

Armor PowerFlex AC Drives Specifications

Bulletin 35

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Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Added Frame B product selection, accessories, specifications, and dimensions	throughout
Updated rating information for auxiliary power cables	14, 15, 17
Added enclosure rating information for product selection	15, 17
Clarified motor cable selection	22, 23, 24, 25
Added I/O power requirements for Class 2 circuits per NEC 725.60	27
Corrected concurrent unswitched and switched auxiliary power ON peak inrush current	27
Added I/O Fuse and Power Circuit Specifications	28
Added current specifications for EM brake	28
Added guidance on using the Drive Input Current Rating Information	29
Added carrier frequency pulse-width modulation derating information	31
Added Load vs. Temperature Derating for 0...1000 m (0...3300 ft)	35
Added enclosure ratings when used with cable assemblies and sealing caps	39
Added link to reference publications for compatible Allen-Bradley® circuit breakers	53
Added link to HARTING cables selection information	53

Armor PowerFlex Variable Frequency AC Drives

Rockwell Automation offers a wide array of starting solutions that range from electromechanical to solid-state. We have taken On-Machine™ motor control to the next level with our Armor™ PowerFlex® AC drives solution. Smart, safe, secure, and simple—Armor PowerFlex drives are a scalable solution that is designed to help meet your application needs.

Armor PowerFlex drives are used with an Allen-Bradley® Logix programmable controller. They feature:

- Volts/Hz, Sensorless Vector, and Velocity Vector motor control
- Safe Torque Off, either hardwired or deployed over the EtherNet/IP™ network (integrated safety)
- Built-in dual-port EtherNet/IP supports multiple network topologies and Device Level Ring functionality
- CIP Security™

Armor PowerFlex Variable Frequency AC Drives (VFDs) make it easier for you to manage your systems, identify problems before downtime happens, and the built-in intelligence proactively tells you about maintenance requirements or possible issues. The Armor PowerFlex drive is suited for variable frequency applications that require more precise motor control. Armor PowerFlex drives are available in safety and standard versions.

Features

Armor PowerFlex drives features include:

- Premier integration with Logix controllers
 - built-in quickstart wizard
 - automatic device configuration (ADC) support
 - firmware supervisor support
 - Add-on Profile (AOP) with automatically created contextualized tags
- Hardwired or integrated safety in one device
- CIP Security
- Embedded dual 1 Gb Ethernet ports support star, linear, and Device Level Ring (DLR) topologies
- IP54/66, UL Type 1/4/12, hygienic-friendly design
- Ambient temperature range -25...+55 °C (-13...+131 °F)
- Patented Electromechanical Disconnect
 - Local disconnect with lockout capability
 - Integrated thermal detection and automatic line isolation
 - Integrated motor branch short-circuit and ground fault protection (self-protected)
 - Line loss or fuse loss detection
 - User test points for PPE requirements
- Monitored disconnect status
- Common single-box construction reduces training needs
- Electromechanical (EM) Brake
 - One cable for brake and motor
- Front panel keypad (HOJ)
- AC Induction motor control
- Open- and closed-loop velocity operation
- Power media with plug-and-play connections
- Safe Torque Off (STO) and Safe Speed Monitoring functions (SLS, SDI, SLP, and SS1)
- Horsepower Rating 5...10 Hp For Frame B, 1...3 Hp for Frame A
- Four standard inputs and two standard configurable I/Os
- Integrated safety version includes safety I/Os:
 - Four single-channel safety inputs or two dual-channel safety inputs
 - One bipolar safety output, can be used as safe brake control (SBC)
- Dynamic Brake function with quick connect allows the following resistor types, based on application needs (Frame A only)
 - Light duty: mounts directly to the unit (360 Ω, 50 W and 120 Ω, 200 W versions)
 - Normal (standard) duty: mounted up to 1 m (3.3 ft) from unit (120 Ω, 300 W and 360 Ω, 100 W versions)
- External 24V DC Power (no mains configuration)
- Internal power supply option helps lower installation cost
- One incremental encoder interface
 - Suitable for both standard and safety applications

Figure 1 - Armor PowerFlex AC Drive Features, Frame A (shown: Drive with integrated safety version, with external power supply)



Figure 2 - Armor PowerFlex AC Drive Features, Frame B (shown: Drive with integrated safety version, with external power supply)

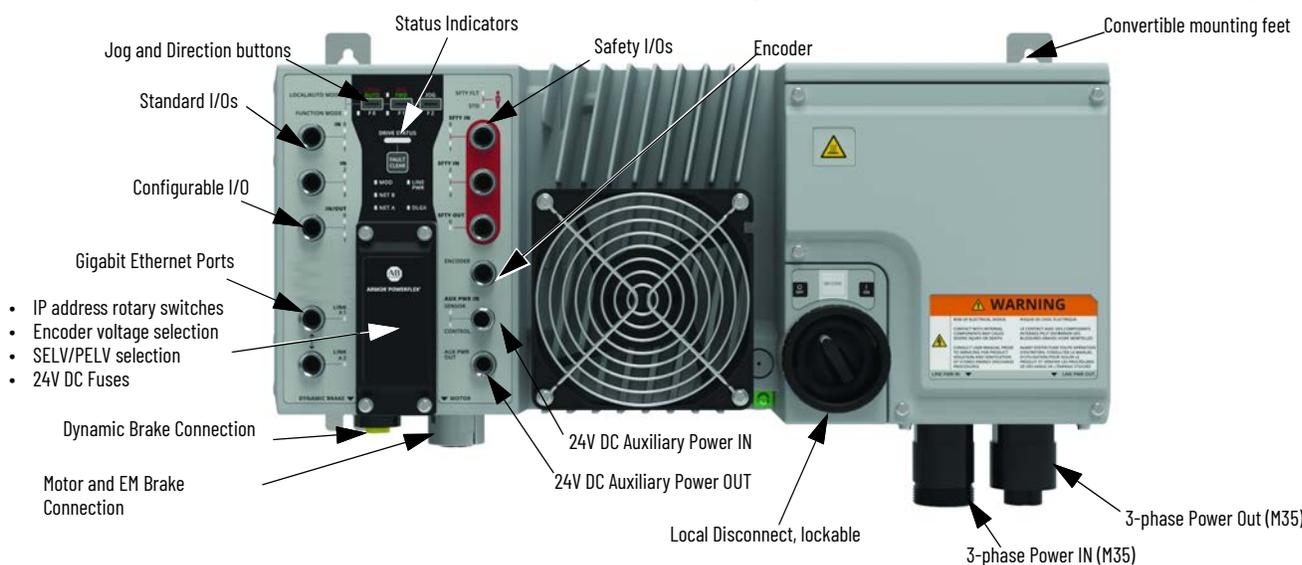


Table 1 - Features Description

Feature	Description
Premier Integration	<ul style="list-style-type: none"> One software tool for controller and drive setup Faster configuration with full access to device data Streamlined configuration and programming
Local Disconnect	<ul style="list-style-type: none"> Removes power from the motor terminals when in the OFF condition Lockable
Electromechanical Disconnect (EMD)	<ul style="list-style-type: none"> Integrates the motor branch short circuit and ground fault protection devices Does not require additional motor control branch circuit protection Multiple Armor PowerFlex drives can be applied in a group application
User Test Points	<ul style="list-style-type: none"> Measure bus voltage and internal 3-phase status for PPE requirements when motor side maintenance is required
Automatic Device Configuration	<ul style="list-style-type: none"> Detects a replaced Armor PowerFlex drive and downloads all configuration data automatically Minimizes the need for manual reconfiguration Reduces downtime
Auxiliary Power	<ul style="list-style-type: none"> External 24V DC allows mains free configuration Internal power supply option Enables local and network monitoring when 3-phase power is removed
Setup Wizards	<ul style="list-style-type: none"> Add-on profile (AOP) QuickStart wizard simplifies startup workflows

Table 1 - Features Description (Continued)

Feature	Description
Internal Power Supply (Optional)	<ul style="list-style-type: none"> Internal source 24V DC auxiliary power Eliminates the need to run separate auxiliary/control power to each unit
CIP Energy	<ul style="list-style-type: none"> Family of embedded objects and services <ul style="list-style-type: none"> Optimizes energy usage from basic energy awareness to more advanced functions for the control of energy demand-response
CIP Security	<ul style="list-style-type: none"> Uses an EtherNet/IP network to provide a secure transport layer <ul style="list-style-type: none"> Lets the drive help protect itself from malicious communication. Provides the following security features <ul style="list-style-type: none"> End point authentication Data Integrity Data Confidentiality
Dynamic Brake Quick Connect and Resistor	<ul style="list-style-type: none"> Lets you use light- or standard-duty resistor Allows excess electrical energy to be dissipated as thermal energy by directing it through a large resistor Allows a faster stop without causing a DC bus overvoltage
Electromechanical Brake <ul style="list-style-type: none"> Frame A - Optional Frame B - Standard 	<ul style="list-style-type: none"> Internally controls the state of the electromechanical motor brake Source voltage (380...480V AC) actuates the motor brake solenoid A network brake status bit is accessible for diagnostic purposes
Integrated EMI Filter	<ul style="list-style-type: none"> CE compliance requires the use of shielded motor cable and EMI filter
Encoder Support	<ul style="list-style-type: none"> Supports a single encoder <ul style="list-style-type: none"> Single- or dual-channel Differential (AqB) Sine-cosine Hiperface (analog only)
EtherNet/IP Communications Network	<ul style="list-style-type: none"> Embedded dual-port switch, 1 Gigabit per port Device-level ring support
Functional Safety (Bul. 35S)	<ul style="list-style-type: none"> Up to SIL 3 Category 4 PLe performance Safe Torque Off (STO) Hardwired and Network (CIP) Safety STO Network safety PLC can also support STO, SSI, SLS, SDI, SLP, and SBC (encoder may be required) Embedded Safe Inputs and Output
Gland Plate Entrance	<ul style="list-style-type: none"> Supports feed-through power Offers conduit or cord hardwired connectivity Offers quick connect connectivity to ArmorConnect® and HARTING® power media

Studio 5000 Logix Designer

Armor PowerFlex drives are integrated within the Studio 5000® environment. Data associated with the drive is automatically generated to ease configuration and minimize the need to manually program the required configuration and tags.

- Add-on Profiles (AOPs) for Armor PowerFlex drives provide seamless integration into the Logix environment.
- Configuration files from Studio 5000 Logix Designer® application can be transferred directly to the Armor PowerFlex drive over EtherNet/IP.
- Automatic Device Configuration downloads configuration data to a replaced device, minimizing the need for a manual reconfiguration.

Simplified AOP User Interface

The user interface for the Armor PowerFlex drives is simple and easy to set up and configure. This simplified profile helps to speed up system design, integration, and maintenance.

The QuickStart wizard can help you set up your device using three easy prompts, which are shown in [Figure 3](#).

Figure 3 - QuickStart Wizard Prompts

Motor Data page

Autotune Window

Name	Value	Units	Test Results	Default Value (Calculated)
Motor Stator Resistance (0.0 - 50.0)	4.93	Ohm		3.25
Motor Rotor Resistance (0.0 - 100.0)	1.0	Ohm		1.0
Motor Flux Current (0.0 - 3.0)	0.75	A		1.94
Motor Total Leakage Inductance (0.0 - 0.500 H)	0	H		0
Motor Mutual Inductance (0.0 - 0.500 H)	0	H		0

Motor Control Modes

Velocity control is accomplished via three options for control mode:

- Volts/Hertz (V/Hz)
- Sensorless Vector (SVC)
- Velocity Vector (VVC)
- Sensorless Vector (SVC) Economizer

Table 2 - Armor PowerFlex Drives Control Mode Comparison

Volts/Hertz	Sensorless Vector (SVC)	Sensorless Vector (SVC) Economizer	Velocity Vector (VVC)
<ul style="list-style-type: none"> • Basic control method <ul style="list-style-type: none"> - provides a variable-frequency drive for applications like simple conveyor, fan, and pump • Fair speed and starting torque at a reasonable cost • Generally regarded as the most common VFD control scheme • Suitable for both constant torque and variable torque applications • Up to 150% of rated torque at zero speed for startup and peak loads 	<ul style="list-style-type: none"> • Better speed regulation and the ability to produce a high starting torque • May not be appropriate when more than one motor is connected to the same drive • No external sensor to obtain motor feedback • Mathematically determines the motor speed with optimum accuracy • Simpler and less costly solution than installing and connecting an encoder • Provides sufficient feedback in most applications to enable pseudo closed-loop operation 	<ul style="list-style-type: none"> • Optimizes the efficiency of SVC by trimming the motor voltage when it is not fully loaded • Frequency Control settings cannot be adjusted in this mode. 	<ul style="list-style-type: none"> • An adaptive controller uses information gained during autotuning, actual reference information, and motor feedback to provide independent torque and flux control, <ul style="list-style-type: none"> - allows continuous regulation of the motor speed and improved overall control • A high-bandwidth regulator replaces the volts/Hertz core used in V/Hz and SVC control modes <ul style="list-style-type: none"> - helps eliminate nuisance trips caused by shock loads - continuously adapts to changes in the motor load and load characteristics • Requires a feedback device for optional motor speed control

Automatic Device Configuration

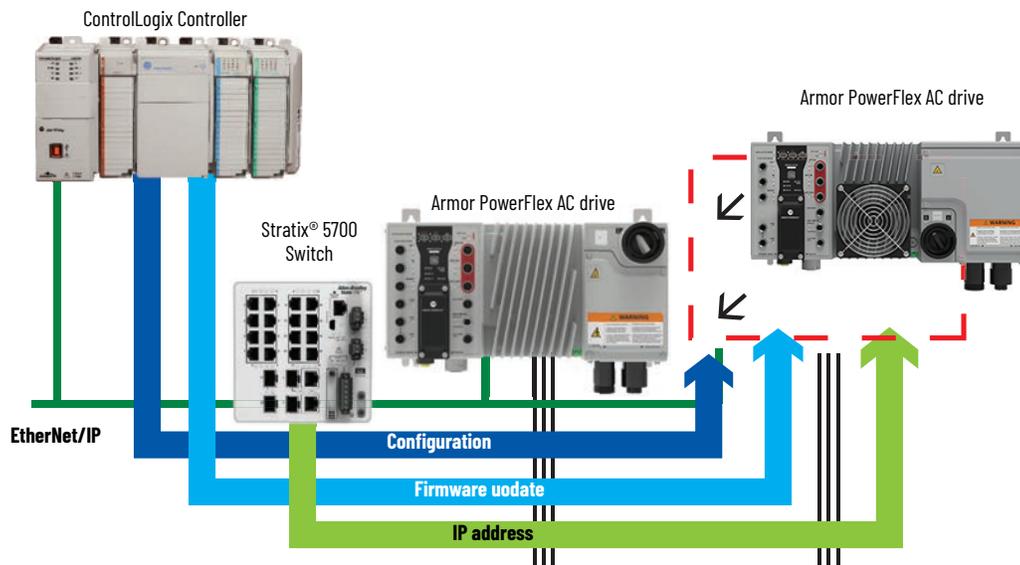
Automatic Device Configuration (ADC) lets Logix controllers detect a replaced PowerFlex drive and download all configuration data automatically, minimizing the need for manual reconfiguration. This feature helps to enhance productivity by facilitating reduced downtime. Our premier integration lets three independent features function automatically:

- Switch dynamic IP address assignment by port
 - Automatically assigns IP address in the drive based on the port that is connected
- Firmware Supervisor
 - Automatically updates the drive if an “exact match” is configured
- Automatic Device Configuration
 - Automatically downloads the drive configuration if ADC is enabled and there is a configuration mismatch



ADC is always enabled for Armor PowerFlex devices.

Figure 4 - Premier Integration—Automatic Device Configuration



Motor Control Features

[Table 3](#) lists the features and benefits of the control modes of Armor PowerFlex drives.

Table 3 - Motor Control Features

Feature	Description
Acceleration Control	<ul style="list-style-type: none"> • user-configurable acceleration and deceleration times <ul style="list-style-type: none"> - Indicates the time it should take for velocity to go from 0...rated motor speed or vice versa
Economizer Mode	<ul style="list-style-type: none"> • sensorless vector control with an additional energy savings function • when steady-state speed is achieved, the economizer becomes active <ul style="list-style-type: none"> - automatically adjusts the drive output voltage based on the applied load
Flying Start	<ul style="list-style-type: none"> • starts a rotating motor as quickly as possible, and resume normal operation with a minimal impact on load or speed.
Load Monitor	<ul style="list-style-type: none"> • monitors the drive for conditions where more (shear pin) or less (load loss) power than expected is being provided to or provided by the motor to drive a particular load • shear pin: <ul style="list-style-type: none"> - monitors for power greater than the configured level - may indicate a stuck load • load loss <ul style="list-style-type: none"> - monitors for power less than the configured level - may indicate that the load is no longer connected to the motor
Motor Thermal Overload	<ul style="list-style-type: none"> • helps to prevent overheating and possible damage to the connected motor • when the drive detects that the motor is too hot, a thermal overload condition is declared <ul style="list-style-type: none"> - power to the motor is removed to allow the motor to cool and the overload condition to clear - when the overload condition is cleared, the motor can be restarted

Safe Torque Off and Safe Monitor Functions

Hardwired and integrated safety features are available on the Armor PowerFlex safety drive. See the Armor PowerFlex AC Drives User Manual, publication [35-UM001](#) for details about how to set up and configure these functions.

Safety Solutions

In the past, implementing safety solutions often meant sacrificing productivity. Armor PowerFlex drives address productivity concerns by offering safety options that help protect your people and equipment while also reducing unplanned downtime.

Choose from a hardwired configuration that is wired directly into the drive, or use integrated safety that is delivered via EtherNet/IP networks. You can implement safety with Armor PowerFlex drives by using either built-in features or safety add-on instructions.

Hardwired Safe Torque Off is ideal for safety-related applications that benefit from removal of rotational power to the motor without removing power from the drive. This functionality offers the benefit of quick startup after a demand on the safety system. Torque is permitted when one pair of inputs is energized; it is disabled when either input is de-energized. [Figure 5](#) shows an example hardwired Safe Torque Off (STO) application.

Integrated (Network) Safe Torque Off provides the same benefits and safety ratings as hardwired Safe Torque Off, plus the ability to simplify your machine design and minimize equipment redundancies.

- One GuardLogix® controller can provide both safety and standard control, so that safety and non-safety functions share the same EtherNet/IP network
- Operators and maintenance personnel have visibility to all machine events including safety events. This enables a quick response that lets the machine return to full production.

[Figure 6](#) shows an example integrated STO application.

Figure 5 - Hardwired Safe Torque Off

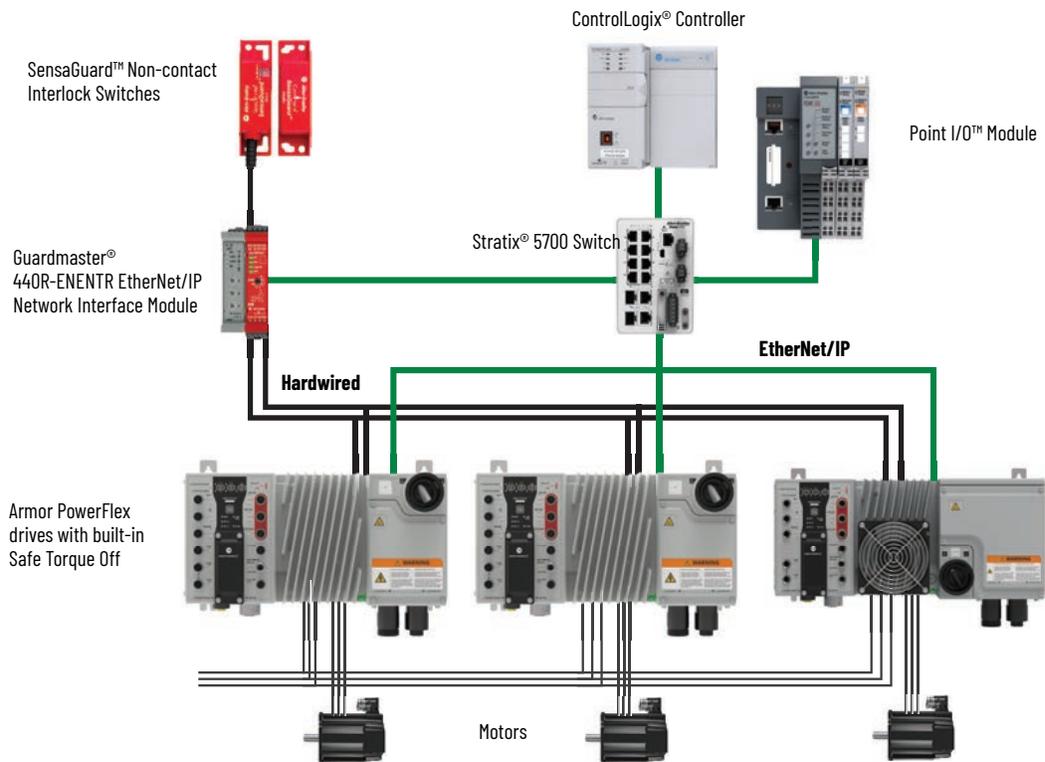


Figure 6 - Integrated Safe Torque Off

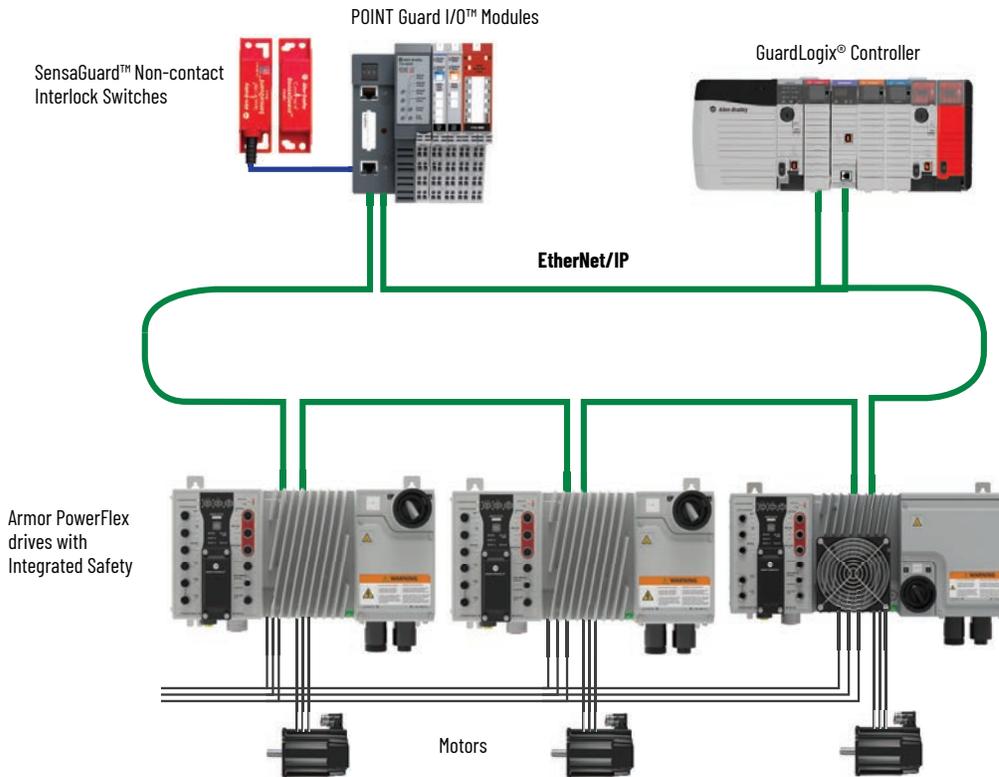


Table 4 - Functional Safety Support

Function Type	Software Version	Safety Function	Safety Capability up to:	Minimum Controller Required
Integrated Safety Over the EtherNet/IP Network				
Drive-based stopping functions	v32	<ul style="list-style-type: none"> Timed Safe Stop 1 (SS1) Safe Brake Control (SBC) 	SIL 3, PL _e , CAT4	<ul style="list-style-type: none"> Standard Connection Only: <ul style="list-style-type: none"> GuardLogix/ControlLogix: 5570, 5580 Compact GuardLogix/ControlLogix: 5370, 5380 Armor GuardLogix, ControlLogix: 5570 Standard and Safety or Safety Only Connection: <ul style="list-style-type: none"> GuardLogix: 5570, 5580 Compact GuardLogix: 5370, 5380
Controller-based stopping functions	v32	<ul style="list-style-type: none"> Safe Brake Control (SBC) Monitored Safe Stop1 (SS1) 	SIL 3, PL _e , CAT4 SIL 2, PLd CAT3	
Controller-based monitoring functions	v32	<ul style="list-style-type: none"> Safely Limited Speed (SLS) Safely Limited Position (SLP) Safe Direction (SDI) 	SIL 2, PLd, CAT3	
Integrated STO mode	v32	Safe Torque-off (STO)	SIL 3, PL _e , CAT4	
Hardwired Safety				
Hardwired STO mode	—	Safe Torque-off (STO)	SIL 3, PL _e , CAT4	<ul style="list-style-type: none"> GuardLogix/ControlLogix: 5570, 5580 Compact GuardLogix/ControlLogix: 5370, 5380 Armor GuardLogix, ControlLogix: 5570

Encoder Operation

The Armor PowerFlex drive has a feedback interface that lets you connect an external feedback device (encoder) to the product. An encoder can provide more accurate velocity control by providing an indication of the actual speed of the motor/load.

