tiastar Motor Control Centre

Solid State Starter Class 14

Sirius Contactor 3RT

Contents

tiastar™ Motor Control Centres

Overview of tiastar

Product Overview

Motor Control Centres at Siemens

Motor control centres (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 centres 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 centre design, testing, construction and application. The tiastar motor control centre 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 Centres
- ICS 18 Standard for motor control centres

UL

- 845 Motor Control Centres
- 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

CSA 254 Motor Control Centres

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 centre 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 centres 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.

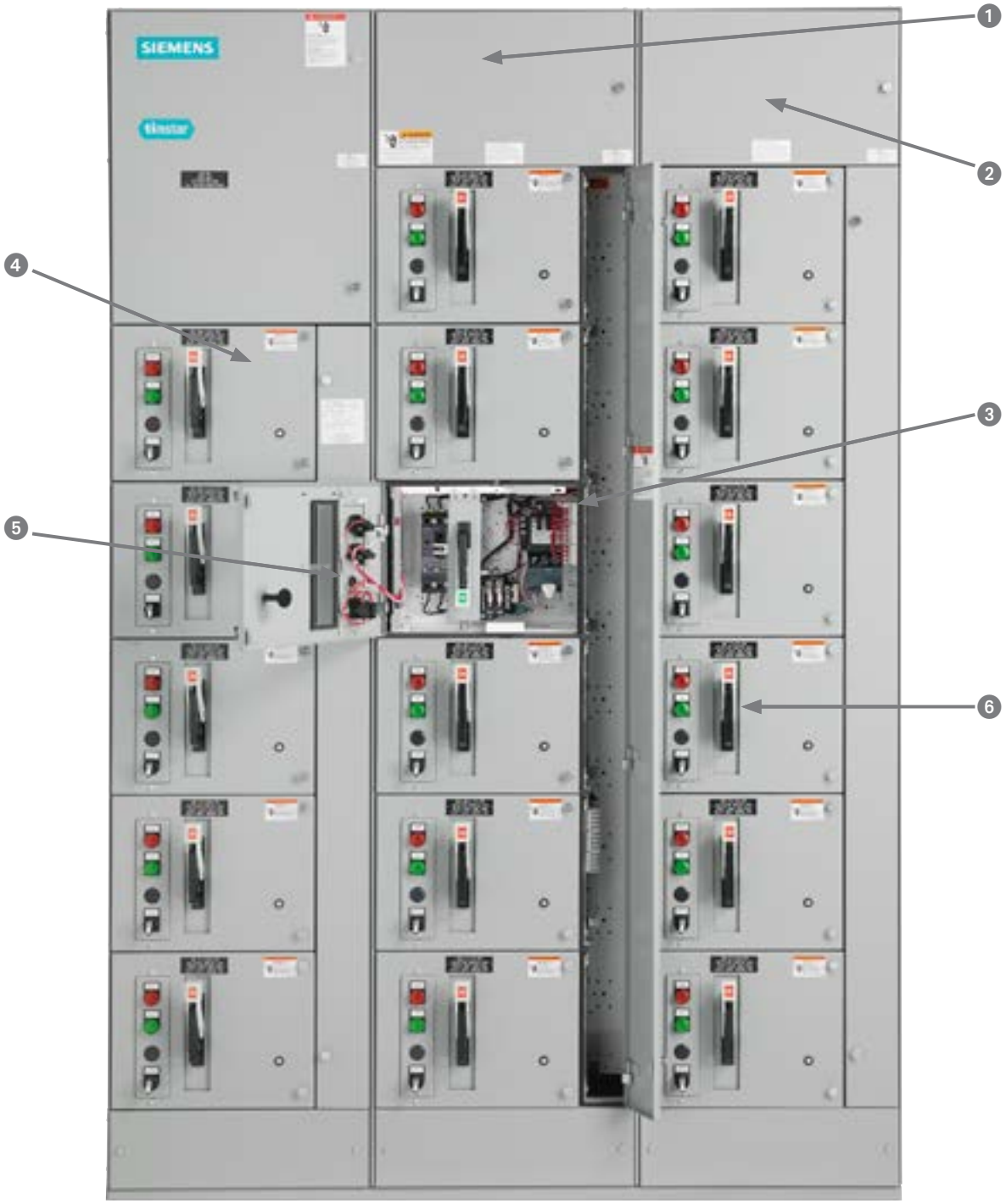
tiastar™ Motor Control Centres

Construction Details

Product Overview

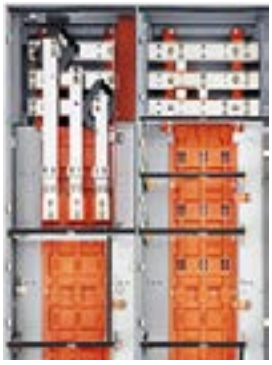
Quality Features Exceed Standards

Siemens tiastar motor control centres 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.



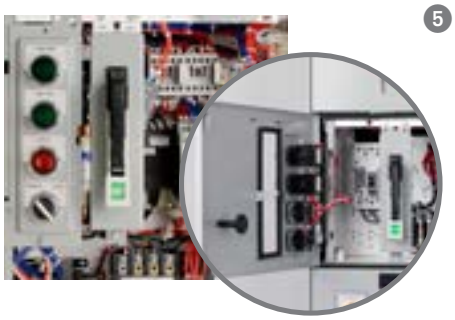
Features

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, NEC and CEC
- 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. 24 in. 30 in. 40 in. 50 in. 60 in.	(508 mm) (610 mm) (762 mm) (1016 mm) (1270 mm) (1524 mm)
Depth	15 in. 20 in.	(381 mm) (508 mm)
Back to Back Structure (BTB)		
Width	20 in. 30 in.	(508 mm) (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 Optional width	4 in. 8 in.	(102 mm) (203.2 mm)
Depth	10 in.	(254 mm)
Cross Section With Opt width	38.25 sq. in. 76.50 sq. in.	(972 sq. mm) (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 * BTB	15 in. 20 in. 30 in.* 40 in.*	(381 mm) (508 mm) (762 mm)* (1016 mm)*
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.
Centre Bottom Cross Ties	12 ga.
Rear Channel (FO)	13 ga.
Channel Sills	7 ga.
Centre-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 800A 1200A 1600A 2000A 2500A* 600A 800A 1200	Cu Cu Cu Cu Cu Cu *NEMA 1 only Al Al Al
Vertical Bus (A)	300A 600A 800A	Cu Cu Cu
Neutral Bus (Bottom Mounted) (A)	600A 800A 1200A 1600A	Cu Cu Cu 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 600A 600A	Cu Cu 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 2000A

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 centres 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 centre, identification of units and their location in the motor control centre, 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 centres shall be the same as Class I motor control centres 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 centres, the manufacturer shall furnish drawings that indicate factory interconnections within the motor control centre.

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

Class I-S and II-S motor control centres 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 centres, 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 centres.

