

LISTEN.  
THINK.  
SOLVE.<sup>SM</sup>

SELECTION GUIDE

ArmorStart<sup>®</sup> Distributed Motor  
Controller and ArmorConnect<sup>®</sup>  
Power Media

BULLETINS 280/281, 283, 284, 888, 889, 898



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Bulletin	280D/281D	280A/281A	283D	283A	284D	284A
<b>Horsepower Range:</b>						
0.5...10 Hp (0.37...7.5 kW)	✓	✓	—	—	—	—
0.5...10 Hp (0.37...5.5 kW)	—	—	✓	✓	—	—
0.5...5 Hp (0.4...3.0 kW)	—	—	—	—	✓	✓
<b>Starting Method:</b>						
Full-Voltage and Reversing	✓	✓	—	—	—	—
Current Limit, Soft Start including Soft Stop	—	—	✓	✓	—	—
Sensorless Vector Performance	—	—	—	—	✓	✓
Sensorless Vector Control	—	—	—	—	✓	✓
<b>Environmental Rating:</b>						
IP67/NEMA Type 4	✓	✓	✓	✓	✓	✓
NEMA Type 4X	✓	—	✓	—	✓	—
<b>Control Voltage Ratings: 24V DC, 120V AC, and 240V AC</b>						
	✓	✓	✓	✓	✓	✓
<b>Operational Voltage Ratings:</b>						
200...480V AC	✓	✓	✓	✓	—	—
200...240V AC	—	—	—	—	✓	✓
380...480V AC	—	—	—	—	✓	✓
500...575V AC	✓	✓	✓	✓	✓	✓
<b>Rated for Group Motor Installations</b>	✓	✓	✓	✓	✓	✓
<b>Network Communications with DeviceNet™ including DeviceLogix™</b>	✓	✓	✓	✓	✓	✓
<b>I/O Capability:</b>						
Four Inputs and Two Outputs	✓	—	✓	—	✓	—
Two Outputs	—	✓	—	✓	—	✓
<b>Network Communications via ArmorPoint® Distributed I/O Products (DeviceNet, EtherNet, ControlNet™)</b>	—	✓	—	✓	—	✓
<b>I/O Expansion with ArmorPoint Distributed I/O Products</b>	✓	✓	✓	✓	✓	✓
<b>LED Status Indication</b>	✓	✓	✓	✓	✓	✓
<b>Gland Plate Entry:</b>						
Conduit Entrance	✓	✓	✓	✓	✓	✓
ArmorConnect Power Media	✓	✓	✓	✓	✓	✓
<b>Quick Disconnects (I/O, Communications, Motor Connection, Three-Phase and Control Power)</b>	✓	✓	✓	✓	✓	✓
<b>Extended Length Motor and Brake Cables</b>	✓	✓	✓	✓	✓	✓
<b>Factory Installed Options:</b>						
HOA Keypad	✓	✓	✓	✓	✓	✓
Safety Monitor	✓	✓	✓	✓	✓	✓
Control Brake Contactor	—	—	—	—	✓	✓
Source Brake Contactor	—	—	✓	✓	✓	✓
Dynamic Brake Connector	—	—	—	—	✓	✓
Output Contactor	—	—	—	—	✓	✓
EMI Filter	—	—	—	—	✓	✓
Shielded Motor Cable	—	—	—	—	✓	✓
0...10V Analog Input	—	—	—	—	✓	✓
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**280/281 ArmorStart Distributed Motor Controller**

- On-Machine starting solution
- Full-voltage and reversing
- Horsepower range 0.5...10 Hp (0.37...7.5 kW)
- Robust IP67/NEMA Type 4 and NEMA Type 4X enclosure rating
- Modular plug and play design
- Quick disconnect connections for I/O, communications, motor, three-phase and control power
- Gland plate entry: conduit entrance or ArmorConnect power media
- Four inputs and two outputs (expandable with ArmorPoint)
- LED status indication
- DeviceNet communications
- DeviceLogix component technology
- Peer-to-peer communication (ZIP)
- Connectivity to ArmorPoint distributed I/O products
- ControlNet and EtherNet communications via ArmorPoint
- Factory installed options:
  - Hand/Off/Auto (HOA) keypad configuration
  - Safety monitor