The encoder signals are connected to both safety and standard drive control. The standard control provides encoder power and the safety control can be configured to monitor the encoder power supply. Standard control can use single-ended encoder signals, but differential signals are required for safety functions.

One sine/cosine (generic or Hiperface) or AqB encoder can be used to provide position and velocity feedback to the safety controller. SIL 2, PLd is achievable with a single encoder and drive-based or controller-based safety functions.

The encoder detects wire error faults via diagnostics and reports them to the user. [Table 5](#) lists the diagnostics that are supported for each encoder configuration. For more information about encoders, safety encoders, and diagnostic operation, see the Armor PowerFlex AC Drives User Manual, publication [35-UM001](#).

Table 5 - Supported Encoder Diagnostic Functions

Encoder Configuration	Encoder Type	Supported Standard Diagnostics
Standard	<ul style="list-style-type: none"> Digital incremental, single-channel, single-ended Digital incremental, single-channel, differential Digital incremental, dual-channel, single-ended Digital incremental dual-channel, differential Generic sine/cosine 	Wire Error Detection: digital incremental dual-channel, dual-ended only Velocity Comparison: all types
Safety	<ul style="list-style-type: none"> AqB Sine/Cosine Hiperface (Analog Only) 	Encoder Voltage Monitoring (Configurable)
		Maximum Speed Limit (Configurable)
		Maximum Acceleration (Configurable)
		Maximum Encoder Input Frequency
	<ul style="list-style-type: none"> AqB 	Inverse Signal Monitoring
		Quadrature Error Detection
	<ul style="list-style-type: none"> Sine/Cosine and Hiperface (Analog Only) 	$\text{Sin}^2 + \text{Cos}^2$ Vector Length Monitoring Zero-crossing Detection Signal Offset (Sine/Cosine Encoder Type Only)

Group Motor Application



The Armor PowerFlex drives and their mating cable assemblies can be applied using NFPA 70 (NEC), NFPA 79, and specific local electrical codes as required.

The Armor PowerFlex drive integrates the motor branch short-circuit and ground fault protection devices. Therefore, no additional motor control branch circuit protection is required. You can apply multiple Armor PowerFlex drives in a group application, as long as you follow the local electrical codes for the protection of the feeder conductors using recommended Branch Circuit Protection devices.

Motor cable assemblies are not supplied and must be ordered separately. To comply with the UL Listing of the drive, use the Rockwell Automation® motor cable assembly that is specified by the instructions for the drive. See the On-Machine Media for Armor PowerFlex, ArmorStart®, and ArmorConnect Products Selection Guide, publication, [280PWR-SG001](#).

Product Comparison

		
Bulletin	35S Safety Armor PowerFlex Drive	35E Armor PowerFlex Drive
Rated output current	2.3...6.0 A (Frame A); 10.5...17 (Frame B)	2.3...6.0 A (Frame A); 10.5...17 (Frame B)
Rated Hp	1...3 (Frame A); 5...10 (Frame B)	1...3 (Frame A); 5...10 (Frame B)
Rated kW	0.75...2.2 (Frame A); 4...7.5 (Frame B)	0.75...2.2 (Frame A); 4...7.5 (Frame B)
Power Supply	External or internal	External or internal
Built-in safety functions	✓	—
Integrated VFD	✓	✓
EM braking (hybrid motor cable)	✓	✓
Dynamic braking	✓	✓
Local Maintenance Switch	✓	✓
Short-circuit current rating	Self protected up to 100 kA	Self protected up to 100 kA
CIP Security	✓	✓
User I/O	✓	✓
Safety I/O	✓	—
Functional Safety	✓	—
Auxiliary power	24V DC	24V DC
Feed-through power connections	✓	✓
Ingress Protection	IP54/IP66, UL Type 1/4/12	IP54/IP66, UL Type 1/4/12
IP address configuration	Static or dynamic	Static or dynamic
100% complete field installation	QuickConnect cables with optional power input glands	QuickConnect cables with optional power input glands
Automatic device configuration	✓	✓
Device-level Ring capable	✓	✓
Communication	Dual-port 1 Gb Ethernet switch	Dual-port 1 Gb Ethernet switch
Motor control options:		
Sensorless vector	✓	✓
Velocity vector	✓	✓
Economizer SVC motor	✓	✓
Closed Loop Velocity Vector Control	✓	✓
Product Selection	page 17	page 15

Typical Configurations

Typical motor control systems include selections from several categories of Allen-Bradley® motor control products and connection media. Figure 7 through Figure 10 depict typical system configurations.

Figure 7 - Standard Drives Configuration

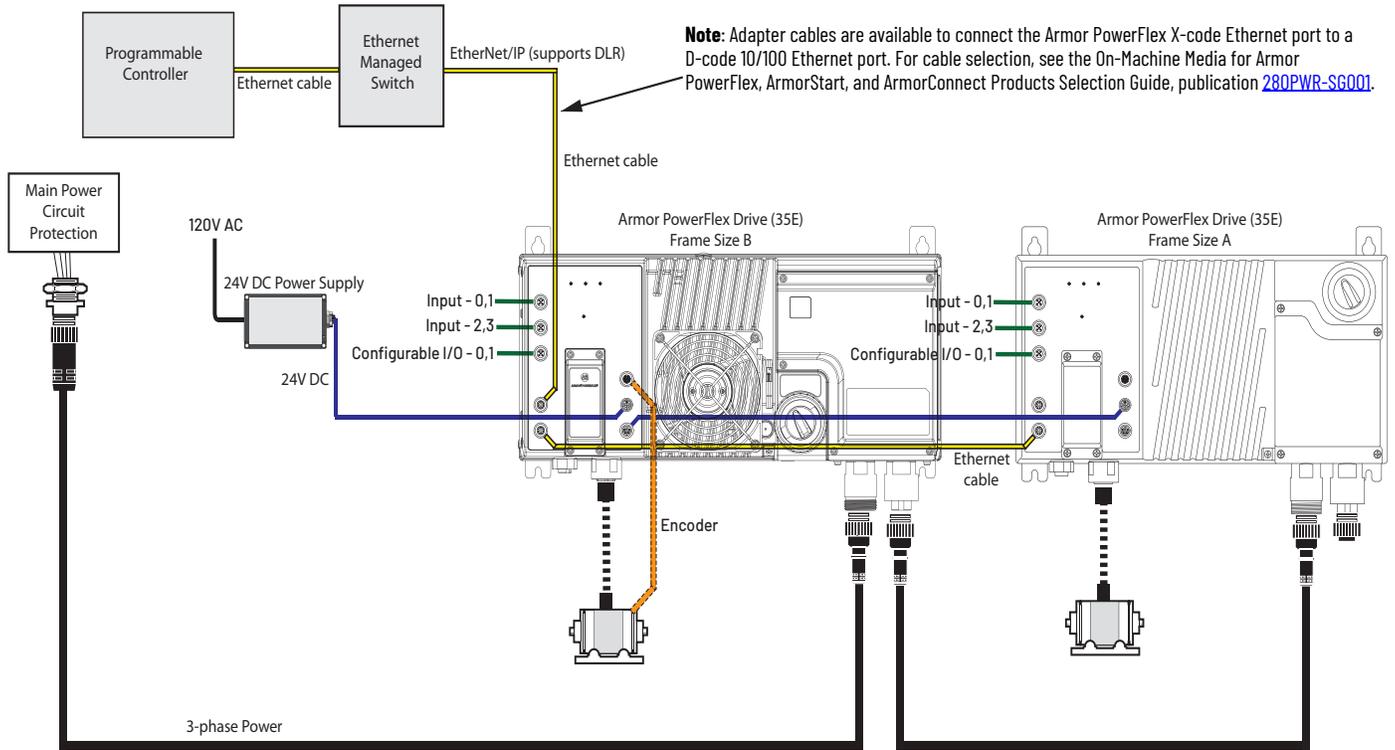


Figure 8 - Hardwired Safe Torque Off

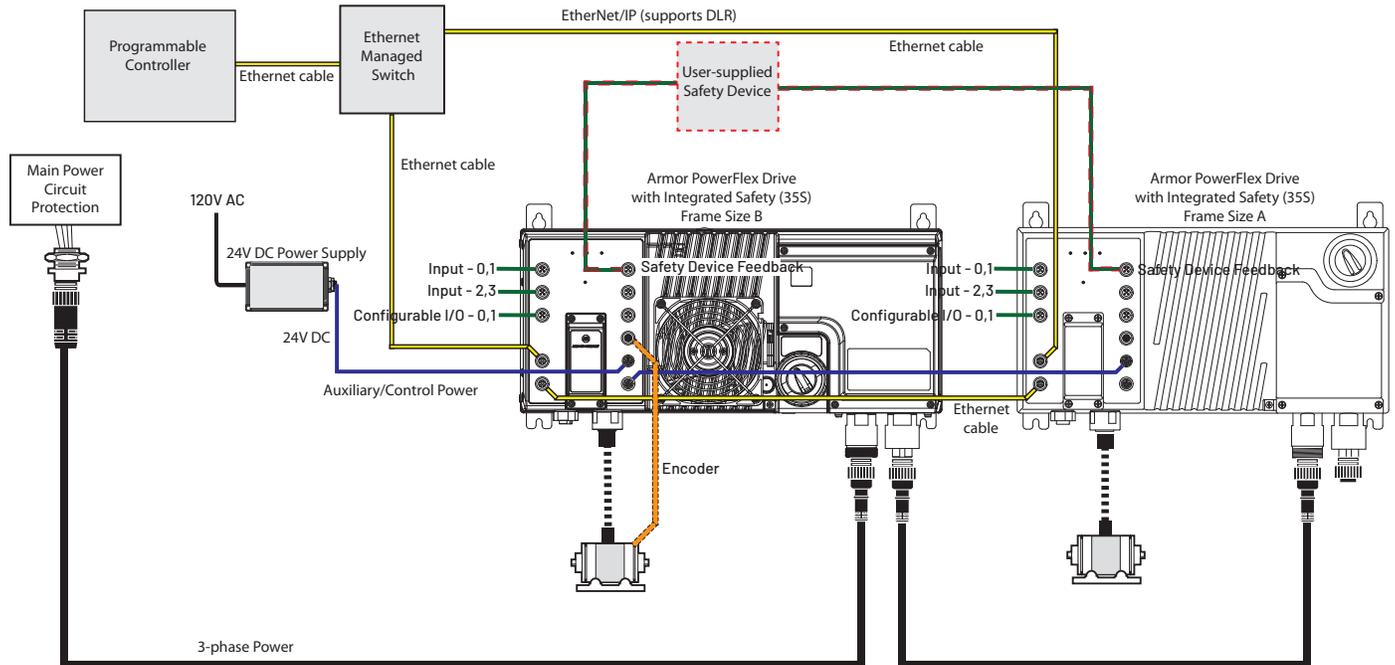


Figure 9 - Integrated Safe Torque Off (STO) or Timed Safe Stop (SS1)

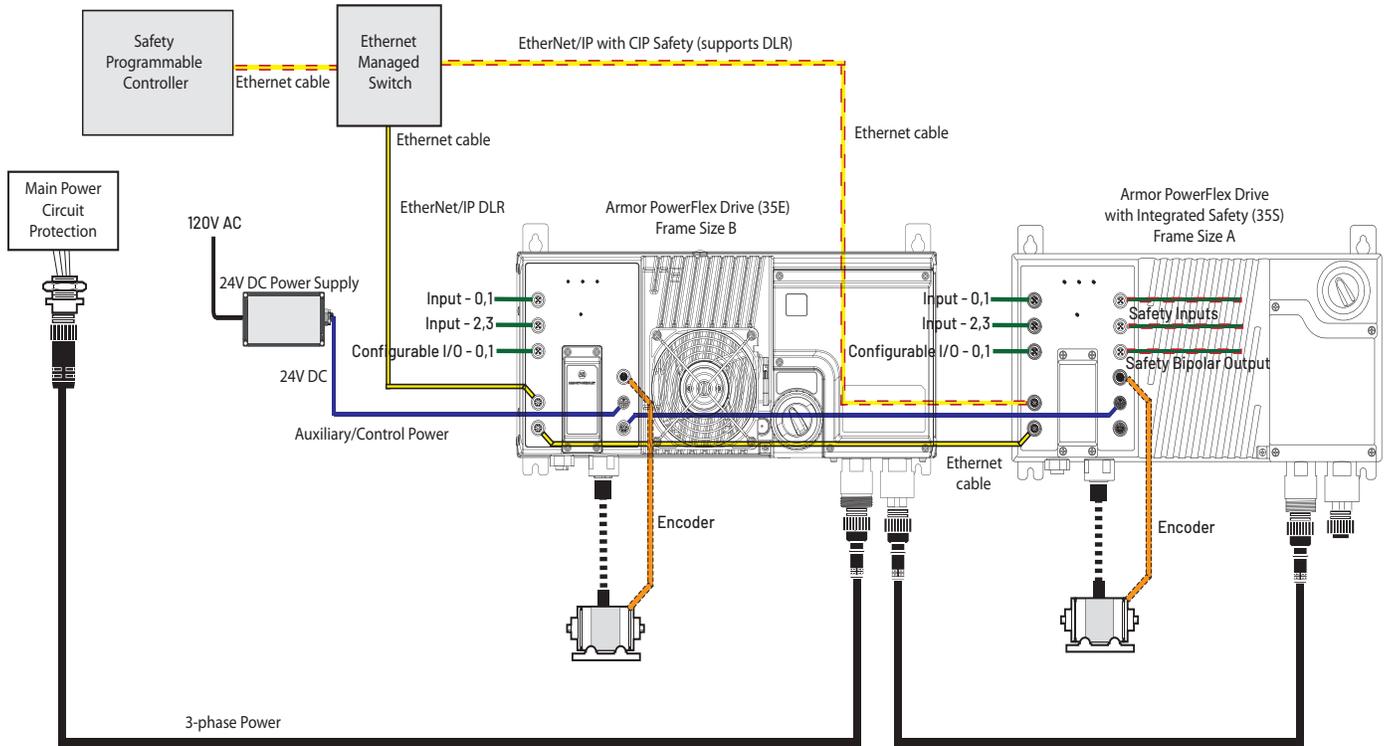
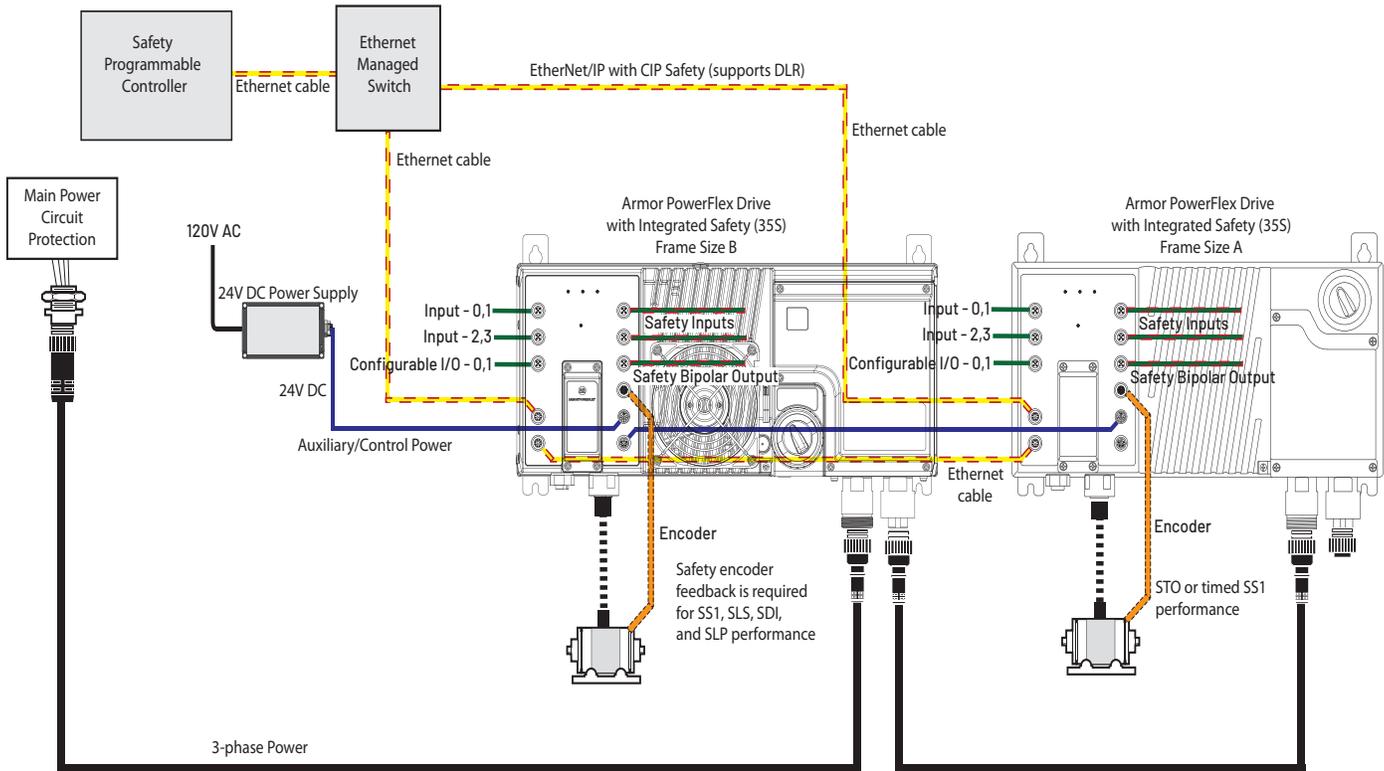


Figure 10 - Integrated Safe Speed Monitor Functions



Catalog Number Explanation

Examples that are given in this section are not intended to be used for product selection. Not all combinations generate a valid cat. no. Use ProposalWorks™ software to configure the Armor PowerFlex Drive. ProposalWorks software is available from rok.auto/systemtools.

35
S -
6
D
1 -
L
0
0
1

a
b
c
d
e
f
g
h
i

a	
Bulletin Number	
Code	Description
35	Armor PowerFlex Drive

b	
Type	
Code	Description
S	Integrated Safety
E	Standard with EtherNet/IP

c	
Enclosure Type ⁽¹⁾	
Code	Description
6	IP54/66, NEMA Type 1/4/12

d	
Line Voltage	
Code	Description
D	480Y/277V AC, 50/60 Hz

(1) See [Table 35](#) for specific enclosure ratings based on cable selection.

e	
Motor Power Output Rating	
Code	Description
1	1 Hp, 0.75 kW, 2.3 A (Frame A)
2	2 Hp, 1.5 kW, 4.0 A (Frame A)
3	3 Hp, 2.2 kW, 6.0 A (Frame A)
4	5 Hp, 4 kW, 10.5 A (Frame B)
5	7.5 Hp, 5.5 kW, 13.0 A (Frame B)
6	10 Hp, 7.5 kW, 17.0 A (Frame B)

f	
24V DC Auxiliary Power Source	
Code	Description
L	External
P	Internal

g	
Power-in Gland	
Code	Description
0	Cord/conduit
1 ⁽¹⁾	Round Quick Connect
2	Square Quick Connect

h	
EM Brake	
Code	Description
0	None
1	Included

i	
EMI Filter	
Code	Description
1	Included

(1) You must select Round Quick Connect power-in gland to qualify for UL Listing.



Our current offering of 5-pin auxiliary power cables and receptacles have an IP66, UL Type 1/12 rating. You must confirm that this rating is acceptable for the intended application.

To achieve a UL Type 4 rating for Frame A, you must select the Round Quick Connect power-in gland **AND** use the included M12 sealing caps or order Cat. No. 1485A-M12 sealing caps.

