

EMICC MEDIUM VOLTAGE MOTOR CONTROL

HMC 1072



EMICC

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Introduction

The “1072” is a modular system of medium voltage (MV) equipment. Standard starters are either single wide (SW) units one pitch wide (325 mm / 12.8 in), or double wide (DW) units which are two pitches (650 mm / 25.6 in) wide, which can be utilized for feed and starting of loads. Open cubicles for optional equipment are available in 1, 2, 3 or 4 pitch wide sections each pitch is 325 mm/ 12.8 in. wide, up to a maximum of 4 pitches per open cubicle. At 84.5 in. high and 33.5 in. deep this is the most compact unit on the market.

Options include:

- Load break switch
- Transitions to breaker or transformer
- Power factor correction capacitors
- Autotransformer or reactor equipment
- Incoming line connections
- Synchronous motor controls
- Special metering
- Monitoring
- Protection equipment
- Soft Start
- Custom Components

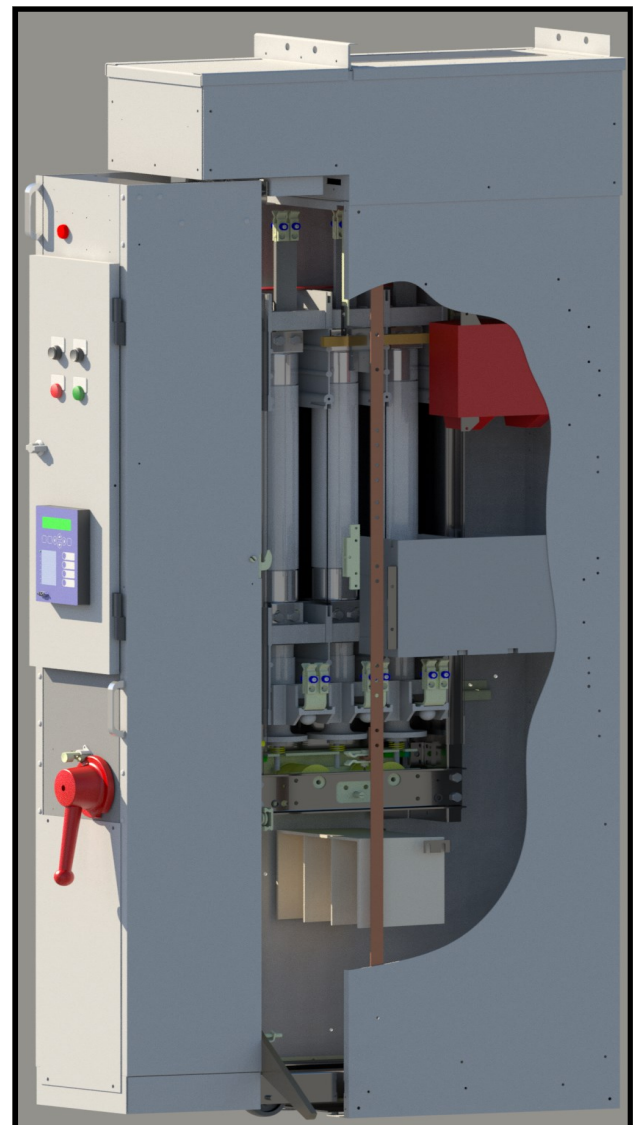
The controllers have top mounted horizontal power bus in the rear including the ground bus. The power bus consists of $\frac{1}{4}$ x 2” copper bars in multiples of 1, 2, 3, 4* or 6* bars per phase, current ratings run from 700A to 2400 A 50 kA rating. The horizontal ground bus provided in the bus compartment has individual vertical buses in each controller and is available in several sizes. The top mounted Low Voltage duct in front is segregated by steel from the power bus.

The cubicles are assembled from bolted and welded sheet steel in a floor-mounted design. **The Modular design of our equipment allows** extension of lineups from either end in the future. Mounting options include **back-to-back**, back-to wall or free-standing sections. All options are available as front access for back to back or back to wall mounting.

The withdrawable truck is on a wheeled carriage not requiring and additional equipment to remove from the cubicle. A simple one man operation.

HMC1072 is a proven, compact motor control device, utilizing the reliable vacuum contactor with ratings up to 600A per starter. A basic HMC1072 unit can accommodate across-the-line starters up to 7200 HP or 6685 KVA at 6.9 kV with the maximum rating limited by the largest size of double barrel main current limiting fuse available. 42 years of vacuum contactor technology and fuse technology have been directed toward motor control applications at EMICC.

*Cubicle height increased by approximately 10 in.



Why HMC1072 Starters?

