

Drive Sizing Confirmation

OS69-120-215-210-12168 SideDrive — PowerFlex 525 Selection Guide

Overview

This document confirms the proper drive selection for the One Motion OS69-120-215-210-12168 SideDrive. A 3 HP Allen-Bradley PowerFlex 525 is the correct and sufficient drive for this application.

The primary configuration is 480V (380–480V class), the standard electrical architecture for industrial conveyor installations in North America. A 230V (200–240V class) reference is included for international or legacy installations.

Motor Specifications — OS69-120-215-210-12168

These specifications are constant regardless of drive voltage class.

Parameter	Value
Model	OS69-120-215-210-12168
Motor Type	Permanent Magnet Outrunner (DDRM)
Form Factor	SideDrive – NEMA 56C Face Mount
Peak Torque	120 Nm (88.6 ft-lb)
Peak Current (at 120 Nm)	8.79 A
Continuous Torque	40 Nm
Continuous Current (at 40 Nm)	2.93 A
Ingress Protection	IP69K
Magnetic Architecture	Permanent magnet array (zero magnetizing current)

Primary Drive Selection — 480V System

Drive Specifications — PowerFlex 525 (380–480V Class)

Parameter	Value
Catalog Number	25B-D6P0N104
Drive Family	Allen-Bradley PowerFlex 525 (Bulletin 25B)
Input Voltage	380–480V AC, 3-phase
Power Rating	3 HP / 2.2 kW (Normal Duty and Heavy Duty)
Rated Continuous Output Current	6.0 A
Control Modes	V/Hz, Sensorless Vector, PM Motor Control

Parameter	Value
Communication	Embedded EtherNet/IP, RS-485 (DSI)
Safety	Safe Torque Off (STO), SIL 2 / PL d
Enclosure	IP20 / NEMA Open Type
Frame Size	Frame A
Integral Brake Transistor	Standard

Drive Overload Capability — 480V (6.0 A Rated)

Per Rockwell Automation Publication 520-TD001, the PowerFlex 525 supports dual overload ratings:

Duty Mode	Overload %	Available Current	Duration
Normal Duty	110%	6.6 A	60 seconds
Heavy Duty	150%	9.0 A	60 seconds

Key Engineering Point: At 480V, the Heavy Duty configuration is required to cover peak torque events. The 150% overload rating provides 9.0 A for a full 60 seconds — exceeding the motor's 8.79 A peak demand. This is why the Heavy Duty overload capability is critical to validating the 3 HP selection at 480V.

Current Demand vs. Drive Capacity — 480V Margin Analysis

Condition	Motor Demand	Drive Capacity	Headroom	Utilization
Continuous (40 Nm)	2.93 A	6.0 A (rated)	3.07 A	48.8%
Peak (120 Nm)	8.79 A	9.0 A (HD, 150%, 60s)	0.21 A	97.7%

480V Engineering Analysis

Continuous operation: The motor draws 2.93 A at full continuous torque (40 Nm), representing 48.8% utilization of the drive's 6.0 A rated output. This is well within the thermal envelope with no derating required under standard ambient conditions (up to 50°C).

Peak operation: At full peak torque (120 Nm), the motor draws 8.79 A. Under Heavy Duty configuration, the PowerFlex 525 delivers 9.0 A for 60 seconds (150% of rated). Peak demand represents 97.7% of available overload current.

Why this works in practice: Peak torque events on conveyor sidedrive applications are transient — acceleration, product loading, and slug flow conditions. These events are typically measured in seconds, not minutes. The 60-second overload window provides significant margin for real-world conveyor operation.

Thermal margin: Because continuous operation utilizes only ~49% of the drive's rated capacity, the PowerFlex 525 will run thermally cool during normal operation. This extends drive life and allows zero-stacking panel mounting at ambient temperatures up to 45°C without derating.

Required configuration: The PowerFlex 525 must be configured in Heavy Duty mode for this application at 480V. Additionally, configure the drive in Permanent Magnet Motor Control mode for optimal torque response and efficiency with the DDRM outrunner architecture.

