

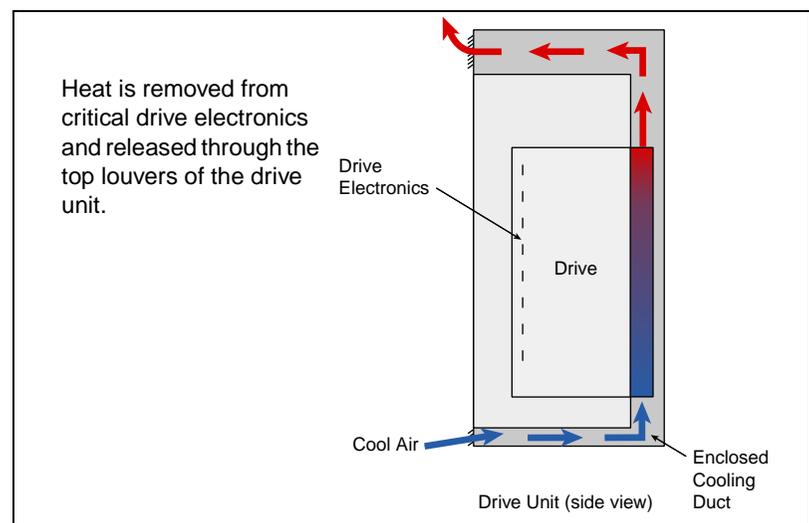


## Heat Management

MCC drives manufactured by Square D include an efficient system for removing heat generated by ac drive power electronics. The cooling system circulates cool air within the drive unit to keep operation within temperature rise limits without the need for oversizing.

Temperature tests and designs are all verified according to the UL 845 standards for MCCs. The cooling system is self-powered, maintained easily, and includes overtemperature protection to shut down the drive in case of cooling blockage. The MCC drive cooling package maintains integrity for the MCC structure and drive electronics in NEMA 1 or NEMA 12 MCC enclosures.

The innovative design of the Square D MCC drive unit maximizes heat dissipation, which helps extend drive life.



**Figure 2: Heat Management**

## Ease of Use and Maintenance

Model 6 MCCs and ALTIVAR® drives manufactured by Square D are best known for their ease of use and reliable operation. Some of the MCC unit features include:

- Twin-handle cam racking mechanism, which works with the “glide rail” feature of the unit. This feature facilitates proper stab alignment.
- Fully compartmentalized design with solid bottom and rear plates are painted white for optimum visibility.
- All horizontal and full-depth vertical wireways are left undisturbed by the drive units to assist in wire routing within the MCC.
- Pull-apart terminals and complete wiring and programming documentation are provided with each unit for maintenance.
- Door-mounted graphical keypad and pilot devices allow operation and adjustments without having to open the enclosure, and provide quick viewing of diagnostics and fault messages.

### Quality and Rugged Construction

All MCC drive units designed and manufactured by Square D are temperature and short circuit tested to MCC standards defined in UL 845. The MCC drive unit's high fault withstand rating enables it to operate in most distribution systems and verifies the rugged electrical and mechanical design.

In addition, the ISO 9001-certified manufacturing plant both designs and assembles the complete MCC drive unit to provide a high level of package performance and consistency. The factory provides single-source product assembly and documentation to meet the customer's specific needs.

### Quick Turnaround

Square D can ship standard MCC ac drive units and options in lead times from 3 days to 4 weeks. All drive components conform to domestic and international standards including UL, NEMA, CSA, IEC, VDE, and CE marking to meet global user needs.

### Drives in Outdoor Applications

NEMA 3R MCCs manufactured by Square D are non-walk-in enclosures with a design based on the standard NEMA 1 MCC. Additional housing and gasketing provide protection from rain, sleet, and ice. The MCC enclosure is further modified to include fan forced ventilation while continuing to meet NEMA 3R integrity testing per UL 845 MCC standards.