- **Compactness** — Occupies one-third the space of other single unit starters.
- **Accessibility** — Starter is fully withdrawable. All low voltage controls are contained in a compartment on the front of the draw-out truck. The low voltage compartment is at eye level for easy access.
- **Added safety** — On the optional motor grounding, When the truck is removed the motor leads are grounded in the cubicle. No additional grounding is required. There is no access to the high voltage section without removing the truck which closes the shutter plate and safely isolates the high voltage section.
- **Flexibility** — The basic design allows for different starting methods, applications, and installations. A modular design allows for all options to be part of the line-up. Line-ups may be extended in both directions.
- **Experience** — These starters have been in service for many years in applications throughout the world.
- **Energy Saving** — Starter heat loss is less than 400W at **maximum** rating, saving many hundreds of dollars on operating costs.
- **Maintenance Free** — Routine plant down-time is eliminated.



Why Vacuum Contactors?

- **High operating rate** — Up to 1200 operations per hour.
- **Low chop current** — An average of 0.5 amps.
- **Experience** — Over 60,000 of our contactors in use throughout the world.
- **Quality** — Superior production facilities and extensive quality control by performing the acceptance test as specified in the quality plan at every stage of production and assembly. This quality assures the most reliable contactor available.

Basic Concept

In their basic concept, the HMC1072 starters are of one- high construction of narrow width and shallow depth. A single starter is only 84½ in. high, 12¾ in. wide, and 33½ in. deep. The high voltage cubicle compartment houses the voltage and current transformers, grounding switch, cubicle heaters (where specified) and main terminations.

The current limiting fuses, control power transformer fuses, and vacuum contactor form a power module mounted on the rear of the low voltage control compartment. The assembly forms a withdrawable truck. The low voltage control compartment is a grounded metal enclosure providing accommodation for and segregation of control, protection and metering functions.

A wide range of standard options for metering and protection are available; Including Schweitzer, GE Multilin, EATON and Siemens relays. Arc-Flash sensing is optional.

Isolation is achieved by operating a handle on the front of the equipment which raises the power module to the 'operate' position and lowers it to the 'isolated' position.

Load-Break Switch, Bus-Ties, and Transformer Feed

LOAD-BREAK SWITCH

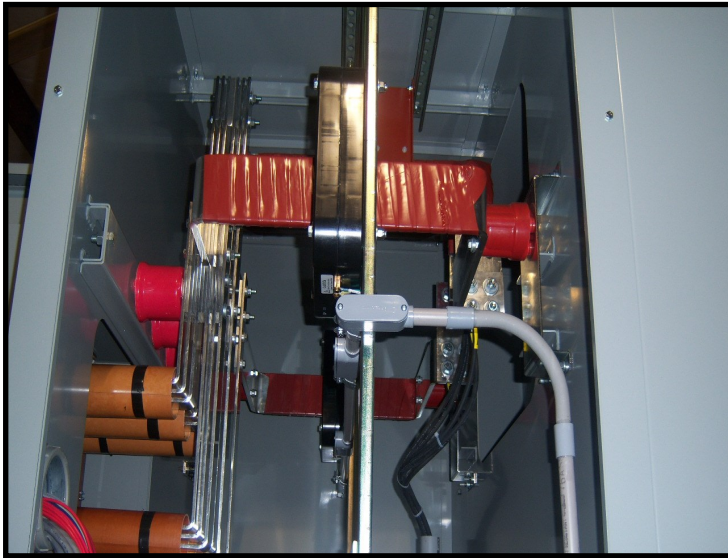
Mounted in a modular cubicle as shown in (figure 1), the switch can be of 400 to 1200 A ratings for either incoming, bus-tie applications and feed applications with fusing included if needed.

Figure 1

CIRCUIT BREAKERS

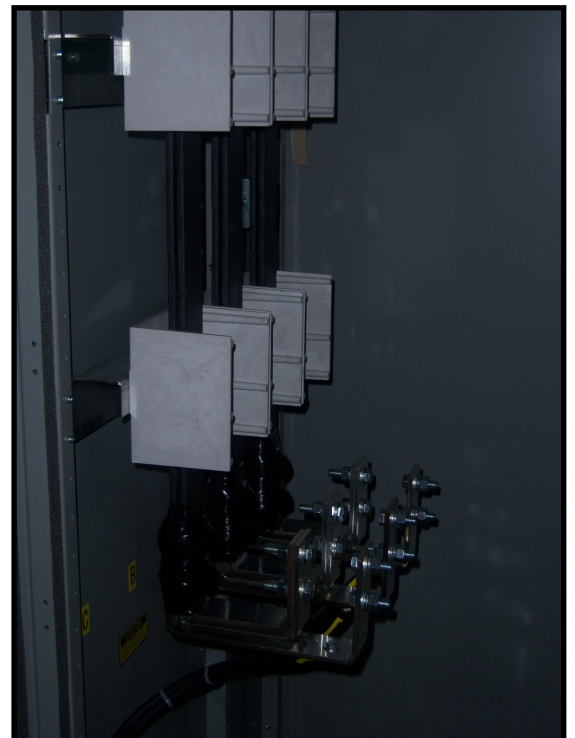
Flush fronted bus transition sections (figure 2) are available to connect a wide variety of circuit breakers for incoming and bus-tie arrangements.