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**Standards Compliance**

UL 508

CSA C22.2, No. 14

EN/IEC 60947-1

CE Marked per Low Voltage Directive 73/23/EEC and EMC Directive 89/336/EEC

CCC

**Certifications**

cULus (File No. E3125, Guides NLDX, NLDX7)

**Description**

The Bulletin 280/281 ArmorStart Distributed Motor Controller is an integrated, pre-engineered, starter for full-voltage and reversing applications. The ArmorStart offers a robust IP67/NEMA Type 4 enclosure design, which is suitable for water wash-down environments. The ArmorStart products are also offered with NEMA Type 4X rating, suitable for environment wash down with caustic chemicals used in the food and beverage industry. The wash-down rating is 1000 psi for the NEMA Type 4X rated devices. The modular plug-and-play design offers simplicity in wiring the installation. The quick disconnects for the I/O, communications, and motor connection reduce the wiring time and eliminate wiring errors. The ArmorStart offers as standard, four DC inputs and two relay outputs to be used with sensors and actuators respectively, for monitoring and controlling the application process. The ArmorStart's LED status indication and built-in diagnostics capabilities allows ease of maintenance and troubleshooting. The optional Hand/Off/Auto (HOA) keypad allows for local start/stop control at the ArmorStart Distributed Motor Controller.

The Bulletin 280/281 ArmorStart Distributed Motor Controller offers short-circuit protection per UL 508 and IEC 60947. The ArmorStart is rated for local-disconnect service by incorporating the Bulletin 140 Motor Protector as the local-disconnect, eliminating the need for additional components. The ArmorStart Distributed Motor Controllers are suitable for group motor installations.

**Mode of Operation**

**Full-Voltage Start**

This method is used in applications requiring across-the-line starting. Full in-rush current and locked-rotor torque are realized. The ArmorStart Bulletin 280 offers full-voltage starting, and the Bulletin 281 offers full-voltage starting for reversing applications.

**Description of Features**

**Overload Protection**

The Bulletin 280/281 ArmorStart Distributed Motor Controller incorporates, as standard, electronic motor overload protection. This overload protection is accomplished electronically with an I<sup>2</sup>t algorithm. The ArmorStart's overload protection is programmable via the communication network providing the user with flexibility. The overload trip class can be selected for class 10, 15, or 20 protection. Ambient insensitivity is inherent in the electronic design of the overload.

**Inputs**

The inputs are single keyed (two inputs per connector), which are sourced from DeviceNet power (24V DC), with LED status indication.

**Outputs**

Two dual-key relay output connectors are supplied as standard. The outputs are sourced from the control voltage power, which can be either, 24V DC, 120V AC, or 240V AC with LED status indication.

**Motor Cable**

With every Bulletin 280/281 ArmorStart Distributed Motor Controller, a 3-meter unshielded 4-conductor cordset is provided with each unit as standard.

**Gland Plate Entrance**

The ArmorStart product offers two different methods for connecting incoming three-phase and control power to the device. One method offered is the traditional conduit entrance which provides a 3/4 and 1 in. conduit hole opening for wiring three-phase and control power. The second method offers connectivity to the ArmorConnect power media. Factory installed receptacles are provided for connectivity to both three-phase and control power media.

**LED Status Indication**

The LED Status Indication provides four status LEDs and a Reset button. The LEDs provide status indication for the following:

- **POWER LED**  
The LED is illuminated solid green when control power is present and with the proper polarity
- **RUN LED**  
This LED is illuminated solid green when a start command and control power are present
- **NETWORK LED**  
This bicolor (red/green) LEDs indicates the status of the communication link
- **FAULT LED**  
Indicates Controller Fault (trip) condition
- The "Reset Button" as a local trip reset.