### NUMEROUS FACTORY STANDARD CONFIGURATIONS

To provide flexibility and a wide application range, Square D has given an extra effort to provide numerous common power and control options in our designs. Factory integration of contactors, disconnects, and controls saves time and coordination.

#### “Basic” Drive Power Circuit

The drive unit is a combination disconnect and drive, similar to standard MCC starters. It includes:

- Choice of disconnect: circuit breaker or fusible switch
- Drive pre-programmed for selected options and application type (i.e. variable torque, constant torque, or low noise variable torque)
- Current limiting power fuses connected between the drive and disconnect that maintain the high fault withstand rating
- UL 845 MCC unit listing
- Short circuit current rating of 100,000 A (ALTIVAR 58) or 65,000 A (ALTIVAR 66)
- Keypad and display mounted on the front of the unit
- Optional pilot devices
- Control power transformer, if necessary, for enclosure ventilation fans

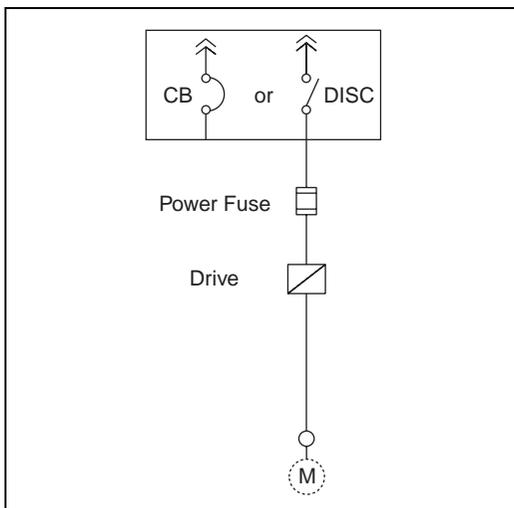
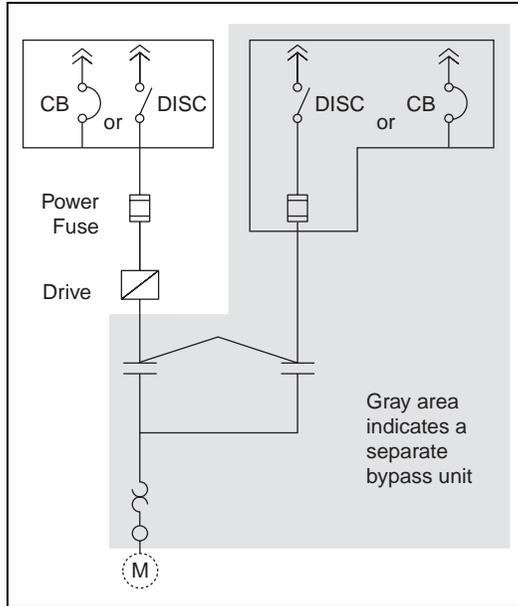


Figure 3: Basic Drive Power Circuit



**Figure 4: Barriered Bypass Drive Power Circuit**

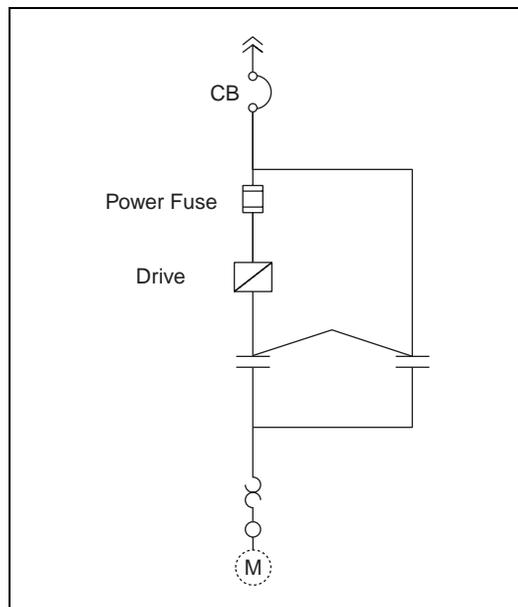
**“Barriered Bypass” Drive Power Circuit**

The barriered bypass drive power circuit provides a backup, full-speed starter for emergency operation mode. This configuration separates the drive unit from the bypass starter unit. Compartments are isolated from each other with metal barriers and individual disconnects.

