PowerFlex 525

Tuning Guide

ONE MOTION

One Motion Tuning Example / Best Practices

Overview

One Motion Products are designed for tough washdown sanitary environments (IP69K-rated), like food processing plants handling meat, cheese, or baked goods. Mag-Drives are built for reliability, require zero maintenance under normal conditions, and come with a **3-year warranty**. They're rated to last longer than all other solutions on the market.

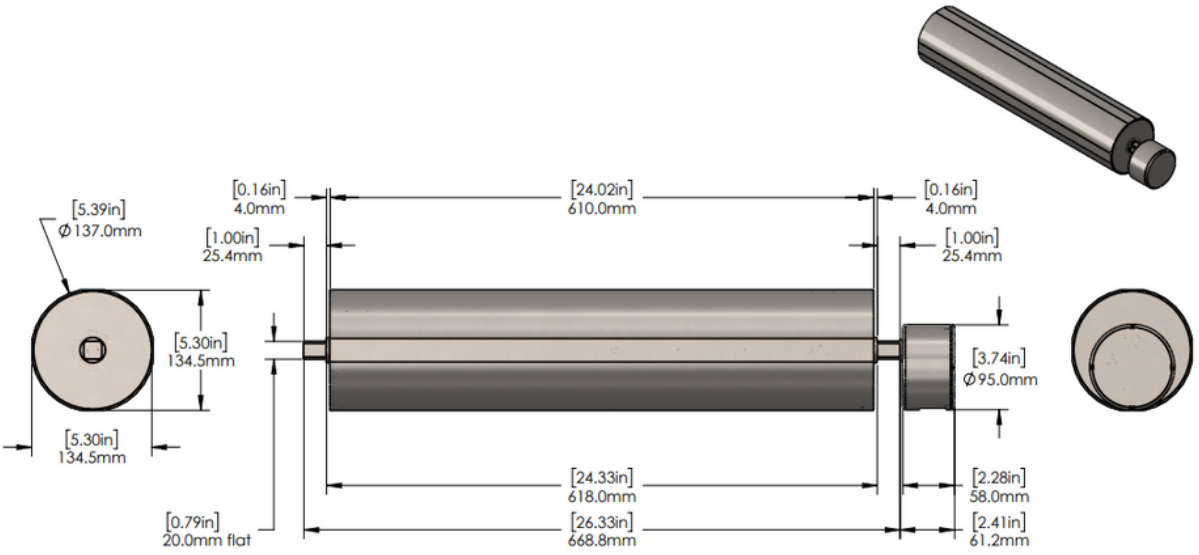
This guide helps your maintenance team manage current levels during setup and troubleshooting to keep the Mag-Drives running efficiently.

Example Product:

This is a relative guide based on example part (OD69-60-135-610-11193).

Each One Motion product has its own technical data specs.

Contact Technical Support for your PN technical data information.



We'll use an example Mag-Drive with these ratings (found on its One Motion product data sheet example):

	Mechanical		Electrical	
1.	Peak Torque:	60Nm (44.3 ft/lbs)	Power:	0.54 / 1.61 / 0.67 kw
2.	Torque:	20Nm (14.8 ft/lbs)	Current:	1.19 / 3.57 amps
3.	Belt Pull:	276 N (62 lbs)	Averages:	59.22 Nm / 107.99 RPM / 3.53 amps v
4.	Synchronous Speed:	257 RPM	BEMF @ 60hz:	304.545 V
5.	IP Rating:	69	Name Plate Volts:	460 v
6.	Option:		Lq / Ld:	88.02 / 56.1 mH
7.	Mounting :	Four Flats	Resitance:	5.89 / 11.18 ohms
8.	Min / Max Width:	618mm (24.33") / 668.8mm (26.33")	Inductance:	40.46 / 89.55 mH
9.	Weight:	40 kg, (86 lbs)	Kt :	16.79 Nm / Amp
10.	Diameter/Shell:	135mm (5.3") / 10mm (0.39")	Ke :	1.675 Volts / RPM (BEMF)
11.	Face Width:	610mm (24.02")	Wire Size / Turns:	0.9 mm / 52 turns
12.	Shell Face:	Square Drive	Core Assembly:	Single Core
13.	Series:	Pulley 135 Series	Lam Stack Length:	225 mm / (sheets) 219 mm
14.	Connector:	IP69k-Junction Box, Conduit Threads: M20		

Understanding Current Limits

Example Current Values (Shown in e.g. data sheet above)

- **Continuous Current:** 1.19 A
- **Maximum Current:** 3.57 A

⚠ **Important:** Continuous and max current values are **product specific**. Always check the One Motion product data sheet for your Mag-Drive's exact ratings before setting up or troubleshooting.