**Fault Diagnostics**

Fault diagnostics capabilities built in the ArmorStart Distributed Motor Controller help you pinpoint a problem for easy troubleshooting and quick re-starting.

- Short Circuit
- Overload
- Phase Loss
- Control Power Loss
- Control Power Fuse Detection
- I/O Fault
- Output Power Fuse Detection
- Overtemperature
- Phase Imbalance
- DeviceNet Power Loss
- EEPROM Fault
- Hardware Fault

**Network and Expandable I/O Capabilities**

The Bulletin 280D/281D ArmorStart Distributed Motor Controller delivers enhanced control to access parameter settings and provides fault diagnostics and remote start/stop control. DeviceNet is the communication protocol provided with the ArmorStart, including DeviceLogix.

The Bulletin 280A/281A ArmorStart Distributed Motor Controller allows connectivity to the ArmorPoint backplane. The ArmorPoint I/O system can communicate using DeviceNet, ControlNet, or EtherNet communication protocols. In addition to the different network protocols, the ArmorPoint Distributed I/O products allow the I/O capability to be expanded beyond the standard two outputs. The two dual-key relay output connectors are supplied as standard. The outputs are sourced from the control voltage power of 24V DC, 120V AC, or 240V AC. LED status indication is also provided. When using the ArmorPoint, a maximum of two ArmorPoint Distributed Motor Controllers can be connected to the ArmorPoint Distributed I/O product.

# ArmorStart® Distributed Motor Controller

## Catalog Number Explanation

### Cat. No. Explanation

Examples given in this section are for reference purposes. This basic explanation should not be used for product selection; not all combinations will produce a valid catalog number.

280   D - F   12Z - 10   C - CR - Option 1 - Option 2

*a*
*b*
*c*
*d*
*e*
*f*
*g*
*h*
*i*

*a*

Bulletin Number	
280	Full Voltage Starter
281	Reversing Starter

*e*

Short Circuit Protection (Motor Circuit Protector)	
10	10 A Rated Device
25	25 A Rated Device

*h*

Option 1	
3	Hand/Off/Auto Selector Keypad
3FR	Hand/Off/Auto Selector Keypad with Forward/Reverse

*b*

Communications	
D	DeviceNet™
A	ArmorPoint

*f*

Overload Selection Current Range	
A	0.24...1.2 A
B	0.5...2.5 A
C	1.1...5.5 A
D	3.2...16 A

*i*

Option 2	
SM	Safety Monitor

*c*

Enclosure Type	
F	Type 4 (IP67)
S	Type 4X

*d*

Contactor Size/Control Voltage		
24V DC	120V AC	240V AC
12Z	12D	12B
23Z	23D	23B

*g*

Control and 3-Phase Power Connections/Motor Cable Connection (CR: Conduit/Round Media) or (RR: Round/Round Media)				
Code		Description		
		Control Power	3-Phase Power	Motor Cable
CR	blank	Conduit Entrance	Conduit Entrance	3 m, unshielded cordset male 90°
CR	W *	Conduit Entrance	Conduit Entrance	No cable
RR	blank	Round Media (Male Receptacle)	Round Media (Male Receptacle)	3 m, unshielded cordset male 90°
RR	W *	Round Media (Male Receptacle)	Round Media (Male Receptacle)	No cable

\* See Accessories on page 6 for extended motor cable lengths.

