

# Motor Control Centers

SPEEDFAX™ 2017



tiastar Motor Control Center



Solid State Starter Class 14



ESP200 Solid State Overload

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## Motor Control Centers at Siemens

Motor control centers (MCC) have come a long way since they were introduced in 1937 as a way to save floor space by placing several starters in a single cabinet. Modern processes and facilities now dictate that motor control centers should display a high level of intelligence as well. They must deliver vital operating information; plus provide automation features, optimal control, and critically fast communications to meet even the most demanding applications. Ideally, the best-of-the-best must also save installation time and money. Siemens MCCs are designed as self-contained modular units. They come with rear-mounted, self-aligning copper stabs that firmly grasp onto the bus. Brackets also guide the placement of units, further assuring positive engagement with the bus.

### tiastar MCC

Siemens tiastar MCC is based on the Furnas System/89™ MCC introduced in 1980 and represent the state-of-the-art motor control technology, with a modular, open architecture design. High performance and quality expectations have been researched at the planning stage and throughout the construction stage. The Siemens tiastar MCC has many features and options to meet your specific needs. Requirements such as the standard isolated vertical bus to fully insulated and isolated vertical bus and standard 22mm to 30mm pilot devices.

Heavy gauge steel is used for framing and side panel; sections are separated by 14 gauge steel barriers that are formed to provide rigidity and durability. The modular units implement all the motor protection and control functions, determine operational, diagnostic and statistical data, and organize communications data between the automation system and the motor feeder.

### tiastar SMART MCC

Siemens tiastar Smart MCC with PROFIBUS-DP Communications combines heavy-duty construction and user friendly features. These intelligent units deliver detailed diagnostics by communicating with starter units, variable frequency drives, reduced voltage soft-start units, circuit breakers, or power meters via PLC/DCS. This means overload relays, linked to the PLCs, can now deliver detailed motor management data at speeds previously unheard of. PROFIBUS-DP, the backbone of the system, greatly simplifies I/O wiring. Also, custom communication options such as PROFINET and Modbus RTU are available.

### Domestic Design Standards

The following are the principal domestic standards which apply to motor control center design, testing, construction and application. The tiastar motor control center complies fully with the latest version of all these standards.

### NEMA

- AB-1 Molded Case Circuit Breakers
- ICS 1 General Standards for Industrial Control
- ICS 2.3 Industrial Control Systems: Instructions for the Handling, Installation, Operation, and Maintenance of Motor Control Centers
- ICS 18 Standard for motor control centers

### UL

- 845 Motor Control Centers
- 508 Industrial Control Equipment
- 891 Switchboard Design
- 94 Test for Flammability of Plastic Materials for Parts, Devices, and Appliances
- 489 Molded Case Circuit Breakers and Circuit Breaker Enclosures
- 991 Tests for Safety-related Controls Employing Solid-state Devices

### NFPA – National Fire Protection Association

- 70 National Electrical Code

## Low Voltage Seismic Compliance

Today, strict seismic requirements are not limited to areas prone to earthquakes. Engineers in all locations must be aware of, and comply with, earthquake protection regulations. In addition to construction materials and techniques, these regulations cover non-structural building systems, including electrical components. In critical applications, such as healthcare facilities, these components must be designed to go beyond surviving an earthquake, to remain in operation after the event is over.

At Siemens, we are committed to making it easier for you to comply with all building requirements, including seismic ratings.

Please contact your Siemens representative for complete details on seismic rating compliance for specific products and configurations.

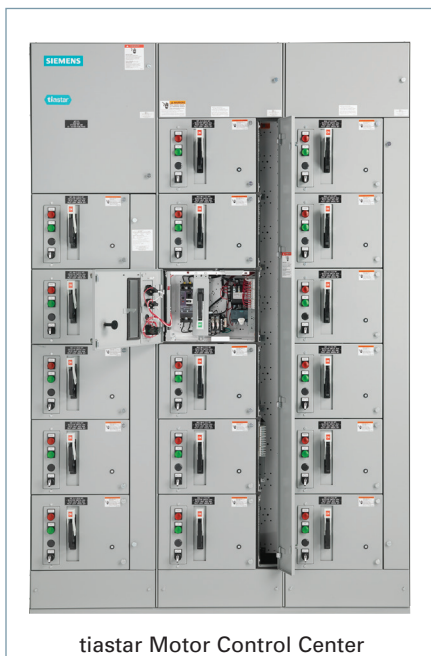
The purpose of this compliance assessment is to document the seismic compliance of tiastar motor control center to the following building codes:

Building code	Edition
Uniform Building Code (UBC)	1997
BOCA National Building Code (BOCA)	1999
Standard Building Code (SBC)	1999
California Building Code (CBC)	2013
International Building Code (IBC)	2012

Earthquake loading compliance tests (shake tests) were performed at Clarke Dynamic Test Laboratories in accordance with ICC-ES-AC 156 and ASCE 7-10.

### Notes:

1. tiastar motor control centers are certified to the stringent seismic requirements of California OSHPD (Office of Statewide Health Planning and Development). Approval # OSP-0074-10. For details, refer to: <http://www.oshpd.ca.gov/FDD/Pre-Approval/>.
2. The codes and standards referenced in this document are published by independent organizations, institutes, or agencies. All copyrights and trademarks related to such codes and publications and the use thereof belong to the entities owning rights to the same.
3. These test results indicate third-party analysis of the Siemens product for compliance to the referenced codes and editions. Nothing in this publication should be taken as endorsements, official approvals, or official test results provided by the publishers of the referenced codes or any code enforcement authorities.



tiastar Motor Control Center

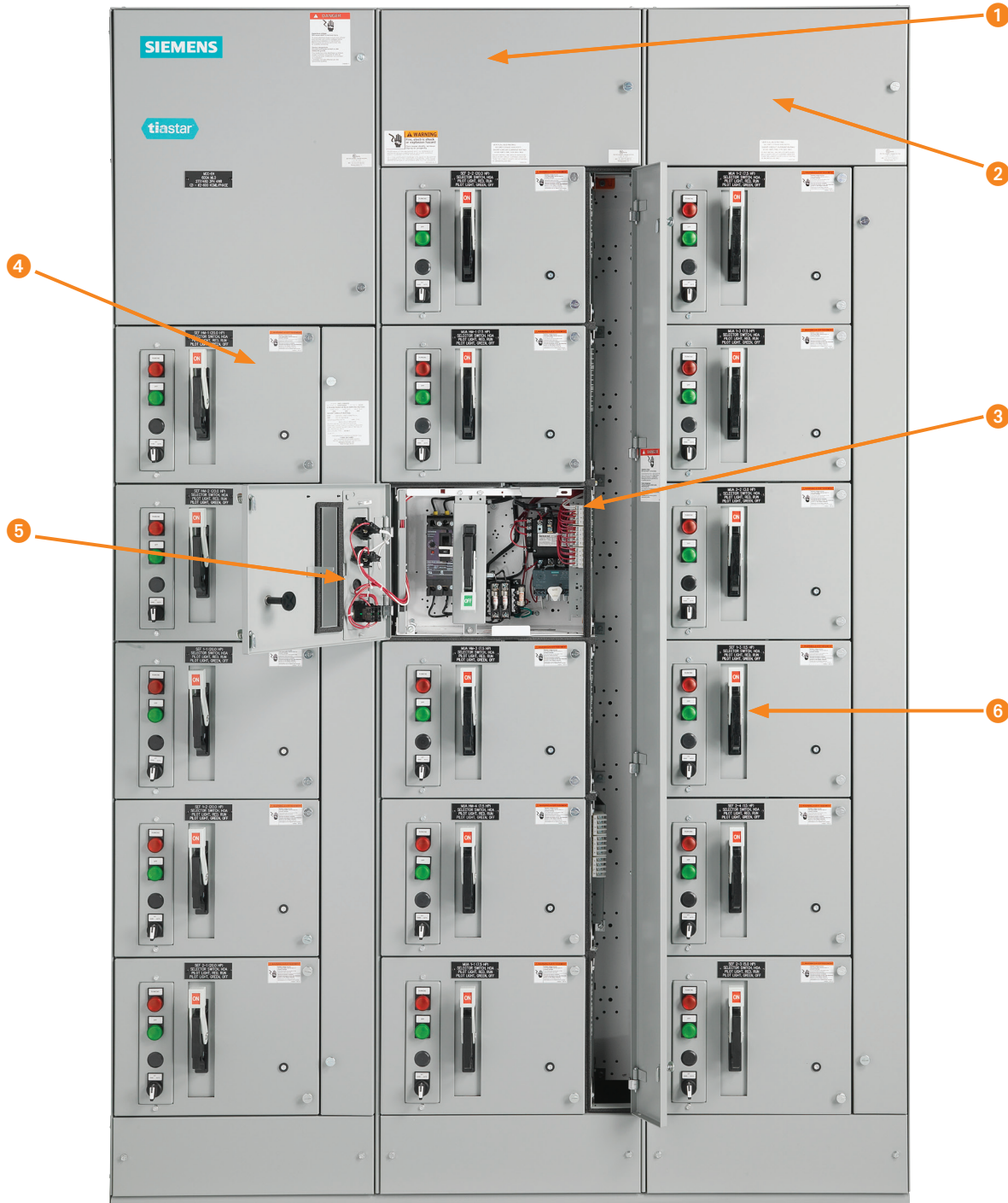
# tiastar Motor Control Centers

## Quality Features Exceed Standards

Siemens tiastar motor control centers are composed of a number of vertical sections bolted together. That allows for future addition of MCC vertical units so the equipment can expand with customer needs. The standards structure is 90 in. (2286 mm) high, plus a 1.125 in.