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

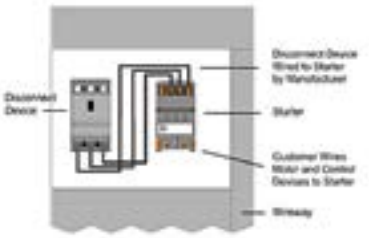


Figure 1. Class I, Type A Wiring

Type B

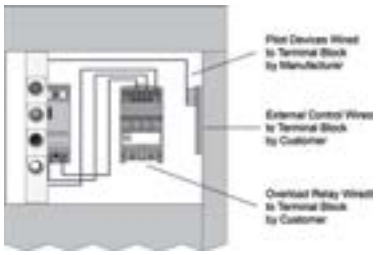


Figure 2. Class I, Type B-d Wiring

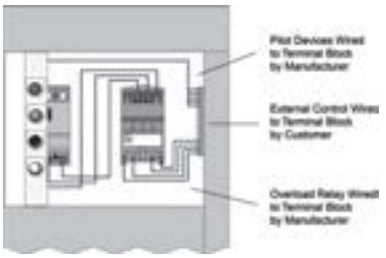


Figure 3. Class I, Type B-t Wiring

Type C

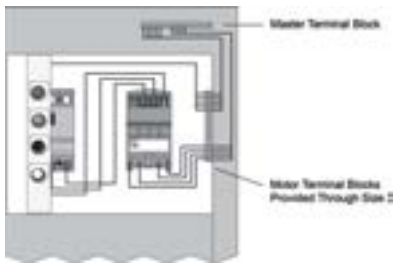


Figure 4. Class I, Type C Wiring

CSA 22.2 No 254-05 and

CSA22.2 No.0.12-M1985 (R2003)

Wiring Space and Wire Bending Space in

Enclosure of Equipment Rated 750V or Less

The National Electrical Code establishes very specific guidelines for minimum cable bending space within motor control centres. 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.

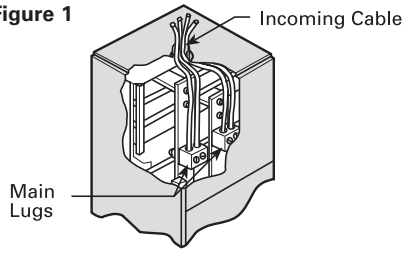
Incoming Cable Space

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.

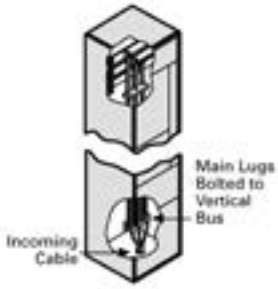
Figure 1



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.

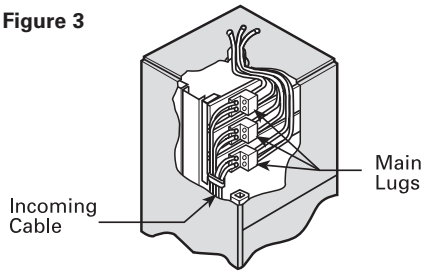
Figure 2



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.

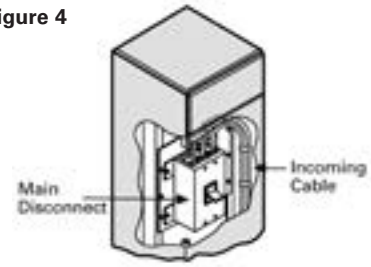
Figure 3



Main Lugs at Top with Top or Bottom Cable Entry

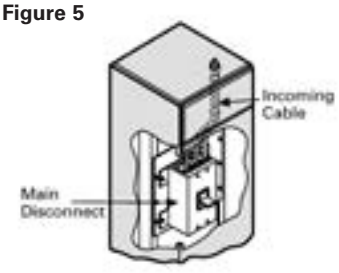
In this arrangement the lugs mount directly on the horizontal bus, eliminating the need to use unit mounting space. The limitation here is 350 kcmil cable per phase.

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; 1¾, 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.

SIRIUS INNOVATION

Sirius Contactor 3RT

SIRIUS Contactors

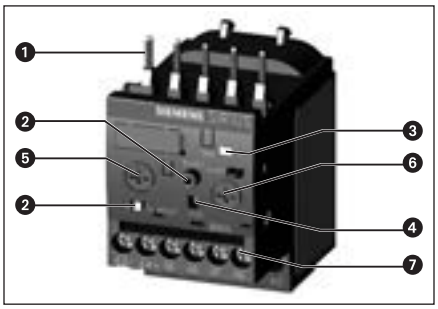
SIRIUS high-performance NEMA contactors offer a high degree of protection whileoffering reduced mounting space.

- CSA certified file #165071

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 e quipment as well as in demanding automotive applications.

Overload Relays



1. **Connection for mounting onto contactors**:
   Optimally adapted in electrical, mechanical and design terms to the contactors. The overload relay can be connected directly to these contactor using these pins. Stand-alone installation is possible as an alternative (in conjunction with a terminal bracket for stand-alone installation).
2. **Selector switch for manual/automatic RESET and RESET button:**
   With this switch you can choose between manual and automatic RESET. A device set to manual RESET can be reset locally by pressing the RESET button. On the 3RB21 a solid-state remote is inte grated into the unit.
3. **Switch position indicator and TEST function of the wiring:**
   Indicates a trip and enables the wiring test.
4. **Solid state test:**
   Enables a test of all important device components and functions.
5. **Motor current setting:**
   Setting the device to the rated motor current is easy with the large rotary knob.
6. **Trip class setting/internal ground-fault detection (3RB21 only):**
   Using the rotary switch you can set the required trip class and activate the internal ground-fault detection dependent on the starting conditions.
7. **Connecting terminals (removable terminal block for auxiliary circuits):**
   The generously sized terminals permit connection of two conductors auxiliary circuit can be connected with screw-type terminals or with spring-loaded terminals.

The 3RB and 3RB solid-state overload relays up to 630 A with internal power supply have been designed for inverse-time delayed protection of loads with normal and heavy starting (see Function) against excessive temperature rise due to overload, phase unbalance or phase failure. An overload, phase un- balance or phase failure result in an increase of the motor current beyond the set motor rated current. This current rise is detected by the current transformers integrated into the devices and evaluated by corresponding solid-state circuits which then output a pulse to the auxiliary contacts. The auxiliary contacts then switch off the load by means of the contactors control circuit. The break time depends on the ratio between the tripping current and set current Ie and is stored in the form of a long-term stable tripping characteristic (see Characteristic Curves).

In addition to inverse-time delayed protection of loads against excessive temperature rise due to overload, phase unbalance and phase failure, the 3RB21/31 solid-state overload relays also allow internal ground-fault detection (not possible in conjunction with wye-delta assemblies). This provides protection of loads against high- resistance short-circuits due to damage to the insulation material, moisture, condensed water etc.

The "tripped" status is signaled by means of a switch position indicator (see Function). Resetting takes place either manually or automatically after the recovery time has elapsed (see Function).

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.

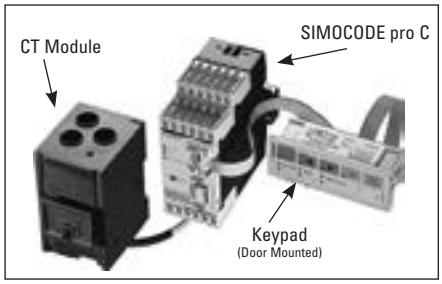
ESP200 has a 4:1 current adjustment range with a fine adjustment dial labeled in full load amps. The heaterless overload minimizes the heat trapped in the enclosures, reduces cost for ventilation or cooling. Easily accessible Reset button, provides visible and audible indications to ensure the tripped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

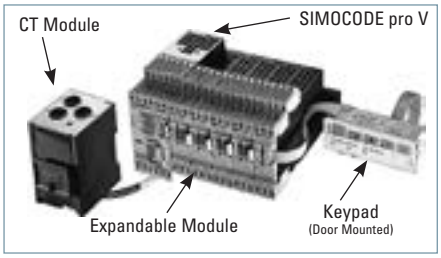
SIMOCODE pro is the latest generation of Motor Management System ("Smart Overload") bringing a new level of flexibility and functionality within the Siemens smart motor control centre. By means of a PROFIBUS DP interface, it can easily be linked to higher-level automation systems. SIMOCODE pro implements 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 family of products

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 (480V)①

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.