### Product Selection

Full-voltage starters — IP67/NEMA Type 4 with conduit entrance and DeviceNet communications, Up to 575V AC

Current Rating [A]	kW		Hp				24V DC Control Voltage	120V AC Control Voltage	240V AC Control Voltage
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	575V AC 60 Hz	Cat. No.	Cat. No.	Cat. No.
	0.24...1.2	0.18	0.37	—	—	0.5	0.5	280D-F12Z-10A-CR	280D-F12D-10A-CR
0.5...2.5	0.37	0.75	0.5	0.5	1	1.5	280D-F12Z-10B-CR	280D-F12D-10B-CR	280D-F12B-10B-CR
1.1...5.5	1.1	2.2	1	1	3	3	280D-F12Z-10C-CR	280D-F12D-10C-CR	280D-F12B-10C-CR
3.2...16	4	7.5	3	5	10	10	280D-F23Z-25D-CR	280D-F23D-25D-CR	280D-F23B-25D-CR

Full-voltage Starters — IP67/NEMA Type 4 with conduit entrance and ArmorPoint communications, Up to 575V AC

Current Rating [A]	kW		Hp				24V DC Control Voltage	120V AC Control Voltage	240V AC Control Voltage
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	575V AC 60 Hz	Cat. No.	Cat. No.	Cat. No.
	0.24...1.2	0.18	0.37	—	—	0.5	0.5	280A-F12Z-10A-CR	280A-F12D-10A-CR
0.5...2.5	0.37	0.75	0.5	0.5	1	1.5	280A-F12Z-10B-CR	280A-F12D-10B-CR	280A-F12B-10B-CR
1.1...5.5	1.1	2.2	1	1	3	3	280A-F12Z-10C-CR	280A-F12D-10C-CR	280A-F12B-10C-CR
3.2...16	4	7.5	3	5	10	10	280A-F23Z-25D-CR	280A-F23D-25D-CR	280A-F23B-25D-CR

**Full-voltage starters — IP67/NEMA Type 4 with quick disconnects for ArmorConnect power media and DeviceNet communications, Up to 575V AC**

Current Rating [A]	kW		Hp				24V DC Control Voltage	120V AC Control Voltage	240V AC Control Voltage
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	575V AC 60 Hz	Cat. No.	Cat. No.	Cat. No.
0.24...1.2	0.18	0.37	—	—	0.5	0.5	280D-F12Z-10A-RR	280D-F12D-10A-RR	280D-F12B-10A-RR
0.5...2.5	0.37	0.75	0.5	0.5	1	1.5	280D-F12Z-10B-RR	280D-F12D-10B-RR	280D-F12B-10B-RR
1.1...5.5	1.1	2.2	1	1	3	3	280D-F12Z-10C-RR	280D-F12D-10C-RR	280D-F12B-10C-RR
3.2...16	4	7.5	3	5	10	10	280D-F23Z-25D-RR	280D-F23D-25D-RR	280D-F23B-25D-RR

**Full-voltage starters — IP67/NEMA Type 4 with quick disconnects for ArmorConnect power media and ArmorPoint communications, Up to 575V AC**

Current Rating [A]	kW		Hp				24V DC Control Voltage	120V AC Control Voltage	240V AC Control Voltage
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	575V AC 60 Hz	Cat. No.	Cat. No.	Cat. No.
0.24...1.2	0.18	0.37	—	—	0.5	0.5	280A-F12Z-10A-RR	280A-F12D-10A-RR	280A-F12B-10A-RR
0.5...2.5	0.37	0.75	0.5	0.5	1	1.5	280A-F12Z-10B-RR	280A-F12D-10B-RR	280A-F12B-10B-RR
1.1...5.5	1.1	2.2	1	1	3	3	280A-F12Z-10C-RR	280A-F12D-10C-RR	280A-F12B-10C-RR
3.2...16	4	7.5	3	5	10	10	280A-F23Z-25D-RR	280A-F23D-25D-RR	280A-F23B-25D-RR