**Features**

The bypass can still operate if the drive unit is removed from the MCC. Includes the basic drive power circuit, plus:

- NEMA style isolation and bypass contactors for emergency, full-speed operation
- or—
- An optional, 6-inch-high, COMPAC™ 6 barriered bypass, which uses IEC- style contactors
- A separate disconnect (circuit breaker or fusible switch) for drive and bypass, which can be operated independently
- Drive and bypass are UL 845 Listed for high fault withstand
- AFC-off-bypass selector switch, red push-to-test “AFC” pilot light, and yellow push-to-test “bypass” pilot light on bypass control island (non-push-to-test used on COMPAC 6)
- Completely inter-wired and pre-tested



**Figure 5: Integrated Bypass Drive Power Circuit**

**“Integrated Bypass” Drive Power Circuit**

One unit, integrated with both the drive and bypass starter, provides a backup, full-speed starter for emergency operation mode. The drive and bypass circuit use a common circuit breaker disconnect and are not isolated, or barriered, from each other.

This bypass allows the process to run at full speed until a more convenient shutdown can be scheduled for drive maintenance. An advantage of this bypass option is that it is typically smaller than and half the cost of the barriered bypass option.

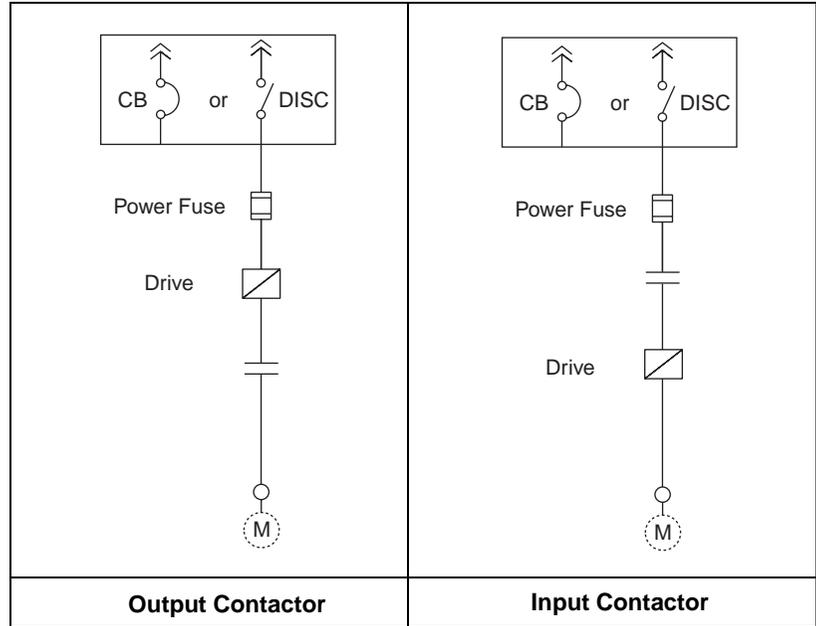
**Features**

Includes a basic drive power circuit, plus:

- IEC-style isolation and bypass contactors for emergency full-speed operation in the same compartment
- Available only as a circuit breaker disconnect common to drive and bypass
- Drive and bypass are UL 845 Listed for high fault withstand
- AFC-off-bypass selector switch, red push-to-test “AFC” pilot light, and yellow push-to-test “bypass” pilot light on bypass control island