Reference Drive Selection — 230V System

For installations with 200–240V, 3-phase electrical infrastructure.

Drive Specifications — PowerFlex 525 (200–240V Class)

Parameter	Value
Catalog Number	25B-B011N104
Input Voltage	200–240V AC, 3-phase
Power Rating	3 HP / 2.2 kW
Rated Continuous Output Current	11.0 A
Frame Size	Frame A
Enclosure	IP20 / NEMA Open Type
Integral Brake Transistor	Standard

Drive Overload Capability — 230V (11.0 A Rated)

Duty Mode	Overload %	Available Current	Duration
Normal Duty	110%	12.1 A	60 seconds
Heavy Duty	150%	16.5 A	60 seconds

Current Demand vs. Drive Capacity — 230V Margin Analysis

Condition	Motor Demand	Drive (Normal Duty)	Drive (Heavy Duty)	Utilization (vs. Rated)
Continuous (40 Nm)	2.93 A	11.0 A (rated)	11.0 A (rated)	26.6%
Peak (120 Nm)	8.79 A	12.1 A (110%, 60s)	16.5 A (150%, 60s)	72.7% ND / 53.3% HD

230V System Notes

- At 230V, the higher rated current (11.0 A) provides additional headroom at peak — Normal Duty configuration is sufficient
- All motor performance parameters (torque, IP69K, form factor) remain identical
- Same Frame A footprint as the 480V version

480V vs. 230V Quick Comparison

Parameter	480V (Primary)	230V (Reference)
Catalog Number	25B-D6P0N104	25B-B011N104

Parameter	480V (Primary)	230V (Reference)
Input Voltage	380–480V AC, 3-phase	200–240V AC, 3-phase
Rated Output Current	6.0 A	11.0 A
Frame Size	Frame A	Frame A
HD Overload (150%, 60s)	9.0 A	16.5 A
Continuous Utilization	48.8%	26.6%
Peak Utilization (HD)	97.7%	53.3%
Required Configuration	Heavy Duty	Normal or Heavy Duty
Recommended for	North America industrial	International / legacy

DDRM System Behavior — Why This Matters

The OS69 SideDrive is torque-controlled, not inertia-driven:

- Zero magnetizing current — permanent magnets eliminate the dominant fixed loss found in AC induction motors
- No gearbox transmission losses — direct drive eliminates mechanical inefficiency
- Linear torque response — current demand is directly proportional to torque load
- Predictable peak events — conveyor start-up and product loading are short-duration, well within the 60-second overload window

Because peak events are transient and predictable, the 97.7% utilization of the Heavy Duty overload at 480V is not a concern — the system will never sustain peak torque for a full 60 seconds in a conveyor application.

Control Configuration Requirements

Setting	Value	Reason
Duty Mode	Heavy Duty (480V)	Required to support 150% overload at peak
Motor Control Mode	Permanent Magnet	Optimized torque response with DDRM
Motor Type	PM Outrunner	Correct motor model for auto-tune

Summary

Item	480V (Primary)	230V (Reference)
Recommended Drive	3 HP PowerFlex 525	3 HP PowerFlex 525
Catalog Number	25B-D6P0N104	25B-B011N104
Rated Output Current	6.0 A	11.0 A
Continuous Margin	2.05× (2.93 A vs 6.0 A)	3.75× (2.93 A vs 11.0 A)
Peak Margin (HD, 60s)	1.02× (8.79 A vs 9.0 A)	1.88× (8.79 A vs 16.5 A)

Item	480V (Primary)	230V (Reference)
Required Duty Mode	Heavy Duty	Normal or Heavy Duty
Oversizing Required	No	No
Derating Required	No	No

Conclusion

The 3 HP PowerFlex 525 fully supports both continuous and peak operating conditions of the OS69-120-215-210-12168 SideDrive at both voltage classes.

480V (25B-D6P0N104): Continuous operation at 48.8% utilization. Peak torque covered by the Heavy Duty 150% overload rating (9.0 A for 60 seconds), which must be configured. Peak conveyor events are transient and well within this window.