Figure 2



Outgoing cabling options: Bottom Entry and rear, top or bottom entry. Incoming cabling options: Bottom, Top and rear entry.

The incoming 1 to 3 pitch cabinet is for dry type connections can be mounted on either side of the lineup.



NEMA E2 STARTER

Basic Standard Features:

- Blown Fuse Indicator
- Loss of Control Power

Standard Optional Extras:

- Motor Grounding
- Mechanical Latch
- IR Monitoring
- KW Monitoring
- Motor Transformer
- Protection Relay
- Top Exit
- PFCC
- RVSS Soft Start
- Transformer or Reactor Start
- Synchronous Solid State Motor Field Control
- Voltage & Current Over & Under Detection
- Custom Components
- NEMA 1 \1A
- NEMA 12
- NEMA 3 House
- Arc Flash Rating
- Mechanical indication of Isolation

The standard enclosure is a NEMA I, ventilated or non-ventilated enclosure depending on starter size. In addition the starters are designed to comply with the requirements of IEC - 144 - 1P31, and IEC - 298 - 1PH3 with respect to providing protection against falling liquids and protection against approach to live or moving parts by objects of thickness greater than 1/10 inch.

Standard paint finish is light grey semi-gloss powder coat., color ANSI 61.

Main Fuse Protection

The equipment incorporates current limiting power fuses specifically designed for vacuum contactor motor starting duties, giving several major benefits: —

- Ability to interrupt all fault currents beyond the capability of the contactor, up to the maximum fault level of the system.
- High current rating in a small size.
- Full protection co-ordination between fuses and overload relay.
- Bolted connections to insure low loss.

The use of the fused contactor combination has the added benefit of allowing smaller cables to be used than would be possible with circuit breakers, resulting in considerable savings.

Advantages of EMICC

- The ability to design and engineer a custom and reliable solution to complex and unique application requirements.
- Custom solutions can be integrated into our standard line-up for a clean packaged design.
- We strive to provide quick knowledgeable service and support for all customer needs.
- Our ability to provide unique solutions makes us a step above the competition.

- **Narrow width and shallow depth benefits with better space saving than other arrangements.**

- **Ratings to 600 A**

- **UL 347**

- **UL 508A**

- **CSA 22.2**

- **NEMA ICS**

- **IEEE C37.20.7 type 2B**

Electrical Specification

HMC1072 is designed to the following parameters:

Rated voltage — 7200 V

Busbars

Continuous current — 700, 1000, 1200, 2000, 2400 A
 Peak withstand current — 167 kA on first asymmetrical peak,
 — 130 kA rated momentary withstand current
 Short time current — 50 kA r.m.s. for 1 or 3 seconds
 Impulse level — 60 kV BIL
 Dielectric Test (Hi-Pot Rating) — 20 kV for 60 seconds
 Insulation — Busbar insulation

	12.8" Wide (single barreled fuses)			25.6" Wide (double barreled fuses)			25.6" Wide (force ventilated double barreled fuses)		
	2400V	4160V	6900V	2400V	4160V	6900V	2400V	4160V	6900V
Supply voltage	2400V	4160V	6900V	2400V	4160V	6900V	2400V	4160V	6900V
Continuous current	265A	265A	265A	430A	430A	430A	560A	560A	560A
Motor duty	1100hp	2000hp	3300hp	1900hp	3300hp	5500hp	2500hp	4400hp	7200hp
Transformer duty – limited to an inrush of less than 9000A peak	1050kVA	1870kVA	3100kVA	1785kVA	3095kVA	5100kVA	2325kVA	4030kVA	6685kVA

Power Module

Short time overload — 12 kA r.m.s. for 1 second
 Interrupting rating (Fuse protected) — 200 MVA at 2300V
 — 400 MVA at 4600V
 — 570 MVA at 6900V
 Control Supply — 120V, 50/60 Hz (rectified for contactor)
 960 w close 2400/7200V
 135 w hold

Test Certification

HMC1072 has been independently tested to the following ratings:
 Rated short circuit withstand current of bus system: 50 kA for 3 seconds
 equivalent to: 570 MVA at 6900V
 Impulse Voltage Withstand on starter (BIL) 45kV standard 60kV with arrestors
 Rated short circuit withstand current of starter grounding system: 50 kA 1 second
 130 kA peak
 Test Certificates are available for inspection.

Compliance with standards

The design of HMC1072 complies with the requirements of NEMA national standards and IEC international standards: —

NEMA No.	— 1978	UL 347
ICS 1	— 1978	UL 508
ICS 2		ICS 6
CCI Electrical Power Connectors		CSA 22.2 No. 253
Type 1 to ICS 6	— 1978	IEEE C37.20.7 type 2B
IEC No.		
298	HV Metal Enclosed Equipment	
129	HV Isolators and grounding switches	
282	HV Fuses	
470	HV Contactors	
144	Degree of protection — LV enclosures	



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