What Are Current Limits?

Current limits tell you how much electrical current your Mag-Drive can handle safely. Going over these limits can overheat the Mag-Drive, causing damage or early failure. Here's what they mean:

Continuous Current

This is the normal operating current for steady, continuous use. For our example Mag-Drive, it's 1.19 A (check your product data sheet for your Mag-Drive's value).

☑ **Stay Safe:** Run the Mag-Drive at or below 1.0–1.1 A to keep it cool and extend its life.

Maximum Current

This is the highest current the Mag-Drive can handle during short bursts, like startup or sudden heavy loads. For our example Mag-Drive, it's 3.57 A (again, check your product data sheet).

⚠ **Limit Time:** Don't let the Mag-Drive run near max current for more than 20% of its duty cycle.

e.g. For a 10-minute cycle (600 seconds), that's 120 seconds max. For a 5-minute cycle (300 seconds), it's 60 seconds max.

Best Practices for Use (PowerFlex 525 as Example)

In a washdown environment, Mag-Drives face wet conditions, high-pressure cleaning, and potential load spikes from slippery surfaces or product surges. Follow these best practices to keep your One Motion Mag-Drive safe and running well:

Best Practice	Target	Why It Matters
Keep continuous current below 1/3 of max	≤ 1.19 A (check your data sheet)	Stops the Mag-Drive from overheating during long runs
Run in the safe range	1.0–1.1 A	Gives a safety buffer to prevent damage
Limit max current time	≤ 20% of duty cycle (e.g., 120 sec in 10 min)	Prevents heat buildup and stress during startups or surges
Check current often	Use drive's B003 parameter	Let's you spot problems early and adjust

How to Set Up Your PowerFlex 525 Drive

The Allen-Bradley PowerFlex 525 drive helps control and protect your Mag-Drive. Use Connected Components Workbench (CCW) software to set it up with the following settings, updated to align with your Mag-Drive's needs in a washdown environment:

Step 1: Enter Mag-Drive Data

Use the values from your One Motion product data sheet to set these parameters:

Parameter	Setting	What It Does
P033	60 Hz	Sets the Mag-Drive's frequency
P034	1.19 A (use your data sheet value)	Sets the continuous current
P036	257 RPM	Sets the Mag-Drive's speed
P484/485	3.22 A	Sets a safe overcurrent limit

Step 2: Set Up Safety Protections

These settings stop the Mag-Drive from running too hot or overloading:

Parameter	Setting	What It Does
A484	**4.00 A**	**Set drive fault limit (absolute limit)**
A486	**2.38 A (1.19 × 2.0)**	**First overcurrent warning level**
A487	**10 sec**	**Waits 10 sec before stopping if overcurrent**
A488	**3.57 A (use your max current)**	**Final overcurrent limit**
A489	**5 sec**	**Stops if max current lasts over 5 sec**

Step 3: Adjust Start and Stop Settings

These settings help avoid big current spikes when starting or stopping:

Parameter	Setting	What It Does
P041	**10 sec**	**Mag-Drive speed to target Hz (application specific)**
P042	**10 sec**	**Mag-Drive speed to 0 Hz (application specific)**

5. Troubleshooting in a Washdown Environment

Here's how to handle common issues in a washdown sanitary environment, like after cleaning or during heavy loads, using the updated settings:

Scenario A: Normal Operation (Cheese Block Conveyor)

Situation: Conveyor moving cheese blocks (2 kg each) for packaging, running 8 hours a day.

Goal: Keep current at 1.0–1.1 A.

Steps:

- Check B003 on the drive to see live current (should be 1.0–1.1 A).
- If current goes over 1.19 A (e.g., from cheese residue buildup), clean the conveyor to reduce friction.
- Drive will stop if current stays above 2.38 A for 10 sec (A486/A487 settings).

Scenario B: Restart After Washdown (Wet Trays)

Situation: Conveyor restarts after a high-pressure washdown, moving wet trays of chicken.

Goal: Avoid max current (3.57 A) for more than 60 sec in a 5-min cycle.