(29 mm) high channel sill. Front-only structures can be either 15 in. (381 mm) or 20 in. (508 mm) deep. Double deep mounted structures are 30 in. (762 mm) or 40 in. (1016 mm) deep, and consist of two horizontal and vertical buses. This

allows for correct bus phasing on the front or rear. Siemens provides a 21 in. back-to-back design, consisting of a common horizontal and vertical bus structure, for applications where available footprint is limited.

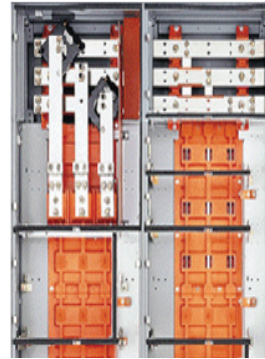




## Features



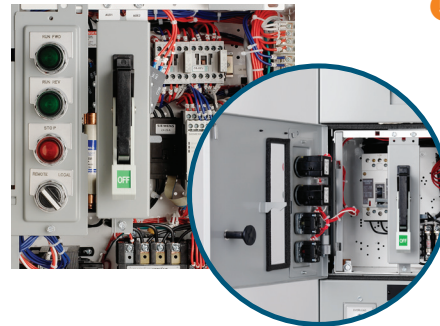
1 Entire horizontal bus assembly is in top 12" of the vertical section



4 Isolated and insulated vertical bus assembly (Optional)



2 Clear Lexan® horizontal wireway barrier



5 Dual location pilot device panel



3 Plug-in units with integrated racking handles



6 Industry's best unit operating handle

### Important Additional Features:

- All wiring and components meet or exceed the requirements of UL, CSA, NEMA, EEMAC, and NEC
- Pre-wired components are professionally harnessed to industrial terminal blocks
- Full depth wire tie rods are standard in each vertical wireway
- White interior increases visibility for easy wiring, maintenance and inspection
- Modular units are fully interchangeable
- Each tiastar MCC is designed to satisfy your most exacting specifications
- White on black base operating handle is easy to identify

### Dimensions

Structure		
Height	91.125 in.	(2315 mm)
Front Mounted Only Structure (FO)		
Width	20 in.	(508 mm)
	24 in.	(610 mm)
	30 in.	(762 mm)
	40 in.	(1016 mm)
	50 in.	(1270 mm)
	60 in.	(1524 mm)
Depth	15 in.	(381 mm)
	20 in.	(508 mm)
Back to Back Structure (BTB)		
Width	20 in.	(508 mm)
	30 in.	(762 mm)
Depth	21 in.	(533 mm)
Double Deep MCC		
Depth	31 in.	(787 mm)
	41 in.	(1441 mm)
Vertical Wireway		
Height	72 in.	(1829 mm)
Width	4 in.	(102 mm)
Optional width	8 in.	(203.2 mm)
Depth	10 in.	(254 mm)
Cross Section	38.25 sq. in.	(972 sq. mm)
With Opt width	76.50 sq. in.	(1943 sq. mm)
Top Horizontal Wireway		
Height	12 in.	(305 mm)
Depth	7 in.	(178 mm)
Bottom Horizontal Wireway		
Height	6 in.	(152 mm)
Depth	15 in.	(381 mm)
	20 in.	(508 mm)
	30 in.*	(762 mm)*
	40 in.*	(1016 mm)*
* BTB		
Enclosure Types		
NEMA 1		Indoor
NEMA 1A	Gasketed	Indoor
NEMA 2	Drip proof	Indoor
NEMA 12	Dust tight	Indoor
NEMA 3R	Rainproof	Outdoor (Non walk-in)
Pull Box (Top Hat)		
Height	12 in.	
	18 in.	
	24 in.	
Width	20 in.	
	30 in.	
Depth	15 in.	
	20 in.	

### Structural Gauge Chart

Structural Parts	
Divider Sheets	14 ga.
Side Sheets	14 ga.
Center Bottom Cross Ties	12 ga.
Rear Channel (FO)	13 ga.
Channel Sills	7 ga.
Center-Top Channel	13 ga.
Vertical Bus Mounting Angles	14 ga.
Lifting Angles	7 ga.
Rear Covers	16 ga.
Top Plates	13 ga.
End Covers	16 ga.
Separator Angles	12 ga.
Shelf Brackets	10 ga.
Unit Parts	
Top and Bottom Unit Barriers	14 ga.
Back Pan	13 ga.
	14 ga.
Side Barrier Plate	18 ga.
Angles	14 ga.
Doors	13 ga.
	14 ga.
Finish (Ext.)	
ANSI 61 Light Gray	
Electrostatically applied TGIC-free polyester powder in standard.	

### Bus

Horizontal Bus (A)	600A	Cu
	800A	Cu
	1200A	Cu
	1600A	Cu
	2000A	Cu
	2500A*	Cu *NEMA 1 only
	600A	Al
	800A	Al
	1200	Al
	Vertical Bus (A)	300A
	600A	Cu
	800A	Cu
Neutral Bus (Bottom Mounted) (A)	600A	Cu
	800A	Cu
	1200A	Cu
	1600A	Cu
Options	Full Neutral Cu Neutral Landing Pad	
Bus Bracing (KA Sym)	42KA	
	65KA	
	100KA*	* Cu Only
Barriers		
Isolation Barrier	Grounded sheet steel with stab openings	
Insulated & Isolated Barrier	Glass filled polyester sandwich that isolates and insulates each phase from the others and the bus from the front and rear compartments	
Removable covers	Inserts to cover unused openings in V-bus barrier	
Automatic shutter mechanism	Option available for the stab in location of each plug-in unit and requested future space. Standard in Arc Resistant MCCs.	
Ground Bus		
Horizontal (Bottom Mounted) (A) Required for UL labeling	300A	Cu
	600A	Cu
	600A	Al
Vertical (A)*	300A	Cu
* Available with motor ground terminations		
Plating		
All power bus, tin plated is Standard		
Silver plating available by request (Cu only)		
Incoming Line Terminations		
Incoming line arrangements are available in many configurations from 600A to 2500A		

### Weight Table

Dimensions Inches (mm)				Shipping weight for NEMA 1, 2, and 12	Weights per Section in lbs (Kg) for NEMA 3R
H	W	D	Type		
91.125 (2315)	20 (508)	15 (381)	FO	550 (250)	650 (295)
	20 (508)	20 (508)	FO	650 (295)	700 (318)
	30 (762)	15 (381)	FO	700 (318)	800 (363)
	30 (762)	20 (508)	FO	850 (386)	900 (409)
	20 (508)	21 (533)	BTB	670 (304)	N/A
	30 (762)	21 (533)	BTB	880 (400)	N/A

### Wiring Specifications

Control on Units	16 ga. copper	
	105°C	
	600V	
Interconnection control wiring between Units	14 ga. copper	
	105°C	
	600V	
Power wiring—Sized to suit maximum HP rating of unit	14 ga. to 2 ga. copper	105°C
		600V
	1 ga. to 500 kcmil copper	105°C
		600V

Siemens MCC's are available as either Class I or Class II assemblies utilizing either Type A, Type B, or Type C wiring as defined in NEMA ICS18-2001. Below are the NEMA class and type definitions:

### Class I — Independent Units

Class I motor control centers shall consist of mechanical groupings of combination motor control units, feeder tap units, other units, and electrical devices arranged in a convenient assembly. The manufacturer shall furnish drawings that include:

- a. Overall dimensions of the motor control center, identification of units and their location in the motor control center, locations of incoming line terminals, mounting dimensions, available conduit entrance areas, and the location of the master terminal board if required (Type C wiring only).
- b. Manufacturer's standard diagrams for individual units and master terminal boards (Type C wiring only) consist of one or more drawing(s) that:
  1. Identify electrical devices.
  2. Indicate electrical connections.
  3. Indicate terminal numbering designations.

**Note:** When a combination schematic and / or wiring diagram for a unit is supplied showing optional devices, the manufacturer shall provide information to indicate which devices are actually furnished.

### Class II — Interconnected Units

Class II motor control centers shall be the same as Class I motor control centers with the addition of manufacturer furnished electrical interlocking and wiring between units as specified in overall control system diagrams supplied by the purchaser. In addition to the drawings furnished for Class I motor control centers, the manufacturer shall furnish drawings that indicate factory interconnections within the motor control center.

### Class I-S and II-S — Motor Control Centers With Custom Drawing Requirements

Class I-S and II-S motor control centers shall be the same as Class I and II except custom drawings shall be provided in lieu of standard drawings as specified by the user. Examples of custom drawings are:

- Special identifications for electrical devices
- Special terminal numbering designations
- Special sizes of drawings

The drawings supplied by the manufacturer shall convey the same information as drawings provided with Class I and II motor control centers, additionally modified as specified by the user.

### Types of Wiring

#### Type A

User field wiring shall connect directly to device terminals internal to the unit and shall be provided only on Class I motor control centers.

#### Type B

a. Type B user field load wiring for combination motor control units size 3 or smaller shall be designated as B-D or B-T, according to the following:

- B-D connects directly to the device terminals, which are located immediately adjacent and readily accessible to the vertical wireway.
- B-T connects directly to a **load** terminal block in, or adjacent to, the unit.

b. Type B user field load wiring for combination motor control units larger than size 3, and for feeder tap units, shall connect directly to unit device terminals.

c. Type B user field **control** wiring shall connect directly to unit terminal block(s) located in, or adjacent to, each combination motor control unit.