① For other Voltage ratings, consult Siemens.

SINAMICS G120 (480V)①

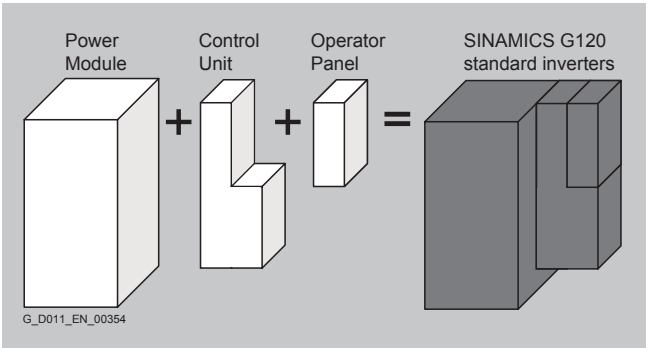
SINAMICS G120 is a modular drive inverter system that comprises various function units. These are essentially: Control Unit (CU) and Power Module (PM). The CU controls and monitors the PM and the connected motor in several operating modes that can be selected. It supports communication with a local or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

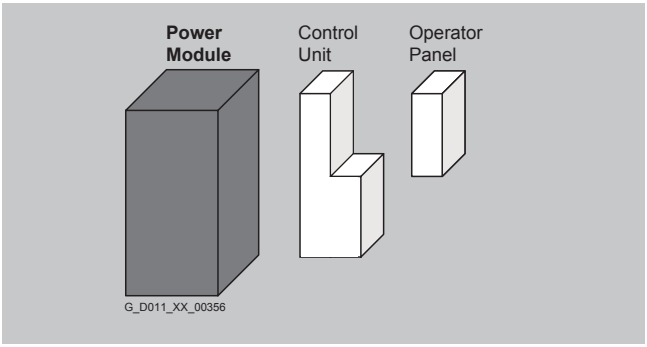
Design



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

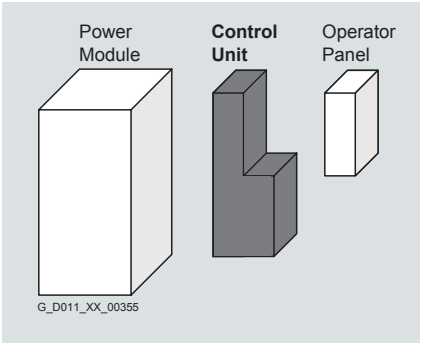
PM250 power modules are suitable for the same applications as the PM240, but they are specialized to address conveyor-related applications - where the braking energy is directly fed back into the line supply using the unique technology of Efficient Infeed Technology. This feature provides the ability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

① For other Voltage ratings, consult Siemens.

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.

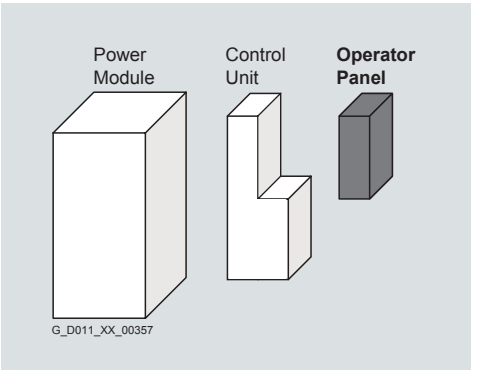
Selecting Optional System Components

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.

tiastar™ Motor Control Centres

TPS3 Family of Hardwired Surge Protective Devices

Product Overview

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 Lightening 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

TPS3 01 Module

TPS3 01 MCC Installation

Ordering Information

Catalogue # 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

MCC Starter Ratings and Dimensions

NEMA Size	Maximum Horsepower Rating 208V	230V	400V	460V	480V	600V	Circuit Breaker Type (For Maximum HP at 460V) MCP Frame Size (Amp)	Dimensions in inches (mm) Unit Height① W= Width, D= Depth	kA Interrupting Rating at 480V②③	Fusible Type (For Maximum HP at 460V) Standard Disconnect Sw/Fuse Clip Sizes	Dimensions in inches (mm) Unit Height① W= Width, D= Depth	kA Interrupting Rating at 480V②③

Full Voltage Non-Reversing (FVNR) and Full Voltage Reversing (FVR)

								FVNR	FVR	IR Std/Opt		FVNR	FVR	IR
1	7.5	7.5	10	10	10	10		12 (305)	18 (457)		30/30	12 (305)	18 (457)	
2	10	15	25	25	25	25	125	12 (305)	24 (610)		60/60	12 (305)	24 (610)	
3	25	30	50	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)	42③	200/200	42 (1067)	48 (1219)	
5	75	100	150	200	200	200	250/400	36 (914)	48 (1219)		JD6 MCS/ 400	60 (1524)	60 (1524)	100
6④	150	200	300	400	400	400	400/600/ 800	48 (1219)	72 (1829) 30W(762W)		MD6 MCS/800	72 (1829)	72 (1829) 30W (762W)	
7④	—	—	—	600	600	600	1200	72 (1829) 20W x 20D (508W x 508D)	N/A	42③	ND6 MCS/1200	72 (1829) 40W x 20D (1016W x 508D)	N/A	

Full Voltage Contactor (FVC)

1	10.8	11.9	18.7	—	23.8	31		12 (305)		30/30	12 (305)	
2	16.2	17.9	31.2	—	35.8	46.7	125	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)	42③	200/200	42 (1067)	100
5	108	119	206	—	238	311	250/400	36 (914)		JXD6 MCS/400	60 (1524)	
6④	198	218	346	—	437	570	600/800	48 (1219) 72 (1829)		LXD6 MCS/800	72 (1829) 30W (762W)	

Two Speed, Constant or Variable Torque

								2S2W	2S1W	IR Std/Opt		2S2W	2S1W	IR
1	7.5	7.5	10	—	10	10		24 (610)	24 (610)		30/30	24 (610)	24 (610)	
2	10	15	25	—	25	25	125	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)	42③	200/200	36 (914)	48 (1219)	100
5④	75	100	150	—	200	200	250/400	72 (1829) 30W (762W)	72 (1829) 30W (762W)		JD6 MCS/400	72 (1829) 30W (762W)	72 (1829) 30W (762W)	
6④	150	200	300	—	400	400	600/800	72 (1829) 30W (672W)	Consult Siemens		MD6 MCS/800	72 (1829) 40W (1016W)	Consult Siemens	

Two Speed, Constant Horsepower

								2S2W-CH	2S1W-CH	IR Std/Opt		2S2W-CH	2S1W-CH	IR
1	5	5	7.5	—	7.5	7.5		24 (610)	24 (610)		30/30	24 (610)	24 (610)	
2	7.5	10	20	—	20	20	125	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)	
4④	30	40	50	—	75	75	125/250	36 (914)	48 (1219)	42③	200/200	48 (1219)	60 (1524)	100
5④	60	75	100	—	150	150	250/400	72 (1829) 30W (762W)	72 (1829) 30W (762W)		JD6 MCS/ 400	72 (1829) 30W (672W)	72 (1829) 30W (672W)	
6④	100	150	200	—	300	300	400/600	72 (1829) 30W (762W)	Consult Siemens		MD6 MCS/800	72 (1829) 40W (1016W)	Consult Siemens	

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

Note: For half size starters, contact Siemens.

MCC Starter Ratings and Dimensions (cont.)