**Other Standard Modifications**

- Input and output contactors
- Line reactors for power line harmonic reduction
- ACCUSINE PCS for increased harmonic reduction and power factor correction
- Load reactors and filters for long motor lead coordination
- 2- or 3-wire control operators
- Additional control VA
- Pre-defined controls for auto mode
- Special pilot devices
- Additional space for field devices
- Wired and unwired relays
- Analog and digital meters
- Drive I/O extension cards
- Communication options for MODBUS® PLUS, DEVICENET®, PROFIBUS®, ethernet, and other common protocols
- Optional NEMA 3R ventilated enclosures for outdoor applications



**Three Application Performance Configurations and Ratings:**

- Variable torque (VT) for centrifugal pumps or fans. VT saves unit cost and space.
- Low motor noise variable torque (LNVT) for fans in HVAC applications where motor noise can be objectionable. LNVT rating increases switching frequency.
- Constant Torque (CT) for conveyors and other continuous full-load applications. CT rating provides high-torque output for short-term overloads and starting.

**ALTIVAR 58 AC DRIVES FOR MCCS**

ALTIVAR 58 ac drives for MCCs are a comprehensive family of economical and simple drives, which are rated up to 100 hp. The ALTIVAR 58 MCC package is optimized for space and cost savings.

**Application**

Each drive can be customized with the user-friendly keypad, included as standard and located on the front of the enclosure. As a time-saving tool, the keypad can store and download similar software configurations to multiple drives. Application macros can preset machine handling and variable torque application settings, or the drive can autotune the drive/motor/machine combination.

Interface to local device communication networks or high-level bus networks can be included in the ALTIVAR 58 MCC through communication option cards.

MCC enclosures can be used to centralize control in an efficient mounting platform. Many process functions can be monitored and controlled with a combination of motor controls and device level data exchange.



**ALTIVAR 58 AC Drives for MCCs**

**Features**

ALTIVAR 58 drives feature third generation Sensorless Flux Vector (SVC) for superior motor speed and torque performance. Units are available in NEMA 1, NEMA 1(A) gasketed, and NEMA 12 MCC enclosures in the following ranges:

**Table 1: HP Ratings for NEMA 1, NEMA 1A (gasketed), and NEMA 12<sup>1</sup>**

Motor Rating	Variable Torque	Constant Torque	Variable Torque, Low Noise
460 V, 3Ø, 60 Hz	½–100 hp (up to 124 A)	½–75 hp (up to 115 A)	½ – 75 hp (up to 96 A)
230 V, 3Ø, 60 Hz	1–50 hp (up to 143 A)	1–40 hp (up to 116 A)	1–40 hp (up to 116 A)
200 V, 3Ø, 60 Hz	1–50 hp (up to 143 A)	1–40 hp (up to 116 A)	1–40 hp (up to 116 A)

<sup>1</sup> Also available for NEMA 3R. See Square D Bulletin No. 8998DB0201 for NEMA 3R MCC ratings.