#### Type C

User field control wiring shall connect directly to master terminal blocks mounted at the top or bottom of those vertical sections that contain combination motor control units or control assemblies which shall be factory wired to their master terminal blocks. User field load wiring for combination motor control units, size 3 or smaller, shall connect directly to master terminal blocks mounted at the top or bottom of vertical sections. Motor control unit load wiring shall be factory wired to the master terminal blocks. User field load wiring for combination motor control units larger than size 3, and for feeder tap units, shall connect directly to unit device terminals.

### Type A

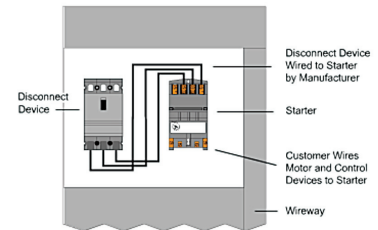


Figure 1. Class I, Type A Wiring

### Type B

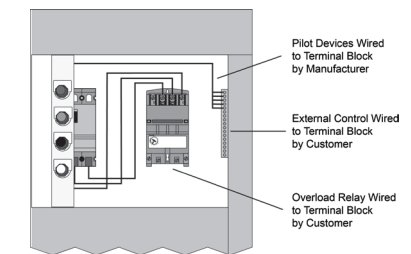


Figure 2. Class I, Type B-d Wiring

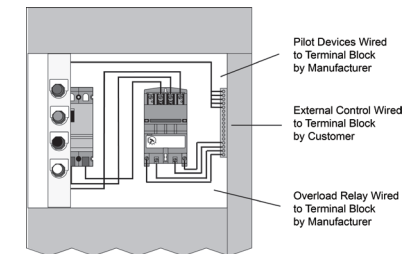


Figure 3. Class I, Type B-t Wiring

### Type C

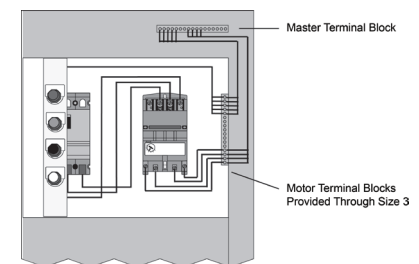


Figure 4. Class I, Type C Wiring

The National Electrical Code establishes very specific guidelines for minimum cable bending space within motor control centers. Figures 1 through 5 below describe the most common arrangements for terminating main incoming power cables in the MCC. Consult Siemens for incoming line compartment braced for 100,000 amperes symmetrical, short circuit.

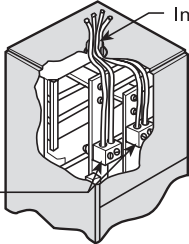
### Incoming Cable Space

Description of Incoming Service	Top or Bottom Incoming Section	Cable Entry Top or Bottom	Space Requirements in Inches (mm)	Notes
≤ 350 kcmil Two per Phase	Top — Directly on Main Bus	Either	None	See Figure 3
≤ 600 kcmil One or Two per Phase	Top	Either	Top Wireway plus 12.0 (305) or 18.0 (457)	See Figure 1
≤ 600 kcmil Three or Four per Phase	Top	Top	Top Wireway plus 18.0 (457)	See Figure 1
750 kcmil One or Two per Phase	Top	Top	Top Wireway plus 24.0 (607)	—
350 kcmil One or Two per Phase	Bottom	Bottom	Bottom Wireway plus 18.0 (457)	600 A Maximum See Figure 2
≤ 600 kcmil One or Two per Phase	Bottom	Bottom	Bottom Wireway plus 24.0 (610)	600 A Maximum See Figure 2
≤ 750 kcmil, up to eight per phase	Top or Bottom	Either	Full Structure	Consult Siemens
≤ 500 kcmil One or Two per Phase ≤ 750 kcmil One per Phase to Main Breaker	Top	Bottom	See Breaker / Disconnect	See Figure 4
≤ 500 kcmil One to Four per Phase ≤ 750 kcmil One per Phase to Main Breaker	Top	Top	See Breaker / Disconnect	See Figure 5
Busway or Cable Feed to Line Reactor	Top or Bottom	Either	Consult Siemens	Consult Siemens

Siemens MCC's are equipped with a 12 in. (305 mm) high, full-width horizontal wireway in the top and 6 in. (152 mm) in the bottom of each structure. A separate vertical wireway connects the top and bottom wiring areas in each vertical section. This wireway is 4 in. (102 mm) wide by 10 in. (254 mm) deep.

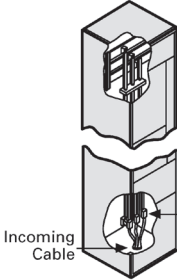
**Note:** All standard Siemens termination schemes shown herein do comply with applicable cable bending requirements of UL and the NEC.

**Figure 1**



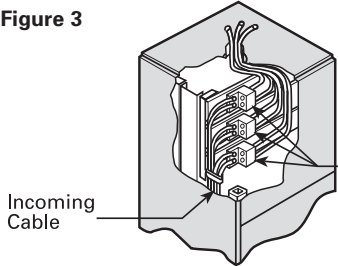
**Main Lugs at Top with Top Cable Entry**  
Can accommodate up to two 600 kcmil cables per phase when using Siemens standard mechanical lugs. A total height of 24 in. (610 mm). This includes 12 in. (305 mm) for the top wireway plus 12 in. (305mm) of unit space. Compression lugs require extra vertical space or the addition of a top hat.

**Figure 2**



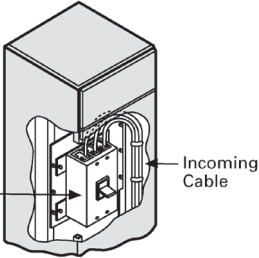
**Main Lugs at Bottom with Bottom Cable Entry**  
Lugs are bolted directly to the bottom of the vertical bus. Can accommodate up to two 350 kcmil per phase in 24 in. (610 mm) high compartment. This includes 6 in. (152 mm) for the bottom wireway plus 18 in. (457 mm) of unit space. Can accommodate up to two 600 kcmil per phase in 30 in. (762 mm) high compartment. This includes 6 in. (152 mm) for the bottom wireway plus 24 in. (610 mm) of unit space.

**Figure 3**



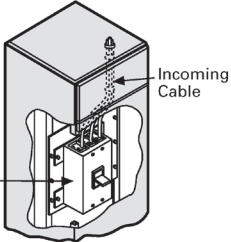
**Main Lugs at Top with Top or Bottom Cable Entry**  
In this arrangement the lugs mount directly on the horizontal bus, eliminating the need to use unit mounting space. The limitation here is 350 kcmil cable per phase.

**Figure 4**



**Main Disconnect with Bottom Cable Entry**

**Figure 5**



**Main Disconnect with Top Cable Entry**

If bottom entry is used, cables must be properly laced and supported based upon the available short circuit current. See dimensional requirements for molded case breakers and fused switches, consult local sales office.

### Heavy Duty Starters

Size 00–4 magnetic starters include the following standard features:

- Rugged Industrial Design
- Half Sizes for Cost and Space Savings
- Dual Voltage, Dual Frequency Coils
- Solid State or Ambient Compensated Bimetal Overload Protection
- Wide Range of Accessories
- Easy Coil Access
- Overload Test Feature
- Straight Thru Wiring
- Gravity Dropout
- Large Silver Cadmium Contacts
- UL listed file #E14900 (class 14, 22, 30, 40 & 43)
- CSA certified file #LR 6535 (class 14, 22, 30, 40 & 43)



**Solid State Starter Class 14**

### Application

Heavy Duty starters are designed for across the line starting of single phase and polyphase motors.

These controls are available in NEMA Sizes 00 through 8. In addition to the usual NEMA Starter Sizes, Siemens offers three exclusive Half Sizes; 1¼, 2½ and 3½. These integral sizes offer the same rugged, industrial construction as our NEMA Sizes and ensure efficient operating performance. Half Sizes provide a real cost savings by cutting down on over capacity when NEMA Sizes exceed the motor ratings. All Siemens Heavy Duty controls, including our popular Half Sizes comply with applicable NEMA and UL tests.

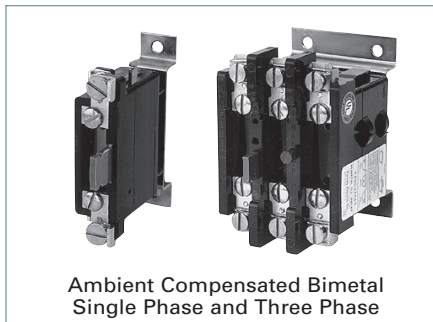
All starters are supplied with a NO holding interlock that in conjunction with an appropriate pilot device will provide low voltage protection or release.

NEMA starters are ideal for applications requiring dependability and durability. Typical applications include use with machine tools, air conditioning equipment, material handling equipment, compressors, hoists and various production and industrial equipment as well as in demanding automotive applications.



### Overload Protection

Siemens understands customer needs vary from motor to motor. That is why we offer 4 lines of overload protection. For basic needs you can specify bi-metal ambient compensated overloads. If single phase is a concern our customers can specify ESP200, and for the most advanced motor protection, customers can consider SIMOCODE overloads that provide detailed information and control.



Ambient Compensated Bimetal Single Phase and Three Phase

#### Ambient Compensated Bimetal Overloads

These thermal type overload relays are used to protect motors from excessive heat resulting from sustained motor overloads, rapid motor cycling and stalled rotor conditions. Although these devices function based on thermal principles they are designed to compensate for the ambient air temperature surrounding the overload. This helps prevent the occurrence of nuisance tripping when there are high surrounding ambient temperatures. The percentage of overload determines the length of time required to open the circuit.