NEMA Size	Maximum Horsepower Rating 208V	230V	400V	460V	480V	600V	Circuit Breaker Type (For Maximum HP at 460V) Standard Breaker Type	Dimensions in inches (mm) Unit Height① W= Width, D= Depth	kA Interrupting Rating at 480V②③	Fusible Type (For Maximum HP at 460V) Standard Disconnect Sw/Fuse Clip Sizes	Dimensions in inches (mm) Unit Height① W= Width, D= Depth	kA Interrupting Rating at 480V②③

Reduced Voltage Autotransformer (RVAT) Non-Reversing, Closed Transition

								RVAT	IR Std/Opt		RVAT	IR
2④	10	15	25	—	25	25	MCP	42 (1067)		100/100	48 (1219)	
3④	25	30	50	—	50	50		48 (1219)		200/200	60 (1524)	
4④	40	50	75	—	100	100		72 (1829) 30W (762W)		JD6MCS/ 400	72 (1829) 30W (762W)	
5④	75	100	150	—	200	200		72 (1829) 30W (762W)		MD6MCS/ 800	72 (1829) 30W (762W)	

Reduced Voltage Wye Delta, Open and Closed Transition

								YDO	YDC	IR Std/Opt		YDO	YDC	IR
2	20	25	25	—	40	40	MCP	30 (762)	42 (1067)	42③	100/100	36 (914)	48 (1219)	100
3	25	30	50	—	75	75		36 (914)	48 (1219)		200/200	48 (1219)	60 (1524)	
4	60	60	75	—	150	150		36 (914)	48 (1219)		JD6MCS/ 400	72 (1829)	72 (1829)	
5④	150	150	150	—	300	300		72 (1829) 30W (672W)	72 (1829) 30W (672W)		LD6MCS/ 600	72 (1829) 30W (672W)	72 (1829) 30W (672W)	

NEMA Size	Maximum Horsepower Rating 208V	230V	400V	460V	480V	600V	Circuit Breaker Type MCP Frame Size	Dimensions in inches (mm) Unit Height①	kA Interrupting Rating at 480V②

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

1	7.5	7.5	10	—	10	10	125	18 (457)	42③

Compact Units Available – High Density FVNR

1	7.5	7.5	—	—	10	—	125	6 (152)	42③
2	10	15	—	—	25	—			
3	25	30	—	—	50	—		12 (305)	
4	40	50	—	—	100	—	125/250	18 (457)	

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

SINAMICS G120C- Technical Data (480V)③

Frame Size	Output Ratings				Dimensions - in. (mm)①		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			
B	10.6	5	7.5	3	24 (610)		
B	14.0	10	10.6	5			
C	21.3	15	14.0	10	30 (762)		
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 (480V)③

	Frame Size	Output Ratings				Dimensions - in. (mm)①		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 15② (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 20② (508 x 508)	
	F	134.9	100	110	75			
	F	165.5	125	145	100			
	F	190.7	150	178	125			
	F	240.0	150	200	150			
	Gx	264.3	200	250	200		40 x 20② (1016 x 508)	
	Gx	323.8	250	302	250			
	Gx	417.4	350	370	300			
PM250	D	35.3	25	32	20	48 (1219)	20 x 15② (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 20② (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
③ For other Voltage ratings, consult Siemens.

600V① Solid State Reduced Voltage — NEMA 1 MCC Enclosures②

Rating HP③	RVSS Type⑦		Rated Amperes	Dimensions - In. (mm)④⑥ Mounting Height	Structure WxD	IR
7.5	3RW40		9	18 (457)	20 x 15 (508 x 381)	25③
15	3RW40		19			
20	3RW40		24			
25	3RW40		28			
30	3RW40		34			
40	3RW40		42			
50	3RW40		58	24 (610)		
60	3RW40		70			
75	3RW40		117	36 (914)		
125	3RW40		132			
150	3RW40		185	48 (1219)⑦		
200	3RW40		205			
20		3RW44	26	36 (914)		
25		3RW44	32			
40		3RW44	42			
50		3RW44	52			
60		3RW44	66			
75		3RW44	80			
100		3RW44	113			
125		3RW44	134	48 (1219)⑦		
150		3RW44	180			
250		3RW44	243			
300		3RW44	318	72 (1829)⑦	30 x 15 (762 x 381)	
500		3RW44	489	Consult Siemens		
600		3RW44	562			
700		3RW44	685			
800		3RW44	880			

① For other available voltage ratings, consult Siemens.
②For other enclosure types, consult Siemens.
③ Ratings are based on CLASS 20 overloads and 6 starts per Hour. For other KA Interrupting ratings, consult Siemens.
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).

480V① Variable Frequency Drives — NEMA 1A MCC Enclosures②

Rating HP③	Drive Type	Rated Amperes	Dimensions - In. (mm)④⑤ Mounting Height	Structure W x D	IR
2	MM440	4	18 (457)	20 x 15 (508 x 381)	100
5		10.2	24 (610)		
7.5		16			
10		18.4	36 (914)		
15		26			
20		32			
25		38	48 (1219)⑦		
30		45			
40		62	48 (1219)⑤⑦		
50		76	60 (1524)⑦		
60		90			
75		110	72 (1829)⑦	20 x 15 (508 x 381)	
100		145			
125		178			
150		205		30 x 15 (762 x 381)	
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).

600V① Variable Frequency Drives — NEMA 1A MCC Enclosures②

Rating HP③	Drive Type	Rated Amperes	Dimensions - In. (mm)④⑤ Mounting Height	Structure W x D	IR
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	48 (1219)⑦		
30		32			
40		41			
50		52	60 (1624)⑦		
60		62			
75		77	72 (1829)⑦	20 x 15⑤	
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	Height in Inches (mm) 3%, 4W 208Y/120
Main Lug Only			
125/250	18	30 (762)	30 (762)
	30	36 (914)	36 (914)
	42	42 (1067)	42 (1067)
Main Circuit Breaker			
125/250	18	30 (762)	30 (762)
	30	36 (914)	36 (914)
	42	42 (1067)	42 (1067)

Distribution Transformers

KVA Rating	Phase	Unit Height in Inches (mm)
1	1	12 (305)①
1.5		
2		
3		
5		
7.5		18 (457)②
10		
15		
25		24 (610)②③
30		
37.5		36 (914)②③
45		
9	3③	18 (457)
15		
25		
30		
37.5		24 (610)
45		

