

## ArmorStart ST Expands the ArmorStart Portfolio with Safety

### Features/Benefits

- Features built-in dual port for EtherNet/IP allowing a DLR to enhance efficiency and reduced installation cost
- Safe Torque-Off safely removes motor power and helps keep personnel safe
- Local lockable motor disconnect provides motor isolation and can reduce system component cost
- Embedded input and output points reduce cost and design time
- Embedded DeviceLogix provides fast local processing of I/O
- Experience premier integration when configuring with Studio 5000 Logix Designer®
- Plug-n-play connections reduce installation and commissioning time
- Full local and network diagnostics information provide secure integration with enterprise network
- Reduce install cost with quick connect braking resistor and EM brake
- IP67 dynamic brake resistor simplifies wiring and installation

### A Better Approach to Conveyance Applications

- On-Machine Solutions
  - Maximizes design efficiency
  - Increases available floor space
  - Lessens equipment downtime
  - Faster, more efficient installation with fewer mistakes
  - Simplifies commissioning



Variable Frequency Drive (VFD) with Safety



Direct Online Reversing (DOLR) with Safety



Variable Frequency Drive (VFD)



Direct Online Reversing (DOLR)

ArmorStart® distributed motor Controllers offer a simple, cost-effective pre-engineered solution for starters or VFDs that can be mounted directly onto your machine. These integrated motor starting solutions incorporate I/O, network capabilities and safety into one package offering simple connections to your application.

ArmorStart ST motor controllers now have built-in hardwired Safe Torque-Off. This capability helps protect your personnel and assets by removing rotational power to the motor when a safety demand is made. These controllers work especially well in the automotive industry and are ideal for applications such as paint, body or assembly conveyors as well as material handling. This functionality offers safety ratings up to and including PLe/ SIL3 and CAT 4 when used with the appropriate Guard I/O™ block.

ArmorStart ST with built-in dual port Ethernet switch, is a seamless and cost effective method of integrating drives and starters into your On-Machine™ architecture.

ArmorStart ST motor controllers use Studio 5000 Logix designer and Allen Bradley Logix controllers for configuration, control and operation. This combination provides a premier integration experience with the ability to use one software tool to configure, operate and maintain your system.

# Safety Solutions Help Improve Productivity

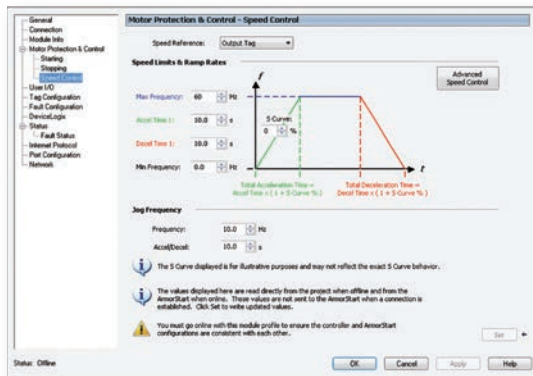
Safety is a crucial concern for every type of automation. Protecting personnel and assets is always a high priority, with far-reaching benefits. However, in the past, implementing safety solutions often meant sacrificing productivity. ArmorStart distributed motor controllers can assist you in solving that dilemma by helping to provide protection for your people and equipment while also reducing unplanned downtime.

A armorStart products offer safety designed to help you best meet the needs of your application. armorStart ST is available with Safe Torque-off functionality offering Safe-off control.

Safe Torque-off is ideal for safety related applications requiring removal of rotational power to the motor without removing power from the drive. Safe Torque-off functionality offers the benefit of quick start-up after a demand on the safety system and helps reduce wear from repetitive start-up. armorStart ST motor controller provides safety ratings up to and including PLe and CAT 4.