**Table 2: Space Requirements for 480 V ALTIVAR 58 AC Drives with Circuit Breaker or Fusible Switch Disconnects**

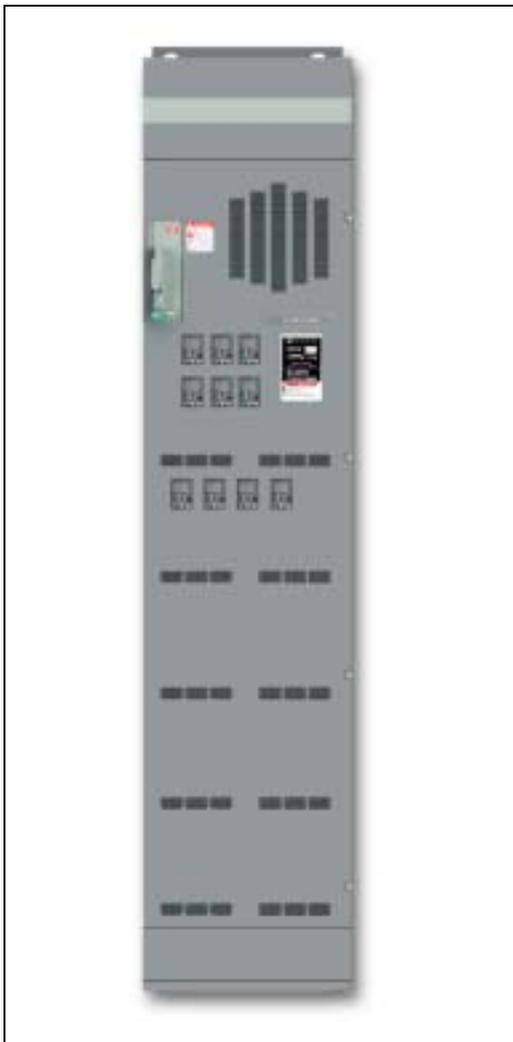
Motor Rated Horsepower at 460 V	NEMA 1 NEMA 1A (Gasketed)	NEMA 12
	Physical Size Required (Plug-in Unit)	Physical Size Required (Plug-in Unit)
1–3	12-in. (H), 6 per section max	24-in. (H), 3 per section max
5–7.5	15-in. (H), 4 per section max	
10–15	24-in. (H), 3 per section max	36-in. (H), 2 per section max
20	27-in. (H), 2 per section max	
25–40	45-in. (H), 1 per section max	45-in. (H), 1 per section max
50 VT		
60–75	20-in. (W) X 15-in. (D) full section-not a plug-in unit	20-in. (W) X 15-in. (D) full section-not a plug-in unit
50 constant torque, LNVT		
100 VT		

**Table 3: Space Requirements for 208/240 V ALTIVAR 58 AC Drives with Circuit Breaker or Fusible Switch Disconnects**

Motor Rated Horsepower		NEMA 1 NEMA 1A (Gasketed)	NEMA 12
200 V	230 V	Physical Size Required (Plug-in Unit)	Physical Size Required (Plug-in Unit)
3	1–3	12-in. (H), 6 per section max	24-in. (H), 3 per section max
5	5	15-in. (H), 4 per section max	
7.5–10	7.5–10	24-in. (H), 3 per section max	36-in. (H), 2 per section max
15–20	15–20	27-in. (H), 2 per section max	
25 VT	25 VT	45-in. (H), 1 per section max	45-in. (H), 1 per section max
25–40	25–40		
50 VT	50 VT	20-in. (W) X 15-in. (D) full section-not a plug-in unit	20-in. (W) X 15-in. (D) full section-not a plug-in unit



**ALTIVAR Keypad in an MCC Control Station Plate**



**ALTIVAR 58 Multi-Drive Process Line Cabinet**

### Keypad Monitoring and Indication

The front-mounted operator keypad displays setup parameters and the last fault occurrence with four-digit display and plain, multi-language dialog on one line of 16 characters.

The keypad is factory preset for the most common adjustments and the control schemes ordered with the unit.

Built-in security is provided by an access-locking switch on the back of the programming keypad. This helps to avoid accidental adjustments.

Programs are saved in the keypad, allowing storage and retrieval of four different programs between multiple drive units.

### Keypad Real-time Display

- drive state (running, ready, accelerating, decelerating, etc.)
- reference frequency (in Hz)
- output frequency (in Hz)
- motor speed (in RPM)
- motor current (in Amps)
- motor voltage (in Volts)
- motor thermal state (in %)
- drive thermal state (in %)
- last fault
- keypad frequency reference (in Hz)

### Remote Monitoring and Indication

- one normally open contact for indication of drive running (closes on run)
- one normally closed contact for indication of drive fault (opens on fault)
- optional analog output for motor current, motor frequency, ramp output, and motor torque
- optional communication cards for remote parameter configuration and monitoring

### ALTIVAR 58 MULTI-DRIVE PROCESS LINE CABINETS

(Patent Pending)

MCC style 90-inch-high relay sections are available with group-mounted ALTIVAR 58 ac drives. All drives are installed in one cabinet instead of individual plug-on MCC units. This allows greater density and reduces floor space over traditional MCC unit construction. Drives are not isolated from each other, are fed from one circuit breaker disconnect, and are fused individually.