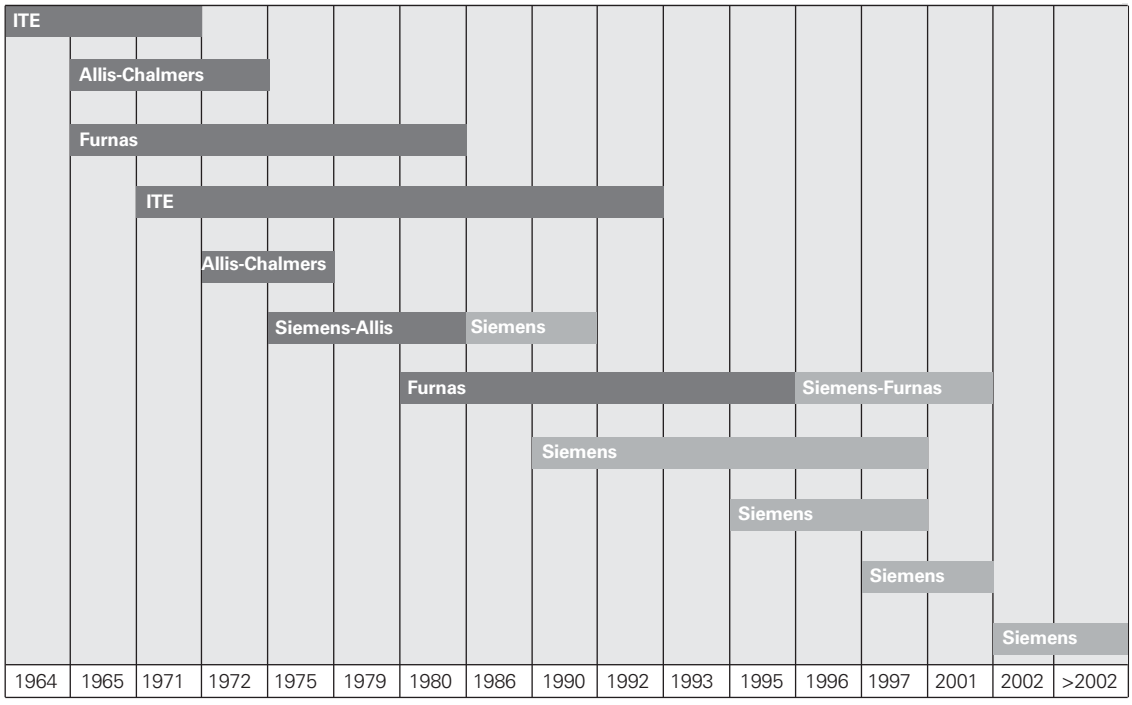
① Plate mounted.
② Transformer mounted on brackets 6 in. (152 mm) off sills.
③ Requires 20 in. (508 mm) deep structure.

tiastar™ Motor Control Centres

Product History

Siemens has an installed base of motor control centres 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 Centres

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 dates①	Bucket w/ door & handle②	Factory retrofit③	Typical MCC number④	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 Siemens Siemens Allis Allis-Chalmers Allis-Chalmers	Model 95 Model 90 Marq 21 Mark 2 Mark 1	1995 – 1997 1990 – 1997 1975 – 1990 1972 – 1975 1965 – 1972	X X X X X	— — — — —	09-001-XXXX-XXXXX-XXX 30-001-XXXX-XXXXX 01-14XX-XXXXX-XX ##### (ex. 15375)	
ITE ITE	Gould 5600 Gould 9600	1971 – 1992 1964 – 1971	— —	X X	84-XXXXX-XX 85-XXXXX-XX 86-XXXXX-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	1-6
FVR	1-6
DFVNR	1
2S1W-CT	1-6
2S1W-VT	1-6
2S2W-CT	1-6
2S2W-VT	1-6
RVAT	2-5
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	

tiastar™ Motor Control Centres Arc Resistant

Innovative protection for your most valuable asset: your personnel.

The Siemens tiastar™ arc resistant Motor Control Centre (MCC) is the industry's first MCC tested to the ANSI/IEEE C37.20.7 testing guide, with representatives of Underwriters Laboratories, Inc. (UL) present to observe the testing procedures. The tiastar Motor Control Centre has been designed with more advanced features to control arc flash exposure. Thus users experience superior arc resistance that meets a high standard in protecting people, capital investments and operations.

tiastar Motor Control Centres

Arc Resistant

Managing Hazards and Reducing Risk are Top Priorities

Manufacturers in all segments of industry are constantly seeking methods to improve the safety of their workforce. One area of focus is the reduction of hazards associated with arc flash events. Siemens arc resistant tiastar Motor Control Centre significantly reduces risk for workers entering areas with arc flash potential by containing and directing the arc flash incident energy away from personnel and maintaining the units physical integrity.

The arc resistant tiastar was developed to meet applicable safety codes and standards, while NFPA 70E and IEEE C37.20.7 provided the guidance to design and manufacture features that are capable of ensuring Type 2 accessibility of the motor control centre.

The ability to provide Type 2 accessibility, as defined by IEEE C37.20.7, helps shield personnel on the front, rear and sides of the equipment from the damaging effects of arc flash incidents. Robust structural and bus designs, isolated horizontal and insulated vertical bus designs are critical to withstand the mechanical forces released during an arc flash event.

The Benefits of a Superior Arc Resistant Design

A HIGHER STANDARD	With UL observing and validating the testing of our arc resistant design, the design innovations of the Siemens tiastar Motor Control Centre have set a new industry benchmark.
INCREASED PROTECTION FOR PERSONNEL	Your people are, and always will be, your most valuable asset. Improve workplace safety and protect your work force by lowering the risk of electrical shock and harmful exposure to arc flash incident energy.
PRESERVED ASSETS	Arc flash events endanger equipment and operations. Enhanced arc resistance reduces damage to nearby assets, which in turn cuts repair and replacement costs.
SMARTER, PASSIVE DESIGN	Passive designs do not rely on secondary devices to mitigate arc flash energies. Siemens arc resistant tiastar™ Motor Control Centres are manufactured to contain the energy created during an arcing event for 50ms.
IMPROVED SPECIFICATIONS	The lack of formal arc flash resistance standards for MCCs poses a challenge for engineers wanting to specify safer solutions. By meeting ANSI/IEEE C37.20.7 testing guides for Metal Enclosed Switchgear, Siemens has raised the bar for MCC designs and created a specifiable standard.

ANSI/IEEE Standard C37.20.7-2007

ANSI/IEEE C37.20.7, IEEE Guide for Testing Metal-Enclosed Switchgear Rated Up to 38kV for Internal Arcing Faults, provides guidelines to test the resistance to the effects of arcing due to an internal fault in metal enclosed equipment; equipment that successfully meets this standard demonstrates greater protection against arc flash hazards, as long as all safety protocols are followed. Note that use of Siemens arc resistance features do not substitute for proper safety procedures in compliance with OSHA and other government safety regulations. They do mean more advanced safety features that can keep your people and facility better protected against electrical dangers and hazards of arc flashes.

Additional Safety Options Available

Dynamic Arc Flash Sentry allows the setting of dual parameters for the circuit protective device. These dual parameters, normal and lower arc flash settings, are designed to enhance the safety of personnel who may work on or near energized equipment.

A normal setting optimizes the WL circuit breaker to provide the most efficient selective trip coordination.

Lower Arc Flash Energy setting enables a reduced operating time, allowing the instantaneous trip function via remote switches, key lock or other inputs.

Smart MCC Technology utilizes built-in networks and pre-configurations to control, monitor and troubleshoot the equipment remotely to minimize the need for personnel to enter the arc flash boundary.

