

Medium Voltage Motor Control Assemblies

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AMPGARD® Motor Control Assembly

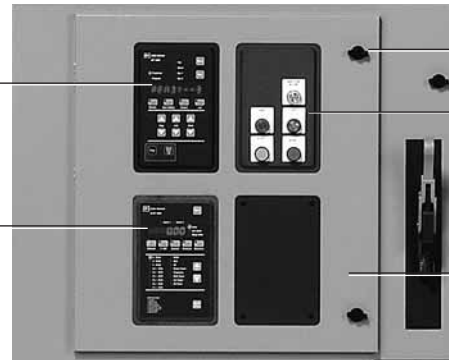
Product Description

Product Description

Eaton's Cutler-Hammer® AMPGARD medium voltage starter family provides flexibility never before available. Rated at 2200 – 7200 volts, up to 8000 hp, they are the first starters designed as integrated, complete units precisely matched to motor ratings, and engineered to provide component-to-component circuitry and front accessibility of all components and terminals. AMPGARD starters are used in a variety of industrial process applications, such as pulp & paper, petrochemical, HVAC (chillers) where proper control and protection of the motor and system are critical to the user. AMPGARD has been the industry leader in medium voltage motor control for over 60 years in these applications, and our starters have been designed with that experience behind them.

MP-3000
(When Specified)

DP-4000 Meter
(When Specified)



1/4 Turn Door Latch
Top and Bottom

Indicating Lights
Start/Stop
Pushbutton
(When Specified)

Low Voltage
Access Door

Low Voltage and High Voltage Compartments

Note: Isolation Switch Mechanism
Locks Medium Voltage Door
Closed in ON Position



Isolation Switch
Viewing Window

Isolated Low Voltage Control Panel



Optional Stab-in Contactor, Bolted Main
Fuses and Optional Blown Fuse Indicator

Application Description

UL® and CSA® Certification

AMPGARD starters are designed, assembled and tested to meet all applicable standards. AMPGARD meets ANSI, NEMA® and IEC standards, and is UL, CSA, cUL® and KEMA third party certified. The major components i.e., contactor, isolating switch, fuses, MP-3000, IQ DP-4000 and IQ Analyzer are UL recognized.

UL or CSA labeling of a specific starter requires review to ensure that all requested modifications and auxiliary devices meet the appropriate standards. Refer to factory when specified.

Seismic Certification

AMPGARD starters are seismically tested, seismically qualified, and exceed requirements of both the International Building Code (IBC) and California Building Code Title 24.

ABS Certification

Cutler-Hammer AMPGARD medium voltage control assemblies have been certified under the ABS type approval program. ABS (American Bureau of Shipping) develops and verifies standards for design, construction and operational maintenance of marine-related facilities. ABS Type Approval is a means of demonstrating compliance with specifications and recording the compliance in the ABS Web site.

AMPGARD is listed in the ABS publications and Web site. AMPGARD may be used onboard a vessel, MODU (mobile offshore drilling unit) or facility classed by ABS with two conditions:

1. The AMPGARD assembly may not be used in the propulsion system.
2. The AMPGARD assembly may not be placed on deck.

The standard AMPGARD assembly will be modified with grab rails, drip shields, insulated bus and wind latches for the doors to meet all the ABS requirements.

AMPGARD starters are equipped with current limiting power fuses to interrupt the short-circuit faults shown below. The contactor and fuses are completely coordinated.

Table 41-1. Interrupting Capacity — kVA

Starter Maximum Horsepower	NEMA Class E2		
	2300 Volt	4600 Volt	6600 Volt
3000	200,000	—	—
5500	—	400,000	—
8000	—	—	570,000

Squirrel Cage Motor Starters: Starters for squirrel cage motors are available in full or reduced voltage designs in all ratings. Full voltage starters are available one- or two-high in a factory-assembled structure. Electromechanical reduced voltage starters are available in either reactor or auto-transformer type. Both provide closed transition from reduced to full voltage. See Table 41-3 on Page 41-4 for application data.

Product Description



AMPGARD IT. Soft Start

Reduced Voltage Solid-State Starters: Offered as an alternative to traditional reactor or autotransformer type reduced voltage starter, the AMPGARD *IT*. Soft Start allows the user to fine-tune starting parameters to meet a wide variety of unique load conditions. The onboard user-friendly microprocessor provides the ability to select the proper combination of initial current, maximum current and ramp time, resulting in smooth stepless load acceleration while minimizing mechanical shock to system components.

The AMPGARD *IT*. Soft Start is available as a stand-alone starter or can be incorporated in a lineup with other AMPGARD starters. Adding to an existing AMPGARD installation is easy via a simple splice kit.

Synchronous Motor Starters: These starters provide reliable, automatic starting of synchronous motors. Automatic synchronization is provided by field frequency circuitry which ensures application of the field at proper motor speed, and at a favorable angular position of stator and rotor poles. As a result, line disturbance resulting from synchronization is reduced and effective motor pull-in torque is increased.



Main Breaker AMPGARD

Main Breaker AMPGARD (MBA): The industry's first truly integrated medium voltage metal-enclosed main breaker and starter assembly combination.

The MBA comprises a metal-enclosed drawout vacuum circuit breaker section that is integrally connected via main bus to the balance of the AMPGARD starter assembly it protects.