See publication [280PWR-SG001](#) for environmental ratings of cables and sealing caps.



If you choose a drive without an EM brake (character **h** is 0), a 4-pin motor cable is required. If you choose a drive with an EM brake (character **h** is 1), then a 7-pin motor cable is required.

Example: Cat. No. 35S-6D3-P101 requires a 4-pin cable (Cat. No. 280-PWRM29x-Mxx or 284-PWRM29x-Mxx). Cat. No. 35S-6D3-P111 requires a 7-pin cable (Cat. No. 357-PWRM29x-Mxx).

See publication [280PWR-SG001](#) for details.

Armor PowerFlex Standard Drives

The standard Armor PowerFlex drive includes the following features:

- Up to 10 Hp
- AC induction motor control
- User I/O
- Local manual control
- Local, lockable disconnect



Armor PowerFlex drives are available with the following enclosure rating options: UL Type 1, 12, 4; NEMA 1, 12, 4; IP54, IP66
See [Table 35](#) for specific enclosure ratings based on cable selection

Bulletin 35E Standard Drives with EMI filter, Line Voltage 480/277V AC, 50/60 Hz

Rated Current [A]	Motor Power		Auxiliary Power Source	Power-in Gland	EM Brake	Cat. No.
	[Hp]	[kW]				
Frame A						
2.3	1	0.75	External	Cord/Conduit	None	35E-6D1-L001
					Included	35E-6D1-L011
				Round Quick Connect	None	35E-6D1-L101
					Included	35E-6D1-L111
				Square Quick Connect	None	35E-6D1-L201
					Included	35E-6D1-L211
	Internal	Cord/Conduit	None	35E-6D1-P001		
			Included	35E-6D1-P011		
		Round Quick Connect	None	35E-6D1-P101		
			Included	35E-6D1-P111		
		Square Quick Connect	None	35E-6D1-P201		
			Included	35E-6D1-P211		
4.0	2	1.5	External	Cord/Conduit	None	35E-6D2-L001
					Included	35E-6D2-L011
				Round Quick Connect	None	35E-6D2-L101
					Included	35E-6D2-L111
				Square Quick Connect	None	35E-6D2-L201
					Included	35E-6D2-L211
	Internal	Cord/Conduit	None	35E-6D2-P001		
			Included	35E-6D2-P011		
		Round Quick Connect	None	35E-6D2-P101		
			Included	35E-6D2-P111		
		Square Quick Connect	None	35E-6D2-P201		
			Included	35E-6D2-P211		
6.0	3	2.2	External	Cord/Conduit	None	35E-6D3-L001
					Included	35E-6D3-L011
				Round Quick Connect	None	35E-6D3-L101
					Included	35E-6D3-L111
				Square Quick Connect	None	35E-6D3-L201
					Included	35E-6D3-L211
	Internal	Cord/Conduit	None	35E-6D3-P001		
			Included	35E-6D3-P011		
		Round Quick Connect	None	35E-6D3-P101		
			Included	35E-6D3-P111		
		Square Quick Connect	None	35E-6D3-P201		
			Included	35E-6D3-P211		

Bulletin 35E Standard Drives with EMI filter, Line Voltage 480/277V AC, 50/60 Hz (Continued)

Rated Current [A]	Motor Power		Auxiliary Power Source	Power-in Gland	EM Brake	Cat. No.
	[Hp]	[kW]				
Frame B						
10.5	5	4	External	Cord/Conduit	Included	35E-6D4-L011
				Round Quick Connect	Included	35E-6D4-L111
				Square Quick Connect	Included	35E-6D4-L211
			Internal	Cord/Conduit	Included	35E-6D4-P011
				Round Quick Connect	Included	35E-6D4-P111
				Square Quick Connect	Included	35E-6D4-P211
13.0	7.5	5.5	External	Cord/Conduit	Included	35E-6D5-L011
				Round Quick Connect	Included	35E-6D5-L111
				Square Quick Connect	Included	35E-6D5-L211
			Internal	Cord/Conduit	Included	35E-6D5-P011
				Round Quick Connect	Included	35E-6D5-P111
				Square Quick Connect	Included	35E-6D5-P211
17.0	10	7.5	External	Cord/Conduit	Included	35E-6D6-L011
				Round Quick Connect	Included	35E-6D6-L111
				Square Quick Connect	Included	35E-6D6-L211
			Internal	Cord/Conduit	Included	35E-6D6-P011
				Round Quick Connect	Included	35E-6D6-P111
				Square Quick Connect	Included	35E-6D6-P211

Armor PowerFlex Safety Drives

Our Armor PowerFlex Safety drives include the following features:

- Up to 10 Hp
- AC induction motor control
- User standard and safety I/O
- Local manual control
- Local, lockable disconnect
- Hard-wired Safe Torque Off (STO)
- Integrated drive-based Safe Stop functions
- Integrated controller-based Safe Monitor functions



Armor PowerFlex drives are available with the following enclosure rating options: UL Type 1, 12, 4; NEMA 1, 12, 4; IP54, IP66
See [Table 35](#) for specific enclosure ratings based on cable selection

Bulletin 35S Safety Drives with EMI filter, Line Voltage 480/277V AC, 50/60 Hz

Rated Current [A]	Motor Power		Auxiliary Power Source	Power-in Gland	EM Brake	Cat. No.
	[Hp]	[kW]				
Frame A						
2.3	1	0.75	External	Cord/Conduit	None	35S-6D1-L001
					Included	35S-6D1-L011
				Round Quick Connect	None	35S-6D1-L101
					Included	35S-6D1-L111
				Square Quick Connect	None	35S-6D1-L201
					Included	35S-6D1-L211
			Internal	Cord/Conduit	None	35S-6D1-P001
					Included	35S-6D1-P011
				Round Quick Connect	None	35S-6D1-P101
					Included	35S-6D1-P111
				Square Quick Connect	None	35S-6D1-P201
					Included	35S-6D1-P211
4.0	2	1.5	External	Cord/Conduit	None	35S-6D2-L001
					Included	35S-6D2-L011
				Round Quick Connect	None	35S-6D2-L101
					Included	35S-6D2-L111
				Square Quick Connect	None	35S-6D2-L201
					Included	35S-6D2-L211
			Internal	Cord/Conduit	None	35S-6D2-P001
					Included	35S-6D2-P011
				Round Quick Connect	None	35S-6D2-P101
					Included	35S-6D2-P111
				Square Quick Connect	None	35S-6D2-P201
					Included	35S-6D2-P211

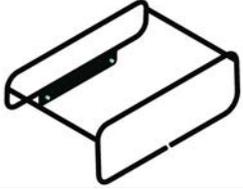
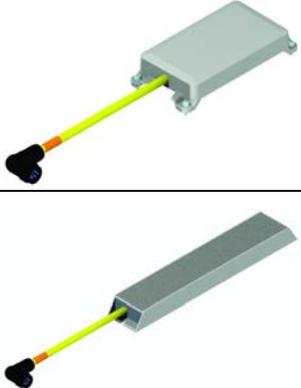
Bulletin 35S Safety Drives with EMI filter, Line Voltage 480/277V AC, 50/60 Hz (Continued)

Rated Current [A]	Motor Power		Auxiliary Power Source	Power-in Gland	EM Brake	Cat. No.
	[Hp]	[kW]				
6.0	3	2.2	External	Cord/Conduit	None	35S-6D3-L001
					Included	35S-6D3-L011
				Round Quick Connect	None	35S-6D3-L101
					Included	35S-6D3-L111
				Square Quick Connect	None	35S-6D3-L201
					Included	35S-6D3-L211
	Internal	Cord/Conduit	None	35S-6D3-P001		
			Included	35S-6D3-P011		
		Round Quick Connect	None	35S-6D3-P101		
			Included	35S-6D3-P111		
		Square Quick Connect	None	35S-6D3-P201		
			Included	35S-6D3-P211		

Frame B

10.5	5	4	External	Cord/Conduit	Included	35S-6D4-L011
				Round Quick Connect	Included	35S-6D4-L111
				Square Quick Connect	Included	35S-6D4-L211
			Internal	Cord/Conduit	Included	35S-6D4-P011
				Round Quick Connect	Included	35S-6D4-P111
				Square Quick Connect	Included	35S-6D4-P211
13.0	7.5	5.5	External	Cord/Conduit	Included	35S-6D5-L011
				Round Quick Connect	Included	35S-6D5-L111
				Square Quick Connect	Included	35S-6D5-L211
			Internal	Cord/Conduit	Included	35S-6D5-P011
				Round Quick Connect	Included	35S-6D5-P111
				Square Quick Connect	Included	35S-6D5-P211
17.0	10	7.5	External	Cord/Conduit	Included	35S-6D6-L011
				Round Quick Connect	Included	35S-6D6-L111
				Square Quick Connect	Included	35S-6D6-L211
			Internal	Cord/Conduit	Included	35S-6D6-P011
				Round Quick Connect	Included	35S-6D6-P111
				Square Quick Connect	Included	35S-6D6-P211

Optional Accessories

	Description	Frame Size	Cat. No.		
	Logic Guard • Black metal construction	A, B	35-LG1-AB		
	Splash plastic shield • Clear plastic	A, B	35-SPS-AB		
	Dynamic Brake Resistors	50 W, 360 Ω	A	35R-00AP1K	
		Light Duty • IP54/66, Type 1/4/12, NEMA Type 1/4/12 • Right-angle plug connector • Mounts directly on Armor PowerFlex drive	200 W, 120 Ω	B	35R-00BP1K
		100 W, 360 Ω	A	35T-360P500	
		Normal Duty • 1 m (3.3 ft) cable • IP54/66, Type 1/4/12, NEMA Type 1/4/12 • Right-angle plug connector • Separate mounting from Armor PowerFlex Drive	300 W, 120 Ω	B	35T-120P1K2

Renewal Parts

	Description	Frame Size	Cat. No.
	Logic section door	A, B	35-LSD-AB
	Power section door	A	35-PSD-A
	Power section door	B	35-PSD-B
	Power section inner cover	A	35-PSC-A
	Power section inner cover	B	35-PSC-B
	Fan	B	35-FAN-NB

Renewal Parts (Continued)

	Description	Frame Size	Cat. No.
	Mounting feet • Set of 4 • Includes screws	A, B	35-MMF-AB
	Safety Bypass Plug • Used to bypass hardwired STO during setup	A, B	35-SPM12M
	Gland Plates	Conduit	35-CPG-AB
		Round Connectors	35-RPG-AB
		Square Connectors	35-SPG-AB

Table 6 - Fuses

Description	Rated Current [A]	Interrupting Capacity	Rated Voltage	Manufacturer	Dimensions [mm (in)]	Frame Size	Cat. No.
3-phase AC Power Fuses • UL Listed Class CC • Std. 248-14	20	100 kA rms	600V AC	Bussman	38.1 x 10.3 (1.5 x 0.41)	A	KTK-20
3-phase AC Power Fuses • UL Listed Class J • Std. 248-14	45	300 kA rms	600V AC	Bussman	60.4 x 26.9 (2.38 x 1.06)	B	LPJ-45SP
EM Brake Fuses • UL Listed Class CC • Std. 248-14	6	100 kA rms	600V AC	Bussman	38.1 x 10.3 (1.5 x 0.41)	A, B	KTK-6
Unswitched (Control) 24V DC Power Fuse • Fuse T C • H CLIP	2.5	1500 A @250V AC	250V DC	Littlefuse	20 x 5.2 (0.78 x 0.2)	A, B	21502.5MXP
Switched (Sensor) 24V DC Power Fuse • Fuse T C • 4 A, 250V • H CLIP	4	1500 A @250V AC	250V DC	Littlefuse	21.5 x 5.5 (0.84 x 0.21)	A, B	215004.MXP

Overview

This section contains descriptions of three-phase power, control (auxiliary) power, motor, brake, I/O, and network communication media, suitable for Armor PowerFlex drive connections. This section also contains typical wiring diagrams that list common cables and media for various Armor PowerFlex drives. In addition to the products listed in the tables in this section, Rockwell Automation offers other options to extend your system.



For complete ordering information, including available options, pinout, dimension, and other specifications, see the following publications.

- On-Machine Media for Armor PowerFlex, ArmorStart, and ArmorConnect Products Selection Guide, publication [280PWR-SG001](#)
- Cordsets & Field Attachables Technical Data, publication [889-TD002](#)
- Ethernet Media Specifications, publication [1585-TD001](#)

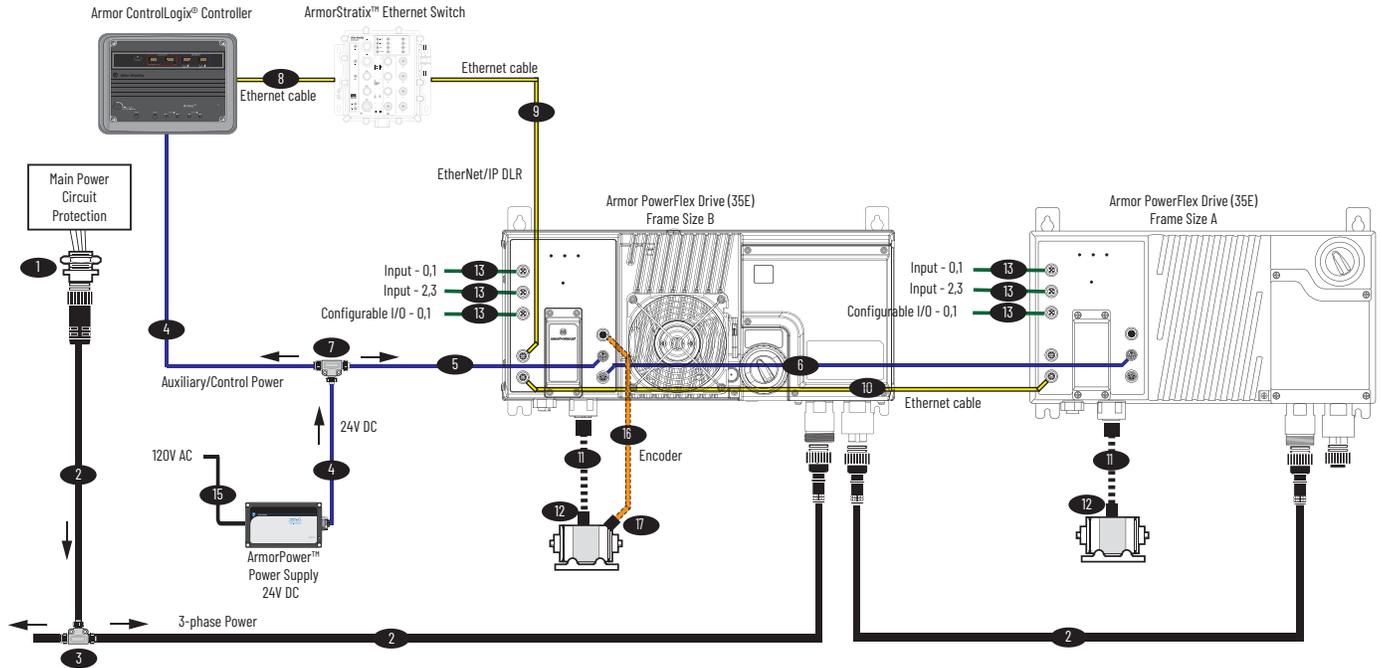
Media Overview

ArmorConnect Three-phase Power Media	Auxiliary (Control) Power Media	Motor and Brake Media	I/O and Network Media
 <p>Trunk cable assemblies</p> <p>Tee, reducer adapter, and field-attachable connector</p> <p>Through-panel receptacles</p>	 <p>5-pin M12 L-code cordset</p> <p>Tees</p> <p>Through-panel receptacles</p>	 <p>Motor cable</p>	 <p>I/O cordset and patchcord</p> <p>Ethernet cordset and patchcord</p>
<ul style="list-style-type: none"> • Three-phase and control power cable systems <ul style="list-style-type: none"> - cordsets - patchcords - receptacles - tees - reducers - accessories • Reduces installation time • Provides plug-and-play environment <ul style="list-style-type: none"> - helps avoid miswiring 	<ul style="list-style-type: none"> • L-Code quick connect cable • Based on a 5-pin mini-connector • Connectors can be straight or right angled • Physically keyed to avoid incorrect wiring 	<ul style="list-style-type: none"> • Available in multiple configurations and lengths • Solutions include: <ul style="list-style-type: none"> - field-attachable connectors - receptacles 	<ul style="list-style-type: none"> • Network media for Ethernet • Input and output devices • Safety connection systems • Solutions include: <ul style="list-style-type: none"> - cordsets - patchcords - V- and Y-cables - splitters - field-attachable connectors - receptacles

Typical Wiring Configurations

Typical motor control systems include selections from several categories of Allen-Bradley® motor control products and connection media.

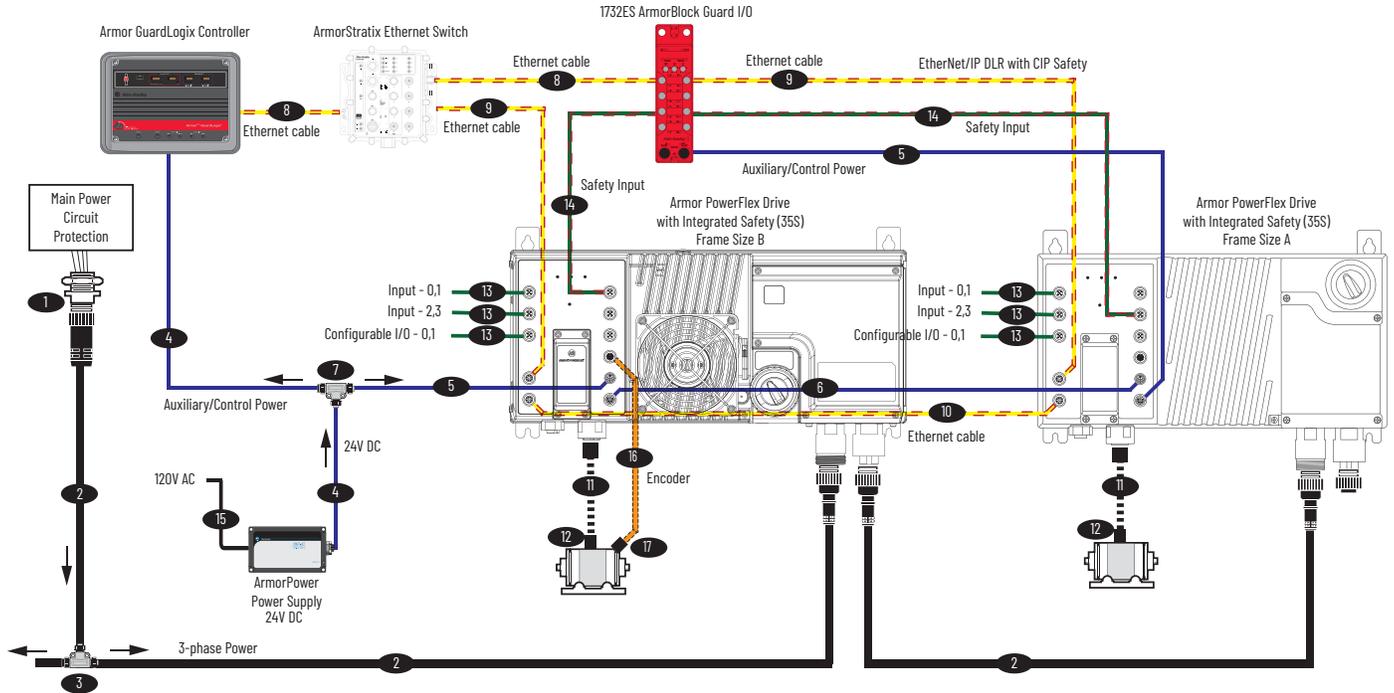
Armor PowerFlex Drive Standard System



Item	Description	Example Cat. No.
1	Three-phase power receptacle, round or Three-phase power receptacle, square	280-M35F-Mxx ⁽¹⁾ or HARTING® 61 04 201 2753
2	Three-phase power cable, round or Three-phase power cable, square	280-PWRM35A-Mxx ⁽¹⁾ or HARTING 61 04 202 2953 Lxxx ⁽¹⁾
3	Three-phase power t-port, round or Three-phase power t-port, square	280-T35 or HARTING 09 12 008 4720
4	Auxiliary/Control power cable, 4-pin	889N-F4AFNM-xx ⁽¹⁾
5	Auxiliary/Control power cable, 4 to 5-pin Auxiliary/Control power cable, 5-pin	889L-R5JFN4M-xx ⁽¹⁾
6	Auxiliary/Control power cable, 5-pin	889L-R5JFLE-xx ⁽¹⁾
7	Auxiliary/Control power t-port, 4-pin	898N-43PB-N4KF
not shown	Auxiliary/Control power receptacle, 4-pin	888N-D4AF1-xx ⁽¹⁾
8	Ethernet patchcord 10/100 MB, D-code to D-code	1585D-M4TBDM-xx ⁽¹⁾
9	Ethernet patchcord 10/100 MB, X-code to D-code	1585D-E8TG04E-xx ⁽¹⁾
10	Ethernet patchcord 1 GB, X-code to X-code	1585D-E8TGDE-xx ⁽¹⁾
11	Motor and EM brake cable, 7-pin (See page 14.) Motor cable (without EM brake), 4-pin (See page 14.)	357-PWRM29A-Mxx ⁽¹⁾ 284-PWRM29A-Mxx ⁽¹⁾
12	Motor and EM brake receptacle, 7-pin (See page 14.) Motor receptacle (without EM brake), 4-pin (See page 14.)	357-M29M-M05 284-M29M-M03
13	I/O cables, standard	889D-R5ACDE-xx ⁽¹⁾
15	120V AC line in cable	889N-F3AFC-XF-xx ⁽¹⁾
16	Encoder cable	889D-R8FBDE-xx ⁽¹⁾
17	Encoder receptacle	888D-F8AB3-xx ⁽¹⁾

(1) xx specifies the available cable/wire lengths.

