M4000 SERIES DIGITAL 3 PHASE DC DRIVES 5-1000 HP

Seco
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Solutions by DANAHER MOTION

M4000 SERIES DIGITAL DC DRIVE

Leader In Technology

Danaher Motion puts you ahead of the game by developing products and systems to help the performance of your machinery. Our motor controller, adjustable speed drives, voltage control and conditioning, AC synchronous and DC step motors, servo motors, and engineered systems are designed to provide next generation solutions to today's applications.

Combining products and technology Danaher Motion Engineered Systems Center boasts a reputation for quality and service. Coupled with unparalleled engineering capabilities, we can help you develop product lines for both new and existing high-technology markets.

M4000 Series Digital DC Drive

All the benefits of digital technology, including simple operation.

The Danaher Motion Engineered Systems Center M4000 Series Digital 3 Phase DC Drive is a programmable, microprocessor-based variable speed DC drive. The M4000 allows keypad control of each parameter, which eliminates analog adjustments. The digital readout provides on-line monitoring of drive operations and performance.

Its versatility makes it ideal for many drive applications including: wire and cable, packaging/converting machinery, material handling and metal forming, plastics, textiles, food processing equipment, spindles, cut-offs, winders, and un-winders.

More Functions

The main circuit board has been developed to incorporate many additional standard features, including serial communications and a field-weakening controller (standard on most models) for constant power and extended speed range applications.

Wide Ranging, More Flexible Communications

A new RS485 port enables the M4000 to communicate directly with PLCs and host computers. Optical isolation means that a number of drives can be multi-dropped onto a standard RS485 interface for networking with other control devices.

Massive Systems Potential

All the analog inputs and most of the digital control inputs are now user-configurable, making the M4000 a true systems drive with more versatility and flexibility than ever before.

Faster Programming

Programming the M4000 has never been easier. The drive has more comprehensive displays, easily assimilated function menus, and a new, four-key control panel.

Better Control

A new self-tuning current loop provides improved performance in response to all speeds. The drive module also contains a fully digital and tunable speed loop immune to drift.

FEATURES

Standard Features – Packaged Drives

- Full-wave, full-control power conversion for smooth, efficient operation and high performance
- Operates on 50 or 60 Hz for worldwide applications
- MOV surge suppressor protects semi-conductors from AC line transients
- Isolated control signal (±10V or 4-20mA)
- AC input line fusing
- 'M' contactor in motor armature circuit disconnects power to drive motor
- Digital setting and control of drive parameters
- Maximum and minimum speed adjustments
- Adjustable, separately set linear acceleration and deceleration rates (1-200 seconds)
- Adjustable current limit (10-150% of full load)
- Jog at separately adjustable speed and acceleration/deceleration rates.
- Simple, easy installation with minimum connections and ample wiring space
- Operator's controls can be mounted at a remote location
- Adjustable IR compensation
- Field loss protection

- Insensitive to AC line phase rotation, phase loss protection
- Armature voltage or tach generator or encoder feedback
- An internal software controlled 8 amp field regulator with field weakening and field economy on units up to 100HP at 460 VAC and 50HP at 230 VAC. If field weakening is used in crossover for extended speed range, motor mounted DC tach is required.
- 0.025% resolution for analog speed demand
- 0.1% speed holding for 100% load change with tach feedback
- Electronic motor-overload protection
- Instantaneous over-current protection
- Tach loss protection
- Software expandable
- Serial interface
- 5 year warranty
- UL certification on most models
- Encoder reference
- Digital speed and position loop (Electronic Line Shaft) standard
- Regenerative or non-regenerative models
- Compact modular chassis design
- Enclosed units available

OPTIONS

AC Line Circuit Breaker

This option is a 3-phase input line disconnecting device, which allows the AC power to be disconnected from the power unit and other equipment within the packaged drive. It protects wiring within the packaged drive by tripping when its rated current is exceeded. On enclosed drives, the door is interlocked so that the disconnect must be turned off before the door can be opened.

Blower Motor Starter

This option allows for the starting and overload protection of a blower motor commonly found on drip-proof fully guarded or separately ventilated DC motors. This starter has no fuses and requires no maintenance. An auxiliary contact on the device is already wired in the stop circuit of packaged drives which stops the main drive motor if the blower motor stops. The overload setting is adjustable to match the blower motor being used.