230V (25B-B011N104): Continuous operation at 26.6% utilization. Peak torque covered under Normal Duty with significant headroom.

No oversizing or derating is required. This is the correct and optimized drive selection.

Reference: Rockwell Automation Publication 520-TD001, PowerFlex 520-series AC Drive Specifications

Catalog Number Explanation

1-3	4	5	6-8	9	10	11	12	13	14
25B	-	B	2P3	N	1	1	4	-	-
Drive	Dash	Voltage Rating	Rating	Enclosure	Reserved	Emission Class	Reserved	Dash	Dash

Code	Type
25A	PowerFlex 523
25B	PowerFlex 525

Code	Voltage	Phase
V	120V AC	1
A	240V AC	1
B	240V AC	3
D	480V AC	3
E	600V AC	3

Code	Interface Module
1	Standard

Code	Enclosure
N	IP20 NEMA / Open

Code	EMC Filter
0	No Filter
1	Filter

Code	Braking
4	Standard

Output Current @ 1-phase, 100...120V Input						
Code	Amps	Frame	ND		HD	
			HP	kW	HP	kW
1P6 ⁽¹⁾	1.6	A	0.25	0.2	0.25	0.2
2P5	2.5	A	0.5	0.4	0.5	0.4
4P8	4.8	B	1.0	0.75	1.0	0.75
6P0	6.0	B	1.5	1.1	1.5	1.1

Output Current @ 1-phase, 200...240V Input						
Code	Amps	Frame	ND		HD	
			HP	kW	HP	kW
1P6 ⁽¹⁾	1.6	A	0.25	0.2	0.25	0.2
2P5	2.5	A	0.5	0.4	0.5	0.4
4P8	4.8	A	1.0	0.75	1.0	0.75
8P0	8.0	B	2.0	1.5	2.0	1.5
011	11.0	B	3.0	2.2	3.0	2.2

Output Current @ 3-phase, 200...240V Input						
Code	Amps	Frame	ND		HD	
			HP	kW	HP	kW
1P6 ⁽¹⁾	1.6	A	0.25	0.2	0.25	0.2
2P5	2.5	A	0.5	0.4	0.5	0.4
5P0	5.0	A	1.0	0.75	1.0	0.75
8P0	8.0	A	2.0	1.5	2.0	1.5
011	11.0	A	3.0	2.2	3.0	2.2
017	17.5	B	5.0	4.0	5.0	4.0
024	24.0	C	7.5	5.5	7.5	5.5
032	32.2	D	10.0	7.5	10.0	7.5
048 ⁽²⁾	48.3	E	15.0	11.0	10.0	7.5
062 ⁽²⁾	62.1	E	20.0	15.0	15.0	11.0

Output Current @ 3-phase, 380...480V Input						
Code	Amps	Frame	ND		HD	
			HP	kW	HP	kW
1P4	1.4	A	0.5	0.4	0.5	0.4
2P3	2.3	A	1.0	0.75	1.0	0.75
4P0	4.0	A	2.0	1.5	2.0	1.5
6P0	6.0	A	3.0	2.2	3.0	2.2
010	10.5	B	5.0	4.0	5.0	4.0
013	13.0	C	7.5	5.5	7.5	5.5
017	17.0	C	10.0	7.5	10.0	7.5
024	24.0	D	15.0	11.0	15.0	11.0
030 ⁽²⁾	30.0	D	20.0	15.0	15.0	11.0
037 ⁽²⁾	37.0	E	25.0	18.5	20.0	15.0
043 ⁽²⁾	43.0	E	30.0	22.0	25.0	18.5

