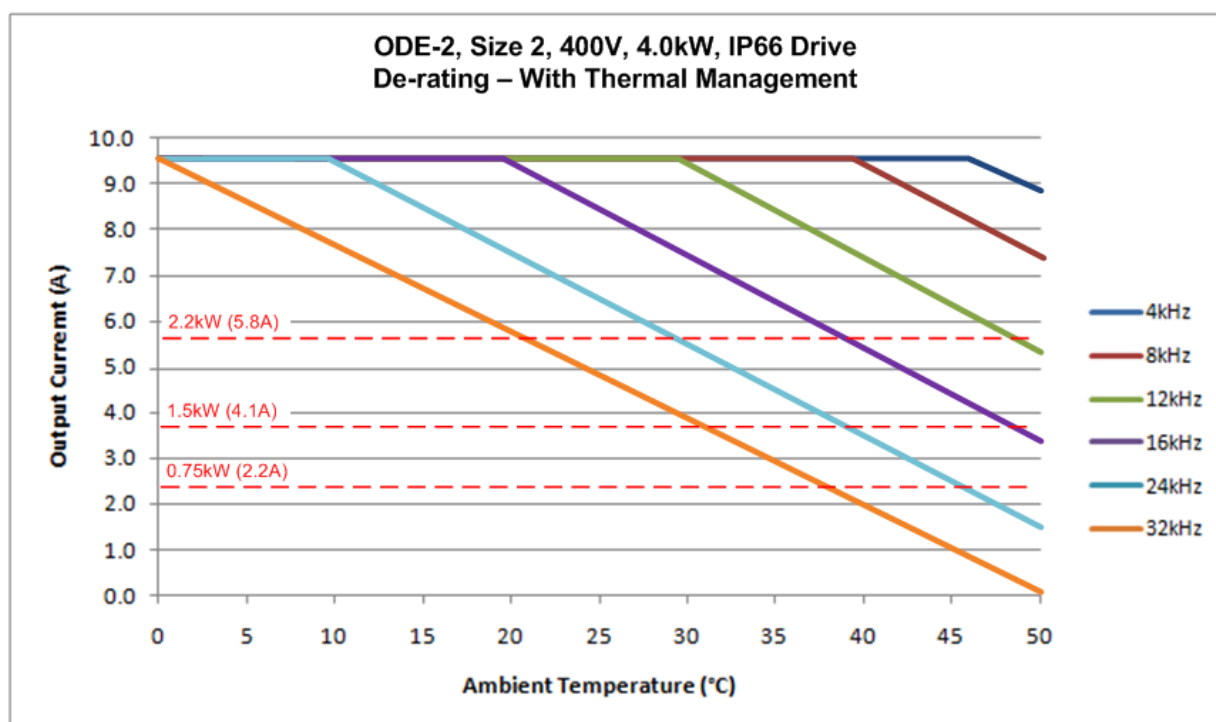
**Size 1, 380-480 Volt, IP66, 0.75 – 1.5kW****Size 2, 110 – 115 Volt, IP20, 1.5HP**