### Application

Multi-drive process line cabinets are suited for process line applications where a fault or maintenance of one drive on the process requires the entire process to shut down. Applications in automotive, food and beverage, pharmaceutical, and other process industries using multiple drives for a single process machine are candidates for this product. Pre-engineered, pre-assembled packaging saves third-party assembly labor and commissioning time on simple installations.

**Features**

An efficient cooling system and current limiting fuses provide UL 845 certified performance. Each drive has a uniquely numbered door-mounted keypad for easy monitoring and setup without having to open the enclosure. Programming can be downloaded from a single keypad if preferred.

Process line cabinet drive units are rated for 480 V installations. No control pilot devices or 120 V control power is available, which makes this package more suited for simple remote control schemes or further integration in the field.

Packages are designed for NEMA 1 environments. Horizontal bus is provided for splicing to existing Model 5 or Model 6 MCC sections or an additional MCC incoming line section.

Any number of drives up to the maximum indicated below can be installed in the multi-drive process line cabinet. However, all drives in the same cabinet must have the same rating. Panels for adding the maximum number of drives are installed.

**Table 4: Multi-Drive Process Line Cabinets**

	<ul style="list-style-type: none"> <li>• Consists of MCC relay section with multiple drives that have the same rating fed from a single circuit breaker disconnect.</li> <li>• Current limiting power fuses (UL Class CC or T) are included for each drive.</li> <li>• Package is UL 845 Listed for 65,000 A short circuit current.</li> <li>• Operation keypad/displays for each drive are mounted on door of cabinet.</li> <li>• No pilot devices are available as standard.</li> <li>• Control power transformer (480 V/240 V) for cabinet ventilation fans is included.</li> <li>• Any number of drives, from one to the maximum indicated, can be factory installed.</li> <li>• NEMA 1 enclosure rating</li> </ul>																
<table border="1"> <thead> <tr> <th>Motor Rated HP at 460 V</th> <th>Max. Drives Per Section</th> <th>Physical Size Required</th> </tr> </thead> <tbody> <tr> <td>1–3</td> <td>10</td> <td rowspan="6">25-in (W) X 20-in (D) relay section</td> </tr> <tr> <td>5–7.5</td> <td>8</td> </tr> <tr> <td>10–15</td> <td>6</td> </tr> <tr> <td>20</td> <td>4</td> </tr> <tr> <td>25–40</td> <td>2</td> </tr> <tr> <td>50 VT</td> <td>2</td> </tr> </tbody> </table>	Motor Rated HP at 460 V	Max. Drives Per Section	Physical Size Required	1–3	10	25-in (W) X 20-in (D) relay section	5–7.5	8	10–15	6	20	4	25–40	2	50 VT	2	
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## ALTIVAR 66 AC DRIVES FOR MCCS

ALTIVAR 66 MCC drives provide a feature-rich ac drive in a space-competitive and comprehensive single family product line ranging from 3/4 up to 400 hp, the widest standard horsepower range in the MCC industry.

Add-on modules can extend the I/O and provide serial communications to various networks, including MODBUS PLUS. This unprecedented modularity allows functions to be added as your application changes.

A door-mounted keypad enables superior diagnostics for ALTIVAR drives. Monitoring and set-up capabilities are not sacrificed by MCC mounting. The MCC packaging for the ALTIVAR 66 drive creates an industrially hardened MCC unit protecting drive electronics from oily and dusty environments.

Available in NEMA 1, 12, and 3R enclosures. See Square D Bulletin No. 8998DB0201 for NEMA 3R application information and ratings.