#### Ambient Compensated Bimetal Overloads

- Automatic or manual reset adjustment
- A manual test button is provided to test the operation of the 3-pole overload relay control contacts
- ±15% nominal trip current adjustment
- Accept either standard Class 20 or Quick Trip (NEMA Class 10) heater elements without any other changes or adjustments
- Available with a normally open contact for an alarm circuit (SPDT) up to 60A
- Compensated bimetal overload relays provide a constant trip time in ambient temperatures from -20°F to +170°F for a given heater rating
- UL Listed File #E22655 or Component Recognized
- CSA Certified File #LR6535



ESP200 Solid State Overload

#### ESP200 Solid State Overloads

Designed for a wide variety of applications. The field selectable Trip Class 5, 10, 20 or 30 can easily be set by 2 DIP switches. This eliminates the guess factor of an application requirements and provides reduced inventory for multiple applications. The inherent benefits of the ESP200 ultimately results in cost savings for the user.

ESP200 has a 4:1 current adjustment range with a fine adjustment dial labeled in full load amps. The heat-less overload minimizes the heat trapped in the enclosures, reduces cost for ventilation or cooling. Easily accessible Reset button, provides visible and audible indications to ensure the tripped overload is ready to re-start.

Designed to replace thermal, or ESP100 overload relays for any application. It has the same dimensions and footprint of the ESP100 overload relays. It can be directly coupled to the contactors or remotely mounted. In addition to the NEMA contactor applications, it also can be used with other types of controllers for applications requiring DP or IEC contactors. As a retrofit for other brands, it is used with a plate available for retrofitting competitive products.

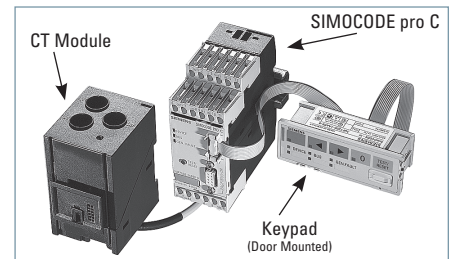
#### SIMOCODE pro

SIMOCODE pro is the latest generation of Motor Management System (“Smart Overload”) bringing a new level of flexibility and functionality within the Siemens smart motor control center. By means of a PROFIBUS DP interface, it can easily be linked to higher-level automation systems. SIMOCODE pro implements all motor protection and control functions, determines operational, diagnostic and statistical data and organizes the communication between the automation system and MCC bucket.

The SIMOCODE pro consists of two device series with different levels of functionality:

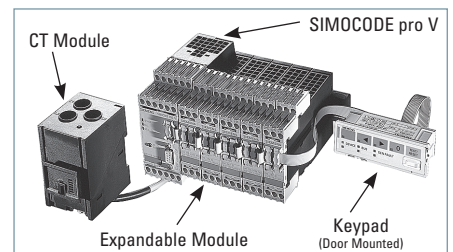
#### SIMOCODE pro C (Compact)

The compact motor management system can be used for Full Voltage Non-reversing (FVNR) starters, Full Voltage Reversing (FVR) starters, and base overload functionality.



#### SIMOCODE pro V (Variable)

The variable motor management system has an even greater range of functions, including voltage and power monitoring and expandable modules for additional I/O, as well as temperature and ground fault protection.



**Note:** For detailed information on the SIMODE pro please contact the local Siemens Sales Office.

## SIRIUS Soft Starters

### Overview

The advantages of the SIRIUS soft starters at a glance:

- Soft starting and soft stop
- Stepless starting
- Reduction of current peaks
- Avoidance of mains voltage fluctuations during starting
- Reduced load on the power supply network
- Reduction of the mechanical load in the operating mechanism
- Considerable space savings and reduced wiring compared with mechanical reduced voltage starters
- Maintenance-free switching
- Fits perfectly in the SIRIUS modular system

## SIRIUS 3RW40

SIRIUS 3RW40 soft starters include soft start and soft stop, and internal bypass. At the same time they come with additional functions, i.e. selectable solid-state motor overload, intrinsic device protection and adjustable current limiting, as well as a new patented two-phase control method (Polarity Balancing) that is unique in this rating range.

SIRIUS 3RW40 soft starters are part of the SIRIUS modular system. This results in advantages such as identical sizes and a uniform connection system. Thanks to their particularly compact design, SIRIUS 3RW40 soft starters are only half as big as comparable wye-delta starters. Hence they can be mounted in compact space requirements in the control cabinet. Configuring and installation are carried out quickly and easily thanks to the 3-wire connection.



SIRIUS 3RW40 for three-phase motors Soft starters rated up to 300 Hp (at 460 V) for standard applications in three-phase power systems. Extremely small sizes, low power losses and simple commissioning are just three of the many advantages of the SIRIUS 3RW40 soft starters.

### Applicable standards

- IEC 60947-2
- UL/CSA #E143112

### Application areas

- Fans
- Pumps
- Building/construction machines
- Presses
- Escalators
- Transport systems
- Air conditioning systems
- Ventilators
- Assembly lines
- Operating mechanisms

## SIRIUS 3RW44

In addition to soft starting and soft stopping, the solid-state SIRIUS 3RW44 soft starters provide numerous functions for higher-level requirements. They cover a rating range up to 800Hp at 460 V in the inline circuit.

The SIRIUS 3RW44 soft starters are characterized by a compact design for space-saving and clearly arranged control cabinet layouts. For optimized motor starting and stopping, the innovative SIRIUS 3RW44 soft starters are an attractive alternative with considerable

savings potential compared to applications with a frequency converter. The new torque control and adjustable current limiting enable these high feature soft starters to be used in nearly every conceivable task. They reliably mitigate the sudden torque applications and current peaks during motor starting and stopping. This creates savings potential when calculating the size of the control-gear and when servicing the machinery installed. Be it for inline circuits or inside-delta circuits – the SIRIUS 3RW44 soft starter offers savings especially in terms of size and equipment costs.

Combinations of various starting, operating and ramp-down possibilities ensure an optimum adaptation to the application specific requirements. Operating and commissioning can be performed by means of the user-friendly keypad and a menu prompted, multi-line graphic display with background lighting. The optimized motor ramp-up and ramp-down can be effected by means of just a few settings with a previously selected language. Four-key operation and plain-text displays for each menu point guarantee full clarity at every moment of the parameterization and operation.

### Applicable standards

- IEC 60947-4-2
- UL/CSA #E143112

### Application areas, e.g.

- Pumps
- Mills
- Ventilators
- Saws
- Compressors
- Crushers
- Water transport
- Mixers
- Conveying systems and lifts
- Centrifuges
- Hydraulics
- Industrial cooling and refrigerating systems



## MICROMASTER 440

### Application

The MICROMASTER 440 inverter is suitable for a variety of variable-speed drive applications. Its flexibility provides for a wide spectrum of applications. These also include cranes and hoisting gear, high-bay warehouses, production machines for food, beverages and tobacco, packaging machines etc.; i.e. applications which require the frequency inverter to have a higher functionality and dynamic response than usual. The inverter is especially characterized by its customer-oriented performance and ease of use. Its large mains voltage range enables it to be used all over the world.

### Design

The MICROMASTER 440 inverter has a modular design. The operator panels and modules can be easily exchanged.

### International standards

- The MICROMASTER 440 inverter complies with the requirements of the EU low voltage guideline
- The MICROMASTER 440 inverter has the **CE** marking
- acc. to **UL** and **cUL** certified
- **c-tick**

### Main characteristics

- Easy, guided start-up
- Modular construction allows maximum configuration flexibility
- Six programmable isolated digital inputs
- Two scaleable analog inputs (0 V to 10 V, 0 mA to 20 mA) can also be used as a 7th/8th digital input
- Two programmable analog outputs (0 mA to 20 mA)
- Three programmable relay outputs (30 V DC/5 A resistive load; 250 V AC/2A inductive load)
- Low-noise motor operation thanks to high pulse frequencies, adjustable (observe derating if necessary)
- Complete protection for motor and inverter.

### Options (overview)

- EMC filter, Class A/B
- LC filter and sinusoidal filter
- Line commutating chokes
- Output chokes
- Gland plates
- Basic Operator Panel (BOP) for parameterizing the inverter
- Plain text Advanced Operator Panel (AOP) with multi-language display
- Communication modules
  - PROFIBUS
  - DeviceNet
  - CANopen
- Pulse encoder evaluation module
- PC connection kits
- Mounting kits for installing the operator panels in the control cabinet doors
- PC start-up tools executable under Windows 98 and NT/2000/ME/XP Professional
- TIA integration with Drive ES

### SINAMICS G120C

SINAMICS G120C has been especially designed for an economic, space-saving and easy-to-operate frequency converter providing a multitude of functions. This device combines in particular compactness with superior power density and is characterized by fast installation and commissioning.

#### Smallest size

- Compact design (integrated braking chopper)
- Fast mechanical installation (i.e. pluggable terminals)

#### Easy to use

- Simple, optimized commissioning with the STARTER tool
- Effective, adequate parameter set (simple storing and cloning functions using IOP, BOP-2 or SD card)
- Usable with IOP or BOP-2 operator panels

#### Leading edge technology

- Energy-efficient, encoder-less vector control - automatic flow reduction with V/F ECO
- Safety Integrated (Safe Torque Off)
- Communication PROFIBUS DP, PROFINET, CAN and USS/ Modbus RTU

#### Application

For industrial and commercial applications (secondary drive in production machines or generally for water/waste water, automotive). Application examples include mixers, extruders, simple pumps, fans, compressors, vibrator motors, simple wire drawing machines.