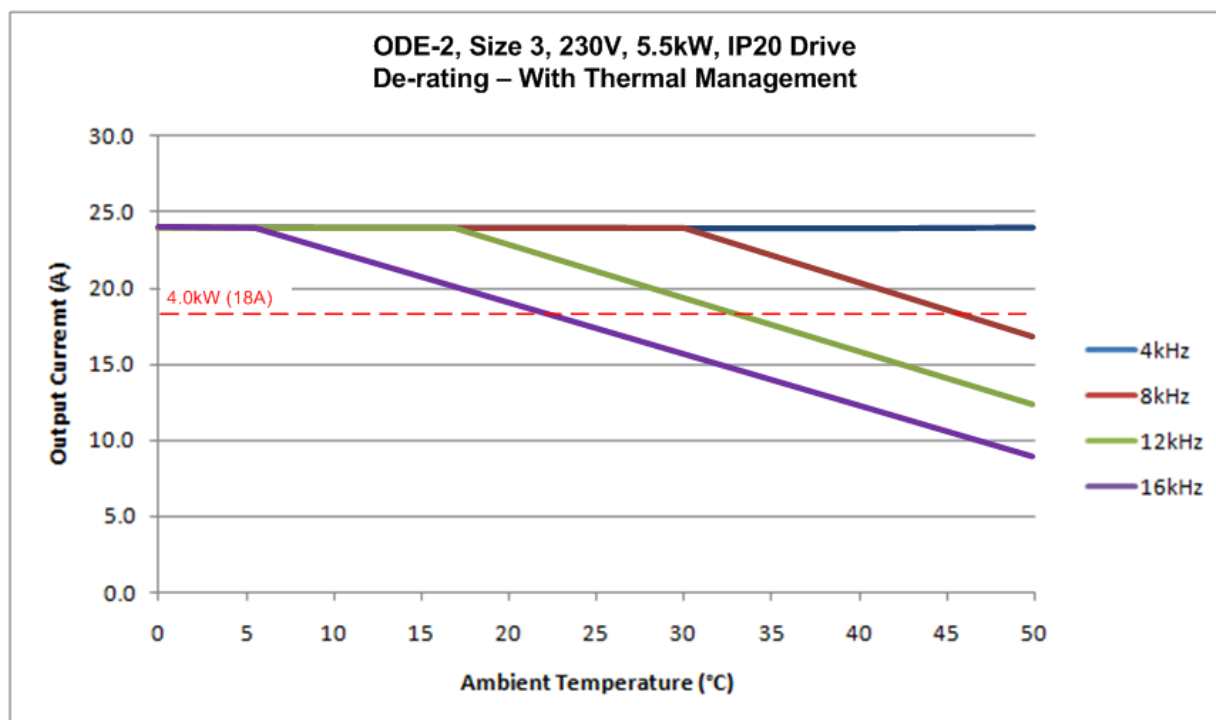
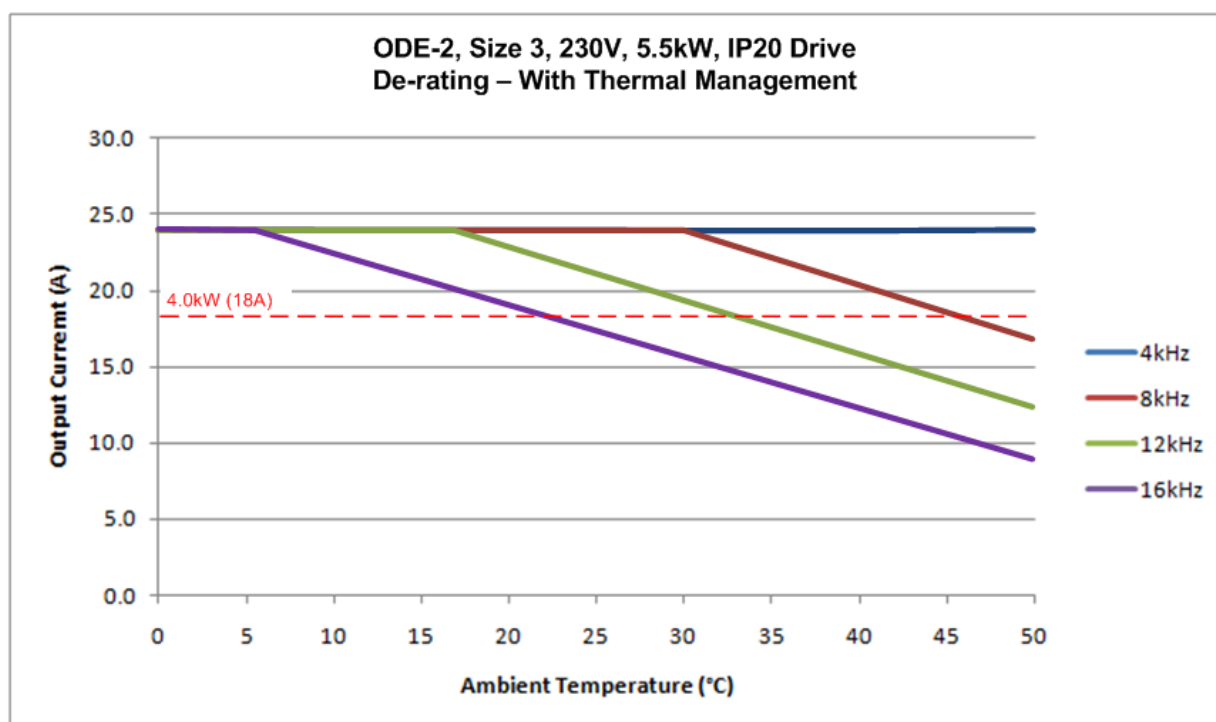
## Size 2, 200-240 Volt, IP20, 1.5 – 2.2kW