tiastar Motor Control Centres

Arc Resistant

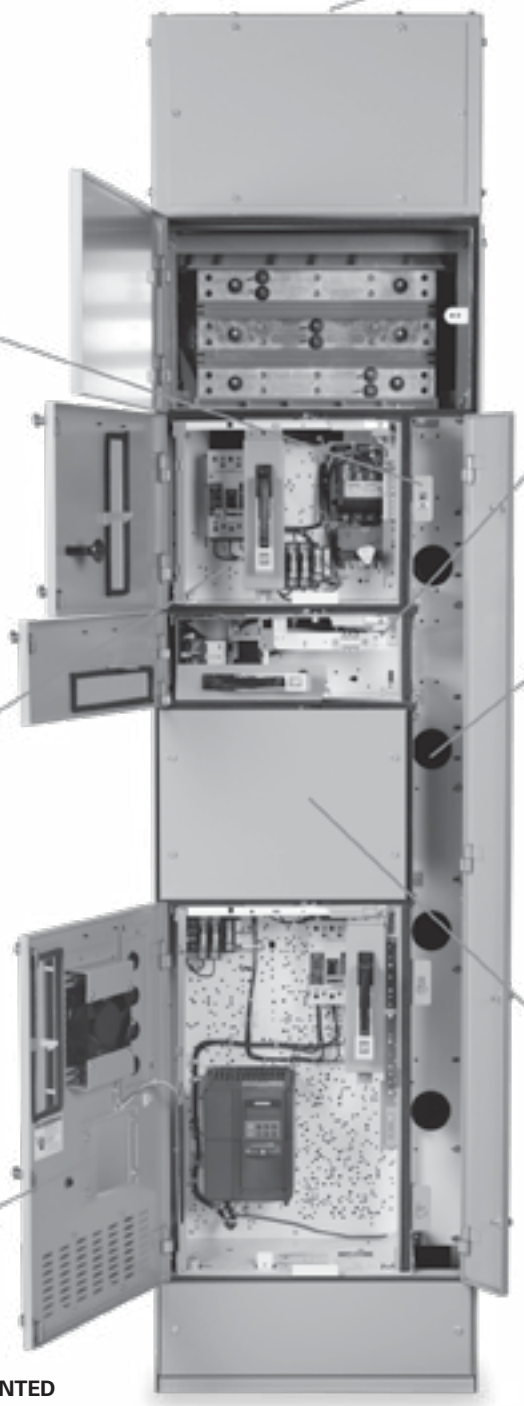
Key Innovations in Arc Resistance

CONTAIN AND CHANNEL THE ARC FLASH INCIDENT ENERGY:

By meeting ANSI/IEEE C37.20.7 Type 2 Arc Resistance, the new tiastar™ arc resistant design protects personnel at the front, back and sides of the equipment by directing the energy through the top.

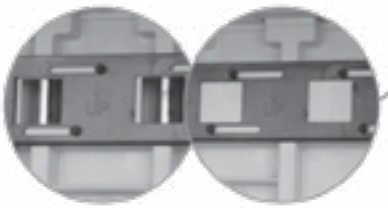
MODIFIED PULL-BOX WITH PRESSURE FLAPS FOR PRESSURE RELIEF IN CASE OF AN ARC FLASH EVENT

REINFORCED ENCLOSURE AND FRONT DOORS
Extra hinges, stronger latching systems and reinforced cabinet ensure the equipment can withstand and contain pressure from internal arcing faults.



6" UNITS AVAILABLE IN SIEMENS tiastar ARC RESISTANT MCC

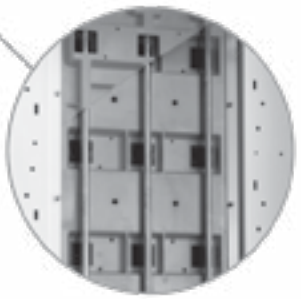
INTERNAL VENTING SYSTEM
The vertical wireway is perforated with holes that channel the gasses to the back and out the top of the MCC.



AUTOMATIC SHUTTERS IN PLUG-IN UNIT COMPARTMENTS

The barrier automatically opens and closes to allow insertion or removal of units.

Isolates the vertical bus to prevent inadvertent contact lowering the risk to personnel.



INSULATED BUS BAR SYSTEM
Isolate energized components and prevent accidental contact and arcing faults from propagating.

NEW PROTECTION PLATE FOR VENTED DOORS ALLOWS THE INCLUSION OF ELECTRONIC STARTERS IN THE ARC RESISTANT MCC.

New technology for reducing arc flash hazards in motor control centers

Dynamic Arc Flash Sentry is now available in tiastar™ motor control centers from Siemens.

Here's how the innovation reduces arc flash hazards and optimizes efficiency:

- Unique dual trip setting technology reduces the energy available in an arc flash event.
- Remote switching enables you to automate trip function settings.

tiastar™ Motor Control Centre

Dynamic Arc Flash Sentry

Arc Flash: A Growing Concern

The risk of arc flashes is a growing concern in the industry. Current research shows that up to 80% of reported electrical injuries are caused by an electrical arc. This fact has spawned new requirements and standards, including NFPA 70E and NEC, designed to protect personnel on and around energized electrical equipment.

To fulfill these enhanced standards, Siemens has developed new technologies to address the critical issue of arc flash. Our unique Dynamic Arc Flash Sentry (DAS) system is now available in tiastar Motor Control Centres. The DAS anchors a suite of standard and optional features, specifically designed to enhance arc flash protection. DAS is also currently available in Siemens low voltage switchgear.

What is Dynamic Arc Flash Sentry?

Siemens strongly recommends that all systems be de-energized when personnel are working on electrical equipment. However, in some circumstances, qualified professionals may need to access and work near energized equipment.

Under these conditions, the Dynamic Arc Flash Sentry provides additional arc flash protection without sacrificing operational efficiency. DAS is based on the electronic trip unit (ETU776), available with the Siemens WL circuit breaker. Using the WL as the main breaker a tiastar motor control centre enables the system to provide two trip level settings. In normal operation mode, trip coordination is optimized for efficiency and reduced nuisance tripping. The second setting is designed to lower arc flash energy using the WL breaker's instantaneous trip function.

The dual protective settings, combined with the ability to toggle between normal and lower arc flash parameters, are designed to enhance the safety of personnel who must work on or near energized equipment. With a range of options, from fully automated switching to manual key operation, Siemens DAS technology combines enhanced arc flash protection with maximum operational flexibility.

Dual protective settings

The dual protection setting capability of ETU776 electronic trip units form the basis of the Dynamic Arc Flash Sentry technology. The ETU776 is placed within a WL Low Voltage Power Circuit Breaker and allows two separate control parameters to be set.

A normal operation parameter (A) optimizes the WL breaker to provide the most efficient selective trip coordination. The second parameter (B) optimizes the system for lower arc flash energy. Since arc flash energy is most affected by the available fault current and operating time of the WL, the instantaneous trip function is a key to the reduction in arc flash energy provided by parameter B.

Remote switching

Siemens Dynamic Arc Flash Sentry can be controlled through a dry contact input. This ability to toggle between trip unit settings allows for remote communications.

Key lock protection

A simple, yet effective way to control trip unit parameter switching from a remote location is by placing a key lock on the entry door of the energized equipment room. Unlocking the door triggers the WL to switch to Parameter B, ensuring this setting is employed when anyone is present in the room.

With Siemens Dynamic Arc Flash Sentry, your facility can have the best of both worlds: reduced arc flash energy and maximum operational efficiency. For more information on DAS, contact your Siemens representative.