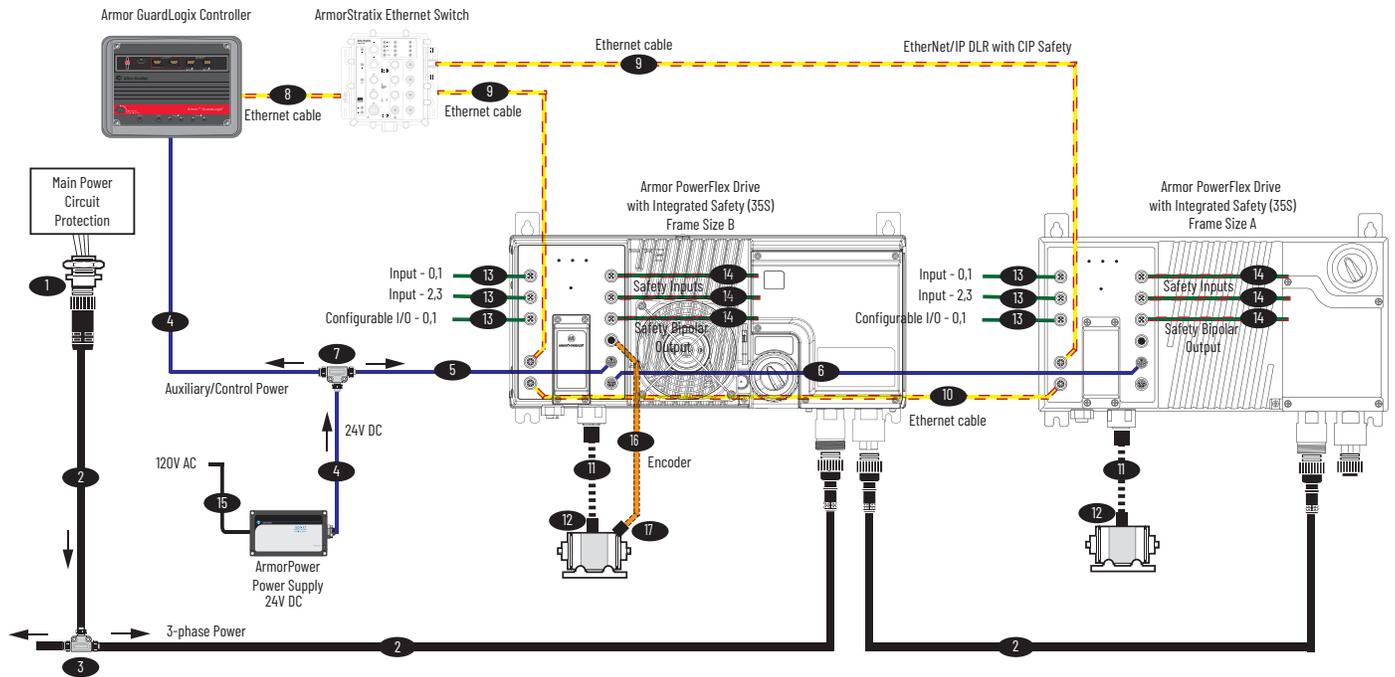
Armor PowerFlex Drive with Hardwired Safety



Item	Description	Example Cat. No.
1	Three-phase power receptacle, round or Three-phase power receptacle, square	280-M35F-Mxx ⁽¹⁾ or HARTING 61 04 201 2753
2	Three-phase power cable, round or Three-phase power cable, square	280-PWRM35A-Mxx ⁽¹⁾ or HARTING 61 04 202 2953 Lxxx ⁽¹⁾
3	Three-phase power t-port, round or Three-phase power t-port, square	280-T35 or HARTING 09 12 008 4720
4	Auxiliary/Control power cable, 4-pin	889N-F4AFNM-xx ⁽¹⁾
5	Auxiliary/Control power cable, 4 to 5-pin	889L-R5JFN4M-xx ⁽¹⁾
6	Auxiliary/Control power cable, 5-pin	889L-R5JFLE-xx ⁽¹⁾
7	Auxiliary/Control power t-port, 4-pin	898N-43PB-N4KF
not shown	Auxiliary/Control power receptacle, 4-pin	888N-D4AF1-xx ⁽¹⁾
8	Ethernet patchcord 10/100 MB, D-code to D-code	1585D-M4TBDM-xx ⁽¹⁾
9	Ethernet patchcord 10/100 MB, X-code to D-code	1585D-E8TGD4E-xx ⁽¹⁾
10	Ethernet patchcord 1 GB, X-code to X-code	1585D-E8TGDE-xx ⁽¹⁾
11	Motor and EM brake cable, 7-pin (See page 14.)	357-PWRM29A-Mxx ⁽¹⁾
	Motor cable (without EM brake), 4-pin (See page 14.)	284-PWRM29A-Mxx ⁽¹⁾
12	Motor and EM brake receptacle, 7-pin (See page 14.)	357-M29M-M05
	Motor receptacle (without EM brake), 4-pin (See page 14.)	284-M29M-M03
not shown	Safety bypass plug	35-SPM12M
13	I/O cables, standard	889D-R5ACDE-xx ⁽¹⁾
14	I/O cables, safety	889D-R5NCDE-xx ⁽¹⁾
15	120V AC line in cable	889N-F3AFC-XF-xx ⁽¹⁾
16	Encoder cable	889D-R8FBDE-xx ⁽¹⁾
17	Encoder receptacle	888D-F8AB3-xx ⁽¹⁾

(1) xx specifies the available cable/wire lengths.

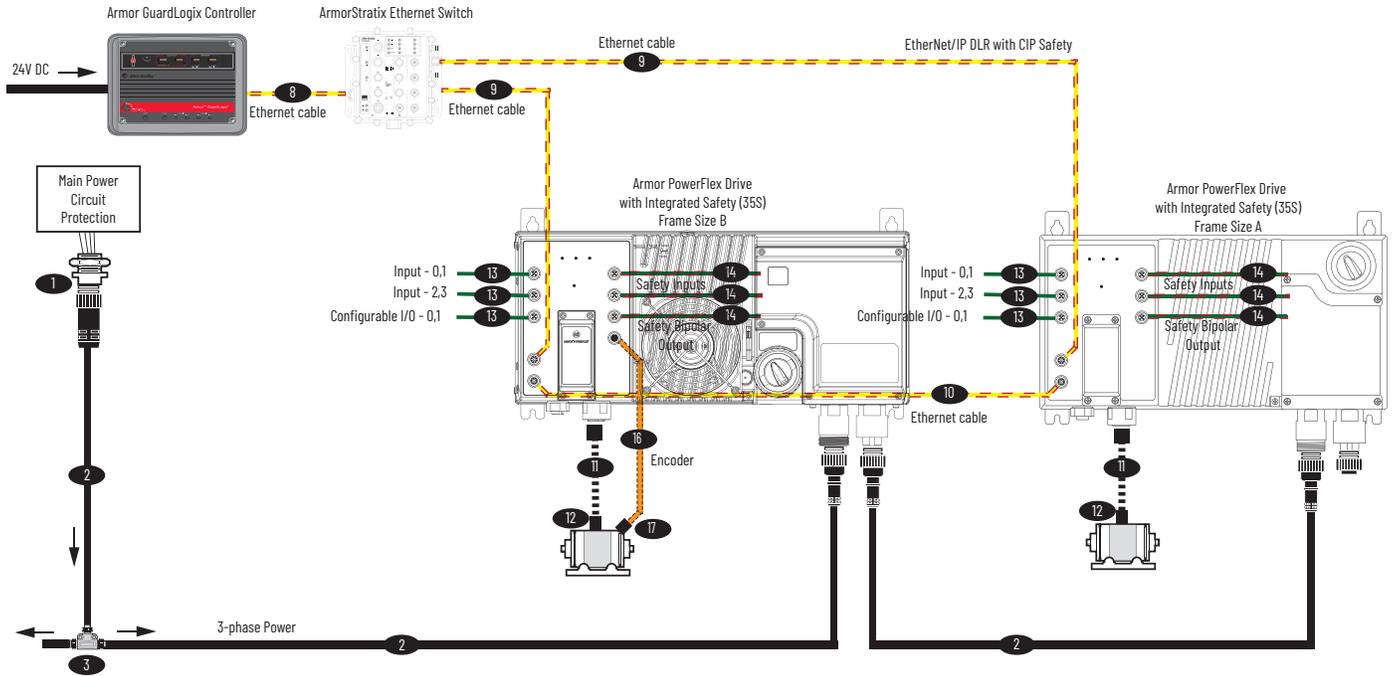
Armor PowerFlex Drive with Integrated Safety



Item	Description	Example Cat. No.
1	Three-phase power receptacle, round or Three-phase power receptacle, square	280-M35F-Mxx ⁽¹⁾ or HARTING 61 04 201 2753
2	Three-phase power cable, round or Three-phase power cable, square	280-PWRM35A-Mxx ⁽¹⁾ or HARTING 61 04 202 2953 Lxxx ⁽¹⁾
3	Three-phase power t-port, round or Three-phase power t-port, square	280-T35 or HARTING 09 12 008 4720
4	Auxiliary/Control power cable, 4-pin	889N-F4AFNM-xx ⁽¹⁾
5	Auxiliary/Control power cable, 4 to 5-pin Auxiliary/Control power cable, 5-pin	889L-R5JFN4M-xx ⁽¹⁾
6	Auxiliary/Control power cable, 5-pin	889L-R5JFLE-xx ⁽¹⁾
7	Auxiliary/Control power t-port, 4-pin	898N-43PB-N4KF
not shown	Auxiliary/Control power receptacle, 4-pin	888N-D4AF1-xx ⁽¹⁾
8	Ethernet patchcord 10/100 MB, D-code to D-code	1585D-M4TBDM-xx ⁽¹⁾
9	Ethernet patchcord 10/100 MB, X-code to D-code	1585D-E8TGD4E-xx ⁽¹⁾
10	Ethernet patchcord 1 GB, X-code to X-code	1585D-E8TGDE-xx ⁽¹⁾
11	Motor and EM brake cable, 7-pin (See page 14.)	357-PWRM29A-Mxx ⁽¹⁾
	Motor cable (without EM brake), 4-pin (See page 14.)	284-PWRM29A-Mxx ⁽¹⁾
12	Motor and EM brake receptacle, 7-pin (See page 14.)	357-M29M-M05
	Motor receptacle (without EM brake), 4-pin (See page 14.)	284-M29M-M03
not shown	Safety bypass plug	35-SPM12M
13	I/O cables, standard	889D-R5ACDE-xx ⁽¹⁾
14	I/O cables, safety	889D-R5NCDE-xx ⁽¹⁾
15	120V AC line in cable	889N-F3AFC-XF-xx ⁽¹⁾
16	Encoder cable	889D-R8FBDE-xx ⁽¹⁾
17	Encoder receptacle	888D-F8AB3-xx ⁽¹⁾

(1) xx specifies the available cable/wire lengths.

Armor PowerFlex Drive with Integrated Safety and with Internal Power Supply



Item	Description	Example Cat. No.
1	Three-phase power receptacle, round or Three-phase power receptacle, square	280-M35F-Mxx ⁽¹⁾ or HARTING 61 04 201 2753
2	Three-phase power cable, round or Three-phase power cable, square	280-PWRM35A-Mxx ⁽¹⁾ or HARTING 61 04 202 2953 Lxxx ⁽¹⁾
3	Three-phase power t-port, round or Three-phase power t-port, square	280-T35 or HARTING 09 12 008 4720
8	Ethernet patchcord 10/100 MB, D-code to D-code	1585D-M4TBDM-xx ⁽¹⁾
9	Ethernet patchcord 10/100 MB, X-code to D-code	1585D-E8TGD4E-xx ⁽¹⁾
10	Ethernet patchcord 1 GB, X-code to X-code	1585D-E8TGDE-xx ⁽¹⁾
11	Motor and EM brake cable, 7-pin (See page 14.)	357-PWRM29A-Mxx ⁽¹⁾
	Motor cable (without EM brake), 4-pin (See page 14.)	284-PWRM29A-Mxx ⁽¹⁾
12	Motor and EM brake receptacle, 7-pin (See page 14.)	357-M29M-M05
	Motor receptacle (without EM brake), 4-pin (See page 14.)	284-M29M-M03
not shown	Safety bypass plug	35-SPM12M
13	I/O cables, standard	889D-R5ACDE-xx ⁽¹⁾
14	I/O cables, safety	889D-R5NCDE-xx ⁽¹⁾
15	120V AC line in cable	889N-F3AFC-XF-xx ⁽¹⁾
16	Encoder cable	889D-R8FBDE-xx ⁽¹⁾
17	Encoder receptacle	888D-F8AB3-xx ⁽¹⁾

(1) xx specifies the available cable/wire lengths.

Technical Specifications

Table 7 - Standards Compliance and Certifications

Certification	Standards Compliance
cULus	<ul style="list-style-type: none"> UL 61800-5-1, 1st Ed, Rev CSA C22.2 No. 274-17, 2nd Ed
RCM	<ul style="list-style-type: none"> Radiocommunications Act:1992 (including Amendments up to 2018) Radiocommunications (Electromagnetic Compatibility) Standard 2017 Radiocommunications Labeling (Electromagnetic Compatibility) Notice 2017
CE	<ul style="list-style-type: none"> 2014/35/EU Low Voltage Directive 2014/30/EU EMC Directive 2006/42/EC Machinery Directive (Cat 3S Only) 2011/65/EU RoHS Directive Reg 2019/1781 (2009/125/EC) Ecodesign Directive RoHS standard EN 63000 Low Voltage Directive EN 61800-5-1 EMC EN 61800-3
Functional Safety (TÜV Rheinland) (EU and UK) Cat: 3S Only	<ul style="list-style-type: none"> EN ISO 13849-1 EN 61800-5-2 IEC 61508 PARTS 1-7 EN 62061 EN 60204-1 Certified up to SIL3/PLe with Safe Torque Off Certified up to SIL2/PLd with Safe Speed Monitoring Certified up to SIL3/PLe with Safety I/O 2006/42/EC Machinery Directive
KCC	<p>Korean Registration of Broadcasting and Communications Equipment Compliant with the following standards:</p> <ul style="list-style-type: none"> Article 58-2 of Radio Waves Act, Clause 3 R-R-RAA-35X R-R-RAA-35 ACC
Efficiency Class	Ecodesign regulation (EU) 2019/1781, IE2 efficiency class, per Ecodesign Regulation (EU) 2019/1781
SEMI F47	<p>Certified compliant with the following standards:</p> <ul style="list-style-type: none"> SEMI F47.0706 IEC 61000-4-11 IEC 61000-4-34
Morocco	<ul style="list-style-type: none"> Arrêté ministériel n° 6404-15 du 1 er muharram 1437(15 octobre 2015) Arrêté ministériel n° 6404-15 du 29 ramadan 1436(16 juillet 2015) NM EN 61800-3 :2018 NM EN 61800-5-1 :2014
UKCA	<ul style="list-style-type: none"> 2016 No. 1101 Low Voltage 2016 No. 1091 EMC 2008 No. 1597 Machinery (Cat 3S Only) 2012 No. 3032 RoHS 2021 No. 745 ECO Design RoHS standard EN 63000 Low Voltage Directive EN 61800-5-1 EMC EN 61800-3

The drive is also designed to meet the appropriate portions of the following specifications:

- NFPA 70 - US National Electrical Code
- NFPA 79 - Electrical Standard for Industrial Machinery
- NEMA ICS 7.1 - Safety standards for Construction and Guide for Selection, Installation and Operation of Adjustable Speed Drive Systems

Electrical Ratings

Table 8 - Power Circuit

Attribute		Value	
Rated Voltage	Operating	380...460V AC, ±10% (solidly Wye-grounded)	
	Insulation	Reinforced	
	Impulse	8.7 kV	
	Dielectric withstand	Primary-ground	4800V DC
		Secondary-ground	2800V DC
Frequency	Operating	48...63 Hz	
Overvoltage Category		Overvoltage Category 3	
Resistance to Shock		Protective Separation	

Table 9 - External Auxiliary/Control Circuit Ratings

Attribute		Value
Rated Voltage	Operating	24V DC power supply is required, PELV or SELV ⁽¹⁾
	SELV Insulation to chassis	Basic
	Dielectric withstand	500V AC
	Operating Frequency	DC
	Overvoltage Category	SELV and Overvoltage Category 2

(1) SELV (separated extra-low voltage) and PELV (protective extra-low voltage) circuits. These circuits have a nominal voltage that does not exceed 50V AC or 120V ripple-free DC.

Table 10 - External Auxiliary Power Requirements⁽¹⁾

Attribute		Unswitched Auxiliary (Sensor) Power ON	Switched Auxiliary (Output) Power ON	Concurrent Unswitched and Switched Auxiliary Power ON
Current (with no I/O demand)	no I/O demand	271 mA nominal	30.27 mA nominal	301.27 mA nominal
	with I/O demand	2.5 A max	4 A max	6.5 A max
Power (Nominal Current x 24V)	no I/O demand	6.5 W	0.726 W	7.226 W
	with I/O demand	66 W max	105 W max	171 W max
Peak Inrush Current; without I/O connected		1.687 A @ 25 ms	3.77 A @ 25 ms	6.5 A @ 15 ms

(1) You must consider the power demands of the I/O when sizing the external 24V DC power supply.

Table 11 - Internal Power Supply (Optional)

Attribute		Value
Rated Operating Voltage	SELV ⁽¹⁾	24V DC +10%, -15%
Current	no I/O demand	345.54 mA nominal
	with I/O demand	6.5 A max
Power (Nominal Current x 24V)	no I/O demand	8.3 W
	with I/O demand	171 W max

(1) SELV (separated extra-low voltage) circuits. These circuits have a nominal voltage that does not exceed 50V AC or 120V ripple-free DC.

Table 12 - I/O Power Requirements for Class 2 Circuits in North America per NEC 725.60

Function	Identifier	Max Voltage [V]	Max Current [A]
Digital inputs	INO...IN3	27.6	0.57
Encoder inputs	Encoder	27.6	1.2
Safety inputs	SFTY IN0...3	27.6	0.5
Configurable I/O	In/OUT0...1	27.6	2.62
Safety Output	SFTY OUT 0	27.6	2.62

Table 13 - I/O Fuse and Power Circuit Specifications

I/O Type			Fuse [A]	Apparent Power [VA]	Max Current [A]	
Auxiliary 24V inputs	Internal	switched	2.5	60	-	
		unswitched	4.0	96	-	
	External	switched	2.5	60	-	
		unswitched	4.0	96	-	
Unswitched I/O	Ethernet		Signal only; no power output		-	
	2 standard inputs		2.5	60	24V sensor power, electronically limited	0.57
	Safety inputs				24V test output, electronically limited	0.5
	Encoder				Selectable 12V/5V supply limit	1.2
Switched I/O	Safety outputs		4.0	96	24V sourcing output, electronically limited	2.62
	Configurable Standard I/O	as input			24V switched power, electronically limited	2.62
		as output			24V outputs, electronically limited	2.62

Table 14 - Electromechanical (EM) Brake

Attribute		Frame A Devices	Frame B Devices
Operating Current (nominal) @ 480V AC	Min ⁽¹⁾	70 mA	70 mA
	Max ⁽²⁾	400 mA	750 mA

- (1) Current draw less than 40mA rms causes an EM brake not connected/broken wire or undercurrent fault.
- (2) Overcurrent fault if the current drawn is over 450 mA rms for Frame A and over 800 mA rms for Frame B. RMS current assumes sinusoidal waveforms. Risk of nuisance faults may occur when the motor brake control circuit is designed using half wave power rectifier.

Table 15 - Protection Specifications

Attribute		Value
Short Circuit Current Rating, max		100,000 A symmetrical
DC Bus	Nominal Bus	680V DC
	Overvoltage Fault	820V DC
	Undervoltage Fault	390V DC
Power Ride-Thru	at 0% load	Loss of input power (0% volts) for 20...500 ms results in < 10% motor speed reduction
	at 100% load	<ul style="list-style-type: none"> • Loss of input power (0% volts) for 20 ms results in < 10% motor speed reduction • Loss of input power (0% volts) for 200 ms results in speed reduction to zero in just over 1 s - results in under-voltage fault) • Loss of phase (40% volts) for 200 ms results in < 10% motor speed reduction
Electronic Motor Overload Protection		Class 10
Overcurrent	Hardware limit	200%
	Instantaneous fault	300%
Ground Fault Trip		Phase-to-ground on drive output, EM brake, and Dynamic Brake ⁽¹⁾
Short-circuit Trip		Phase-to-phase on drive output, EM brake, and Dynamic Brake ⁽¹⁾
Short Circuit Protection Device (SCPD) Performance	Max Branch Circuit Protection	size per local codes ⁽²⁾

- (1) EM Brake option is available for Frame A devices only. EM brake is standard for Frame B devices and cannot be ordered without it.
- (2) Compatible circuit breakers shall not exceed 60 A rated current and 100,000 A symmetrical short-circuit current. For compatible Allen-Bradley circuit breakers, use Bulletin 140UT, 140MT, or 140G devices or equivalent.

Table 16 - Drive Characteristics

Attribute			Value		
Efficiency			up to IE2		
General Specifications	Maximum Hp Rating/Input Voltage	Frame A	3 Hp/480V		
		Frame B	10 Hp/480V		
Preset Speeds			4, user configurable		
Control Functions	Carrier Frequency	Frame A	2...16 kHz, based on 4 kHz		
		Frame B	4 kHz		
Real-time Clock (RTC) backup			7 days		
Max Input/Output Operating Current	Rated Operating Current ⁽¹⁾	Frame A	1 Hp (0.75 kW)	Input	4 A
			2 Hp (1.5 kW)	Output	2.3 A
				Input	6.5 A
		3 Hp (2.2 kW)	Output	4.0 A	
			Input	8.3 A	
		5 Hp (4 kW)	Output	6.0 A	
	Input		14.6 A		
	Frequency	Frame B	7.5 Hp (5.5 kW)	Output	10.5 A
				Input	16.2 A
			10 Hp (7.5 kW)	Output	13 A
		Input		19.2 A	
		Output		17 A	
		Line Input			48...63 Hz
	Motor Output			0...500 Hz	

(1) The maximum input current includes 0.35 A consumed by the optional internal power supply and 0.45 A consumed by the electromechanical (EM) brake, which is optional for Frame A. If one or both of these options are not selected, subtract their corresponding currents from the maximum value.
 EXAMPLE: When an Armor PowerFlex drive is ordered with an external power supply and no EM brake such as Cat. No. 35S-6D1-L101, subtract 0.8 A from the listed maximum current value.