#### Design

SINAMICS G120C is a compact inverter where the Control Unit (CU) and Power Module (PM) function units are combined in one device. SINAMICS G120C can be integrated into the widest range of applications, either using the integrated digital and analog inputs or via the integrated fieldbus interface (available in the USS/ Modbus RTU, PROFINET, PROFIBUS DP, CANopen versions). Especially the product versions with integrated PROFIBUS DP or Profinet interface make full integration into the Siemens TIA family possible, therefore allowing the advantages of the seamless TIA product family to be fully utilized. SINAMICS G120C devices are preset in the factory so that they can be immediately connected to PROFIBUS DP or Profinet fieldbuses and used without parameterization.



## SINAMICS G120

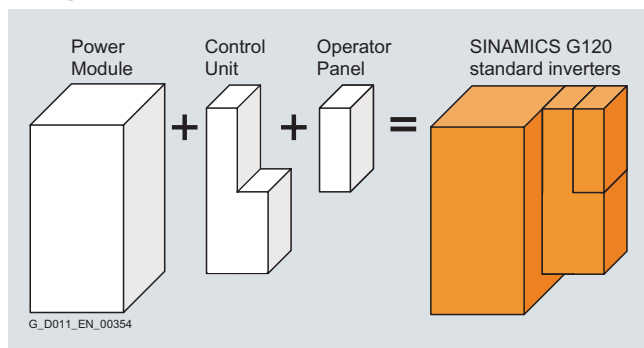
SINAMICS G120 is a modular drive inverter system that comprises various function units. These are essentially: Control Unit (CU) and Power Module (PM). The CU controls and monitors the PM and the connected motor in several operating modes that can be selected. It supports communication with a local or central controller and monitoring devices.

- **With many innovative functions**  
Safety Integrated for safety-relevant machines and systems, capable of regenerative feedback into the line supply for energy saving
- **Fast commissioning**  
STARTER tool and data backup using the BOP-2, IOP or MMC/SD card
- **Efficient and consistent solutions**  
via Totally Integrated Automation (TIA), consistency from SINAMICS through to the automation level

### Application

Machines and plants in industrial and commercial applications (machinery construction, automotive, textiles, chemical industry, printing, steel). Application examples include: Pumps and fans, Compressors, Centrifuges, Conveyor systems.

### Design

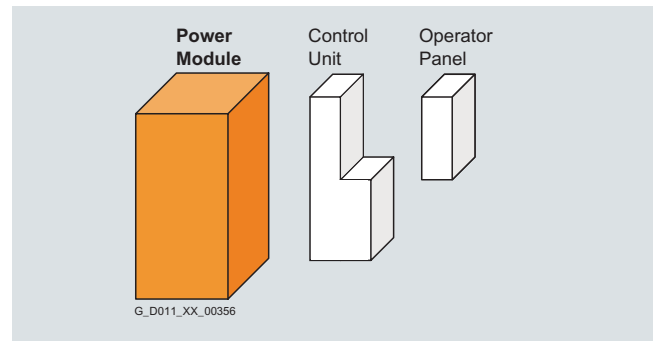


### Application-oriented design of SINAMICS G120

SINAMICS G120 standard inverters are modular inverters for standard drives. Selection of the SINAMICS G120 is reduced to two or three steps thanks to the modular system used.



### Selecting the Power Module



### PM240 Power Modules

PM240 Power Modules are suitable for many applications. The PM240 has an integrated braking chopper in frame sizes FSA up to FSF and has the possibility of connecting a braking resistor. For frame size FSGX, an optional pluggable braking module can be ordered.

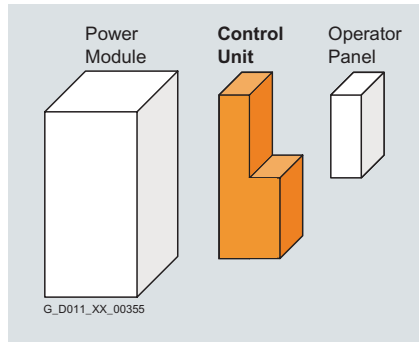
### PM250 Power Modules

PM250 power modules are suitable for the same applications as the PM240, but they are specialized to address conveyor-related applications - where the braking energy is directly fed back into the line supply using the unique technology of Efficient Infeed Technology. This feature provides the ability to feed energy back into the supply system in the generator mode (electronic braking) so that the energy is not wasted in a braking resistor.

## SINAMICS G120 (cont.)

### Selecting the Control Unit

The optimum Control Unit is selected, based on the number of I/Os and any additional functions required such as Safety Integrated or HVAC. The communication options are already integrated and do not have to be additionally ordered or plugged in. Three product series are available corresponding to the particular application.



### CU230 Control Units

The CU230 Control Units have been specifically designed for pump, fan and compressor applications.

### CU240 Control Units

The CU240 Control Units are suitable for a wide range of applications in a general machine construction, such as conveyor belts, mixers and extruders.

### CU250 Control Units

The CU250 Control Unit is particularly suited for drives with high requirements in speed and torque accuracy.

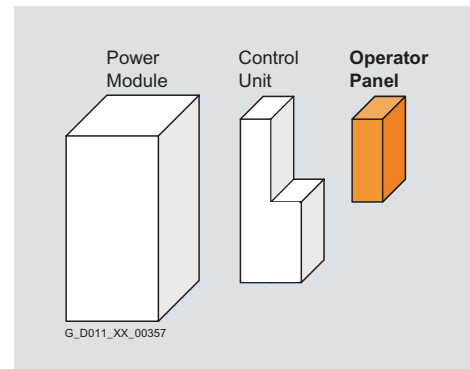
### Selecting Optional System Components

#### Intelligent Operator Panel IOP

Graphic display with bar-type diagrams, e.g. for status values such as pressure or flow rate.

#### Basic Operator Panel BOP-2

Menu navigation and 2-line display permit fast and user-friendly commissioning of the inverter. Simple basic commissioning by simultaneously displaying parameter value, as well as the option of filtering parameters.



## Power Monitoring

Siemens line of power meters provides market leading technology for power quality measurement. These products continually change to meet growing needs for power quality and energy monitoring. Siemens tiastar MCCs are fully capable of installing any of Siemens power meters for your needs.



PAC3200



PAC4200

## PAC3100

The **SENTRON PAC3100** is a powerful compact power monitoring device that is suitable for use in industrial, government and commercial applications, where basic metering and energy monitoring is required. The meter may be used as a stand alone device monitoring over 25 parameters or as part of an industrial control, building automation or global power monitoring system. Metering and monitoring applications range from simple analog volt and amp meter replacements to stand-alone sub-billing or cost allocation installations.

The PAC3100 has many features not usually found in this price class of meters. A large graphical display supports multiple languages and easy to use menus that can be used to set up the meter. The meter also has built in Modbus RTU communications via a RS485 interface. The meter comes standard with two digital inputs and outputs. One output is suitable for pulse output for export/import real and reactive energy. The other output is controllable from an outside source by way of a Modbus register.

## PAC3200

The **SENTRON PAC3200** is a powerful compact power monitoring device that is suitable for use in industrial, government and commercial applications where basic metering and energy monitoring is required. The meter may be used as a stand alone device monitoring over 50 parameters or as part of an industrial control, building automation or global power monitoring system. Metering and monitoring applications range from simple analog volt and amp meter replacements to stand-alone sub billing or cost allocation installations with multiple tariffs.

The SENTRON PAC3200 provides open communications using Modbus RTU/TCP, PROFIBUS-DP, and PROFINET protocols for easy integration into any local or remote monitoring system. Simple configuration of the meter can be done from the front display.

## PAC4200

The **SENTRON PAC4200** is a feature packed power monitoring device that is suitable for use in industrial, government and commercial applications where basic to advanced metering, logging, and I/O is required. The meter may be used as a stand alone device monitoring over 200 parameters or as part of an industrial control, building automation or global enterprise wide monitoring system.

Advanced power quality monitoring and logging applications range from single low voltage breaker / building metering to sub-station main feeder monitoring, sub-billing or cost allocation installations with multiple tariffs. Whether your goal is to reduce operation cost, reduce your carbon footprint or to maintain your power assets, the PAC 4200 meter should be an important part of your power monitoring system.

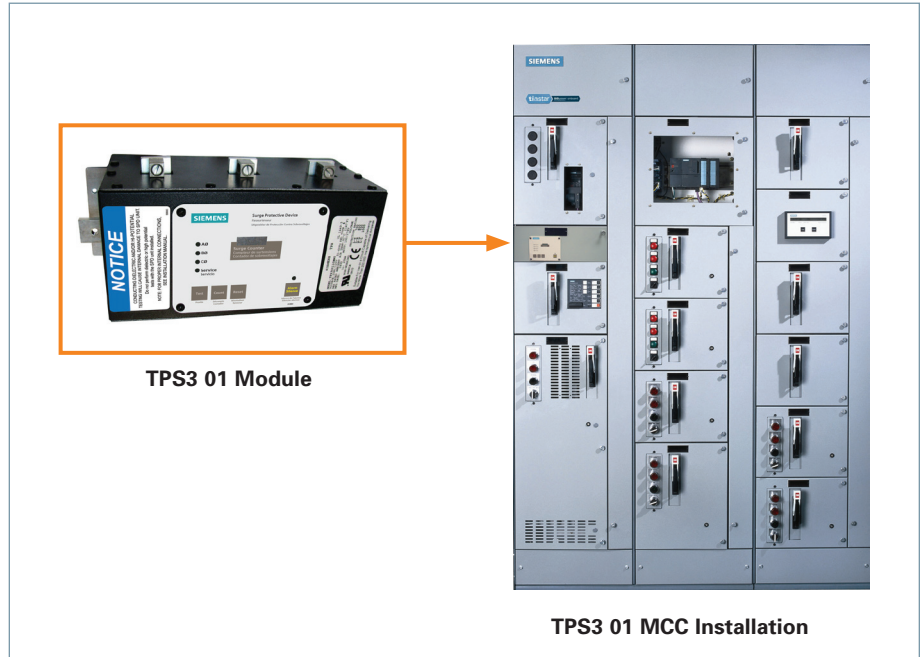
The SENTRON PAC4200 provides open communication using the standard built-in Ethernet Modbus TCP and has the capability of communicating through Optional Modbus RTU, PROFIBUS-DP, and PROFINET protocol modules simultaneously. This allows for easy integration into any local or remote monitoring system. The gateway functionality of this device reduces installation cost by replacing other gateway devices and simplifying wiring.