The main bus configuration is in the same top-mounted location as on all AMPGARD assemblies, allowing for ease of installation with adjacent sections and addition for future sections.

Front aligned, rear aligned, or front and rear aligned with back-to-back starters available.

The main breaker is the industry-leading Type VCP-W drawout vacuum circuit breaker which provides the performance our customers expect.

Dramatically reduced lead-time, typically 50 percent less than the industry norm. Our single-source approach has cut delivery time from months to weeks. The extended waiting period between order placement and delivery has been eliminated.

Other Motor Starters: Starters for Wound Rotor and Multispeed Motors are available. However, each application must be reviewed for proper motor protection and operation. Refer to the factory for pricing and equipment details.

Features, Benefits and Functions

Personnel Safety: A positive mechanical isolating switch with visible disconnect completely grounds and isolates the starter from the line connectors with a mechanically driven isolating shutter, leaving no exposed high voltage. Additional safety features include:

- Isolated cable entry for added safety. The starters and cables are completely isolated from each other by steel barriers.
- All new low voltage wireway. Low voltage wire is isolated from the medium voltage compartment and customer terminal blocks are accessible through the low voltage control panel.
- Easily accessible low voltage panel completely isolated from the medium voltage compartment that offers generous device mounting space.
- Standard viewing window for visual verification of isolation switch operation.

Ease of Installation: Current limiting fuses, contactor assembly and isolating switch assembly are easily removed from the enclosure; line and load terminals are completely accessible from the front. Standard structures are 36.00 W x 92.00 H x 30.00-inch D (914.4 W x 2336.8 H x 762.0 mm D) including a 12.00-inch (304.8 mm) top mounted main bus compartment. The main bus compartment is top, side and front accessible, making maintenance and lineup extensions easy.

Ease of Maintenance: All components are front accessible, facilitating routine inspection or parts replacement. Isolation switch life is 10,000 operations.

Vacuum Contactor: The Type SL vacuum contactors were designed and engineered specifically for use in AMPGARD starters. They are self-supporting, compact, bolt-in or stab-in 3-pole contactors. The contactors utilize a solid-state control board, allowing the user maximum flexibility to change control voltages and drop-out times in the field, simply by adjusting DIP switch settings. To permit application matching of the starter to the motor rating, contactors are available for 2200 – 7200 volts at ratings of 400 and 800 amperes. The 400 ampere contactor interrupting rating is the highest in the industry at 8500 amperes, allowing for higher levels of coordination with power fuses. The 800 ampere contactor has an interrupting rating of 12,500 amperes, also the highest in the industry.

Features, Benefits and Functions

The 800 ampere contactor is also applicable on systems from 2200 – 7200 volts. The 800 ampere contactor interrupting rating is 13,200 amperes, also the highest in the industry, providing maximum coordination with power fuses.

Note: For full starter/contacter horsepower ratings and other technical data (including power fuse coordination), refer to **Section 13**, Medium Voltage Power Contactors.

Motor Protective Relay: When a Motor Protective Relay is required, the AMPGARD starters are provided with the MP-3000 Microprocessor-based Motor Protective Relay as standard. This package offers benefits like a 20-cycle voltage sag ride through, UL 1053 certification for ground fault sensing that is internal to the relay, arm/disarm capability, a drawout case option, Intel-I-Trip overload protection for custom curve setting to precisely match your motor's requirements, and optional PowerNet™ or Modbus® communications capability.

15 kV Starter: A 15 kV rated AMPGARD starter is available with the same features and capabilities as described for the 7.2 kV rated starter. The starter is supplied with a 250 ampere vacuum contactor and three power fuses (maximum 250E) for motors rated to 5000 horsepower. These starters may be supplied with the Cutler-Hammer InsulGard relay for partial discharge detection.



15 kV Starter with InsulGard

Technical Data and Specifications

Table 41-2. Main Breaker AMPGARD

Description	Ratings		
	Amperes	Volts	hp
Main Breaker Starters	1200, 2000 and 3000 400 and 800	2200 to 7200 2200 to 7200	— Up to 8000

Table 41-3. Starting Characteristics

Starter Type	% Motor Voltage	% Motor Current	% Line Current	% Torque
Reactor Reduced Voltage				
80% Tap	80	80	80	64
65% Tap ①	65	65	65	42
50% Tap	50	50	50	25
Autotransformer Reduced Voltage				
80% Tap	80	80	67	64
65% Tap ①	65	65	45	42
50% Tap	50	50	28	25

① Factory set on 65% tap.

Cutler-Hammer is a federally registered trademark of Eaton Corporation. NEMA is the registered trademark and service mark of the National Electrical Manufacturers Association. UL and cUL are federally registered trademarks of Underwriters Laboratories Inc. CSA is a registered trademark of the Canadian Standards Association. Modbus is a registered trademark of Modicon, a division of Schneider Electric Industries SA.

Further Information:

AMPGARD Brochure	BR02003002E
AMPGARD RVSS Brochure	BR02003001E
Technical Data	TD02003001E
Renewal Parts	RP.48J.01.T.E
AMPGARD Main Breaker	PA48D01SE
15 kV AMPGARD Technical Data	TD02003001E