Steps:

- Soft start (P041 at 10 sec) keeps startup current around 2.5 A.
- If current hits 3.57 A (e.g., trays stick due to suction), drive stops after 5 sec (A489 setting).
- After startup, ensure current settles to 1.0–1.1 A; dry trays if needed to reduce sticking.

Scenario C: Heavy Load Surge (Meat Packages)

Situation: Sudden surge of heavy meat packages (3 kg each) on the conveyor.

Goal: Limit max current (3.57 A) to under 120 sec in a 10-min cycle.

Steps:

- Drive stops if current hits 3.57 A for over 5 sec (A489 setting).
- If the conveyor slips, increase A533 (suggest 1 Hz increment) to improve grip.
- If speed stutters, increase A581 (suggest +2) to smooth it out.
- Spread out the packages to lower the current back to 1.0–1.1 A.

6. Quick Reference Summary

Operation Type	**Safe Limit**	**Drive Settings to Check**
Normal Running	**1.0–1.1 A (max 1.19 A)**	**B003, A484**
Startup or Surge	**≤ 3.57 A for ≤ 20% of cycle**	**A488/A489, P041**
Safety Protections	**Stop if over limits**	**A486/A487, A488/A489**

Contact Technical Support for your specific part number's technical data information.

PowerFlex 525 Parameter Reference for One Motion PM Motors

This table provides a complete breakdown of essential parameters used to configure, monitor, and protect One Motion permanent magnet motors with the PowerFlex 525 VFD.

Parameter	Name	Recommended Value	Description
Basic Motor Setup (P Parameters)			
P031	Motor NP Volts	As per tech sheet	Nominal voltage rating of the motor
P032	Motor NP Hertz	60 Hz	Rated operating frequency
P033	OL Current	1.19 A	Sets overload threshold slightly below max current
P034	Motor NP FLA	1.19 A	Motor's continuous rated current
P035	Motor NP Poles	28	Number of motor poles (based on motor RPM)
P036	Motor NP RPM	257 RPM	Rated speed at 55 Hz
P037	Motor NP Power	1.61 kW	Motor’s output power (HP or kW)
P039	Torque Performance Mode	1	Enable PM motor control
P041	Accel Time	10 sec	Ramp-up time to limit inrush current

P042	**Decel Time**	**10 sec**	**Controlled stop to prevent overvoltage**
P484	**OL Current Level 1**	**3.57 A**	**Trip level to detect sustained overloads**
P485	**OL Time Level 1**	**3.57 A**	**Trip level to detect sustained overloads (matches P484)**
Advanced Protection & Current Limiting (A Parameters)			
A484	**Current Limit One**	**4.00 A**	**Sets non-fault current cap for continuous operation**
A486	**Shear Pin 1 Level**	**2.38 A**	**First overcurrent fault threshold**
A487	**Shear Pin 1 Time**	**10 sec**	**Duration allowed at A486 before fault**
A488	**Shear Pin 2 Level**	**3.57 A**	**Max current (absolute fault limit)**
A489	**Shear Pin 2 Time**	**5 sec**	**Duration allowed at A488 before trip**
A516	**PM Initial Selection**	**1 (HFI)**	**Prevents rollback at startup**
A517	**PM DC Injection Current**	**100%**	**Ensures proper alignment during startup**
A518	**PM Align Time**	**0 sec**	**Disables alignment delay for faster startup**

A527	**PM FWKn 1Kp**	**500%**	**Improves field weakening performance**
A528	**PM FWKn 2Kp**	**500%**	**Enhances high-speed stability**
A531	**Start Boost**	**6.0%**	**Improves startup torque**
A532	**Break Voltage**	**55.0%**	**Improves start under load or fixes overloads**
A533	**Break Frequency**	**+1 Hz as needed**	**Prevents slippage during shock loads**
A581	**PM Stable 1 Frequency**	**+2**	**Reduces speed ripple or torque instability**
A585	**PM Motor Type**	**1 (Surface Mount)**	**Select correct PM motor profile**
A586	**PM Steploaд Kp**	**10%**	**Improves step-load performance**
A587/A588	**PM Efficiency 1/2**	**1900%**	**Stabilizes current and reduces oscillation**
Live Monitoring (B Parameters)			
B003	**Output Current**	**Live value**	**Real-time monitoring of motor draw (use for diagnostics)**