## TPS3 Integral or Internally Mounted SPDs for MCCs

Siemens Integral TPS3s are UL 1449 4th Edition, factory installed SPDs within our MCCs, utilizing optimal electrical system connections to minimize impedance losses. This results in the some of the industry's best "installed" Voltage Protection Ratings. This SPD has the following features:

### TPS3 01 Features

- UL 1449 4th Edition and UL 1283
- UL 1449-4 Type 2 SPD, UL 1283 Listed, CSA 22.2 No. 269.2, Optional UL 1449 4th Edition Recognized Type 1, CSA 22.2
- 20 kA  $I_n$  (most models)
- 200 kA SCCR (most models)
- UL96A Lightning Protection Master Label Compliant
- 100 –300 kA surge current capacity per phase
- EMI/RFI filtering or Sine Wave tracking
- Standard Monitoring –LEDs, audible alarm, dry contacts, surge counter, and ground references monitoring (GRM) diagnostics.
- 10 year product warranty



### Ordering Information

Catalog # **TPS3**    **01**       **X** **0** **M**

**Voltage Code**

- A** = 120/240 V, 1Ø, 3W
- B** = 120/240 V, 3Ø, 4W
- C** = 120/208 V, 3Ø, 4W
- D** = 240 V, 3Ø, 3W
- E** = 277/480 V, 3Ø, 4W
- F** = 480 V, 3Ø, 3W
- G** = 600 V, 3Ø, 3W (100kA & 150kA Only)
- K** = 380/220 V, 3Ø, 4W
- L** = 600/347 V, 3Ø, 4W
- S** = 400/230 V, 3Ø, 4W

*Please consult the factory for applications requiring SPDs with larger per phase surge current capacities and/or 10-mode style configurations.*

**Surge Current (kA)**

- 10** = 100 kA per phase
- 15** = 150 kA per phase
- 20** = 200 kA per phase
- 25** = 250 kA per phase
- 30** = 300 kA per phase

- 2** = Type 2 SPD (Default) Includes UL 1283 EMI/RFI Filters
- 0** = Type 1 SPD (Consult Factory Prior to Ordering)
- M** = MCC Application
- X** = Surge Counter

- Example: **TPS3C0120X0M** = Type 4 SPD intended for use in Type 1 applications, for a 208/120 V MCC with a surge current capacity of 200 kA per phase and a surge counter option
- When an option is not selected, include a **zero (0)** in the field
- Available Accessory: Ordered Separately  
**RMSIE** = Remote monitor



# tiastar Motor Control Centers

Starter Ratings and Dimensions

Selection Guide

## MCC Starter Ratings and Dimensions

NEMA Size	Maximum Horsepower Rating						Circuit Breaker Type (For Maximum HP at 460V)			Fusible Type (For Maximum HP at 460V)		
	208V	230V	400V	460V	480V	600V	MCP Frame Size (Amp)	Dimensions in inches (mm) Unit Height <sup>①</sup> W= Width, D= Depth	kA Interrupting Rating at 480V <sup>②③</sup>	Standard Disconnect Sw/Fuse Clip Sizes	Dimensions in inches (mm) Unit Height <sup>①</sup> W= Width, D= Depth	kA Interrupting Rating at 480V <sup>②③</sup>

## Full Voltage Non-Reversing (FVNR) and Full Voltage Reversing (FVR) - UL Listed

								FVNR	FVR	IR Std/Opt			FVNR	FVR	IR
1	7.5	7.5	10	10	10	10	125	12 (305)	18 (457)	42/100	30/30	12 (305)	18 (457)	100	
2	10	15	25	25	25	12 (305)		24 (610)	60/60			12 (305)	24 (610)		
3	25	30	50	50	50	18 (457)		30 (762)	100/100			24 (610)	36 (914)		
4	40	50	75	100	100	100	125/250	24 (610)	36 (914)	42/65	ND6 MCS/1200	42 (1067)	48 (1219)	100	
5	75	100	150	200	200	200	250/400	36 (914)	48 (1219)			60 (1524)	60 (1524)		
6 <sup>②</sup>	150	200	300	400	400	400	400/600/ 800	48 (1219)	72 (1829) 30W(762W)	42/65	ND6 MCS/1200	72 (1829)	72 (1829) 30W (762W)	100	
7 <sup>②</sup>	—	—	—	600	600	600	1200	72 (1829) 20W x 20D (508W x 508D)	N/A			72 (1829) 40W x 20D (1016W x 508D)	N/A		

## Full Voltage Contactor (FVC)

1	10.8	11.9	18.7	—	23.8	31	125	12 (305)	100	30/30	12 (305)	100	
2	16.2	17.9	31.2	—	35.8	46.7		12 (305)			60/60		12 (305)
3	32	35	62	—	71	93		18 (457)			100/100		24 (610)
4	48	54	94	—	107	140	125/250	24 (610)	42/65	NXD6 MCS/1200	42 (1067)	100	
5	108	119	206	—	238	311	250/400	36 (914)			JXD6 MCS/400		60 (1524)
6 <sup>②</sup>	198	218	346	—	437	570	600/800	48 (1219) 72 (1829)	65	NXD6 MCS/1200	72 (1829) 30W (762W)	100	
7 <sup>②</sup>	259	286	476	—	572	747	1200	72(1829)			72 (1829) 50W 20D (1270W x 508D)		

## Two Speed, Constant or Variable Torque — UL Listed

								2S2W	2S1W	IR Std/Opt			2S2W	2S1W	IR
1	7.5	7.5	10	—	10	10	125	24 (610)	24 (610)	42/100	30/30	24 (610)	24 (610)	100	
2	10	15	25	—	25	25		24 (610)	24 (610)			60/60	24 (610)		24 (610)
3	25	30	50	—	50	50		36 (914)	48 (1219)			100/100	30 (762)		36 (914)
4	40	50	75	—	100	100	125/250	48 (1219)	60 (1524)	42/100	200/200	36 (914)	48 (1219)	100	
5 <sup>②</sup>	75	100	150	—	200	200	250/400	72 (1829) 30W (762W)	72 (1829) 30W (762W)			72 (1829) 30W (762W)	72 (1829) 30W (762W)		
6 <sup>②</sup>	150	200	300	—	400	400	600/800	72 (1829) 30W (672W)	Consult Siemens	42/100	MD6 MCS/800	72 (1829) 40W (1016W)	Consult Siemens	100	

## Two Speed, Constant Horsepower — UL Listed

								2S2W-CH	2S1W-CH	IR Std/Opt			2S2W-CH	2S1W-CH	IR
1	5	5	7.5	—	7.5	7.5	125	24 (610)	24 (610)	42/100	30/30	24 (610)	24 (610)	100	
2	7.5	10	20	—	20	20		24 (610)	24 (610)			60/60	24 (610)		24 (610)
3	20	25	40	—	40	40		30 (762)	36 (914)			100/100	36 (914)		48 (1219)
4 <sup>②</sup>	30	40	50	—	75	75	125/250	36 (914)	48 (1219)	42/100	200/200	48 (1219)	60 (1524)	100	
5 <sup>②</sup>	60	75	100	—	150	150	250/400	72 (1829) 30W (762W)	72 (1829) 30W (762W)			72 (1829) 30W (762W)	72 (1829) 30W (762W)		
6 <sup>②</sup>	100	150	200	—	300	300	400/600	72 (1829) 30W (762W)	Consult Siemens	42/100	MD6 MCS/800	72 (1829) 40W (1016W)	Consult Siemens	100	

① The addition of oversized CPTs (above 50VA), relays, timers, etc. may increase unit height.  
 ② For other available voltage ratings, consult Siemens.  
 ③ Interrupting ratings are 25kAIC when not UL listed.

④ Fixed mounted units (not plug-in).

Note: For half size starters, contact Siemens.