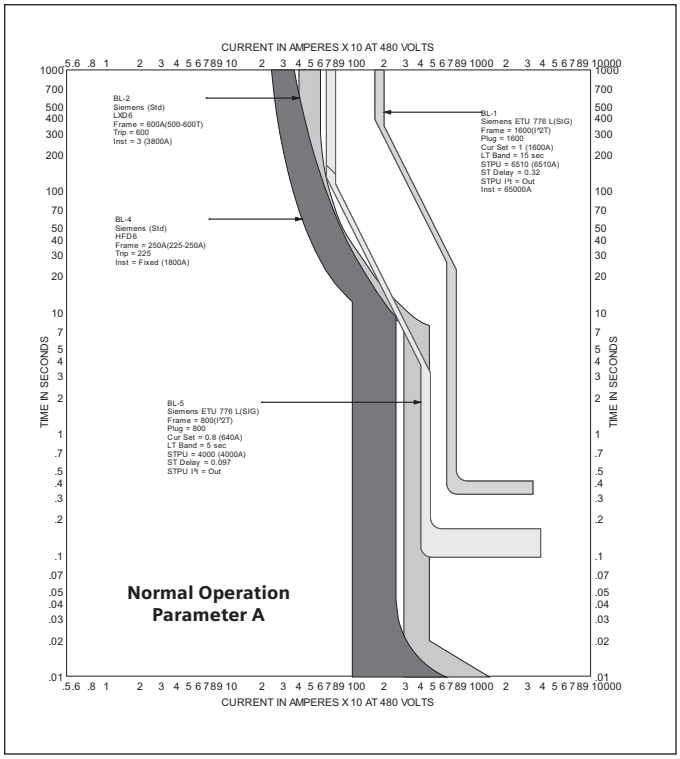
tiastar Motor Control Centres

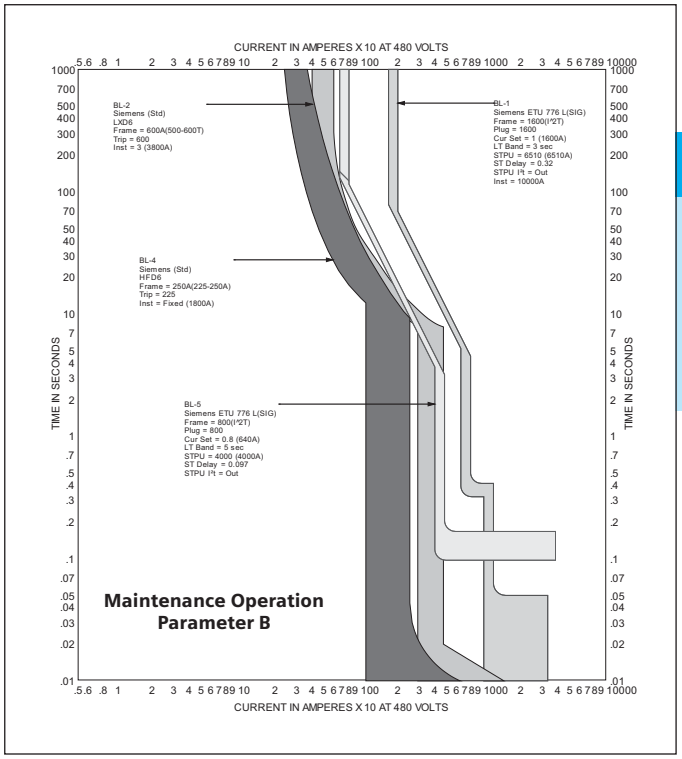
Dynamic Arc Flash Sentry

Benefits of Siemens Dynamic Arc Flash Sentry Technology

By reducing the potential arc flash energy that can accompany an electrical fault, the Dynamic Arc Flash Sentry offers:

- Creates an improved work environment. By decreasing the amount of energy available in an arc flash, Dynamic Arc Flash Sentry makes the area surrounding the motor control centre less susceptible to arc flash damage.
- Promotes operational efficiency. Trip coordination is optimized when personnel are not near energized equipment and arc flash energy is reduced when they are.
- Provides a clear competitive advantage. Unlike other "arc flash" circuit breakers, the DAS allows modification of the parameters in the trip unit, instead of utilizing potentially compromising trip coordination at all times.
- Offers enhanced flexibility. The DAS has the features required to allow remote communication to alter trip parameters or to fully automate the system.





Siemens Arc Sentry tiastar Motor Control Centre

Required features:

- Dynamic Arc Flash Sentry
- Automatic Shutters
- Isolated and insulated vertical bus
- Assembly open bus covers
- Vertical ground bus

Optional features:

- High resistance ground
- Phase isolated horizontal bus
- Voltage indicator
- Infrared inspection ports
- Smart MCC Technology featuring Profibus DP
- Blown fuse indicators

Voltage indicator

Automatic shutters

Isolated/insulated vertical bus assembly

Motor Control Centres

Specification Checklist

Customer:	Prepared By:

Check boxes and fill in blanks as required.

STANDARDS

☐ CSA ☐ NEMA ☐ Service Entrance
☐ Hydro Utility Company _____

INCOMING POWER

* System Voltage:	☐ 208/120V 3p4w	☐ 380V 3p3w ☐ 380V 3p4w	☐ 480V 3p3w ☐ 480/277V 3p4w	☐ 600V 3p3w ☐ 600/347V 3p4w
* Power System Configuration:	☐ Wye	☐ Delta	☐ High Resistance Ground	☐ Other _____
* Available Fault Current:	☐ 18 000A ☐ 22 000A	☐ 25 000A ☐ 35 000A	☐ 42 000A ☐ 65 000A	☐ 85 000A ☐ 100 000A

STRUCTURE

* Enclosure:	☐ Type 1 - Indoor (Std.) ☐ Type 1A - Indoor, Gasketed ☐ Type 12 - Indoor, Industrial		☐ Type 2/1 - Indoor, Drip Proof ☐ Type 2/1A - Indoor, Drip Proof/Gasketed ☐ Type 2/12 - Indoor, Drip Proof/Industrial	
* Depth:	☐ 15" Deep, Front Only	☐ 20" Deep, Front Only	☐ 21" Deep, Back to Back	
Pullbox:	☐ 12" ☐ Incoming Section Only	☐ 18" ☐ All Sections	☐ 24"	
Options:	150 W Space Heater:	☐ None Power Source:	☐ 120V ☐ External	☐ 240V ☐ Internal
	Modifications:	☐ Thermostat Every Shipping Split ☐ 2 Piece Backplate (20W) ☐ Automatic Shutters		☐ Removable Bottom Plates ☐ Seismic Zone 4 (UBC)
	Paint:	☐ Gray ANSI 61 (Std)		☐ Custom Color - describe _____

BUS

* Power Bus Bracing (amperes rms symmetrical):		☐ 45 kA STD	☐ 65 kA	☐ 100 kA
* Horizontal Bus:	65°C Copper: Rating:	☐ 600A STD	☐ 800A STD	☐ 1200A STD _____
	50°C Copper:	☐ 600A	☐ 600A	☐ 600A ☐ 1200A ☐ 1600A STD ☐ 2000A STD
Vertical Bus:	Main Vertical Bus:	☐ 300A F.O.B. STD	☐ 600A B.T.B. STD	☐ Option F.O.B. 600A
		☐ Insulated Barriers c/w Fish-Tape Barrier(s)		
* Ground Bus:	Horizontal Ground Bus:	☐ 300A 1/4 x 1	☐ 600A 1/4 x2	
	Ground Bus Location:	☐ Top Mounted	☐ Bottom Mounted	
	Note: 3 phase 3 wire (3p3w) - standard ground bus location bottom			
	Ground Bus Plating:	☐ Bare Copper STD	☐ Tin Plated Copper	☐ Silver Plated Copper- describe
	Vertical Ground Bus:	☐ Not required	☐ Required w/ Motor Terms	

Motor Control Centres

Specification Checklist

BUS - *continued*

Neutral Bus:

Rating: ☐ Full Rated: ☐ 600A ☐ 800A ☐ 1200A ☐ 1600A
☐ Half Rated: ☐ 600A ☐ 800A ☐ 1200A

Location: ☐ Incoming Section Only ☐ All Sections

INCOMING LINE TERMINATION

* INCOMING

Located in Section No. _____ ☐ Top ☐ Bottom

☐ 600A Inc. 2 x 350 MCM inside wireway "no loss of space"

Main Lug (MLO):

No. of cables per phase: _____ Cable Size:_____ ☐ Copper ☐ Alum

☐ Mechanical Lugs (Please check Tiastar MCC Instruction Guide for lugs detail)

☐ Compression Lugs (Provision for NEMA 2 holes pattern)

☐ Notes: _____

Main Circuit Breaker (MCB):

Located in Section No._____ ☐ Top ☐ Bottom

Breaker Rating, Frame:_____ Breaker Rating, Trip:_____

No. of cables per phase: _____ Cable Size:_____ ☐ Copper ☐ Alum

☐ Mechanical Lugs (Please check Tiastar MCC Instruction Guide for lugs detail)