## 1732ES ArmorBlock Guard I/O Module

- TÜV certified for use in safety applications, up to SIL3 and Category 4
- I/O point level diagnostics and LEDs: quickly identify a problem and reduce machine downtime



*Studio 5000 Logix Designer AOP is the single software that provides premier integration for easy setup and commissioning.*

## ArmorStart ST 281E and 284E

The armorStart ST Distributed Motor controller family includes:

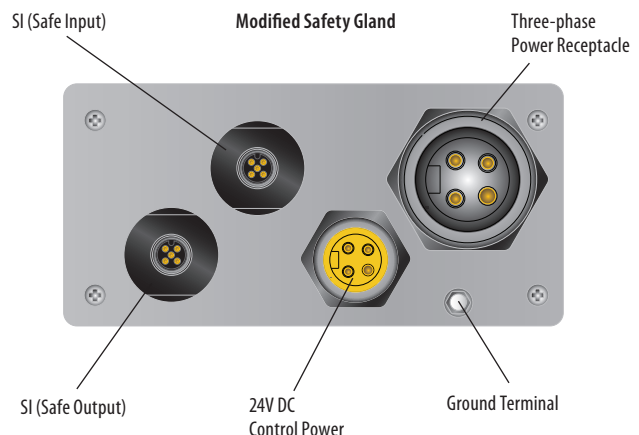
- Safety Category 4 PLe with TÜV certification
- Full voltage and Reversing or Sensorless Vector Control AC drive motor controllers
- Local and lockable disconnect means, discrete user I/O, and comprehensive local LED status and diagnostics
- Four DC inputs and two solid state outputs (24V DC)
- Plug and play quick disconnect power cable solutions
- UL Listed Suitable for Group Installation
- Designed to meet NEMA Type 4/12 with enclosures suitable for harsh and wash down environments



## Faster Installation with ArmorConnect Connectivity

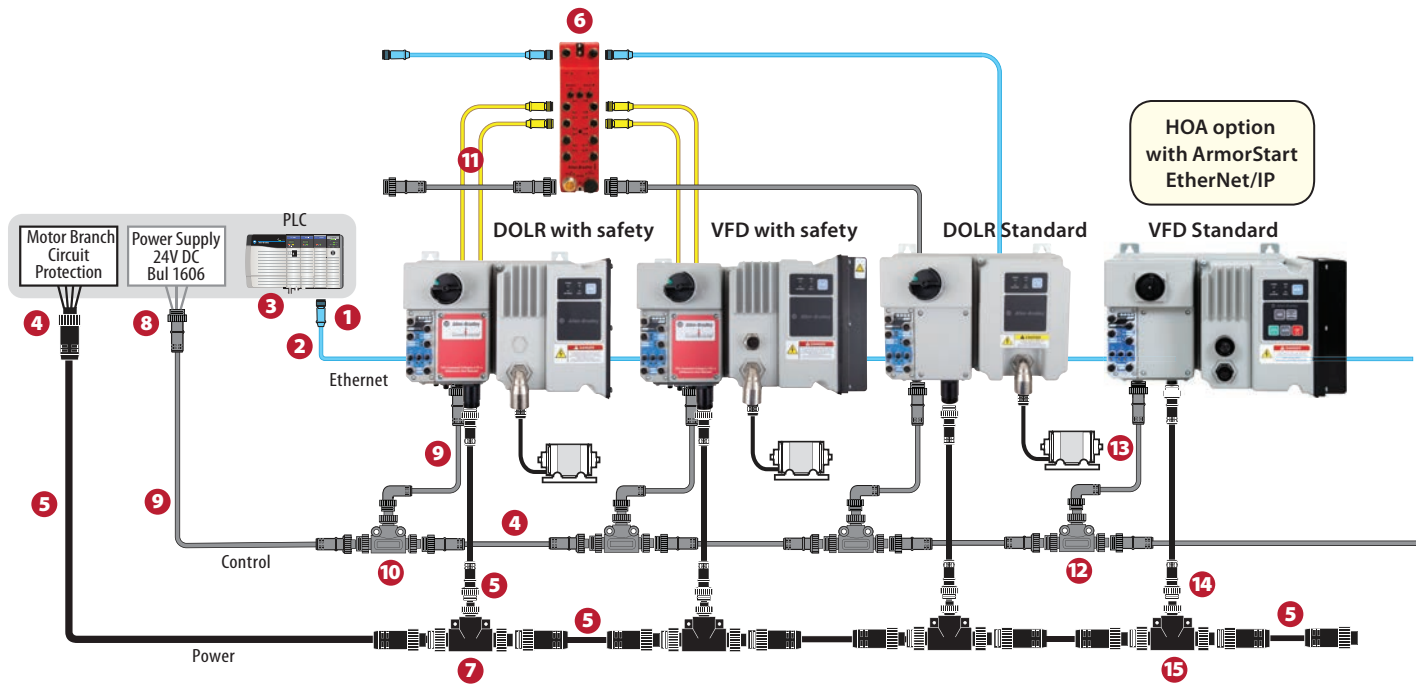
Compared to the traditional conduit installations, with the ArmorConnect® Power Media you can benefit from:

- Reduced commissioning time
- Plug and play design eliminates wiring errors
- Increased system design flexibility
- No special tools required
- Reduced labor costs
- Factory-installed receptacles for safety and power offer the greatest wiring savings and labor cost reduction



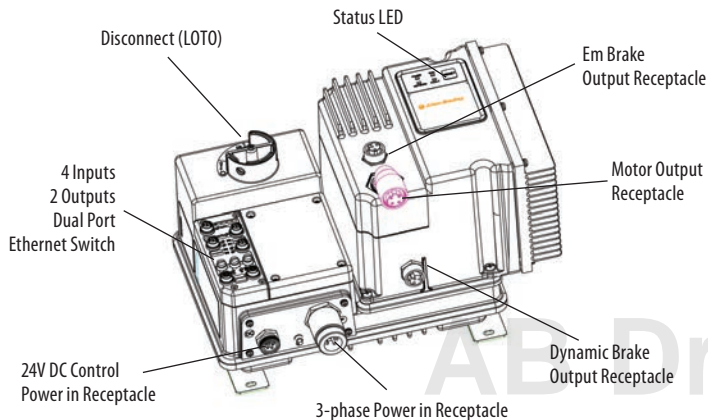
# Cable System Quick Reference Guide

The introduction of ArmorStart ST motor controllers also brings new cordsets and connectors that help ease your motor controller installation and streamline your parts management. This quick reference diagram shows the new cordsets and connectors and an example of the minimum cables required to complete a system and how to integrate ArmorStart ST and ArmorStart EtherNet/IP when HOA (hand-off-auto) option is required.

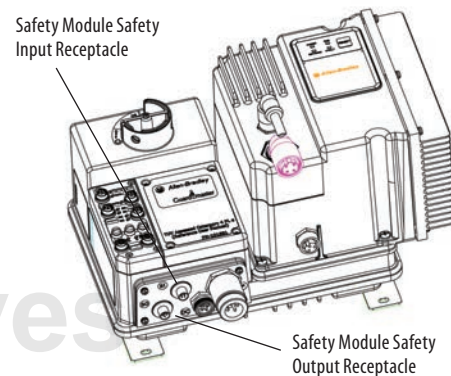


- 1 CAT5e Bulkhead Connector – Cat. No. 1585A-\*
- 2 CAT5e Patchcord, – Cat. No. 1585D-\*
- 3 CAT5e, RJ45 to RJ45 – Cat. No. 1585J-\*
- 4 Three-Phase Power Receptacles – Cat. No. 280-M35F-\*
- 5 Three-Phase Power Cable (M35) – Cat. No. 280-PWRM35\*
- 6 ArmorBlock Guard I/O – Cat. No. 1732ES-IB8X0BV2
- 7 Three-Phase Power Tee – Cat. No. 280-T35
- 8 Control Power Receptacles – Cat. No. 888N-\*
- 9 Control/Auxiliary Power Cables – Cat. No. 889N-F4\*
- 10 Control/Auxiliary Power Tees – Cat. No. 898N-43PB-N4KT
- 11 IO Cable between Safety I/O Module and ArmorStart – Cat. No. 889D-\*
- 12 ArmorStart Auxiliary T-Port – Cat. No. 898N-543ES-NKF
- 13 Control Power Drop Cable – Cat. No. 889N-F65\*
- 14 Three-Phase Power Cable (M22) – Cat. No. 280-PWRM22-\*
- 15 Three-Phase Tee Reducing Drop – Cat. No. 280-RT35