# tiastar Motor Control Centers

Starter Ratings and Dimensions

Selection Guide

## MCC Starter Ratings and Dimensions (cont.)

NEMA Size	Maximum Horsepower Rating						Circuit Breaker Type (For Maximum HP at 460V)			Fusible Type (For Maximum HP at 460V)		
	208V	230V	400V	460V	480V	600V	Standard Breaker Type	Dimensions in inches (mm) Unit Height <sup>①</sup> W= Width, D= Depth	kA Interrupting Rating at 480V <sup>②③</sup>	Standard Disconnect Sw/Fuse Clip Sizes	Dimensions in inches (mm) Unit Height <sup>①</sup> W= Width, D= Depth	kA Interrupting Rating at 480V <sup>②③</sup>

## Reduced Voltage Autotransformer (RVAT) Non-Reversing, Closed Transition — UL Listed

2 <sup>④</sup>	10	15	25	—	25	25	MCP	RVAT	IR Std/Opt	100/100	RVAT	IR
								42 (1067)			48 (1219)	
3 <sup>④</sup>	25	30	50	—	50	50	MCP	48 (1219)	42/100	200/200	60 (1524)	100
4 <sup>④</sup>	40	50	75	—	100	100		72 (1829) 30W (762W)		JD6MCS/400	72 (1829) 30W (762W)	
5 <sup>④</sup>	75	100	150	—	200	200		72 (1829) 30W (762W)		MD6MCS/800	72 (1829) 30W (762W)	
6 <sup>④</sup>	150	200	300	—	400	400	ND6	Consult Siemens	42/100	ND6MCS/1200	Consult Siemens	100
7 <sup>④</sup>	—	—	—	—	600	600	ND6	72 (1829) 20W x 20D (508W x 508D)		ND6MCS/1200	72 (1829) 40W x 20D (1016W x 508D)	

## Reduced Voltage Wye Delta, Open and Closed Transition

2	20	25	25	—	40	40	MCP	YDO	YDC	IR Std/Opt	100/100	YDO	YDC	IR
								30 (762)	42 (1067)			36 (914)	48 (1219)	
3	25	30	50	—	75	75	MCP	36 (914)	48 (1219)	42/100	200/200	48 (1219)	60 (1524)	100
4	60	60	75	—	150	150		36 (914)	48 (1219)		JD6MCS/400	72 (1829)	72 (1829)	
5 <sup>④</sup>	150	150	150	—	300	300		72 (1829) 30W (672W)	72 (1829) 30W (672W)		LD6MCS/600	72 (1829) 30W (672W)	30W (672W)	

16  
MOTOR CONTROL CENTERS

NEMA Size	Maximum Horsepower Rating						Circuit Breaker Type		
	208V	230V	400V	460V	480V	600V	MCP Frame Size	Dimensions in inches (mm) Unit Height <sup>①</sup>	kA Interrupting Rating at 480V <sup>②</sup>

## Dual Full Voltage Non-Reversing (DFVNR) Unit with Circuit Breaker

1	7.5	7.5	10	—	10	10	125	18 (457)	100
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## Compact Units Available – High Density FVNR

1	7.5	7.5	—	—	10	—	125	6 (152)	100
2	10	15	—	—	25	—		12 (305)	
4	40	50	—	—	100	—		125/250	

## Compact Units Available – High Density FVC

NEMA Size	208V	230V	400V	460V	480V	600V	Dimensions in inches (mm) Unit Height <sup>①</sup>	kA Interrupting Rating at 480V <sup>②</sup>
1	9.7	10.7	—	—	22	—	6 (152)	100
2	16.2	17.9	—	—	37	—		
3	32	35.8	—	—	74	—		
4	48	54	—	—	112	—		

- ① The addition of oversized CPTs (above 50VA), relays, timers, etc. may increase unit height.
- ② For other available voltage ratings, consult Siemens.
- ③ Interrupting ratings are 25kAIC when not UL listed.
- ④ Fixed mounted units (not plug-in).
- ⑤ The addition of relays, timers, etc. will increase unit height.

# tiastar Motor Control Centers

## SINAMICS G120C- Technical Data

Frame Size	Output Ratings				Dimensions - in. (mm) <sup>①</sup>		IR
	LO-OL	LO-OL	HI-OL	HI-OL	Mounting Height	Structure W x D	
	A	hp	A	hp			
A	1.4	0.5	1.1	0.5	18 (457)	20 x 15 (508 x 381)	65ka
A	1.9	0.75	1.4	0.5			
A	2.6	1	1.9	0.75			
A	3.5	2	2.6	1			
A	4.8	2	3.5	2			
A	6.2	3	4.8	2			
A	7.5	3	6.2	3	24 (610)		
B	10.6	5	7.5	3			
B	14.0	10	10.6	5	30 (762)		
C	21.3	15	14.0	10			
C	26.4	15	21.3	15			
C	31.5	20	26.4	15			

① Circuit Breaker, Reactor (Line or Load) and Drive Included.

## SINAMICS G120 Technical Data

Frame Size	Output Ratings				Dimensions - in. (mm) <sup>①</sup>		IR	
	LO-OL	LO-OL	HI-OL	HI-OL	Mounting Height	Structure W x D		
	A	hp	A	hp				
PM240	A	1.2	0.5	1.3	0.5	18 (457)	20 x 15 (508 x 381)	65ka
	A	1.6	0.5	1.7	0.75			
	A	2.0	0.75	2.2	1			
	A	2.9	1	3.1	1.5			
	A	3.8	2	4.1	2			
	B	5.5	3	5.9	3	24 (610)		
	B	7.2	3	7.7	5			
	B	9.5	5	10.2	5			
	C	16.7	10	13.2	7.5	36 (914)		
	C	23.3	15	19	10			
	C	29.8	20	26	15			
	D	35.3	25	32	20	48 (1219)	20 x 15 <sup>②</sup> (508 x 381)	
	D	41.9	30	38	25			
	D	55.8	40	45	30			
	E	69.8	50	60	40	60 (1624)		
	E	83.7	60	75	50			
	F	102.3	75	90	60	72 (1829)	20 x 20 <sup>②</sup> (508 x 508)	
	F	134.9	100	110	75			
F	165.5	125	145	100				
F	190.7	150	178	125	40 x 20 <sup>②</sup> (1016 x 508)			
F	240.0	150	200	150				
Gx	264.3	200	250	200				
Gx	323.8	250	302	250				
Gx	417.4	350	370	300				
PM250	D	35.3	25	32	20	48 (1219)	20 x 15 <sup>②</sup> (508 x 381)	
	D	41.9	30	38	25			
	D	55.8	40	45	30			
	E	69.8	50	60	40	60 (1624)		
	E	83.7	60	75	50			
	F	102.3	75	90	60	72 (1829)	20 x 20 <sup>②</sup> (508 x 508)	
	F	134.9	100	110	75			
F	165.5	125	145	100				

1 Circuit Breaker, Reactor (Line or Load) and Drive Included.

2 Fixed Mounted

### 480V<sup>①</sup> Solid State Reduced Voltage — NEMA 1 MCC Enclosures<sup>②</sup>

Rating HP <sup>③</sup>	RVSS Type <sup>⑦</sup>	Rated Amperes	Dimensions - In. (mm) <sup>④⑤</sup>		IR
			Mounting Height	Structure WxD	
5	3RW40	9	18 (457)	20 x 15 (508 x 381)	100
10	3RW40	19			
15	3RW40	24			
20	3RW40	28			
25	3RW40	34			
30	3RW40	42			
40	3RW40	58	24 (610)		
50	3RW40	70			
75	3RW40	117	36 (914)		
100	3RW40	145			
150	3RW40	205	48 (1219) <sup>⑦</sup>		
200	3RW40	315			
300	3RW40	385	72 (1829) <sup>⑦</sup>	30 x 15 (762 x 381)	65
15	3RW44	26			
20	3RW44	32			
25	3RW44	42			
30	3RW44	52			
40	3RW44	68			
50	3RW44	82			
60	3RW44	100			
75	3RW44	117			
100	3RW44	145			
125	3RW44	180			
150	3RW44	215	48 (1219) <sup>⑦</sup>		
200	3RW44	280			
250	3RW44	385			
400	3RW44	494			
450	3RW44	562			
500	3RW44	693			
600	3RW44	850			
750	3RW44	970	Consult Siemens	42	
800	3RW44	1076	Consult Siemens		

- ① For other available voltage ratings, consult Siemens.
- ② For other enclosure types, consult Siemens.
- ③ Ratings are based on CLASS 20 overloads and 6 starts per Hour. Consult Siemens for other applications.
- ④ Dimensions shown are for circuit breaker or fusible disconnects.
- ⑤ RVSS with bypass and / or isolation contactors require extra mounting space. Consult Siemens for further information.
- ⑥ 3RW40 Units include line side isolation contactor
- ⑦ Fixed mounted units (not plug-in).

### 480V<sup>①</sup> Variable Frequency Drives — NEMA 1A MCC Enclosures<sup>②</sup>

Rating HP <sup>③</sup>	Drive Type	Rated Amperes	Dimensions - In. (mm) <sup>④⑤</sup>		IR	
			Mounting Height	Structure W x D		
2	MM440	4	18 (457)	20 x 15 (508 x 381)	100	
5		10.2				
7.5		16				
10		18.4				
15		26				
20		32				
25		38				
30		45				
40		62				
50		76				
60		90				
75		110				
100		145				
125		178				
150		205				
200		250				
2		MM440	4	18 (457)		20 x 15 (508 x 381)
5			10.2			
7.5			16			
10			18.4			
15	26					
20	32					
25	38					
30	45					
40	62					
50	76					
60	90					
75	110					
100	145					
125	178					
150	205					
200	250					

- ① For other available voltage ratings, consult Siemens.
- ② For other enclosure types, consult Siemens.
- ③ Ratings are for Variable Torque applications. Consult Siemens for other applications.
- ④ Dimensions shown are for circuit breaker or fusible disconnects except as noted.
- ⑤ Fusible disconnect unit is larger, consult Siemens.
- ⑥ Drives with bypass and / or isolation contactors require extra mounting space. Consult Siemens for further information.
- ⑦ Fixed mounted units (not plug-in).