Field Regulator

This option allows control of the field current supplied to the motor. By field control, extended speed ranges may be achieved. If field weakening is used in crossover for extended speed range, a motor-mounted DC tach is required. The motor's maximum speed rating must not be exceeded. Five through 100HP 460 VAC and 5 through 50HP 230 VAC units have 8 amp field regulators standard. For larger units and where field currents exceed 8 amps, the FXM-5 field current regulator is available (20 amps DC maximum).

Systems Interface Board

Has all the features of the standard interface board normally supplied with packaged drives plus two additional user programmable Form C isolated relays. Drive enable and enable reference logic inputs are also supplied. This interface board works with any M4000 packaged drive as a replacement part, enhancement part, or spare part. Ideal for systems integrators!

Digital Remote Operator Interface

A NEMA 4/12 compliant two-line x 20 character LCD display with keypad allows remote access to selected M4000 para-meters. Provides status display and user-selectable readout. Also available with custom configuration.

SOFTWARE OPTIONS

Constant Tension Center-Wind (CTCW)

Designed for maintaining a constant 'web' tension in coiling and uncoiling (winder/unwind) applications mainly in the paper, wire, plastic, textile, and metals industries. The drive torque is continuously adjusted to compensate for coil diameter, machine losses, and coil inertia.

Shaft Orientation

This allows the user to specify the final position of the motor shaft relative to an electronic feedback reference, usually a marker pulse from an encoder. The position is adjusted by simply changing the value of the appropriate parameter. An output signal is provided on completion of orientation. This function is widely used for CNC machine tool-changing and other automated applications.

Enhanced Digital Speed and Position Loop (Electronic Line Shaft)

This allows several drives to be run in velocity or position synchronization. Shaft positions can be offset by an adjustable ratio introduced remotely via BCD-coded thumb-wheel input or via RS485 serial input to compensate for stretch or shrinkage in applications such as plastic extrusion, wire drawing, and textile manufacturing. There is no accumulated tracking error with digital speed and position loop software.

KW Signal

Provides a 0-10 VDC output in direct proportion to the power delivered by the motor shaft corrected for motor efficiency. Typical applications include mixer, extruders, calenders, and any application that requires an accurate indication of physical power consumption.

High Speed Serial Bus

High speed serial communications capability using ARCNET, Interbus-S, Profibus, DeviceNet, or MODBUS protocols. For other protocols, please contact factory.

MentorSoft Programming Software

MentorSoft allows the complete control and display of all parameters within the M4000 drive, with a custom list of 15 user-defined parameters. A graphic representation of the drive for some menus is available and may be displayed within MentorSoft. On-line and off-line modes are provided, with up-load, down-load, and compare features, and capabilities for auto tuning and simple setup (commissioning). A database holds details of all parameters and allows the entry of comment text by the user for each parameter.

Zero Position Dancer Control

Provides control of PID gains for dancer arm control in winding and unwinding applications. Digitally set and drift free.

S-Ramp Control

Provides smooth acceleration for hoists, conveyors, and similar loads.

Note: Application specific software can be developed to solve process problems.

SPECIFICATIONS

Service Conditions

AC Line Input:	380 to 460 or 200/240 volts ±10%, three phase
AC Line Input Frequency:	48 to 62 Hz
Ambient Temperature:	0°C to 40°C enclosed units, 0°C to 55°C chassis units
Humidity:	5 to 95% non-condensing
Altitude:	To 3300 ft without derating

Operating Conditions

Armature Voltage:	0-240 VDC or 0-500 VDC
Maximum Load Capacity:	150% for 1 minute
Line Protection:	Fuses, M.O.V.s and capacitors

Performance

Speed Range:	50:1, motor dependent
Speed Regulation:	95% load change
Armature Feedback:	±1% to ±2%, motor dependent
Tach Feedback:	+0.1% to +1% tach dependent
Encoder Feedback:	+0.01% using 1024 PPR encoder
Resolution:	.025% with analog input, and encoder feedback

Basic Adjustments

Max. Speed:	0 to 100% of base speed
Min. Speed:	0 to max speed
Accel. Time:	0 to 200 seconds
Decel. Time:	0 to 200 seconds
Jog. Speed:	0 to 100% of base speed (separate accel/decel)
Max. Torque Motoring:	0-150%
Max. Torque Regenerating:	0-150%

Analog Inputs

1 Programmable Analog Input:	Scalable 0 to ±10 VDC, 0 to 20mA, 4 to 20mA, 20 to 0mA, 20 to 4mA current input selectable. 12 bit resolution.
4 Programmable Analog Inputs:	Scalable 0 to ±10 VDC. 10 bit resolution.