**ArmorStart EtherNet/IP  
284E Version Pictured**



**ArmorStart EtherNet/IP Safety  
284E Version Pictured**



## Standard ArmorStart Direct Online & Reversing Starters

Current Rating [A]	kW		Hp			24V DC Control Voltage
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	Catalog Number
NEMA Type 4/12 with ArmorConnect power media connections, up to 480V AC						
0.24...1.2 A	0.18	0.37	–	–	0.5	281E-F12Z-10A-RRG
<b>0.5...2.5 A</b>	<b>0.37</b>	<b>0.75</b>	<b>0.5</b>	<b>0.5</b>	<b>1</b>	<b>281E-F12Z-10B-RRG</b>
1.1...5.5 A	1.1	2.2	1	1	3	281E-F12Z-10C-RRG
<b>3.2...16 A</b>	<b>4</b>	<b>7.5</b>	<b>3</b>	<b>5</b>	<b>10</b>	<b>281E-F12Z-10D-RRG</b>

## Standard ArmorStart Variable Frequency Drives

Input Voltage	3-Phase kW Rating	3-Phase Hp Rating	Output Current	Catalog Number
NEMA Type 4/12 with ArmorConnect power media connections, up to 480V AC				
380...480V, 50/60 Hz 3-Phase	0.75	1	2.3	284E-FVD2P3Z-10-RRG-SBG-DB1-EMI
	<b>1.5</b>	<b>2</b>	<b>4</b>	<b>284E-FVD4P0Z-10-RRG-SBG-DB1-EMI</b>
	2.2	3	6	284E-FVD6P0Z-25-RRG-SBG-DB1-EMI
	<b>3</b>	<b>5</b>	<b>7.6</b>	<b>284E-FVD7P6Z-25-RRG-SBG-DB1-EMI</b>

## ArmorStart Safety Direct Online & Reversing Starters

Current Rating [A]	kW		Hp			24V DC Control Voltage
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	Catalog Number
NEMA Type 4/12 with ArmorConnect power media connections, up to 480V AC						
0.24...1.2 A	0.18	0.37	–	–	0.5	281E-F12S-10A-RRG
<b>0.5...2.5 A</b>	<b>0.37</b>	<b>0.75</b>	<b>0.5</b>	<b>0.5</b>	<b>1</b>	<b>281E-F12S-10B-RRG</b>
1.1...5.5 A	1.1	2.2	1	1	3	281E-F12S-10C-RRG
<b>3.2...16 A</b>	<b>4</b>	<b>7.5</b>	<b>3</b>	<b>5</b>	<b>10</b>	<b>281E-F23S-25D-RRGStan</b>

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	2.2	3	6	284E-FVD6P0S-25-RRG-SBG-DB1-EMI
	<b>3</b>	<b>5</b>	<b>7.6</b>	<b>284E-FVD7P6S-25-RRG-SBG-DB1-EMI</b>

Note: products in bold are preferred improved availability.


## Component Response Time

Component	Response Time (ms)
1732ES-IB8XOBV2 or 1732ES-IB8XOBV4	See publication 1732DE-IN001*
Bulletin 281	20...57
Bulletin 284	8...17


## Probability of Dangerous Failure per Hour and MTTFd for Uncontrolled Stop

ArmorStart Safety Controller used in Combination of ArmorStart Safety Related Parts	MTTFd (years)	Average Probability of Dangerous Failure per Hour (1/h)
Bulletin 281	100	6.0E-9
Bulletin 284	100	6.0E-9




## Cable Assemblies and Accessories




3-Phase Power	Description	Catalog Number
	Power cable – M35	280-PWRM35*-M <sup>1</sup>
	Power cable – straight male and wires	280-PWRM22*-M <sup>1</sup>
	Power tee – M22	280-T35
	Power tee – 3-phase, 4-pole, reducing drop	280-RT35
	Field-attachable, M35 connector – 10 AWG, 600V, 32A	280-FAM35F

\* Straight and right angle connectors are available.

Control (AUX) Power	Description	Catalog Number
	Cordset – 4 pin mini	889N-F4* <sup>1</sup>
	Cordset – 5/6 pin mini (for use with ArmorStart Auxiliary T-port drop)	889N-F65* <sup>1</sup>
	Auxiliary device T-Port	898N-43PB-N4KT
	ArmorStart Auxiliary T-port	898N-543ES-NKF

\* Straight and right angle connectors are available.