Output Current @ 3-phase, 525...600V Input						
Code	Amps	Frame	ND		HD	
			HP	kW	HP	kW
0P9	0.9	A	0.5	0.4	0.5	0.4
1P7	1.7	A	1.0	0.75	1.0	0.75
3P0	3.0	A	2.0	1.5	2.0	1.5
4P2	4.2	A	3.0	2.2	3.0	2.2
6P6	6.6	B	5.0	4.0	5.0	4.0
9P9	9.9	C	7.5	5.5	7.5	5.5
012	12.0	C	10.0	7.5	10.0	7.5
019	19.0	D	15.0	11.0	15.0	11.0
022 ⁽²⁾	22.0	D	20.0	15.0	15.0	11.0
027 ⁽²⁾	27.0	E	25.0	18.5	20.0	15.0
032 ⁽²⁾	32.0	E	30.0	22.0	25.0	18.5

(1) This rating is only available for PowerFlex 523 drives.

(2) Normal and Heavy Duty ratings are available for this drive.

Control (Continued)

Specifications	PowerFlex 523	PowerFlex 525
Performance with Encoder SVC (Sensorless Vector): SVC Economizer: VVC (Velocity Vector Control): PM Motor (iPM motor, 10 HP rating and below) ⁽¹⁾ :	(Applicable to PowerFlex 525 drives only) ±0.1% of base speed across a 100:1 speed range ⁽²⁾ ±0.1% of base speed across a 100:1 speed range ⁽²⁾ ±0.1% of base speed across a 1000:1 speed range ⁽²⁾ ±0.1% of base speed, up to a 60:1 speed range	
Output Voltage Range:	0V to rated motor voltage	
Output Frequency Range:	0...500 Hz (programmable)	
Efficiency:	97.5% (typical)	
Stop Modes:	Multiple programmable stop modes including - Ramp, Coast, DC-Brake, and Ramp to Stop	
Accel/Decel:	Four independently programmable accel and decel times. Each time can be programmed from 0...600 s in 0.01 s increments	
Intermittent Overload Normal Duty:	110% Overload capability for up to 60 s, 150% for up to 3 s Applies for power ratings above 15 kW (20 HP) only. Based on 480V drive rating	
Heavy Duty:	150% Overload capability for up to 60 s, 180% for up to 3 s (200% programmable)	

(1) For details on specific motor performance, see rok.auto/knowledgebase answer ID [0A34823](#).

(2) For more information, see the PowerFlex 520-series Adjustable Frequency AC Drive User Manual, publication [520-UM001](#).

Control Inputs

Specifications	PowerFlex 523	PowerFlex 525
Digital	Bandwidth:	10 Rad/s for open and closed loop
	Quantity:	(1) Dedicated for stop (4) Programmable
	Current:	6 mA
	Type Source Mode (SRC): Sink Mode (SNK):	18...24V = ON, 0...6V = OFF 0...6V = ON, 18...24V = OFF
	Pulse Train Quantity: Input Signal: Input Frequency: Current Consumption:	(1) Shared with one of the programmable digital input terminals. Transistor contact (open collector) 0...100 kHz 7 mA @ 24V DC max
Analog	Quantity:	(1) Isolated, 0...10V and 4...20 mA
	Specification Resolution: 0...10V DC Analog: 4...20 mA Analog: External Pot:	(2) Isolated, -10...+10V and 4...20 mA 10-bit 100 kΩ input impedance 250 Ω input impedance 1...10 kΩ, 2 W min

Control Outputs

Specifications	PowerFlex 523	PowerFlex 525
Relay	Quantity:	1 programmable Form C
	Specification Resistive Rating: Inductive Rating:	2, 1 programmable Form A and 1 programmable Form B 3.0 A @ 30V DC, 3.0 A @ 125V, 3.0 A @ 240V AC 0.5 A @ 30V DC, 0.5 A @ 125V, 0.5 A @ 240V AC
	Quantity:	—
Opto	Specification:	2, programmable 30V DC, 50 mA Non-inductive
	Quantity:	1, nonisolated 0...10V or 4...20 mA ⁽¹⁾
Analog	Specification Resolution: 0...10V DC Analog: 4...20 mA Analog:	10-bit 1 kΩ min 525 Ω max

(1) The feature is not applicable to PowerFlex 523 series A drives.