Analog Outputs

1 Dedicated Meter Output:	0 to +6.6 VDC corresponds to 0 to 150% full load armature current. Output is unipolar absolute value 0 to +6.6 VDC @ 5mA DC max current output capability.
3 Programmable Analog Outputs:	Scalable 0 to ±10 VDC scalable output. User programmable to indicate armature voltage, current, speed, tach voltage, field current, etc. @ 5mA DC max current output capability each.

Digital Inputs

10 Programmable Digital Inputs:	24 VDC pull down to drive common. Low or high level switch selectable active logic inputs. Can be used to control speed/torque switching, tach/arm feedback selection, and many more useful logic functions.

Digital Outputs

6 User Relays:	Programmable to indicate Drive Ready, Drive Fault, Zero Speed, Overload, @ Speed, or Motor Running. Relays have Form C contacts rated at 250 VAC, 5 amps. (Packaged drives only)

SPECIFICATIONS

2 User Relays:	One dedicated drive ready relay Form C contact. Relays have Form C contact rated at 250 VAC, 5 amps.
5 Programmable Digital Outputs:	Open collector +24 VDC at 40mA DC max each when used with power unit. One dedicated drive ready relay Form C contact. (Power Unit version)

Selectable Feature

Select:	Speed or Torque control, Speed reference 1 or 2, Field Loss Alarm disable, Standstill Logic. (Default settings listed, user programmable)

Diagnostics

Status Display: 9 LED status indicators, labeled and visible from the front of the module, are provided to indicate the following drive conditions:

- Drive ready
- Alarm (drive overloaded)
- Drive at zero speed
- Run forward selected
- Run reverse selected
- Bridge 1 enabled
- Bridge 2 enabled
- Drive at set speed
- Current limit reached

Motor Requirements

Type:	DC Shunt Wound, 240 V Armature 150 V Field or 500 V Armature 300 V Field

Encoder Requirements (when needed for application)

Type:	Incremental 600 pulses per revolution preferred, must be differential output (A, $\overline{A}$, B, $\overline{B}$). Programmable for 60 to 2,048 pulses per revolution 2-channel quadrature, differential power supply, 5V/12V/15V, 300 mA max. Max. frequency 200kHz

Stopping Modes

Coast to Rest (Dynamic Braking if available)
Ramp to Rest
Regenerative (Reversing Regen only)

Communications

Serial Port:	RS 485, isolated ANSI 3.28X protocol 9-Pin D-type connector

Start Modes

Manual:	By operators controls
Remote:	By serial communications

Other Features

Auto Tune:	Of Current Control Loop
Security:	Multi-level programmable security codes

A wide range of DC motors are available for use with M4000 Series DC Digital Drives. Consult customer service for details.

MODEL SELECTION

Non-Regenerative 240 VDC

HP	Power Unit	Run-Stop		Run-Brake	
		Chassis	Enclosed	Chassis	Enclosed
5	M4205-00020A	M4205-21120A	M4205-22120A	M4205-31120A	M4205-32120A
7.5	M4207-00020A	M4207-21120A	M4207-22120A	M4207-31120A	M4207-32120A
10	M4210-00020A	M4210-21120A	M4210-22120A	M4210-31120A	M4210-32120A
15	M4215-00020A	M4215-21120A	M4215-22120A	M4215-31120A	M4215-32120A
20	M4220-00020A	M4220-21120A	M4220-22120A	M4220-31120A	M4220-32120A
25	M4225-00020A	M4225-21120A	M4225-22120A	M4225-31120A	M4225-32120A
30	M4230-00020A	M4230-21120A	M4230-22120A	M4230-31120A	M4230-32120A
40	M4240-00020A	M4240-21120A	M4240-22120A	M4240-31120A	M4240-32120A
50	M4250-00020A	M4250-21120A	M4250-22120A	M4250-31120A	M4250-32120A
60	M4260-00000A	M4260-21110A	M4260-22110A	M4260-31110A	M4260-32110A
75	M4275-00000A	M4275-21110A	M4275-22110A	M4275-31110A	M4275-32110A
100	M421 A-00000A	M421 A-21110A	M421 A-22110A	M421 A-31110A	M421 A-32110A
125	M421 B-00000A	M421 B-21110A	M421 B-22110A	M421 B-31110A	M421 B-32110A
150	M421 C-00000A	M421 C-21110A	M421 C-22110A	M421 C-31110A	M421 C-32110A
200	M421 D-00000A	M421 D-21110A	M421 D-22110A	M421 D-31110A	M421 D-32110A
250	M421 E-00000A	M421 E-21110A	M421 E-22110A	M421 E-31110A	M421 E-32110A
300 400 500	Consult Factory				