Table 17 - Input Current Rating Scaled by Motor FLA

Cat. No.	Armor PowerFlex Drive		Drive Output Current				Drive Input Current			
	Power Rating		Motor FLA [A]				Max Current [A]			
	[Hp]	[kW]	Motor 1	Motor 2	Motor 3	Motor 4	Drive 1	Drive 2	Drive 3	Drive 4
35E-6D1...	1	0.75	2.3	1.8	1.5	1.2	4	3.4	2.9	2.4
35E-6D2...	2	1.5	4	3.2	2.6	2	6.5	5.4	4.5	3.7
35E-6D3...	3	2.2	6	4.8	3.9	3	8.3	6.8	5.7	4.6
35E-6D4...	5	4	10.5	8.4	6.8	5.3	14.6	11.8	9.8	7.7
35E-6D5...	7.5	5.5	13	10.4	8.5	6.5	16.2	13.1	10.8	8.5
35E-6D6...	10	7.5	17	13.6	11.1	8.5	19.2	15.5	12.8	10.0
35S-6D1...	1	0.75	2.3	1.8	1.5	1.2	4	3.4	2.9	2.4
35S-6D2...	2	1.5	4	3.2	2.6	2	6.5	5.4	4.5	3.7
35S-6D3...	3	2.2	6	4.8	3.9	3	8.3	6.8	5.7	4.6
35S-6D4...	5	4	10.5	8.4	6.8	5.3	14.6	11.8	9.8	7.7
35S-6D5...	7.5	5.5	13	10.4	8.5	6.5	16.2	13.1	10.8	8.5
35S-6D6...	10	7.5	17	13.6	11.1	8.5	19.2	15.5	12.8	10.0

Using the Drive Input Current Rating Information

[Table 17](#) provides information that helps you determine the max input current for a given drive/motor pair. This rating depends on the power rating of the Armor PowerFlex drive and the motor FLA (listed on the motor nameplate). In the table, the column for Motor 1 corresponds to the column for Drive 1, Motor 2 to Drive 2, and so on.

The drive input max current that is listed in [Table 17](#) for Drive 1...Drive 4 accounts for the 0.35 A consumed by the internal power supply (when this option is selected) and for 0.45 A consumed by the EM Brake Control (when this option is selected). If one or both of these options are not selected (Frame B always comes with EM Brake Control), the associated current consumption can be subtracted from the max input current value.

The following examples demonstrate the correct way to read the table.

EXAMPLE:

You have a 2 Hp/1 kW Armor PowerFlex drive. Your application uses a 2 Hp motor with an FLA rating of 3.4 A.

1. Locate the catalog number of your Armor PowerFlex drive in the table.

Armor PowerFlex Drive			Drive Output Current				Drive Input Current			
Cat. No.	Power Rating		Motor FLA [A]				Max Current [A]			
	[Hp]	[kW]	Motor 1	Motor 2	Motor 3	Motor 4	Drive 1	Drive 2	Drive 3	Drive 4
35E-6D1...	1	0.75	2.3	1.8	1.5	1.2	4	3.4	2.9	2.4
35E-6D2...	2	1.5	4	3.2	2.6	2	6.5	5.4	4.5	3.7
35E-6D3...	3	2.2	6	4.8	3.9	3	8.3	6.8	5.7	4.6

2. In the same row of the table, find the Drive Output Current motor FLA rating that most closely matches your application’s motor FLA. For this example, we choose Motor 1.



If the motor FLA falls between values in the table, use the higher of the two values.

Armor PowerFlex Drive			Drive Output Current				Drive Input Current			
Cat. No.	Power Rating		Motor FLA [A]				Max Current [A]			
	[Hp]	[kW]	Motor 1	Motor 2	Motor 3	Motor 4	Drive 1	Drive 2	Drive 3	Drive 4
35E-6D1...	1	0.75	2.3	1.8	1.5	1.2	4	3.4	2.9	2.4
35E-6D2...	2	1.5	4	3.2	2.6	2	6.5	5.4	4.5	3.7
35E-6D3...	3	2.2	6	4.8	3.9	3	8.3	6.8	5.7	4.6

3. Follow the row across to the corresponding Drive column in the table. Because we chose the value under Motor 1, we reference the column for Drive 1 to determine the max input current. **Max drive input current for this application is 6.5 A.**

Armor PowerFlex Drive			Drive Output Current				Drive Input Current			
Cat. No.	Power Rating		Motor FLA [A]				Max Current [A]			
	[Hp]	[kW]	Motor 1	Motor 2	Motor 3	Motor 4	Drive 1	Drive 2	Drive 3	Drive 4
35E-6D1...	1	0.75	2.3	1.8	1.5	1.2	4	3.4	2.9	2.4
35E-6D2...	2	1.5	4	3.2	2.6	2	6.5	5.4	4.5	3.7
35E-6D3...	3	2.2	6	4.8	3.9	3	8.3	6.8	5.7	4.6

4. If your Armor PowerFlex unit has an external power supply, you can subtract 0.35 A from the Drive 1 value determined in the previous step. This makes the max drive input current for this example 6.15 A.

EXAMPLE:

You have a 2 Hp/1 kW Armor PowerFlex drive. Your application uses a 1 Hp motor with an FLA rating of 1.8 A.

1. Locate the catalog number of your Armor PowerFlex drive in the table.

Armor PowerFlex Drive			Drive Output Current				Drive Input Current			
Cat. No.	Power Rating		Motor FLA [A]				Max Current [A]			
	[Hp]	[kW]	Motor 1	Motor 2	Motor 3	Motor 4	Drive 1	Drive 2	Drive 3	Drive 4
35E-6D1...	1	0.75	2.3	1.8	1.5	1.2	4	3.4	2.9	2.4
35E-6D2...	2	1.5	4	3.2	2.6	2	6.5	5.4	4.5	3.7
35E-6D3...	3	2.2	6	4.8	3.9	3	8.3	6.8	5.7	4.6

2. In the same row of the table, find the Drive Output Current motor FLA rating that most closely matches your application’s motor FLA. For this example, we choose Motor 4.



If the motor FLA falls between values in the table, use the higher of the two values.

Armor PowerFlex Drive			Drive Output Current				Drive Input Current			
Cat. No.	Power Rating		Motor FLA [A]				Max Current [A]			
	[Hp]	[kW]	Motor 1	Motor 2	Motor 3	Motor 4	Drive 1	Drive 2	Drive 3	Drive 4
35E-6D1...	1	0.75	2.3	1.8	1.5	1.2	4	3.4	2.9	2.4
35E-6D2...	2	1.5	4	3.2	2.6	2	6.5	5.4	4.5	3.7
35E-6D3...	3	2.2	6	4.8	3.9	3	8.3	6.8	5.7	4.6

3. Follow the row across to the corresponding Drive column in the table. Because we chose the value under Motor 4, we reference the column for Drive 4 to determine the max input current. **Max drive input current for this application is 3.7 A.**

Armor PowerFlex Drive			Drive Output Current				Drive Input Current			
Cat. No.	Power Rating		Motor FLA [A]				Max Current [A]			
	[Hp]	[kW]	Motor 1	Motor 2	Motor 3	Motor 4	Drive 1	Drive 2	Drive 3	Drive 4
35E-6D1...	1	0.75	2.3	1.8	1.5	1.2	4	3.4	2.9	2.4
35E-6D2...	2	1.5	4	3.2	2.6	2	6.5	5.4	4.5	3.7
35E-6D3...	3	2.2	6	4.8	3.9	3	8.3	6.8	5.7	4.6

4. If your Armor PowerFlex unit has an external power supply and no EM brake control, you can subtract 0.8 A from the Drive 4 value determined in the previous step. This makes the max drive input current for this example 2.9 A.

The 0.8 A value is derived by adding together 0.35 A from not selecting an internal power supply, and an additional 0.45 A from not selecting the EM brake control option.

Table 24 - Motor Control Circuit Specifications

Attribute	Value	
Method	Volts/Hertz, Sensorless Vector Control (SVC), Economizer SVC motor control, Closed Loop Velocity Vector Control	
Carrier Frequency	2...16 kHz, Drive rating based on 4 kHz (see Figure 11 for derating information)	
Performance	V/Hz	±1% of base speed across a 60:1 speed range
	SVC	±0.5% of base speed across a 100:1 speed range
	SVC Economizer	±0.5% of base speed across a 100:1 speed range
	Velocity Vector Control (VVC)	±0.5% of base speed across a 60:1 speed range ±0.5% of base speed, up to a 20:1 speed range
Performance with Encoder	SVC	±0.1% of base speed across a 100:1 speed range ⁽¹⁾
	SVC Economizer	±0.1% of base speed across a 1000:1 speed range
	VVC	±0.1% of base speed, up to a 60:1 speed range
Output Voltage Range	OV to rated motor voltage	
Output Frequency Range	0...500 Hz (programmable)	
Efficiency	See Performance Specifications per Ecodesign Regulations (EU) 2019/1781 on page 36	
Stop Modes	Multiple programmable stop modes, including: Ramp, Coast, DC-Brake, and Ramp-to-Stop	
Acceleration/Deceleration	Four independently programmable times. Each time can be programmed from 0...600 s	
Intermittent Overload	150% Overload capability for up to 60 s, 180% for up to 3 s (200% programmable)	

(1) For more information, see the Armor PowerFlex Drives user manual, publication [35-UM001](#).

Figure 11 - Maximum PWM Frequency—Frame A Devices

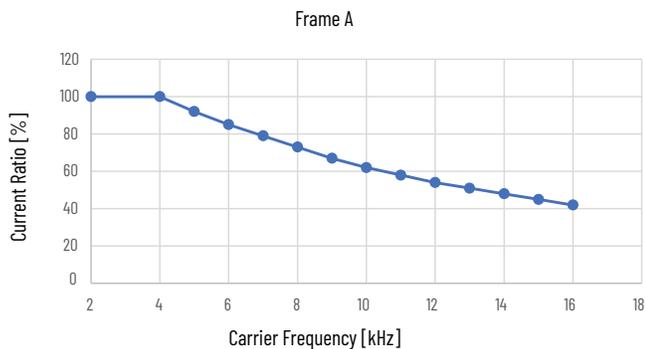


Table 25 - Mechanical Ratings

Attribute			Value
Approximate Shipping Weight	Frame A	without package	9.1 kg (20 lb)
		with package	10.3 kg (23 lb)
	Frame B	without package	13 kg (28.66 lb)
		with package	15.1 kg (33.28 lb)
Enclosure rating ⁽¹⁾	with dust caps		IP54, UL Type 1/12
	with sealing caps		IP66, UL Type 4
Resistance to Shock per IEC 60068-2-27		Operational	25 G, 6 ms, half sine waveform
		Non-operational	25 G, 6 ms, half sine waveform
Resistance to Vibration per IEC 60068-2-6		Operational	20 mm p-p from 5...9 Hz; 3 G from 9...500 Hz
		Non-operational	0.075 mm amplitude from 10...57 Hz; 1 G from 57...150 Hz
Power and Ground Terminals	Wire Size, Max	Primary Terminal	8.4 mm ² (8 AWG)
	Tightening Torque	Primary Terminal	1.5 N•m (13 lb•in)
	Wire Strip Length		0.35 in. (9 mm)
Disconnect Lock Out			Recommend 8 mm (5/16 in.) lock shackle or hasp. The hasp must not exceed 8 mm (5/16 in.) when closed.

(1) See [Table 35](#) for specific enclosure ratings based on cable selection.

Table 26 - Standard I/O Specifications, Discrete Inputs

Attributes		Value
Input Compatibility		IEC 61131-2
Source Power	Unswitched	24V DC
Operating Voltage		24V DC +10%/-15%
Input Current, Max		50 mA per input, 200 mA max total
Connection Type		single-key M12 quick disconnect
Input Voltage per IEC 61131-2 Type 1	ON State	15...26.4V DC
	OFF State	0...5V DC
Current per IEC 61131-2 Type 1	ON State	> 2 mA
	OFF State	< 2 mA
Sink mode (SNK)	OFF	< 5V DC
	ON	≥ 15V DC
Sensor ⁽¹⁾	Supply voltage	24V DC, -15%/+10%
	Leakage current, max	< 2 mA
	Sourcing current	50 mA per input, 200 mA max total
	Current limit	0.5 A ±20%, all inputs combined
	Operating voltage	19.2...26V DC
De-bounce filter	Input, software configurable	0...65000 ms
	Hardware, fixed	63.9 kHz, 15.6 μs

(1) If you require a Class 2 power supply for your application, you need to order your Armor PowerFlex Drive with the external power supply option (-L) and connect to your own Class 2 rated power supply.

Table 27 - Configurable I/O Specifications, Self-configurable Points

Attributes	Value
Operating Voltage	24V DC
Self-configurable points per connector	2
Source	24V DC Switched power
Connection Type	single-key M12 quick disconnect
Operating voltage	19.2...26V DC

Table 27 - Configurable I/O Specifications, Self-configurable Points (Continued)

Attributes		Value	
Input Configuration	Input Compatibility	IEC 61131-2	
	No. of Inputs	0...2, total I/O not to exceed 2	
	Type	DC current sinking	
	Sensor	Supply voltage	24V DC, -15%/+10%
		Leakage current, max	< 2 mA
		Sourcing current	50 mA per input, 100 mA max total
		Current limit	2.3 A ±14%, all inputs combined
	Input Voltage per IEC 61131-2 Type 1	ON State	15...26.4V DC
		OFF State	0...5V DC
	Current per IEC 61131-2 Type 1	ON State	> 2 mA
		OFF State	< 0.5 mA
	De-bounce filter	Input, software configurable	0...65000 ms
Hardware, fixed		100 µs	
Output configuration	Output Compatibility	IEC 61131-2	
	No. of Outputs	0...2, total I/O not to exceed 2	
	Type	DC Sourcing	
	Load	Resistive (DC-1) or Light inductive loads (DC-13) ⁽¹⁾	
	Output state	Normally open	
	Overcurrent protection	2 A maximum, all outputs combined	
	Output Voltage	Operating	19.2...26V DC
	Output Current	Output sourcing current	0.5 A per output max
		OFF State leakage, max	1 µA
		Current limit	2.3 A ±14%, all configurable I/O combined
	Surge Suppression	Integrated diode, clamps @ 33V DC	
	Thermal Protection	Integrated short-circuit and overcurrent protection	

(1) DC-13 load cannot exceed 0.95 A peak (instantaneous current) per output and 1.9 A peak when both of the outputs are ON.

Table 28 - Encoder Specifications

Attribute	Value
Types	Incremental Quadrature (AqB) Incremental Sin/Cos Hiperface (analog signals only) Pulse (Single Channel)
Supply	5V/12V, 250 mA
Quadrature	90°, ± 20° @ 25 °C (77 °F)
Duty Cycle	50%, +10%
Current Limit	0.3 A ±1%
Requirements	Digital Line driver type, 3.5...12V DC output, single-ended or differential, and capable of supplying 10 mA min per channel. Allowable input is DC up to 250 kHz max. The encoder I/O automatically scales to allow 5V and 12V DC nom.
	Analog sin/cos, 2.5V, 1Vp-p Allowable input up to 167 kHz max

Safety Specifications

Table 29 - Functional Safety (Bulletin 35S only)

Attribute		Value	
Functional safety rating	Hardwired stop control	STO	SIL 3, PLe, Cat. 4
	Integrated safety and advanced safety stop control	STO and SS1(t)	SIL 3, PLe, Cat. 4, maximum.
		SS1(r), SLS, SDI, SLP	SIL 2, PLd, Cat. 3, maximum. ⁽¹⁾
	Safety inputs	1 channel	SIL 2, PLd
		2 channel	SIL 3, PLe
Safety output	Bi-polar	SIL 3, PLe, Cat. 4	

(1) With application-appropriate encoder feedback.

Table 30 - Required Software

Network	Software	Version
EtherNet/IP	FactoryTalk® Linx	6.20 or later
	Studio 5000 Logix Designer	32.0 or later
	Add-on Profile	Download the most current version from the Product Compatibility and Download Center at rok.auto/pcdc
	BOOTP/DHCP Utility	Version 2.3 or later (BOOTP is not supported.)
Programmable Controller		Firmware Version
35S and 35E Armor PowerFlex versions	GuardLogix and Compact GuardLogix controllers (see Table 4 for the listing of compatible controllers)	32.0 or later
35E Armor PowerFlex version	ControlLogix and CompactLogix controllers (see Table 4 for the listing of compatible controllers)	32.0 or later

Table 31 - Safety I/O Ratings

Attribute	Safety Inputs	Safety Output
Number	4 single-channel or 2 dual-channel	1 bi-polar
Type	Sinking	Sink and Source
Source	Unswitched power	Switched power
On-State Current per input	3.2 mA	–
On-State Current total	12.8 mA	–
Test Output Current	0.4 A max	1.0 A nominal, short-circuit protected

Environmental Specifications

Table 32 - Environmental Specifications

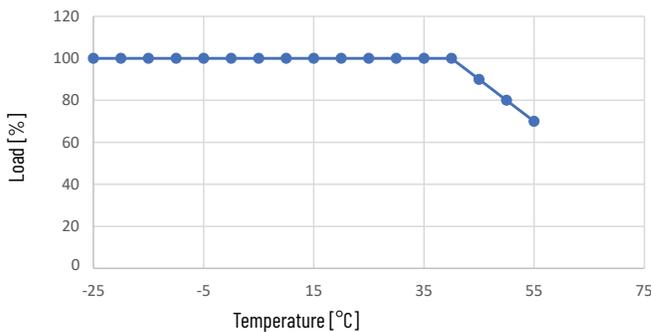
Attribute		Value		
Ambient Temperature Range	Operating	without derating	-25...+40 °C (-13...+104 °F)	
		with derating ⁽¹⁾	90% motor output current	-25...+45 °C (-13...+113 °F)
			80% motor output current	-25...+50 °C (-13...+122 °F)
	70% motor output current	-25...+55 °C (-13...+131 °F)		
	Storage and Transportation		-40...+70 °C (-40...+158 °F)	
Altitude	nominal, no derating		1000 m (3280 ft) max	
	with derating ⁽¹⁾		4800 m (15,748 ft) max	
Humidity			5...95%, non-condensing	
Pollution Degree (Surrounding Environment)			I and II	
Sound Pressure Level	A-weighted		< 30 dBA	
Housing	EMC Emission Levels	Conducted Radio Frequency Emissions		
	EMC Immunity Levels	Electrostatic Discharge		
		Radio Frequency Electromagnetic Field		
		Fast Transient		
		Surge Transient		
Corrosive Atmosphere	ASTM B845-97 Method H Accelerated Test (20-day exposure)	per ANSI/ISA 71.04-2013, Airborne Contaminants - Gases	Frame A Severity level G3 ⁽²⁾	
			Frame B ⁽³⁾	
		per IEC 60721-3-3-2019, Chemically Active Substances	Frame A	Severity level CX ⁽⁴⁾
			Frame B	⁽³⁾

(1) See derating information below and [Figure 13](#).
 (2) Port plugs must remain installed in unused ports at all times during storage and operation for the product to meet this rating.
 (3) Rating for Frame B devices is not yet determined.
 (4) Up to 9.6 microns per year, corrosion rate of copper.

Derating for High Altitude

Use the Load vs. Temperature graph, [Figure 12](#), to derate for altitudes from 0...1000 m (0...3300 ft).

Figure 12 - Load vs. Temperature Derating for 0...1000 m (0...3300 ft)

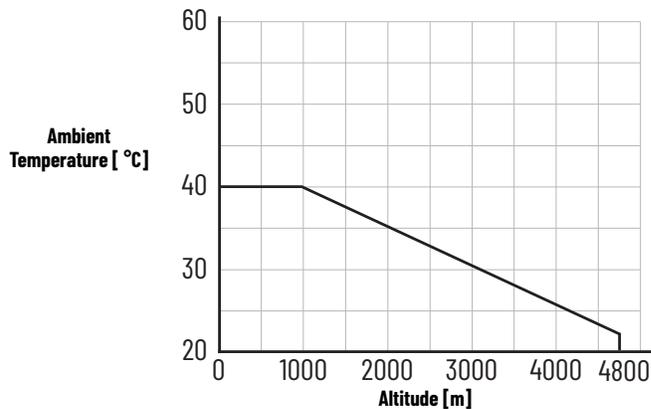
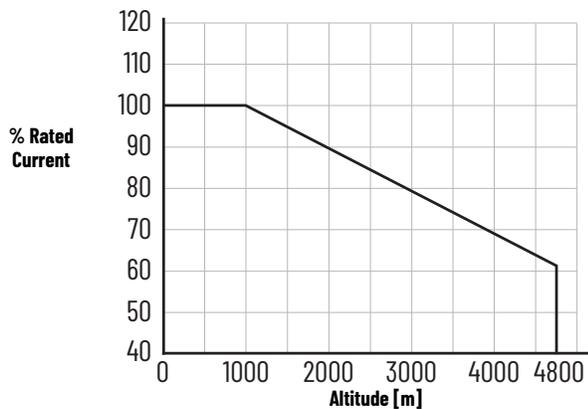


If the drive is used above 1000 m (3300 ft):

- Derate the maximum ambient temperature by 5 °C (9 °F) for every additional 1000 m (3300 ft), above the nominal 1000 m (3300 ft).
Or
- Derate the output current by 10% for every additional 1000 m (3300 ft), above the nominal 1000 m (3300 ft).

See [Figure 13](#).

Figure 13 - Derating Curves for High Altitude



Resistance to Cleaning Chemicals

Table 33 - Chemical Resistance Test Results⁽¹⁾

Chemical	Chemical Resistance Test Results ⁽²⁾		
	Housing	Label	Cable
0.5% weight/volume sodium hydroxide (NaOH)	Good-Fair	Good	Good-Fair
Simple Green® All-Purpose Cleaner (5%)	Good-Fair	Good	Good-Fair
3% volume/volume Clorox® bleach	regular (5.25% sodium hypochlorite [NaOCl])	Good	Good-Fair
	concentrated (8.25% NaOCl)	Good	Good-Fair
Ecolab® Quorum® Yellow LP cleaner (5 fl oz/gal)	Good-Fair	Good	Good-Fair
Ecolab® Whisper® V sanitizer (3%)	Good-Fair	Good	Good-Fair
Spor-Klenz® Ready-to-Use Sterilant	Good-Fair	Good	Good-Fair

(1) Testing was performed at room temperature for a period of 24 hours and results were observed both visually and under a microscope.

(2) See [Table 34](#) for definitions.

Table 34 - Chemical Resistance Test Definitions

Term	Definition
Good	No visible change in surface appearance
Fair	Slight discoloration or marring of the surface
Poor	Defects will interfere with the functioning of the part and/or operator use

Performance Specifications per Ecodesign Regulations (EU) 2019/1781

For information on Armor PowerFlex drives and performance specifications per Ecodesign regulations, please see PowerFlex AC Drive Performance Specifications per Ecodesign Regulation (EU) 2019/1781 and UK SI 2021 No. 745, publication [PFLEX-TD003](#).