### 600V<sup>①</sup> Variable Frequency Drives — NEMA 1A MCC Enclosures<sup>②</sup>

Rating HP <sup>③</sup>	Drive Type	Rated Amperes	Dimensions - In. (mm) <sup>④⑤</sup>		IR
			Mounting Height	Structure W x D	
2	MM440	2.7	24 (610)	20 x 15 (508 x 381)	100
5		6.1			
7.5		9			
10		11			
15		17			
20		22			
25		27			
30		32			
40		41			
50		52			
60		62			
75		77			
100		99			
125		125			
2		MM440	2.7	72 (1829) <sup>⑦</sup>	
5	6.1				
7.5	9				
10	11				
15	17				
20	22				
25	27				
30	32				
40	41				
50	52				
60	62				
75	77				
100	99				
125	125				

- ① For other available voltage ratings, consult Siemens.
- ② For other enclosure types, consult Siemens.
- ③ Ratings are for Variable Torque applications. Consult Siemens for other applications.
- ④ Dimensions shown are for circuit breaker or fusible disconnects except as noted.
- ⑤ Fusible disconnect unit is larger, consult Siemens.
- ⑥ Drives with bypass and / or isolation contactors require extra mounting space. Consult Siemens for further information.
- ⑦ Fixed mounted units (not plug-in).



## Lighting Panelboards Applied in MCCs

Amp Rating	Number of Circuits	Height in Inches (mm)		
		1%, 3W 240/120	3%, 4W 208Y/120	3%, 4W 277/480

## Main Lug Only

125/250	18	30 (762)	30 (762)	30 (762)
	30	36 (914)	36 (914)	36 (914)
	42	42 (1067)	42 (1067)	42 (1067)

## Main Circuit Breaker

125/250	18	30 (762)	30 (762)	30 (762)
	30	36 (914)	36 (914)	36 (914)
	42	42 (1067)	42 (1067)	42 (1067)

## Distribution Transformers

KVA Rating	Phase	Unit Height in Inches (mm)
1	1	12 (305) <sup>①</sup>
1.5		
2		
3		
5		
7.5		18 (457) <sup>②</sup>
10		
15		
25		
30		
37.5	24 (610) <sup>②③</sup>	
45		
45	36 (914) <sup>②③</sup>	
9		
15	3 <sup>③</sup>	18 (457)
25		
30		
37.5		24 (610)
45		

① Plate mounted.

② Transformer mounted on brackets 6 in. (152 mm) off sills.

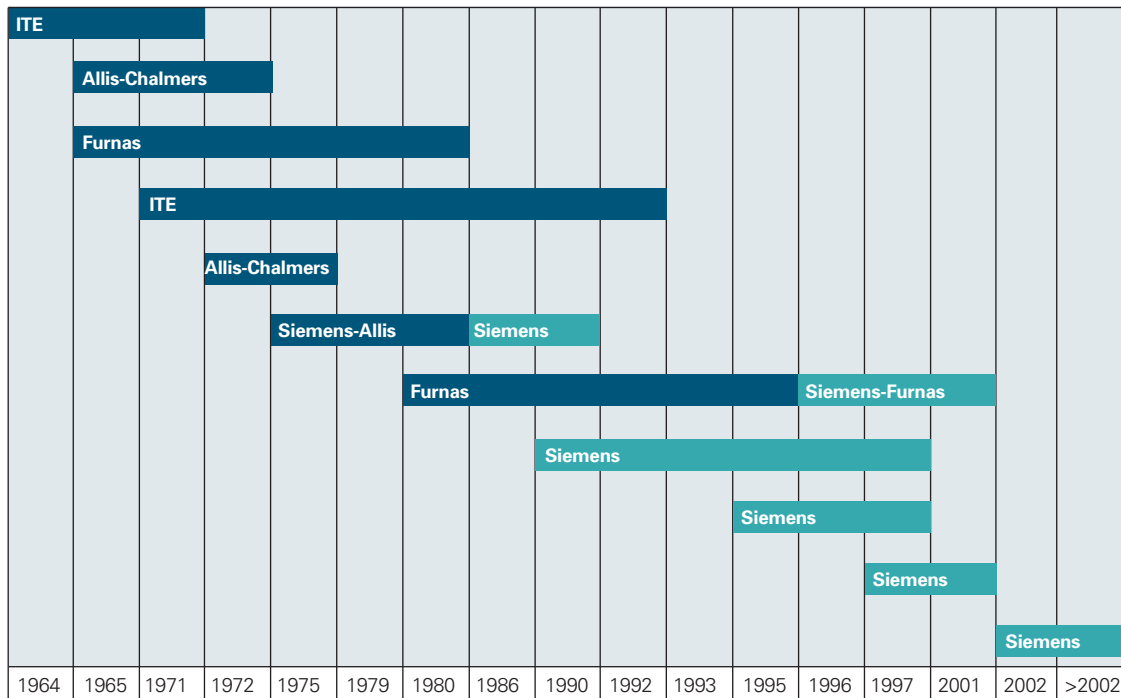
③ Requires 20 in. (508 mm) deep structure.

# tiastar Motor Control Centers

Siemens has an installed base of motor control centers dating back to 1964 due to acquisitions of Allis-Chalmers in 1978, ITE Gould in 1983 and Furnas Electric in 1996. This has resulted in eleven MCC models installed across the United States. Replacement units for these models as well as the current tiastar™ MCC offerings are built in the Siemens West Chicago plant. Siemens developed this tool to help people gain a better understanding of the wide variety of this installed base of MCCs. This should enable people

to order aftermarket buckets or new MCCs much easier. In this program brochure, all the tools necessary for identifying existing MCCs to ordering forms are included. All items listed as follows: timeline, product overview, identification guide, product descriptions, work sheets and ordering check sheet. The intent of this guide is to provide a tool for Siemens customers so they can make a more educated purchasing decision. If you have any questions, please contact your local Siemens representative.

## MCC Timeline



Year

Note: Timeline represents approximate values

# tiastar Motor Control Centers

## Product History

Aftermarket

This overview is a clear and concise snap shot of Siemens entire MCC product offering. For your convenience, typical MCC part numbers are shown for continued identification possibilities.

Furthermore, the overview covers the standard options for the product offering.

Original manufacturer	Model	Production dates <sup>①</sup>	Bucket w/ door & handle <sup>②</sup>	Factory retrofit <sup>③</sup>	Typical MCC number <sup>④</sup>	X=Letter # = Number
Siemens	tiastar	2002 – Current	X	—	Same as System89	
Siemens/Furnas	System89	1980 – 2001	X	—	89BFXX### ### 89BSXX### ### 89BBXX### ### WX### (ex. WU760)	
Siemens	Model 95 +	1997 – 2001	X	—	95BFXX### ### 95BSXX### ### 95BBXX### ### XX### (ex. WU760)	
Siemens	Model 95	1995 – 1997	X	—	09-001-XXXX-XXXX-XXX	
Siemens	Model 90	1990 – 1997	X	—	30-001-XXXX-XXXX	
Siemens Allis	Marq 21	1975 – 1990	X	—	01-14XX-XXXX-XX	
Allis-Chalmers	Mark 2	1972 – 1975	X	—	##### (ex. 15375)	
Allis-Chalmers	Mark 1	1965 – 1972	X	—		
ITE	Gould 5600	1971 – 1992	—	X	84-XXXX-XX	
ITE	Gould 9600	1964 – 1971	—	X	85-XXXX-XX 86-XXXX-XX	
Furnas	Class89	1965 – 1979	—	X	89FVXXXX XXX 89SVXXXX XXX 89BVXXXX XXX V#### (ex. V2176)	

① Dates represent approximate values only.

② Buckets exceeding 250 amps are fix mounted.

③ Contact West Chicago Aftermarket Dept. for Retrofit Program at (800) 683-6200.

④ In some instances, a generic 5 alphanumeric number is designed as the MCC sales order number. In most cases a 5 alphanumeric number within the MCC number is the sales order number. MCC numbers can be found inside the MCC bucket.

Starters 208V, 230V, 400V, 480V, 600V	NEMA size
FVNR	1-7
FVR	1-7
DFVNR	1
2S1W-CT	1-6
2S1W-VT	1-6
2S2W-CT	1-6
2S2W-VT	1-6
RVAT	2-7
RVSS	Consult factory
VFD	Consult factory
YDC/YDO	2-5

Standard options	
Amp meter + CT	Surge suppression
CT	Under voltage CB
Voltage monitor	Shunt trip
Vac. contactor	Ground stab
Transducer	High density bucket
Fuse puller	Special paint
Bypass	Timer
ASI®	4P relay
Ground fault	Extra unit space
Elapse time meter	

Aftermarket and Replacement units forms are available at [www.usa.siemens.com/mcc](http://www.usa.siemens.com/mcc) on the aftermarket page.

### MCC Aftermarket Web Form

#### Your Contact Information

First Name *	<input type="text"/>	Last Name *	<input type="text"/>
Work Phone *	<input type="text"/>	Email Address *	<input type="text"/>
Company *	<input type="text"/>	Address *	<input type="text"/>
City *	<input type="text"/>	State *	-- Select below --
Zip *	<input type="text"/>	Account #	<input type="text"/>

#### MCC Information

Model *	<input type="text" value="Please Choose.."/>	<a href="#">MCC Identification Guide</a>
System Voltage *	<input type="text" value="Please Choose.."/>	<a href="#">MCC Aftermarket Replacement Parts Catalog</a>
System Grounding *	<input type="text" value="Please Choose.."/>	<a href="#">Application Help</a>
Short Circuit *	<input type="text" value="Please Choose.."/>	
Serial/Order #	<input type="text"/>	

#### Add Line Item

Line Type \*

\* Add at least one line item before submitting.

#### Comments

#### File Attachment

Attachments: (Max 4 x 5MB)

No file selected.

Please browse the file and click Upload

\* Add at least one line item before submitting.

\* indicates a required field.