Regenerative 240 VDC

HP	Power Unit	Run-Stop		Run-Brake	
		Chassis	Enclosed	Chassis	Enclosed
5	M4205-10020A	M4205-41120A	M4205-42120A	M4205-51120A	M4205-52120A
7.5	M4207-10020A	M4207-41120A	M4207-42120A	M4207-51120A	M4207-52120A
10	M4210-10020A	M4210-41120A	M4210-42120A	M4210-51120A	M4210-52120A
15	M4215-10020A	M4215-41120A	M4215-42120A	M4215-51120A	M4215-52120A
20	M4220-10020A	M4220-41120A	M4220-42120A	M4220-51120A	M4220-52120A
25	M4225-10020A	M4225-41120A	M4225-42120A	M4225-51120A	M4225-52120A
30	M4230-10020A	M4230-41120A	M4230-42120A	M4230-51120A	M4230-52120A
40	M4240-10020A	M4240-41120A	M4240-42120A	M4240-51120A	M4240-52120A
50	M4250-10020A	M4250-41120A	M4250-42120A	M4250-51120A	M4250-52120A
60	M4260-10000A	M4260-41110A	M4260-42110A	M4260-51110A	M4260-52110A
75	M4275-10000A	M4275-41110A	M4275-42110A	M4275-51110A	M4275-52110A
100	M421 A-10000A	M421 A-41110A	M421 A-42110A	M421 A-51110A	M421 A-52110A
125	M421 B-10000A	M421 B-41110A	M421 B-42110A	M421 B-51110A	M421 B-52110A
150	M421 C-10000A	M421 C-41110A	M421 C-42110A	M421 C-51110A	M421 C-52110A
200	M421 D-10000A	M421 D-41110A	M421 D-42110A	M421 D-51110A	M421 D-52110A
250	M421 E-10000A	M421 E-41110A	M421 E-42110A	M421 E-51110A	M421 E-52110A
300 400 500	Consult Factory				

M4000 Series DC Drive Types

Power Unit:
Includes control circuitry and power conversion components to convert AC line voltage into variable DC voltage. The Power Unit is designed for integra-ting into a drive system.

Packaged Drives
Run-Stop:
Includes non-rege-nerative power unit armature contactor and enclosure if specified.

Run-Brake:
Includes non-rege-nerative power unit armature contactor with dynamic braking resistor and enclosure if specified.

Reversing/ Regenerative-Stop:
Includes regenerative power unit for contactorless reversing and enclosure if specified.

Reversing/ Regenerative-Brake:
Includes regenerative power unit for contactorless reversing, armature contactor with dynamic brake resistor, and enclosure if specified.