Connector Data

Connector Pinouts and Cable Torques

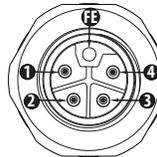
I/O Standard Input Socket Connector (M12)



Input
 Pin 1: +24V unswitched power (sensor power)
 Pin 2: Input n+1
 Pin 3: Input Common
 Pin 4: Input n
 Pin 5: Chassis (PE)

Cable Connector Torque
 0.5...0.6 N·m (4.4...5.3 lb·in)
 (hand tight)

Auxiliary Power IN Plug Connector (M12)



Pin 1: +24V unswitched power (sensor power) (brown)
 Pin 2: Switched power ground (white)
 Pin 3: Unswitched power ground (blue)
 Pin 4: +24V switched power (black)
 FE: FE pass-through jumper (gray)

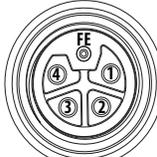
Cable Connector Torque
 0.6...0.65 N·m
 (5.3...5.8 lb·in)

I/O Configurable Input or Output Socket Connector (M12)



Input	Output	Cable Connector Torque 0.5...0.6 N·m (4.4...5.3 lb·in) (hand tight)
Pin 1: +24V switched power (control power)	Pin 1: Not used (+24V)	
Pin 2: Input 1	Pin 2: Output 1	
Pin 3: I/O Common	Pin 3: I/O Common	
Pin 4: Input 0	Pin 4: Output 0	
Pin 5: Chassis (PE)	Pin 5: Chassis (PE)	

Auxiliary Power OUT Socket Connector (M12)



Pin 1: +24V unswitched power (sensor power) (brown)
 Pin 2: Switched power ground (white)
 Pin 3: Unswitched power ground (blue)
 Pin 4: +24V switched power (black)
 FE: FE pass through jumper (gray)

Cable Connector Torque
 0.6...0.65 N·m
 (5.3...5.8 lb·in)

I/O Safety Socket Connector: Configurable 2-channel safety input with test outputs (M12)



Pin 1: Test Output 1
 Pin 2: Safety Input n+1
 Pin 3: Common
 Pin 4: Safety Input n
 Pin 5: Test Output 0

Cable Connector Torque
 0.5...0.6 N·m (4.4...5.3 lb·in)
 (hand tight)

Dynamic Brake Connection Socket Connector (M22)



Pin 1: DB temp SW-
 Pin 2: DB resistor T1
 Pin 3: Chassis (PE)
 Pin 4: DB resistor T2
 Pin 5: DB temp SW+

Cable Connector Torque
 1.69 N·m (15 lb·in)

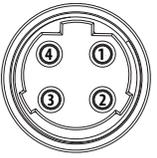
I/O Safety Socket Connector: Configurable bipolar output (M12)



Pin 1: NC (no connection)
 Pin 2: Output n (N) sinking
 Pin 3: Output Power Common
 Pin 4: Output n (P) sourcing
 Pin 5: Output Power Common

Cable Connector Torque
 0.5...0.6 N·m (4.4...5.3 lb·in)
 (hand tight)

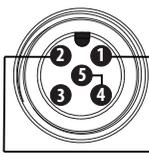
Motor without EM brake Socket Connector (M29)



Pin 1: Motor T1 (black)
 Pin 2: Motor T2 (white)
 Pin 3: Motor T3 (red)
 Pin 4: Ground (green/yellow)

Cable Connector Torque
 2.26 N·m (20 lb·in)

I/O Safety: Jumper Bypass Plug



Pin 1: connect to Pin 2
 Pin 2: connect to Pin 1
 Pin 3: NC (no connection)
 Pin 4: connect to Pin 5
 Pin 5: connect to Pin 4

Cable Connector Torque
 0.5...0.6 N·m (4.4...5.3 lb·in)
 (hand tight)

Motor with EM brake Socket Connector (M29)



Pin 1: Motor T1 (black)
 Pin 2: Motor T2 (white)
 Pin 3: Motor T3 (red)
 Pin 4: Ground (green/yellow)
 Pin 5: EM brake T1
 Pin 6: EM brake T2
 Pin 7: Drain wire

Cable Connector Torque
 2.26 N·m (20 lb·in)

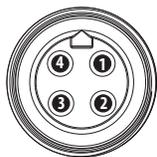
EtherNet 1 GB Socket Connector (M12)



Pin 1: D1+ (white/orange)
 Pin 2: D1- (orange)
 Pin 3: D2+ (white/green)
 Pin 4: D2- (green)
 Pin 5: D4+ (white/brown)
 Pin 6: D4- (brown)
 Pin 7: D3- (blue)
 Pin 8: D3+ (white/blue)

Cable Connector Torque
 0.5...0.6 N·m (4.4...5.3 lb·in)
 (hand tight)

Three-Phase Power IN with Round Plug Connector (M35)

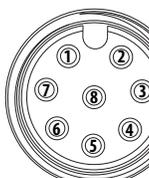


Pin 1: L1 (black)
 Pin 2: Ground (green/yellow)
 Pin 3: L3 (red)
 Pin 4: L2 (white)

Use when application requires UL or CE compliance, as standard

Cable Connector Torque
 4.52 N·m (40 lb·in)

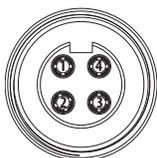
Encoder Socket Connector (M12)



Pin 1: Output A, SIN-
 Pin 2: Output A, SIN+
 Pin 3: Output B, COS-
 Pin 4: Output B, COS+
 Pin 5: not used
 Pin 6: not used
 Pin 7: Encoder supply ground
 Pin 8: Encoder supply power (5V or 12V)

Cable Connector Torque
 0.5...0.6 N·m (4.4...5.3 lb·in)
 (hand tight)

Three-Phase Power OUT with Round Socket Connector (M35)



Pin 1: L1 (black)
 Pin 2: Ground (green/yellow)
 Pin 3: L3 (red)
 Pin 4: L2 (white)

Use when application requires UL or CE compliance, as standard

Cable Connector Torque
 4.52 N·m (40 lb·in)

Three-Phase Power IN with Square Plug Connector

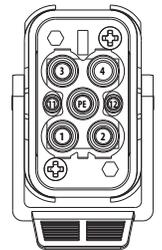


Pin 1: Line input 1
 Pin 2: Line input 2
 Pin 3: Line input 3
 Pin 4: not used
 Pin 11: not used
 Pin 12: not used
 Center Pin: Chassis (PE)

Use when application requires CE compliance, as standard

Cable Connector Torque
 Snap in place (no torque)

Three-Phase Power OUT with Square Socket Connector



Pin 1: Line input 1
 Pin 2: Line input 2
 Pin 3: Line input 3
 Pin 4: not used
 Pin 11: not used
 Pin 12: not used
 Center Pin: Chassis (PE)

Use when application requires CE compliance, as standard

Cable Connector Torque
 Snap in place (no torque)

Table 35 - Armor PowerFlex Drive Enclosure Ratings with Media Cable Connections

Cable Type		UL			NEMA			IEC	
		Type 1	Type 12	Type 4	1	12	4	IP 54	IP 66
Digital I/O (DIO)	Cable	✓	✓	–	✓	✓	–	✓	✓
	Factory Cap	✓	✓	✓	✓	✓	✓	✓	✓
Safety digital I/O (SDIO)	Cable	✓	✓	–	✓	✓	–	✓	✓
	Factory Cap	✓	✓	✓	✓	✓	✓	✓	✓
Ethernet 2 (ENET-2)	Cable	✓	✓	✓ ⁽¹⁾	✓	✓	✓ ⁽¹⁾	✓	✓
	Factory Cap	✓	✓	✓	✓	✓	✓	✓	✓
Encoder (ENC)	Cable	✓	–	–	✓	✓	✓	✓	✓
	Factory Cap	✓	✓	✓	✓	✓	✓	✓	✓
Auxiliary OUT (AUX OUT)	Cable	✓	✓	–	✓	✓	–	✓	✓
	Factory Cap	✓	✓	✓	✓	✓	✓	✓	✓
Dynamic Brake	Cable	✓	–	–	✓	✓	✓	✓	✓
	Factory Cap	✓	–	–	✓	–	–	✓	–
	Accessory Cap	✓	✓	✓	✓	✓	✓	✓	✓
AC Power OUT (AC-OUT)	Cable	✓	✓	✓	✓	✓	✓	✓	✓
	Factory Cap	✓	–	–	✓	–	–	✓	–
	Accessory Cap	✓	✓	✓	✓	✓	✓	✓	✓

(1) When applied with 1585D-M8UGDM-xx, 1585D-M8TGDE-xx, or 1585D-E8TGDE-xx. When applied with 1585D-M8TGD4M-xx or 1585D-E8TGD4E-xx, UL Type 4 and NEMA 4 are excluded.

Factory-installed ArmorConnect Gland Plate Connections

Figure 14 - Conduit Gland

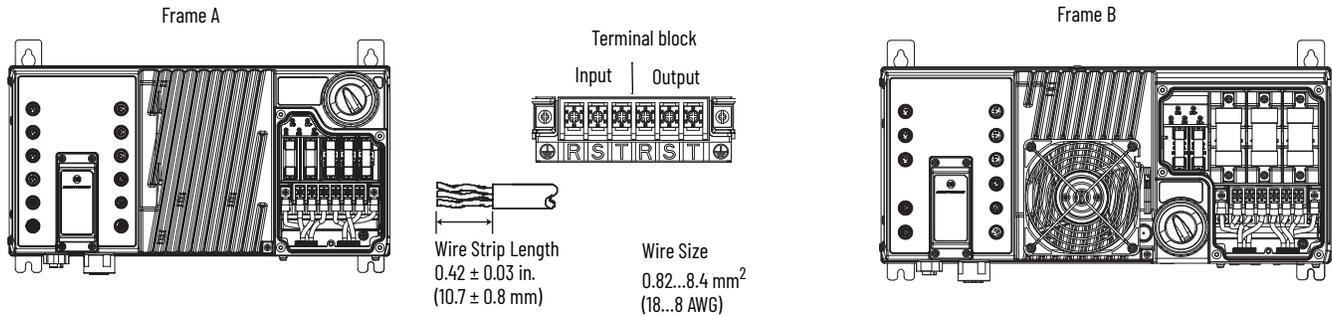


Table 36 - Conduit Gland 3-phase Power Designations

	Input				Output			
Terminal Label	Terminal - \oplus	Terminal - R	Terminal - S	Terminal - T	Terminal - R	Terminal - S	Terminal - T	Terminal - \oplus
Designation	ground	Line 1	Line 2	Line 3	Line 1	Line 2	Line 3	ground

Figure 15 - Round Gland

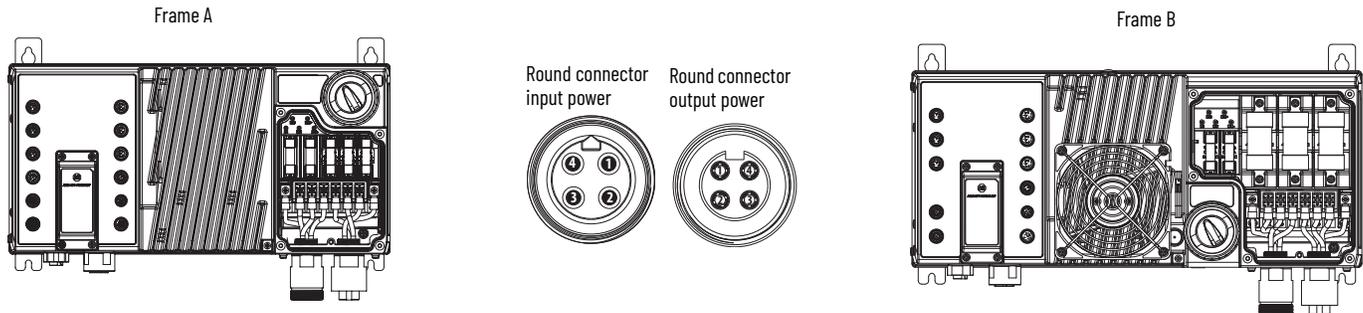


Table 37 - Round Gland 3-phase Power Designations

	Input/Output			
Label	Pin 1	Pin 2	Pin 3	Pin 4
Designation	Line 1	ground	Line 3	Line 2

Figure 16 - Square Gland

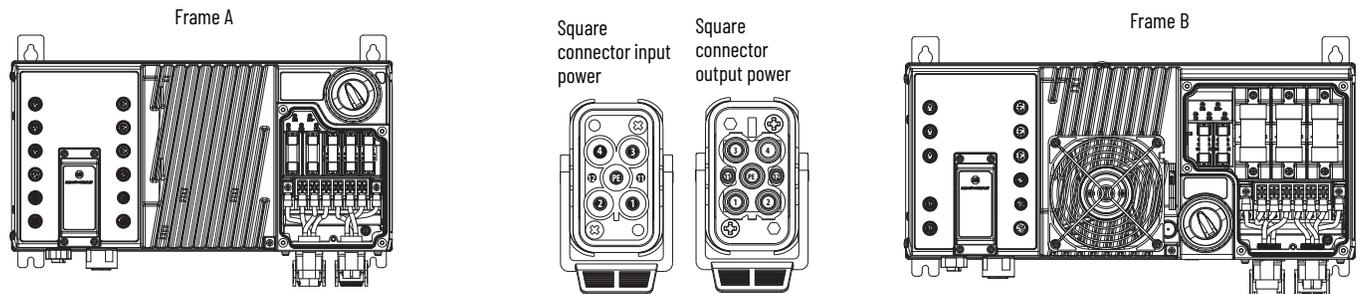


Table 38 - Square Gland 3-phase Power Designations

	Input/Output						
Terminal Label	Pin 1	Pin 2	Pin 3	Pin 4	Pin 11	Pin 12	Center Pin
Designation	Line 1	Line 2	Line 3	not used	not used	not used	Chassis (PE)

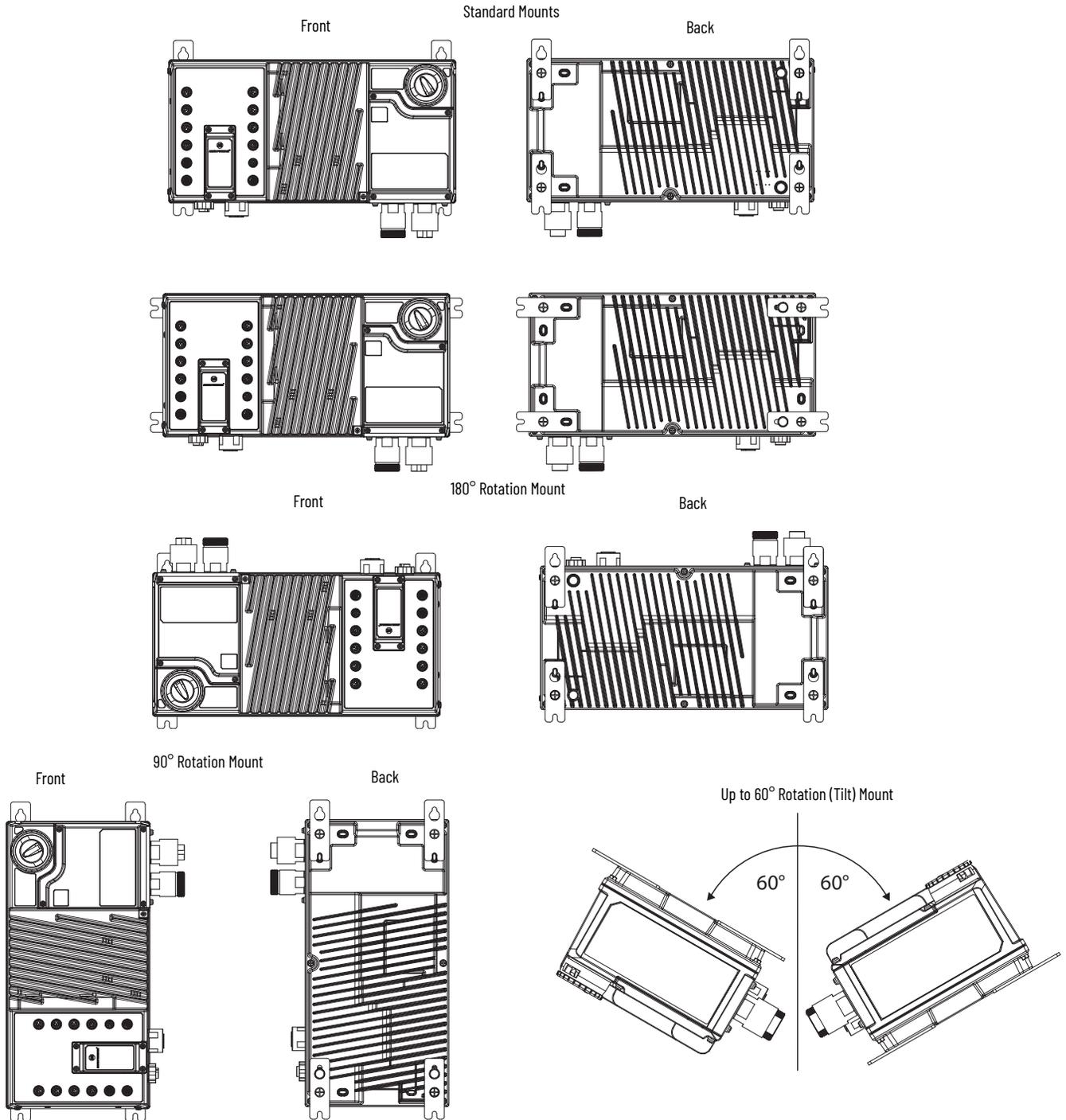
Mounting Orientation

Table 39 and Figure 19 explain the mounting orientation options that are available with Armor PowerFlex devices.

Table 39 - Armor PowerFlex Drive Mounting Positions

Mounting Method (See Figure 19)	X-axis Orientation	Y-axis Orientation	Z-axis Orientation	High-voltage Connector Orientation
Standard	Horizontal	Vertical	Out	Pointing down
60° tilt—forward or back	Horizontal	± 60°		Angled downward
90°	90°	Vertical		Pointing left
180°	180°	Vertical		Pointing up

Figure 19 - Mounting Positions (Frame A shown in example)



Dimensions that are given in this section are in millimeters (inches) unless otherwise noted. Dimensions are not intended to be used for manufacturing purposes.