### Motor Ratings

— System Voltage	460 Vac, 3-Phase, 60 Hz
— Variable Torque Applications	3/4–400 hp (up to 124 A)
— Constant Torque Applications	3/4–350 hp (up to 115 A)
— Variable Torque Low Noise Applications	3/4–75 hp (up to 96 A)

### Benefits of ALTIVAR 66 AC Drives

#### Single Family Concept

- One control interface design for all ratings
- Consistent wiring for any application
- Interchangeable spare parts
- Common integration approach

#### Unprecedented Modularity

- Optional I/O upgrades and extensions are attached easily
- Pull-apart control terminals allow quick installation/removal

#### Clearly Displays Information

- 6-line X 21 character graphic LCD display
- Selectable bar graph or text display of motor and drive information
- Fault information in complete statements, not codes

#### Adapts to Your Requirements

- Multiple languages for worldwide acceptance
- Keypad or terminal strip control
- Scalable frequency and current to indicated production levels
- User assignable function keys
- Menus expand as options are added

#### Walks You Through Startup

- User prompt, pull-down menus and help screens make it simple for user configuration
- Multi-level programming menus are divided for quick setup
- Self-tuning upon power up based on input mains voltage and frequency
- Automatic motor sensing and modeling at startup for self-tuning sensorless flux vector control
- Help screens available to answer startup questions quickly

#### Monitoring and Communication Capability

- PCMCIA option cards support various communication protocols including MODBUS PLUS
- Fault history for eight occurrences can help diagnose system events.
- Auto-diagnostic and logic test routines communicate drive conditions for maintenance



**Table 5: Space Requirements: Variable Torque ALTIVAR 66 Drives with Circuit Breaker/Fusible Switch Disconnects**

Nominal horsepower shown for convenience only. Size per actual motor full-load amps.

Motor Rated Horsepower at 460 V	Max. Cont. Output Amps	NEMA 1 and 1A (Gasketed) Space (in.)	NEMA 12 Space (in.)
3/4-5	7.6	18	24
7.5	11	18	36
10	14	24	
15	21	24	
20	27	36	
25	34	36	45
40	52	45	
50	65	45	72 (25 W)
75	96	72 (25 W)	
100	124	72 (25 W)	72 (35 W x 20 D)
125	156	72 (35 W x 20 D)	
200	240		
400	477	72 (40 W x 20 D)	Not Available

See Square D Bulletin No. 8998DB0201 for NEMA 3R application information and ratings.

**Table 6: Space Requirements: Constant Torque ALTIVAR 66 Drives with Circuit Breaker or Fusible Switch Disconnects**

Nominal horsepower shown for convenience only. Size per actual motor full-load amps.

Motor Rated Horsepower @ 460 V	Max. Cont. Output Amps	NEMA 1 and 1A (Gasketed) Space (in.)	NEMA 12 Space (in.)
3/4-5	7.6	18	24
10	14	24	36
20	27	36	36
40	52	45	45
75	96	72 (25 W)	72 (25 W)
200	240	72 (35 W x 20 D)	72 (35 W x 20 D)
350	420	72 (40 W x 20 D)	Not Available

See Square D Bulletin No. 8998DB0201 for NEMA 3R application information and ratings.

**Table 7: Space Requirements: Low Noise Variable Torque ALTIVAR 66 Drives with Circuit Breaker or Fusible Switch Disconnects**

Nominal horsepower shown for convenience only. Size per actual motor full-load amps.

Motor Rated Horsepower @ 460 V	Max. Cont. Output Amps	NEMA 1 and 1A (Gasketed) Space (in.)	NEMA 12 Space (in.)
3/4-5	7.6	18	24
10	14	24	36
20	27	36	36
40	52	45	45
75	96	72 (25 W)	72 (25 W)

See Square D Bulletin No. 8998DB0201 for NEMA 3R application information and ratings.