MODEL SELECTION

Non-Regenerative 500 VDC

HP	Power Unit	Run-Stop		Run-Brake	
		Chassis	Enclosed	Chassis	Enclosed
5	M4405-00020A	M4405-21120A	M4405-22120A	M4405-31120A	M4405-32120A
7.5	M4407-00020A	M4407-21120A	M4407-22120A	M4407-31120A	M4407-32120A
10	M4410-00020A	M4410-21120A	M4410-22120A	M4410-31120A	M4410-32120A
15	M4415-00020A	M4415-21120A	M4415-22120A	M4415-31120A	M4415-32120A
20	M4420-00020A	M4420-21120A	M4420-22120A	M4420-31120A	M4420-32120A
25	M4425-00020A	M4425-21120A	M4425-22120A	M4425-31120A	M4425-32120A
30	M4430-00020A	M4430-21120A	M4430-22120A	M4430-31120A	M4430-32120A
40	M4440-00020A	M4440-21120A	M4440-22120A	M4440-31120A	M4440-32120A
50	M4450-00020A	M4450-21120A	M4450-22120A	M4450-31120A	M4450-32120A
60	M4460-00020A	M4460-21120A	M4460-22120A	M4460-31120A	M4460-32120A
75	M4475-00020A	M4475-21120A	M4475-22120A	M4475-31120A	M4475-32120A
100	M441 A-00020A	M441 A-21120A	M441 A-22120A	M441 A-31120A	M441 A-32120A
125	M441 B-00000A	M441 B-21110A	M441 B-22110A	M441 B-31110A	M441 B-32110A
150	M441 C-00000A	M441 C-21110A	M441 C-22110A	M441 C-31110A	M441 C-32110A
200	M441 D-00000A	M441 D-21110A	M441 D-22110A	M441 D-31110A	M441 D-32110A
250	M441 E-00000A	M441 E-21110A	M441 E-22110A	M441 E-31110A	M441 E-32110A
300	M441 F-00000A	M441 F-21110A	M441 F-22110A	M441 F-31110A	M441 F-32110A
400	M441 G-00000A	M441 G-21110A	M441 G-22110A	M441 G-31110A	M441 G-32110A
500	M441 H-00000A	M441 H-21110A	M441 H-22110A	M441 H-31110A	M441 H-32110A
600 700 800 900 1000	Consult Factory				

Regenerative 500 VDC

HP	Power Unit	Run-Stop		Run-Brake	
		Chassis	Enclosed	Chassis	Enclosed
5	M4405-10020A	M4405-41120A	M4405-42120A	M4405-51120A	M4405-52120A
7.5	M4407-10020A	M4407-41120A	M4407-42120A	M4407-51120A	M4407-52120A
10	M4410-10020A	M4410-41120A	M4410-42120A	M4410-51120A	M4410-52120A
15	M4415-10020A	M4415-41120A	M4415-42120A	M4415-51120A	M4415-52120A
20	M4420-10020A	M4420-41120A	M4420-42120A	M4420-51120A	M4420-52120A
25	M4425-10020A	M4425-41120A	M4425-42120A	M4425-51120A	M4425-52120A
30	M4430-10020A	M4430-41120A	M4430-42120A	M4430-51120A	M4430-52120A
40	M4440-10020A	M4440-41120A	M4440-42120A	M4440-51120A	M4440-52120A
50	M4450-10020A	M4450-41120A	M4450-42120A	M4450-51120A	M4450-52120A
60	M4460-10020A	M4460-41120A	M4460-42120A	M4460-51120A	M4460-52120A
75	M4475-10020A	M4475-41120A	M4475-42120A	M4475-51120A	M4475-52120A
100	M441 A-10020A	M441 A-41120A	M441 A-42120A	M441 A-51120A	M441 A-52120A
125	M441 B-10000A	M441 B-41110A	M441 B-42110A	M441 B-51110A	M441 B-52110A
150	M441 C-10000A	M441 C-41110A	M441 C-42110A	M441 C-51110A	M441 C-52110A
200	M441 D-10000A	M441 D-41110A	M441 D-42110A	M441 D-51110A	M441 D-52110A
250	M441 E-10000A	M441 E-41110A	M441 E-42110A	M441 E-51110A	M441 E-52110A
300	M441 F-10000A	M441 F-41110A	M441 F-42110A	M441 F-51110A	M441 F-52110A
400	M441 G-10000A	M441 G-41110A	M441 G-42110A	M441 G-51110A	M441 G-52110A
500	M441 H-42110A	M441 H-41110A	M441 H-42110A	M441 H-51110A	M441 H-52110A
600 700 800 900 1000	Consult Factory				

M4000 Series DC Drive Types

Power Unit:
Includes control circuitry and power conversion components to convert AC line voltage into variable DC voltage. The Power Unit is designed for integrating into a drive system.

Packaged Drives
Run-Stop:
Includes non-regenerative power unit armature contactor and enclosure if specified.

Run-Brake:
Includes non-regenerative power unit armature contactor with dynamic braking resistor and enclosure if specified.

Reversing/ Regenerative-Stop:
Includes regenerative power unit for contactorless reversing and enclosure if specified.