Frame A Devices

Figure 20 - Drilling Locations for Frame A

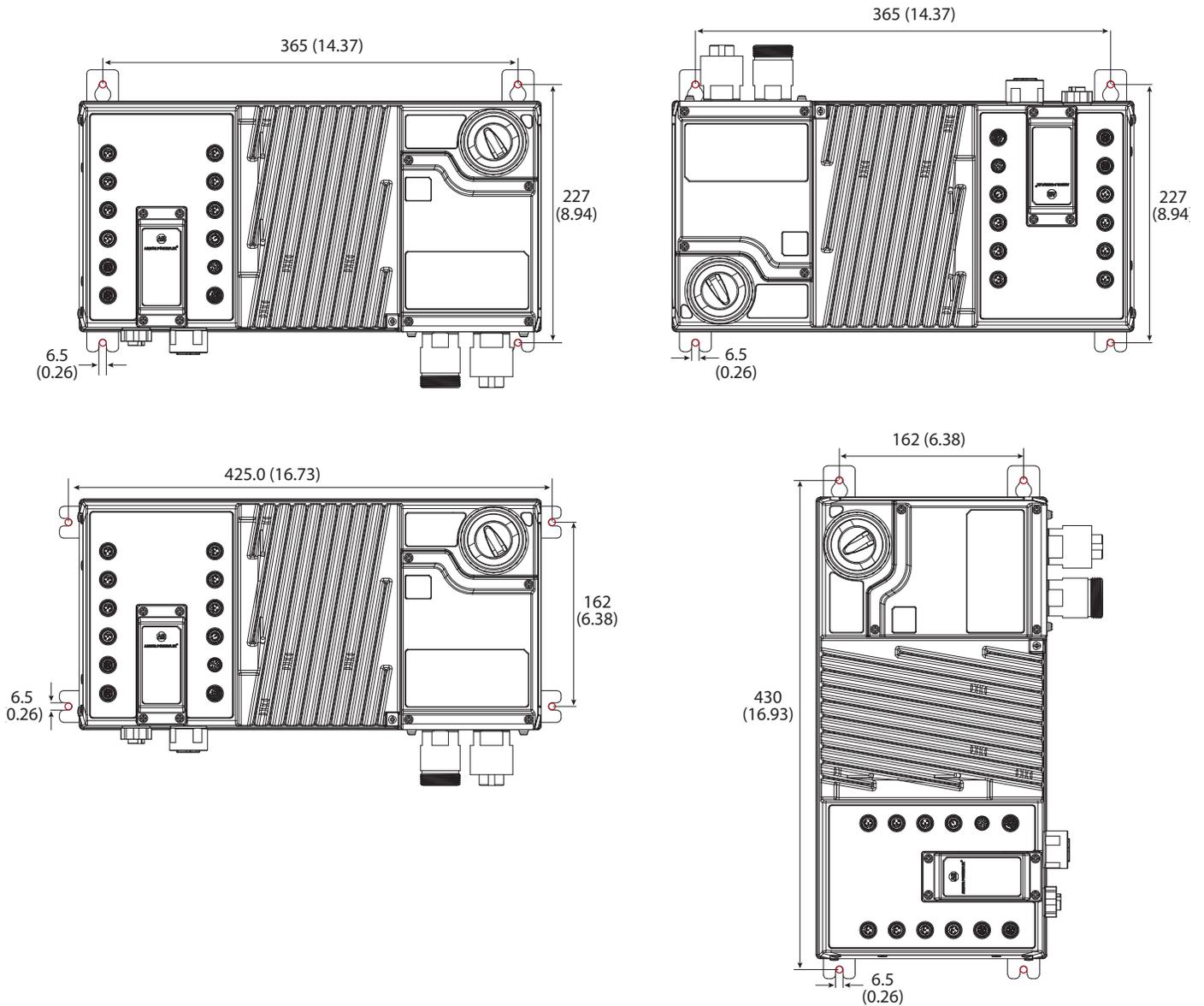


Figure 21 - Standard Mounting Position for Frame A

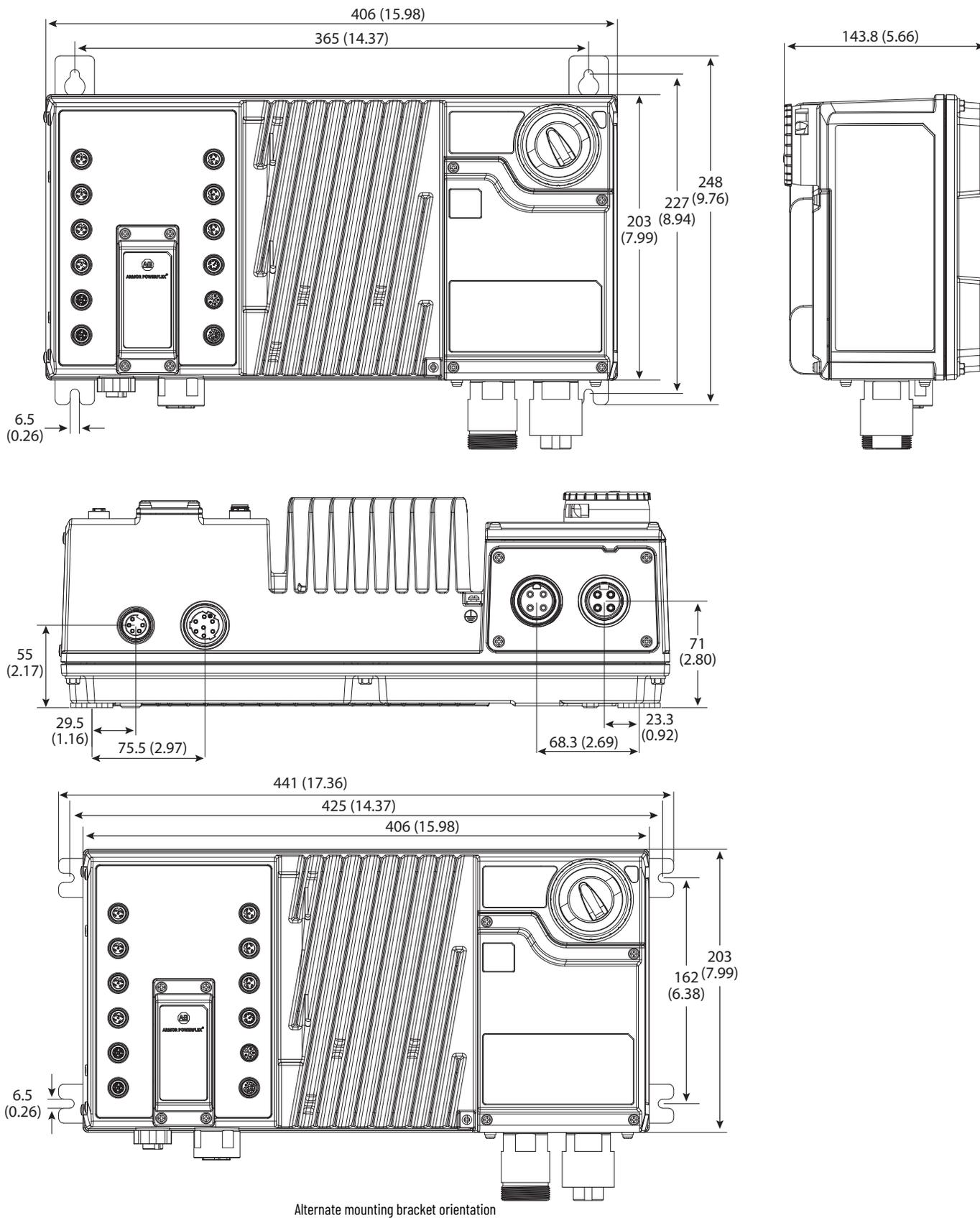


Figure 22 - 180° Mount Position for Frame A

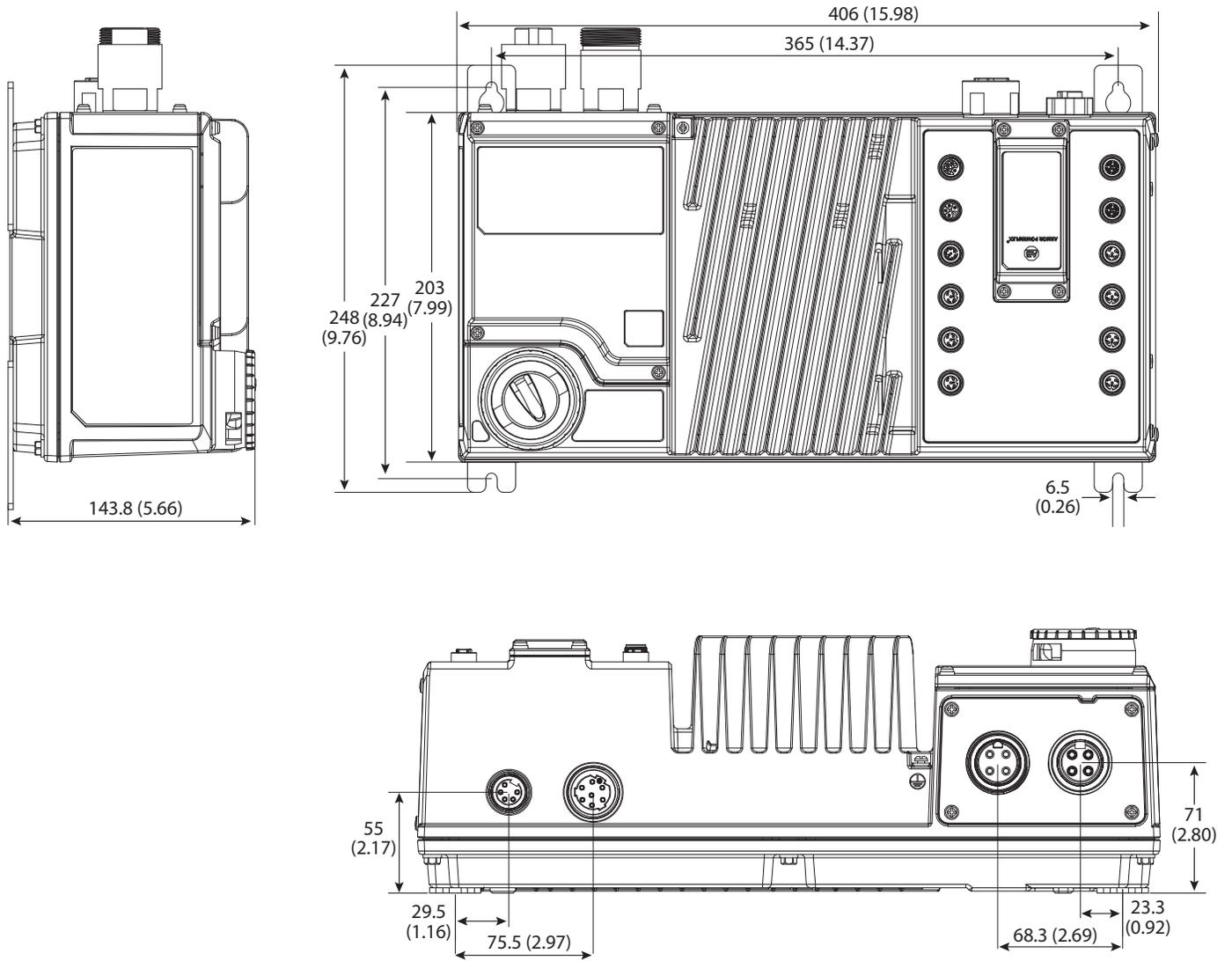


Figure 23 - 90° Mount Position for Frame A

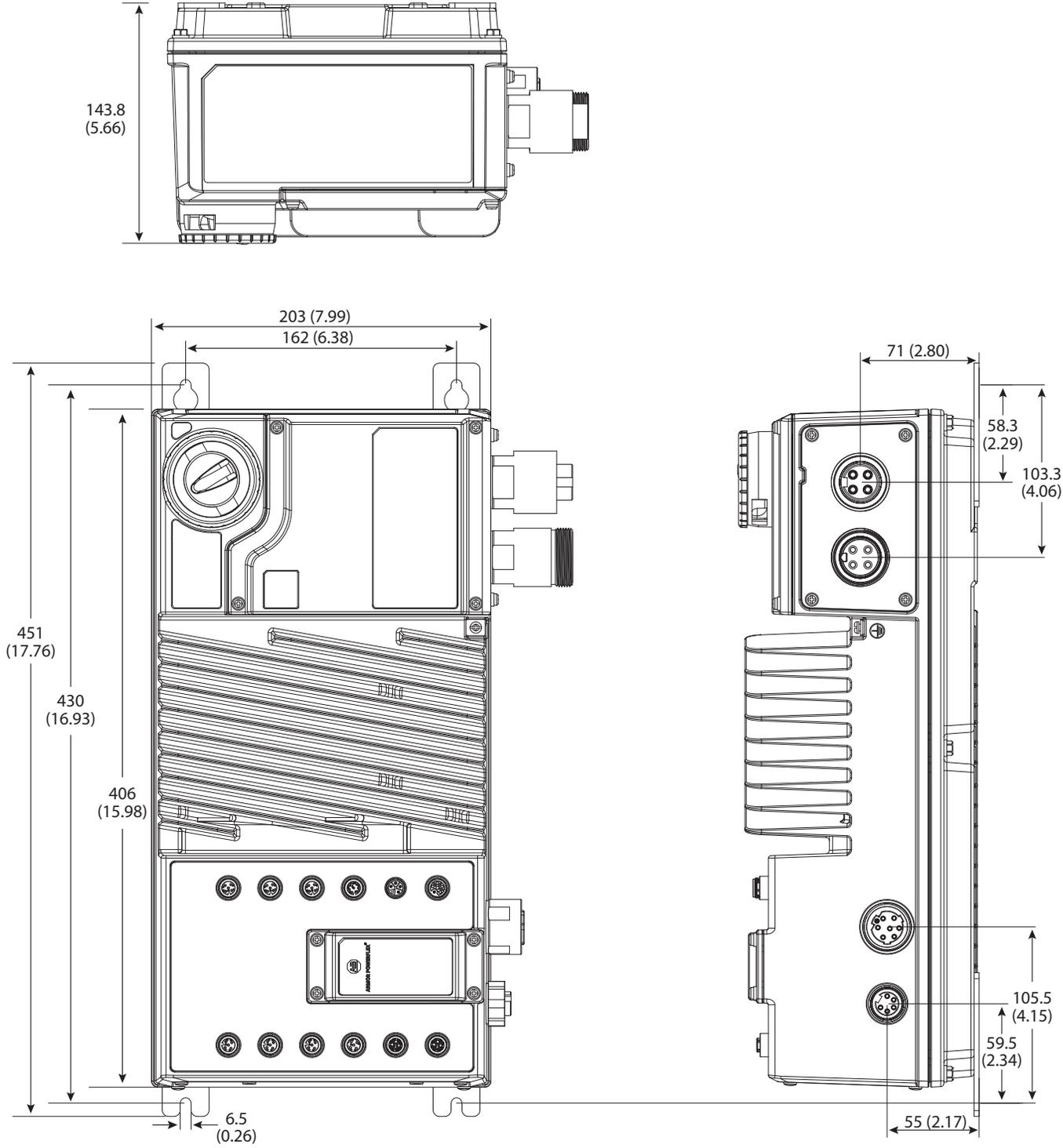
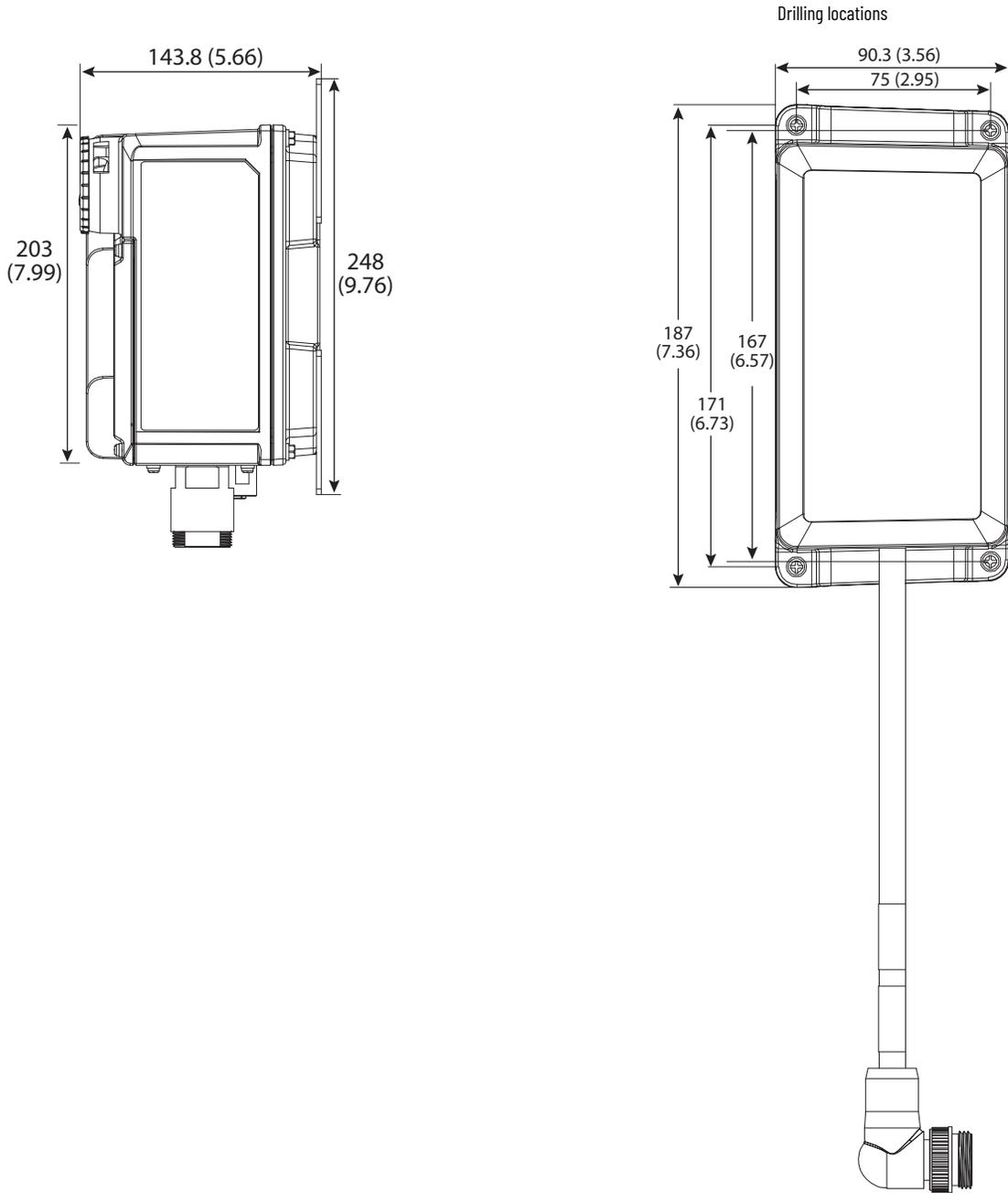


Figure 24 - Armor PowerFlex Drive with Dynamic Brake



Frame B Devices

Figure 25 - Standard Mounting Position for Frame B

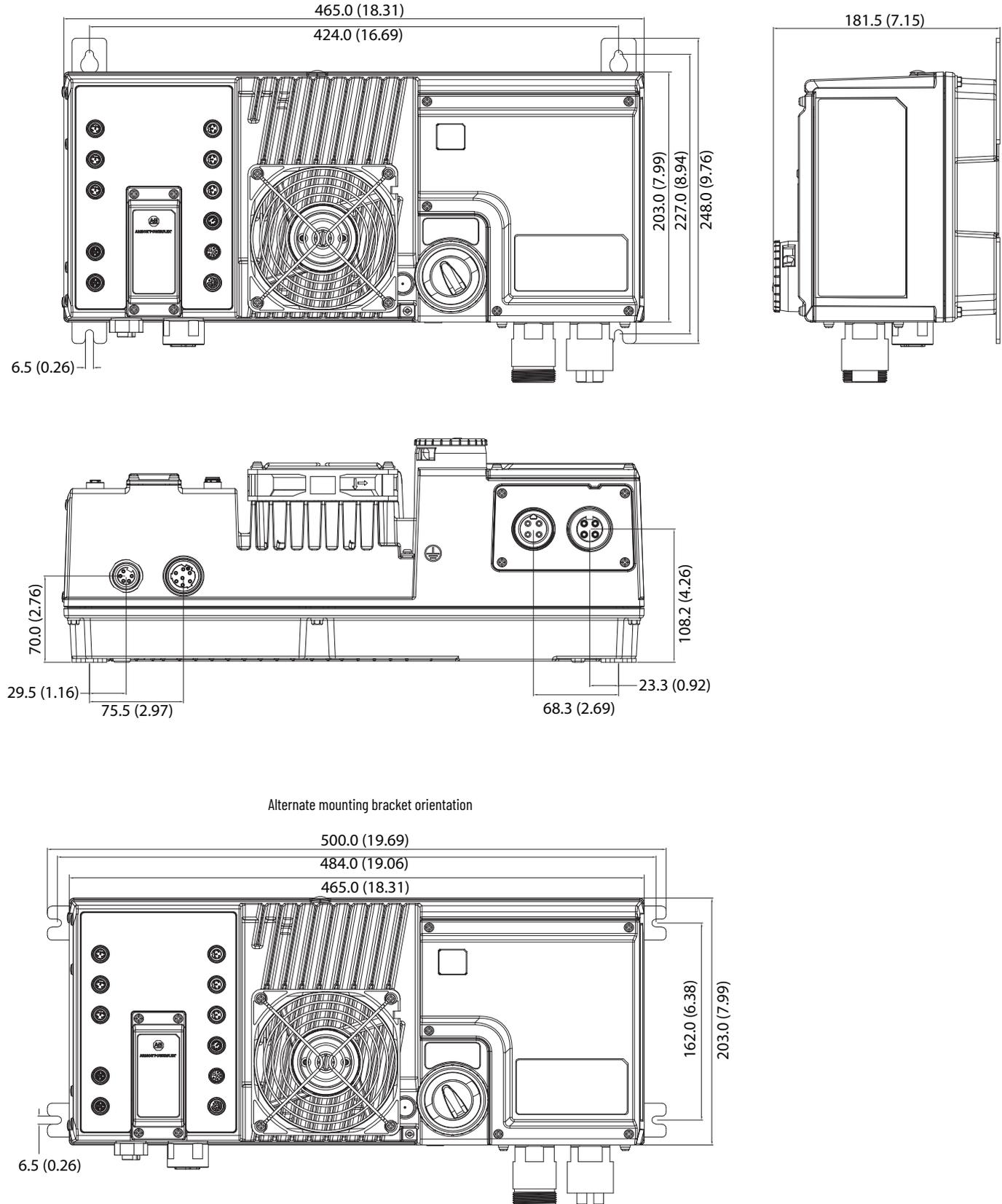


Figure 26 - 180° Mount Position for Frame B

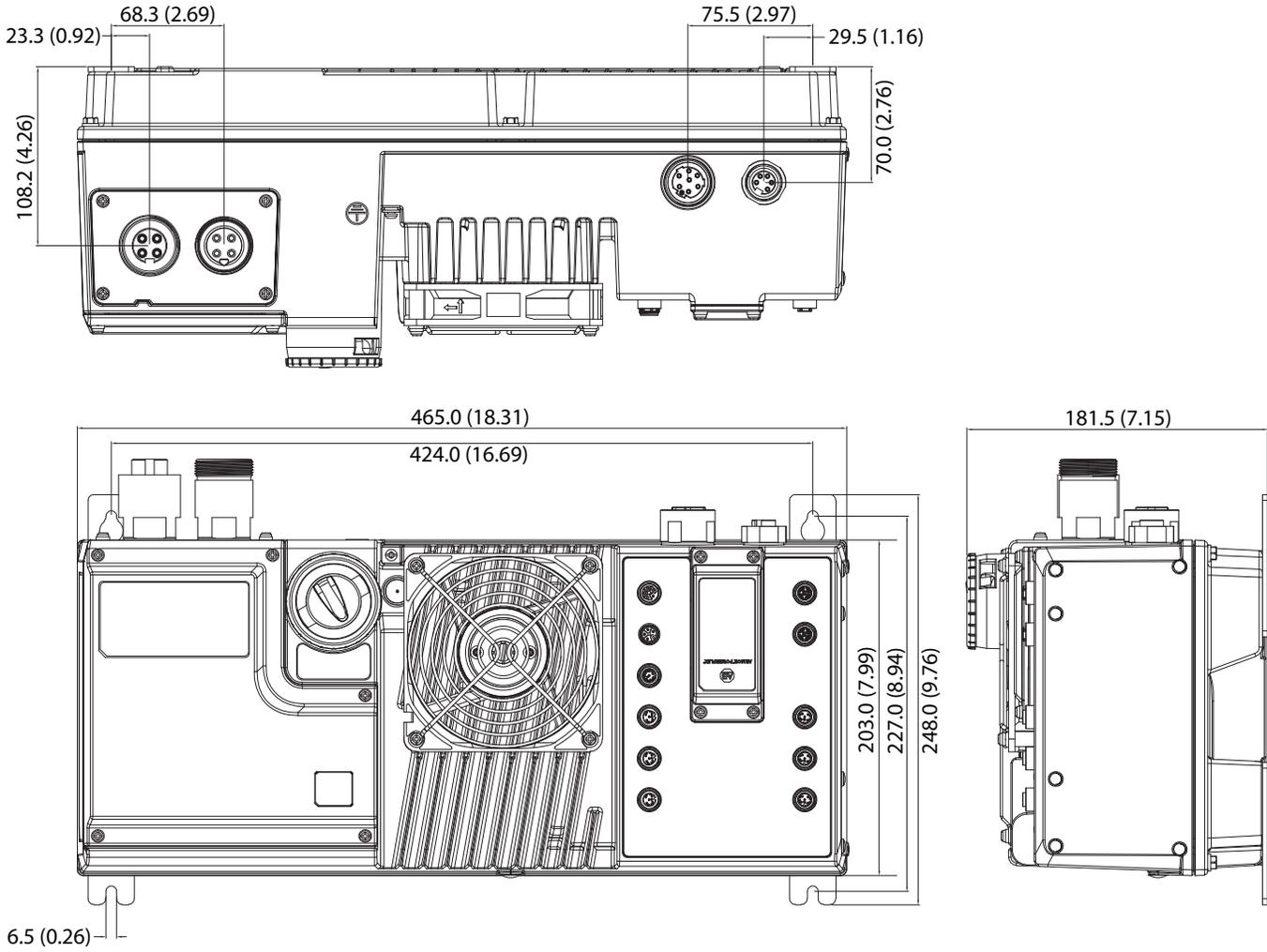
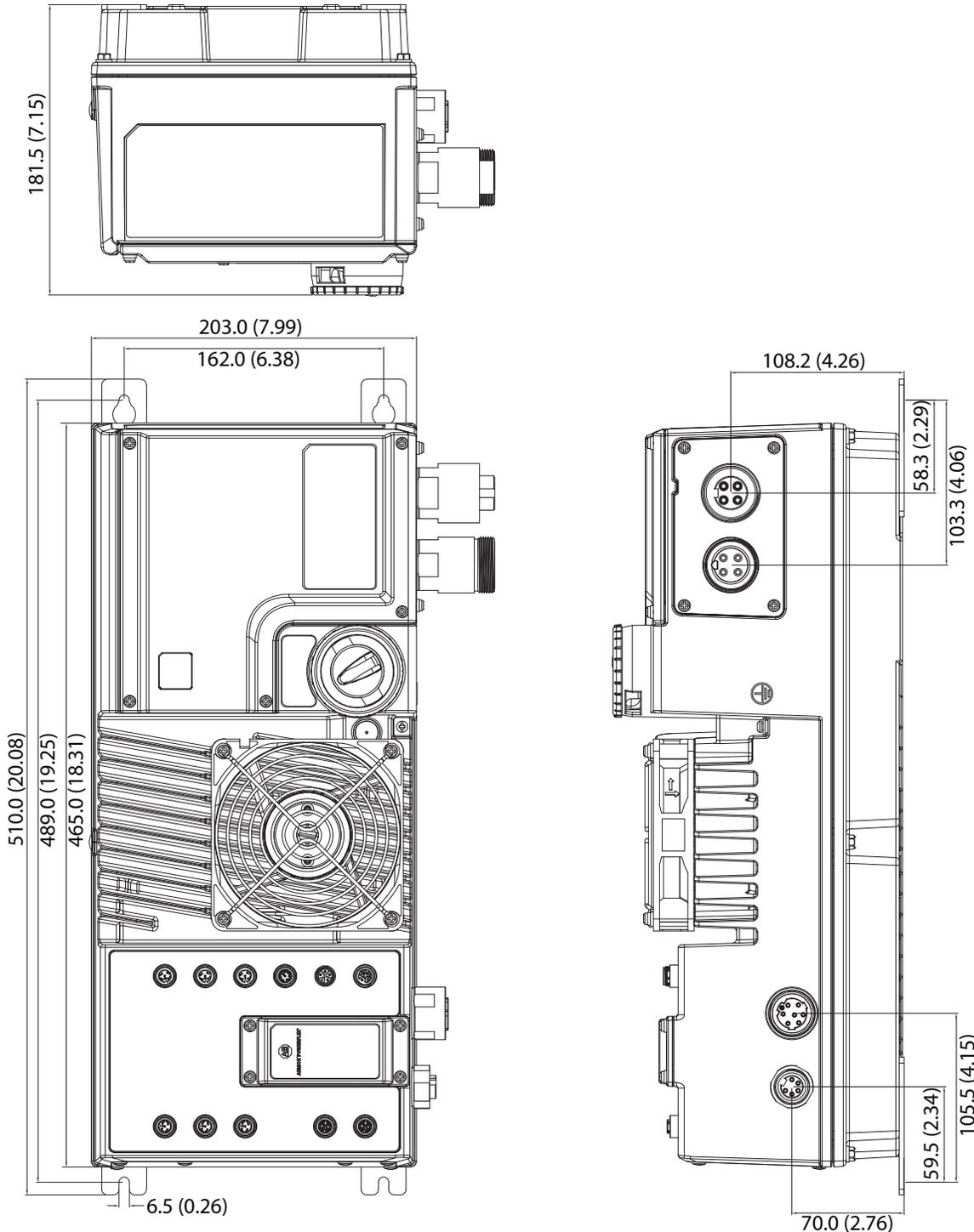