Motor Connections	Description	Catalog Number
	Non-shielded cordset cable assembly with straight male/ flying leads, 29 mm shell, 4 pin, 12 AWG conductors	280-PWRM29G-M <sup>1</sup>
	Shielded cordset cable assembly with straight male/ flying leads, 29 mm shell, 4 pin, 12 AWG conductors	284-PWRM29G-M <sup>1</sup>
	Non-shielded patch cable assembly with straight male/ female receptacle, 29 mm shell, 4 pin, 12 AWG conductors	280-PWRM29A-M <sup>1</sup>
	Shielded patch cable assembly with straight male/female receptacle with leads, 29 mm shell, 4 pin, 12 AWG conductors	284-PWRM29A-M <sup>1</sup>
	Shielded straight male receptacle with 4 wires, 29 mm shell, 4 pin, 12 AWG conductors	284-M29M-M03
	Shielded straight female receptacle with 4 wires, 29 mm shell, 4 pin, 12 AWG conductors	284-M29F-M03

Source Brake	Description	Catalog Number
	Non-shielded cord assembly with straight male receptacle with leads, 22 mm shell, 3 pin, 16 AWG conductors	285-BRC22-M <sup>1</sup>
	Non-shielded cordset cable assembly with 90° male/ flying leads 22 mm shell, 3 pin, 16 AWG conductors	285-BRC22H-M <sup>1</sup>
	Non-shielded patch cable assembly with straight male/ straight female receptacle with leads, 22 mm shell, 3 pin, 16 AWG conductors	285-BRC22-M <sup>1</sup> D
	Non-shielded patch cable assembly with 90° male/90° female receptacle with leads, 22 mm shell, 3 pin, 16 AWG conductors	285-BRC22D-M <sup>1</sup>
	Non-shielded receptacle straight female with flying leads, 22 mm shell, 3 pin, 14 AWG conductors	285-M24M-M05


<sup>1</sup> Check with your local distributor or account manager for available lengths.


# AB Drives

## Cable Assemblies and Accessories

IP67 Dynamic Brake Resistor and Cable	Drive and Motor Size KW (Hp)	Catalog Number *
	0.37 (0.5)	284R-360P500-M <sup>①</sup>
	0.75 (1)	284R-360P500-M <sup>①</sup>
	1.5 (2)	284R-360P500-M <sup>①</sup>
	2.2 (3)	284R-120P1K2-M <sup>①</sup>
	3.3 (5)	284R-120P1K2-M <sup>①</sup>

\* Drive rating and DB part numbers are not interchangeable. Only use specified resistor.


Ethernet Media	Description	Catalog Number
	Unshielded Male Straight to Male Straight	1585D-M4TBDM- <sup>①</sup>
	Unshielded Male Straight to Male Right Angle	1585D-M4TBDE- <sup>①</sup>
	Unshielded Male Right Angle to Male Right Angle	1585D-E4TBDE- <sup>①</sup>
	Unshielded Male Straight to Female Straight	1585D-M4TBDF- <sup>①</sup>


IO Cable, Micro	Description	Catalog Number *
	Straight Female Straight Male	889D-F4ACDM- <sup>①</sup>
	Straight Female Right Angle Male	889D-F4ACDE- <sup>①</sup>

\* Required when 0 to 2 inputs

IO Cable, Micro V-Cable	Description	Catalog Number *
	Straight Female	879D-F4ACDM- <sup>①</sup>
	Right Angle Female	879D-R4ACM- <sup>①</sup>

\* Required when 3 to 4 inputs

Safety IO	Description	Catalog Number
	Safety IO Module, 2 ArmorStart Safety version per Block	1732ES-IB12XOBV2
	Safety IO Module, 4 ArmorStart Safety version per Block (Check for availability)	1732ES-IB8XOBV4

Safety IO Cable	Description	Catalog Number
	Patchcord: DC Micro (M12), Female, Straight, 4-Pin, PVC Cable, Yellow, Unshielded, DC Mic, Male, Straight	889D-F4AEDM- <sup>①</sup>
	Patchcord: DC Micro (M12), Female, Straight, 4-Pin, TPE Cable, Yellow, Unshielded, IEC Color Coded, DC Mic, Male, Straight	889D-F4HJDM- <sup>①</sup>

<sup>①</sup> Check with your local distributor or account manager for available lengths.

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