☐ Notes: _____

Breaker Option: ☐ Alarm Contact ☐ Internal Ground Fault ☐ Shunt Trip
☐ Internal Aux. Switch ☐ Kirk Key ☐ Undervoltage Release

Main Fusible Disconnect (MFD):

Located in Section No. _____ ☐ Top ☐ Bottom

No. of cables per phase: _____ Cable Size:_____ ☐ Copper ☐ Alum

Ampere Rating: _____ ☐ Factory Supplied and Installed

☐ Supplied & Installed by Others

Fuse Clip:

☐ Class J Current limiting, time delay

Fuse Rating: _____

☐ Class L "for 800A and 1200A only"

☐ Mechanical Lugs

☐ Notes: _____

Modification Option:

☐ Door Padlock Hasp ☐ Lighting Arrester ☐ Surge Capacitor
☐ Ground Detection Lights ☐ Phase Monitor

* Metering Options

☐ PAC3100 Power Meter, 3p4w, 2000A (3CT, 3PT)
☐ PAC3200 Power Meter, 3p4w, 2000A (3CT, 3PT)
☐ PAC4200 Power Meter, 3p4w, 2000A (3CT, 3PT)
☐ CT for Metering, 2000:X
☐ PT for Metering, Including fuses, 575V, 60Hz
☐ Phase Selector Switch for Ammeter or Voltmeter
☐ Extra Fuses (with Switch \-or\-Shorting Terminal Block)

Motor Control Centres

Specification Checklist

INCOMING LINE TERMINATION - *continued*

Surge Protection Device

Surge Current: ☐ None ☐ 100 kA ☐ 150 kA ☐ 200 kA ☐ 250 kA ☐ 300 kA

*Disconnect: ☐ Circuit Breaker Disconnect ☐ Fusible Disconnect ☐ Direct Connection (12")

Options: ☐ Surge Counter ☐ Remote Monitor (External to MCC) (RMSIE)

FEEDER UNITS

Fused Switch:

☐ Class J Clips for "Current Limiting Time Delay" Fuse

☐ Single Mounted (30a, 60A) ☐ Dual Mounted (30A, 60A)

☐ Quantity _____ ☐ 100 ☐ 200 ☐ 400 ☐ 600

Fuse Rating: _____

Other Options: _____

Circuit Breaker (Thermal Magnetic):

Interrupting Rating: _____

☐ Dual Mounted ☐ ED, 125A Frame Max 18 kA

☐ Dual Mounted ☐ CED, 125A Frame Max 100 kA

☐ Quantity _____ ☐ 250A F frame ☐ 400A J frame ☐ 600A L frame ☐ 800A M frame ☐ 1200A N frame

Other Options: _____

Breaker Option: ☐ Internal Aux. Switch ☐ Alarm Contact ☐ Shunt Trip ☐ Undervoltage Release ☐ Other Options: _____

External Option: ☐ Ground Fault Indication ☐ Ground Fault Trip

COMBINATION CONTACTOR/STARTER UNITS

* Wiring:

NEMA Wiring Class: ☐ I ☐ IS ☐ II ☐ IIS

NEMA Wiring Type:

☐ BD - Unit Terminal Block

☐ BT - Unit Terminal Block Load connected thru size 3

☐ C - Mater Terminal Block:

☐ Top 12" Wireway ☐ Bottom 6" Wireway ☐ Master Control Section

☐ Pull-apart Control Terminal STD

☐ Stationary Control Terminal

Contactor/Starter Types: ☐ FVC ☐ FVNR ☐ FVR ☐ 2S1W ☐ 2S2W

☐ Other: _____

Disconnecting Means - Fusible: ☐ Class J Clips for "Current Limiting Time Delay" Fuse

Fuses: ☐ Factory Supplied and Installed ☐ Supplied and Installed by Others

Disconnecting Means - Circuit Breaker: ☐ Motor Circuit Protector (magnetic/instantaneous only) ☐ Circuit Breaker (thermal-magnetic)

Accessories: _____

* = Required Field

COMBINATION CONTACTOR/STARTER UNITS - *continued*

* Overload Relays:

☐ 3RB20 STD ☐ Option Electronic 3RB21 c/w ground fault
☐ Simocode Pro V **Note:** Max 30 Simocodes per network segment

Secondary Voltage: ☐ 120 VAC (std) ☐ Other: _____

☐ Factory wired with Profibus

Options: _____

☐ CT Module ☐ PT/CT Module in place of CT Module

☐ No Operator Control Panel/Door push button (label) Reset

☐ Operator Control Panel w/o LCD ☐ Operator Control Panel with LCD

Simocode Expansion Modules

☐ 4I/2O 110-240VAC Monostable Module
☐ 1I/1O Analog Module
☐ Temperature Module
☐ Decoupling Module use with PT/CT module
☐ Earth Fault Module
☐ Summation Current Transfomer
☐ 4I/2O 110-240VAC Bistable Module

Options: _____

* Unit Nameplate:

☐ None ☐ Self Adhesive STD ☐ Screw ☐ 1200A N frame

Colours ☐ Black letters on white ☐ White letters on black ☐ Other: _____

* Control Power:

STD ☐ Individual Control Transformer (CPT)

Secondary Voltage: ☐ 120 VAC (std) ☐ Other: _____

☐ Standard Capacity ☐ 100 VA extra

Option: ☐ No Interlock on Handle
☐ Interlock on Handle 1 NO, 1 NC
☐ Interlock Auxiliary Switch 1 NO, 1 NC

Option: ☐ Mater Control Transformer

Secondary Voltage: ☐ 120 VAC (std) ☐ Other: _____

☐ Factory Wiring ☐ Control Fuses Inside Starter

Standard: ☐ Interlock on Handle 1 NO, 1 NC

Option: ☐ Internal Auxiliary Switch 1 NO, 1 NC

Option: ☐ Separate Source (remote to MCC)

Secondary Voltage: ☐ 120 VAC (std) ☐ Other: _____

☐ Control Fuses Inside Starter

Standard: ☐ Interlock on Handle 1 NO, 1 NC

Option: ☐ Internal Auxiliary Switch 1 NO, 1 NC

* Starter Options:

☐ Starter Auxiliary Option - Qty._____N.O. Qty._____N.C.

☐ Pilot Devices ☐ Pushbuttons, Describe Function (such as start/stop): _____

_____

☐ Selector Switches, Describe Function (such as off-on, hand-off-auto): _____

_____

☐ Pilot Lights ☐ 22 mm ☐ STD Bulb Qty. _____ Colour(s): _____

☐ 30 mm ☐ LED Qty. _____ Colour(s): _____

☐ Push-to-test

☐ Relays or Timers, Describe: _____

☐ Others, Describe: _____

Specification Checklist

OTHER UNIT/APPARATUS

Voltage: _____ Phase: _____ Wire: _____

IC Rating: _____

☐ Panelboard: ☐ Main Lug ☐ Main Breaker

Quantity and Pole Configuration: _____

☐ Soft Starters: ☐ Keypad ☐ Communication ☐ External Bypas ☐ Input Isolation ☐ Reset

Describe: _____

☐ Drives ☐ MM440 ☐ 6SE70 ☐ Keypad ☐ Communication

Contactors and Reactors:

Contactor Type: ☐ Input Isolation ☐ Output Isolation ☐ Bypass

Reactor Type: ☐ Line ☐ Load

Filter Type: ☐ DV/DT Filter ☐ RFI Filter

☐ Extra Space for Future Units: Describe: _____

☐ Additional Notes/Comments: _____