Figure 27 - 90° Mount Position for Frame B



3-Phase Input Power Connectors

Figure 28 - Conduit Connection

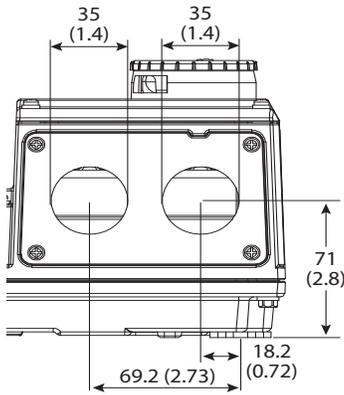


Figure 29 - Round QuickConnect Connectors

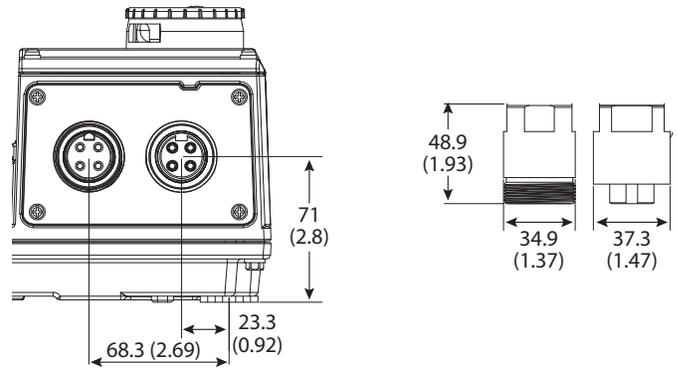
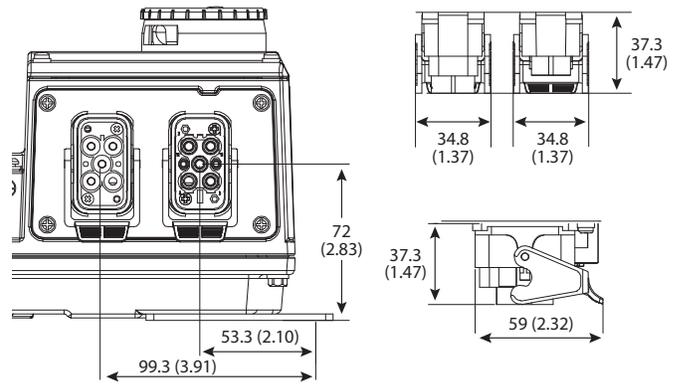


Figure 30 - Square QuickConnect Connectors



Accessories

Figure 31 - Cat. No. 35R-00AP1K Light-Duty Dynamic Brake Resistor

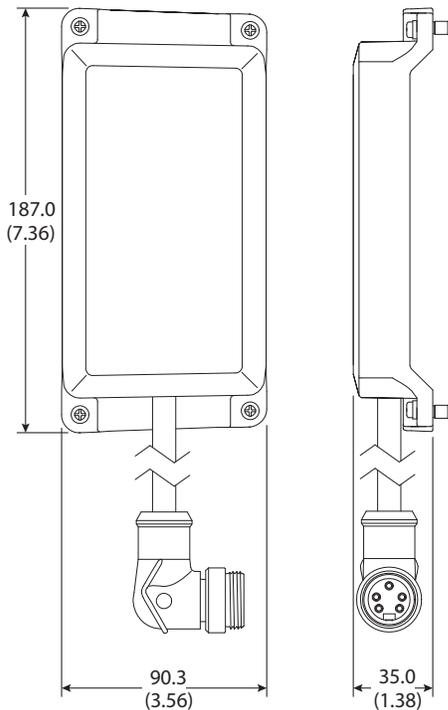


Figure 32 - Cat. No. 35R-00BP1K Light-Duty Dynamic Brake Resistor

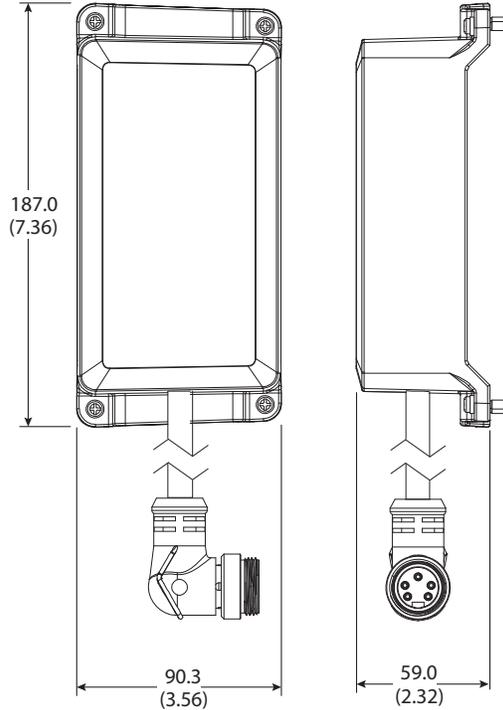


Figure 33 - Cat. Nos. 35T-360P500 and 35T-120P1K2 Normal-Duty Dynamic Brake Resistors

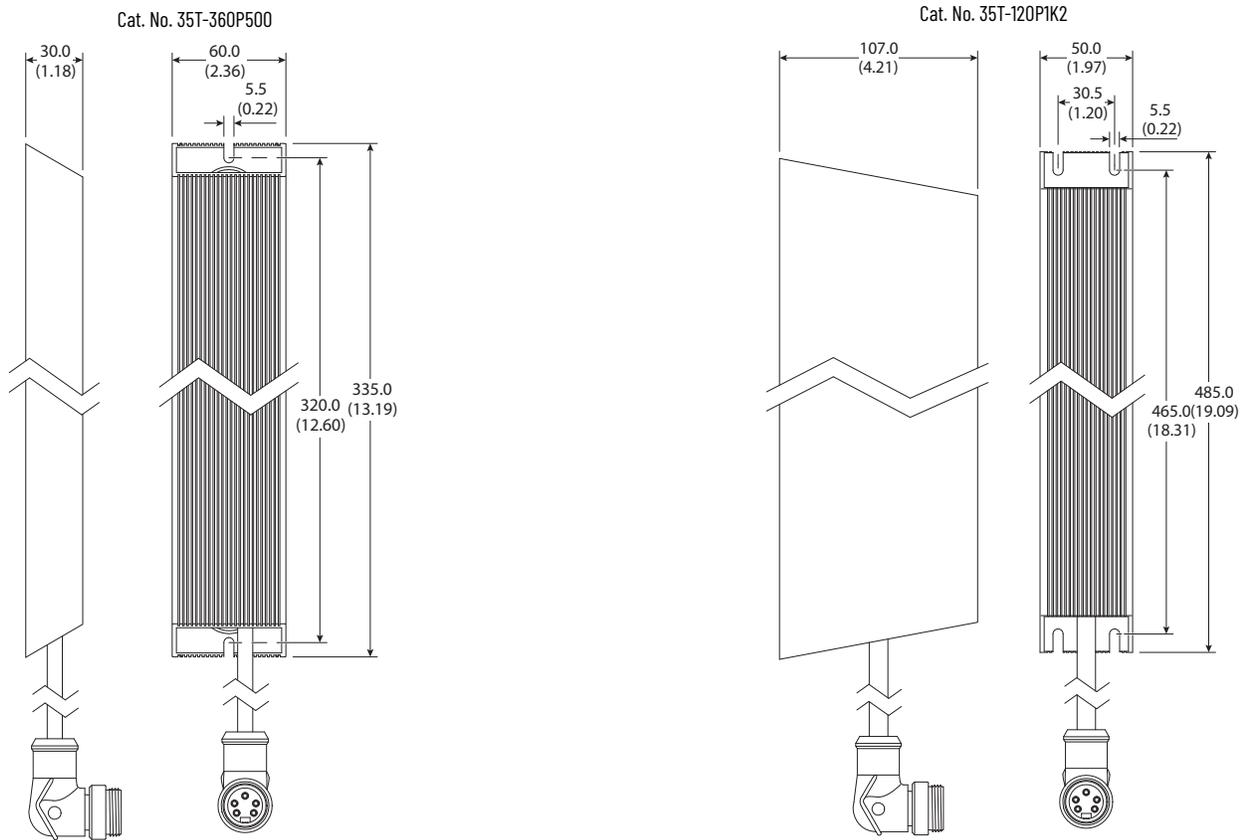


Figure 34 - Cat. No. 35-LG1-AB Logic Guard

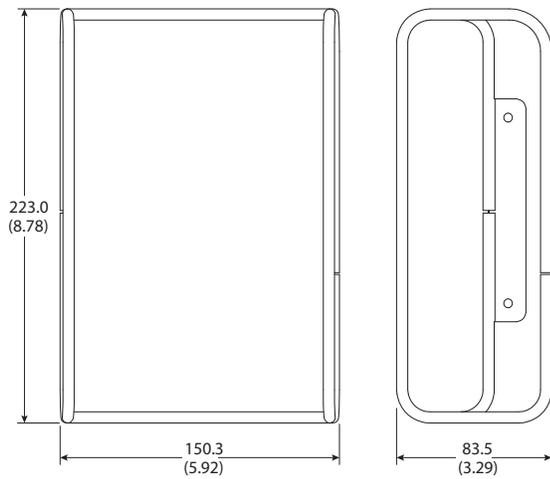
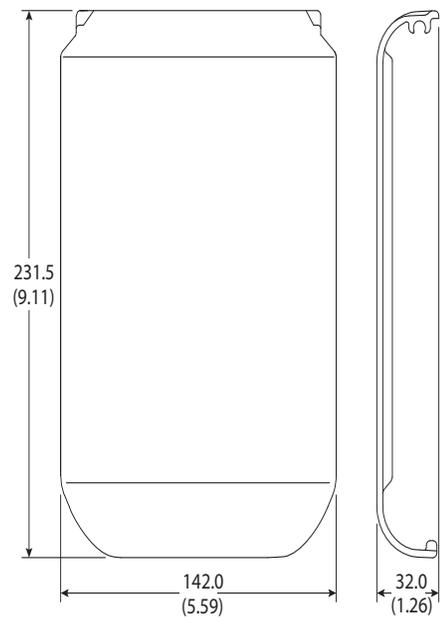


Figure 35 - Cat. No. 35-SPS-AB Splash Guard



Renewal Parts

Figure 36 - Cat. No. 35-MMF-AB Mounting Feet

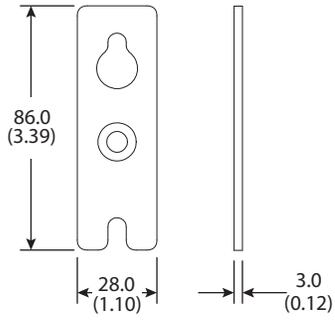


Figure 40 - Cat. No. 35-PSC-B Power Section Covers

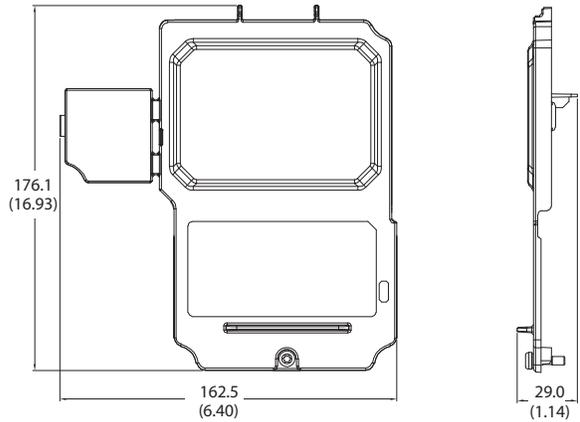


Figure 37 - Cat. No. 35-LSD-AB Logic Section Door

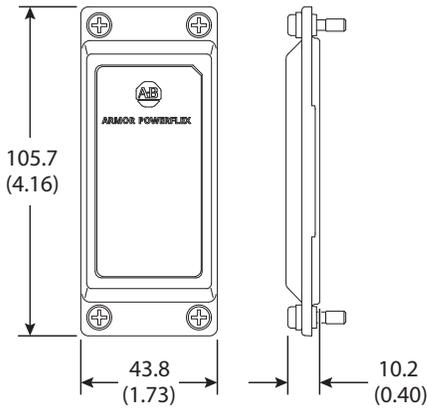


Figure 41 - Cat. No. 35-PSD-A Power Section Door

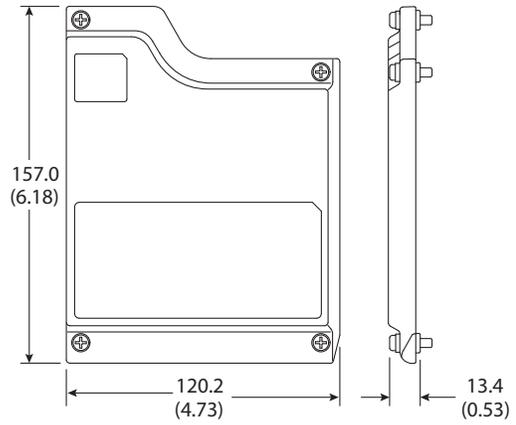


Figure 38 - Cat. No. 35-FAN-NB Fan

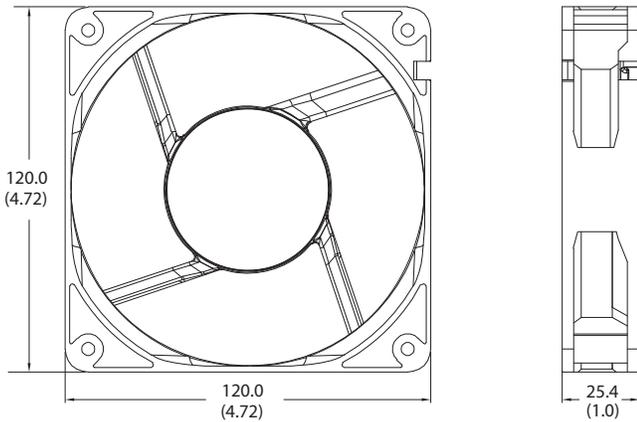


Figure 42 - Cat. No. 35-PSD-B Power Section Door

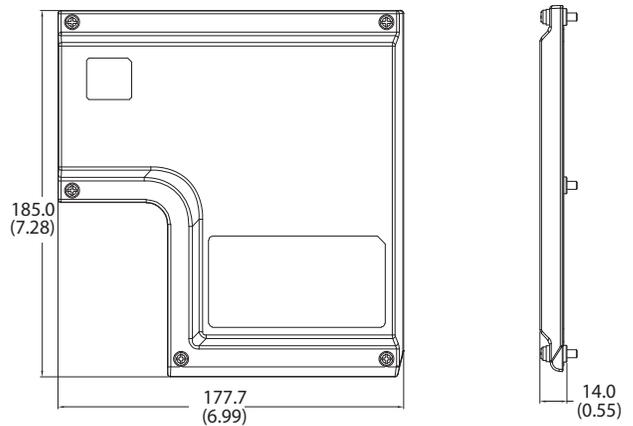
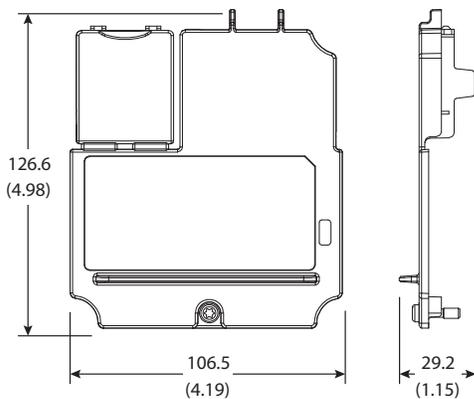


Figure 39 - Cat. No. 35-PSC-A Power Section Covers



Additional Resources

These documents contain additional information concerning related products from Rockwell Automation. You can view or download publications at rok.auto/literature.

Resource	Description
Armor PowerFlex AC Drives User Manual, publication 35-UM001	Provides information on how to install, set up, program, operate, and troubleshoot Armor PowerFlex drives.
Armor PowerFlex AC Drives Installation Instructions, publication 35-PC001	Provides information on how to install and set up Armor PowerFlex drives.
On-Machine Media for Armor PowerFlex, ArmorStart, and ArmorConnect Products Selection Guide, publication 280PWR-SG001	Provides product selection and specification information for ArmorStart and ArmorConnect media.
PowerFlex AC Drive Performance Specifications per Ecodesign Regulation (EU) 2019/1781 and UK SI 2021 No. 745, publication PFLEX-TD003	Provides specifications per EU and UK Ecodesign, including efficiency class.
Group Installation Listing Requirements for Drives and Motor Controllers, publication 280-WP001	This document describes how to verify whether a motor controller has been Listed for group installations.
HARTING System Cabling for Armor PowerFlex Drives web link	Provides selection information and specifications for HARTING cables that are available for Armor PowerFlex drives.
Cordsets & Field Attachables Technical Data, publication 889-TD002	Provides additional control and auxiliary power media options and technical specifications.
Ethernet Media Specifications, publication 1585-TD001	Provides additional Ethernet media options and technical specifications.
ControlLogix 5580 and GuardLogix 5580 Controllers User Manual, publication 1756-UM543	Provides information about designing a system, using the controllers, and developing applications.
Molded Case Circuit Breaker Specifications, publication 140G-TD101B	Provides product selection and specification information for Bulletin 140G Molded Case Circuit Breakers.
Molded Case Circuit Breaker Specifications, publication 140UT-TD001	Provides product selection and specification information for Bulletin 140UT Molded Case Circuit Breakers.
Motor Protection Circuit Breaker and Motor Circuit Protector Specifications, publication 140-TD005	Provides product selection and specification information for Bulletin 140MP, 140MT, and 140M-F devices.
Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives, publication DRIVES-IN001	Provides information to install, protect, wire, and ground pulse-width modulated (PWM) AC drives.
EtherNet/IP Network Devices User Manual, publication ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.
Ethernet Reference Manual, publication ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
EtherNet/IP Device Level Ring Application Technique, publication ENET-AT007	Describes Device Level Ring (DLR) topologies, configuration considerations, and diagnostic methods.
CIP Security with Rockwell Automation Products Application Technique, publication SECURE-AT001	Provides information on CIP Security, including which Rockwell Automation products support CIP Security.
System Security Design Guidelines Reference Manual, publication SECURE-RM001	Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment.
American Standards, Configurations, and Ratings: Introduction to Motor Circuit Design, publication IC-AT001	Provides an overview of American motor circuit design based on methods that are outlined in the NEC.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-11	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Rockwell Automation Global SCCR Tool, rok.auto/sccr	Provides coordinated high-fault branch circuit solutions for motor starters, soft starters, and component drives.
System Design for Control of Electrical Noise Reference Manual, publication GMC-RM001	Information, examples, and techniques that are designed to minimize system failures caused by electrical noise.
Product Compatibility and Download Center at rok.auto/pcdc	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

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Technical Documentation Center	Quickly access and download technical specifications, installation instructions, and user manuals.	rok.auto/techdocs
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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