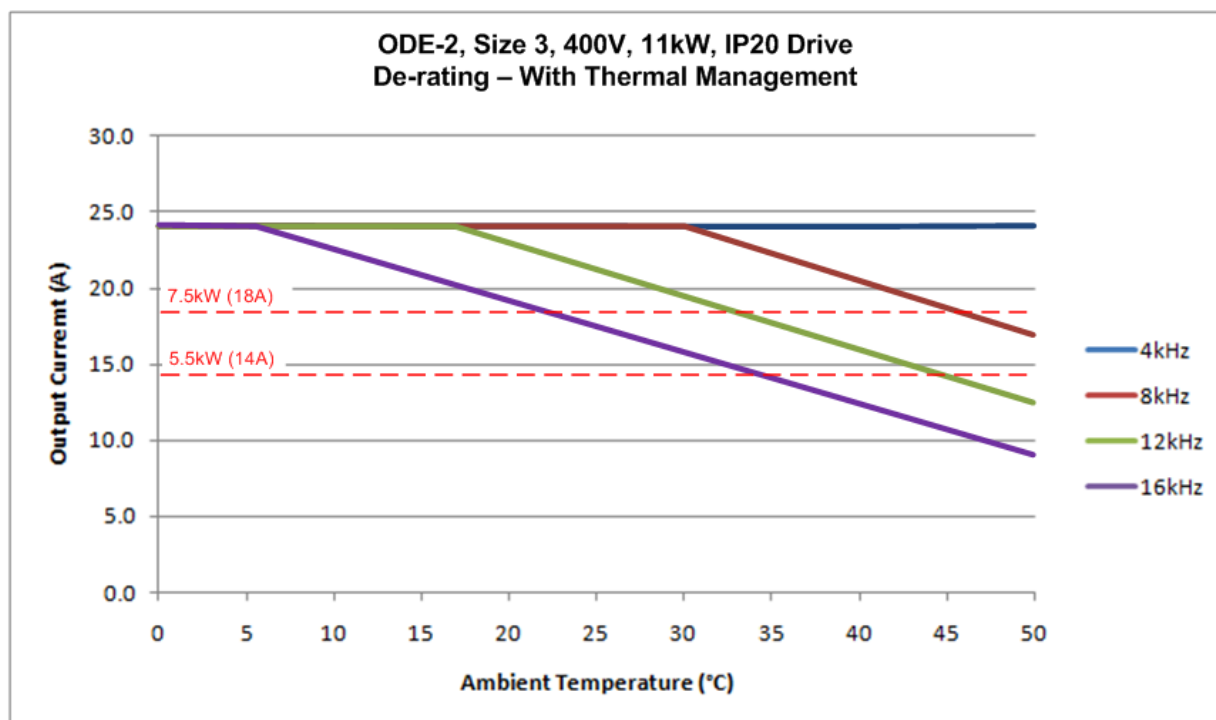
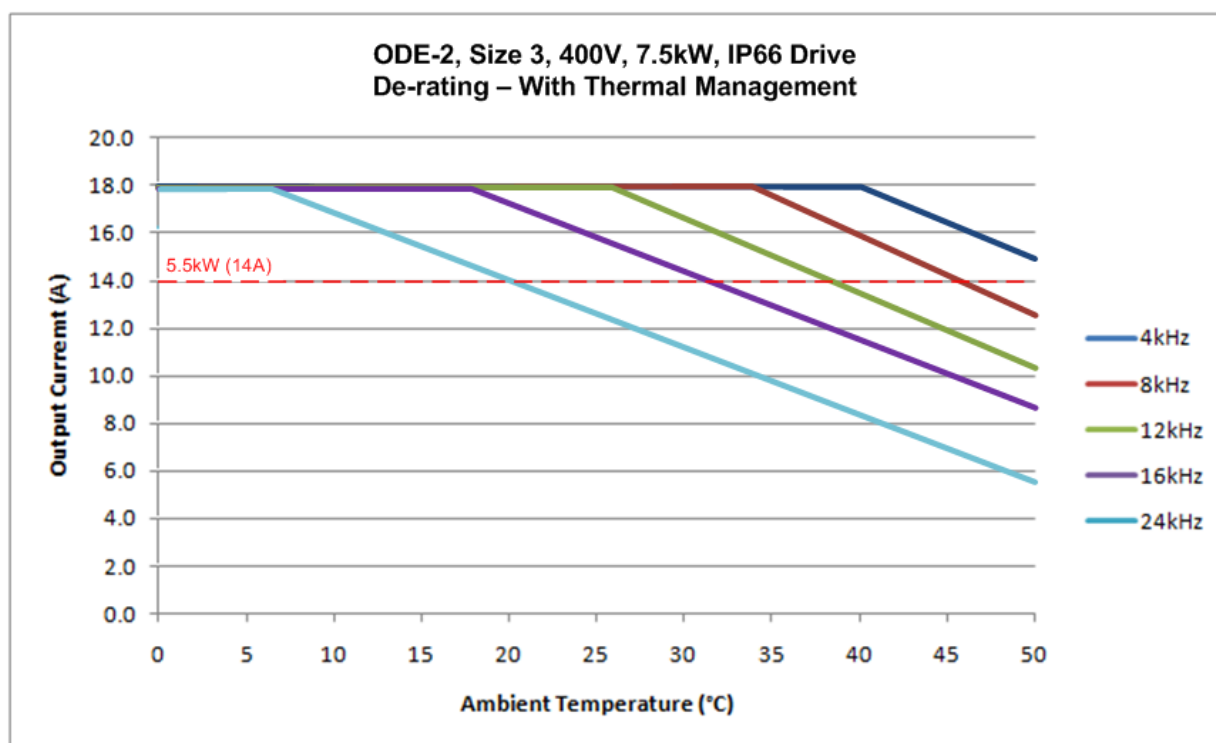


## Size 2, 200 – 240 Volt, IP66 with Thermal Management, 1.5 – 2.2kW



**Size 2, 380-480 Volt, IP20 with Thermal Management, 1.5 – 2.2kW****Size 2, 380 – 480 Volt, IP66, 2.2 - 4.0kW**

**Size 3, 200-240 Volt, IP20, 4.0kW (Note: 5.5kW not available)****Size 3, 200 – 240 Volt, IP66, 4.0kW, IP66 (Note: 5.5kW Not Available)**

**Size 3, 380-480 Volt, IP20, 5.5 – 11kW****Size 3, 380 – 480 Volt, IP66, 5.5 - 7.5kW****Appendix:**

Revision History			
Issue	Comments	Author	Date
01	Initial Release	PAE	09/03/09
02	4kW 240V 1 and 3 phase separated. Revised current limits for 1 phase 240V 4kW	JSP	21/05/09
03	Changed to new number system, new graphs used	KB	15/2/13
04	Revised to new format	KB	24/04/14