**Full-voltage starters — NEMA Type 4X with conduit entrance and DeviceNet communications, Up to 575V AC**

Current Rating [A]	kW		Hp				24V DC Control Voltage	120V AC Control Voltage	240V AC Control Voltage
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	575V AC 60 Hz	Cat. No.	Cat. No.	Cat. No.
0.24...1.2	0.18	0.37	—	—	0.5	0.5	280D-S12Z-10A-CR	280D-S12D-10A-CR	280D-S12B-10A-CR
0.5...2.5	0.37	0.75	0.5	0.5	1	1.5	280D-S12Z-10B-CR	280D-S12D-10B-CR	280D-S12B-10B-CR
1.1...5.5	1.1	2.2	1	1	3	3	280D-S12Z-10C-CR	280D-S12D-10C-CR	280D-S12B-10C-CR
3.2...16	4	7.5	3	5	10	10	280D-S23Z-25D-CR	280D-S23D-25D-CR	280D-S23B-25D-CR

**Full-voltage starters — NEMA Type 4X with quick disconnects for ArmorConnect power media and DeviceNet communications, Up to 575V AC**

Current Rating [A]	kW		Hp				24V DC Control Voltage	120V AC Control Voltage	240V AC Control Voltage
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	575V AC 60 Hz	Cat. No.	Cat. No.	Cat. No.
0.24...1.2	0.18	0.37	—	—	0.5	0.5	280D-S12Z-10A-RR	280D-S12D-10A-RR	280D-S12B-10A-RR
0.5...2.5	0.37	0.75	0.5	0.5	1	1.5	280D-S12Z-10B-RR	280D-S12D-10B-RR	280D-S12B-10B-RR
1.1...5.5	1.1	2.2	1	1	3	3	280D-S12Z-10C-RR	280D-S12D-10C-RR	280D-S12B-10C-RR
3.2...16	4	7.5	3	5	10	10	280D-S23Z-25D-RR	280D-S23D-25D-RR	280D-S23B-25D-RR

**Reversing starters — IP67/NEMA Type 4 with conduit entrance and DeviceNet communications, Up to 575V AC**

Current Rating [A]	kW		Hp				24V DC Control Voltage	120V AC Control Voltage	240V AC Control Voltage
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	575V AC 60 Hz	Cat. No.	Cat. No.	Cat. No.
0.24...1.2	0.18	0.37	—	—	0.5	0.5	281D-F12Z-10A-CR	281D-F12D-10A-CR	281D-F12B-10A-CR
0.5...2.5	0.37	0.75	0.5	0.5	1	1.5	281D-F12Z-10B-CR	281D-F12D-10B-CR	281D-F12B-10B-CR
1.1...5.5	1.1	2.2	1	1	3	3	281D-F12Z-10C-CR	281D-F12D-10C-CR	281D-F12B-10C-CR
3.2...16	4	7.5	3	5	10	10	281D-F23Z-25D-CR	281D-F23D-25D-CR	281D-F23B-25D-CR

**Reversing starters — IP67/NEMA Type 4 with conduit entrance and ArmorPoint communications, Up to 575V AC**

Current Rating [A]	kW		Hp				24V DC Control Voltage	120V AC Control Voltage	240V AC Control Voltage
	230V AC 50 Hz	400V AC 50 Hz	200V AC 60 Hz	230V AC 60 Hz	460V AC 60 Hz	575V AC 60 Hz	Cat. No.	Cat. No.	Cat. No.
0.24...1.2	0.18	0.37	—	—	0.5	0.5	281A-F12Z-10A-CR	281A-F12D-10A-CR	281A-F12B-10A-CR
0.5...2.5	0.37	0.75	0.5	0.5	1	1.5	281A-F12Z-10B-CR	281A-F12D-10B-CR	281A-F12B-10B-CR
1.1...5.5	1.1	2.2	1	1	3	3	281A-F12Z-10C-CR	281A-F12D-10C-CR	281A-F12B-10C-CR
3.2...16	4	7.5	3	5	10	10	281A-F23Z-25D-CR	281A-F23D-25D-CR	281A-F23B-25D-CR