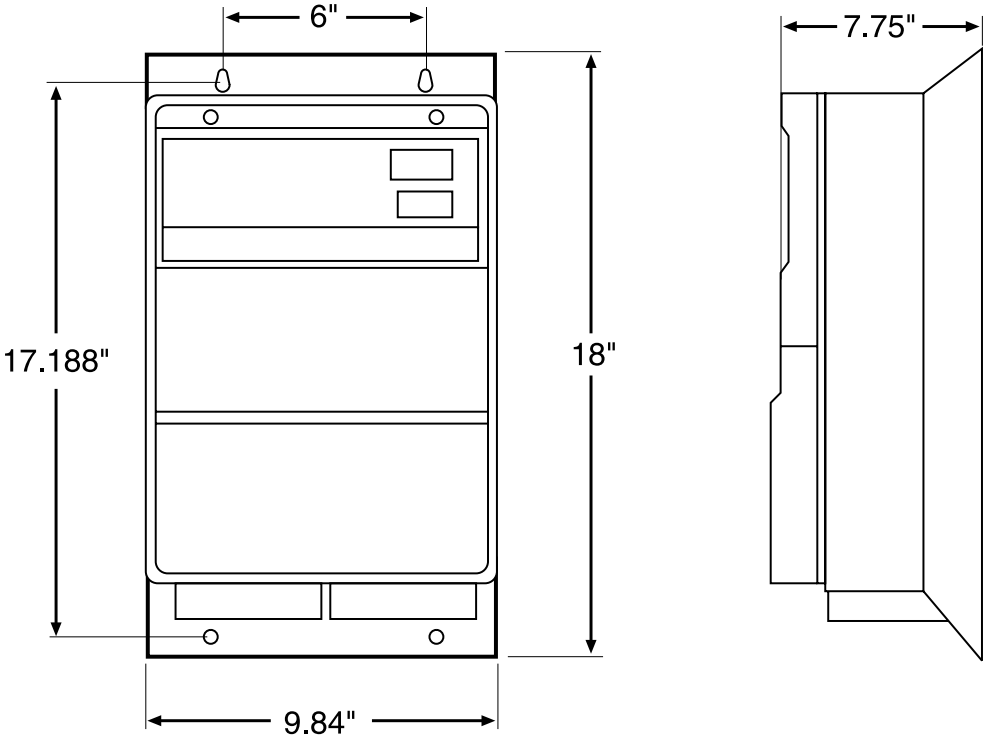
Reversing/ Regenerative-Brake:
Includes regenerative power unit for contactorless reversing, armature contactor with dynamic brake resistor, and enclosure if specified.

DIMENSIONS

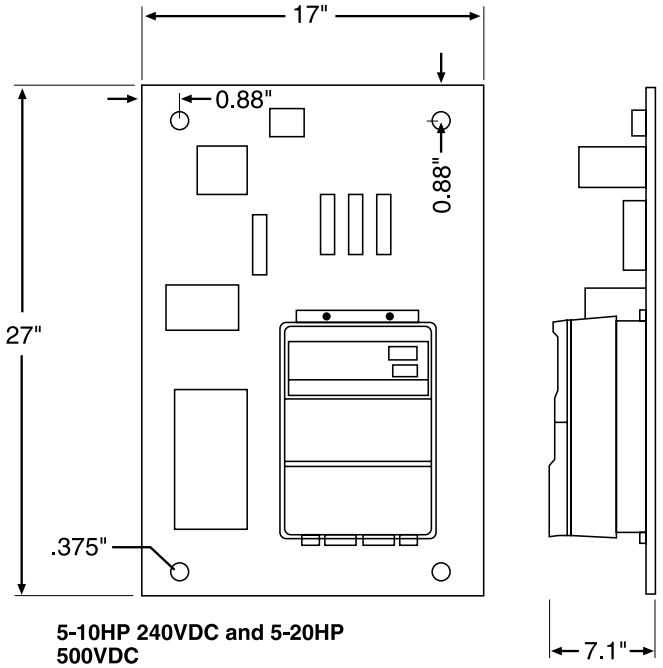
All dimensions supplied are for estimating purposes only. Contact Danaher Motion Engineered Systems Center for certified dimensions.

5 - 10HP - 240VDC / 5 - 20HP - 500VDC

Power Units

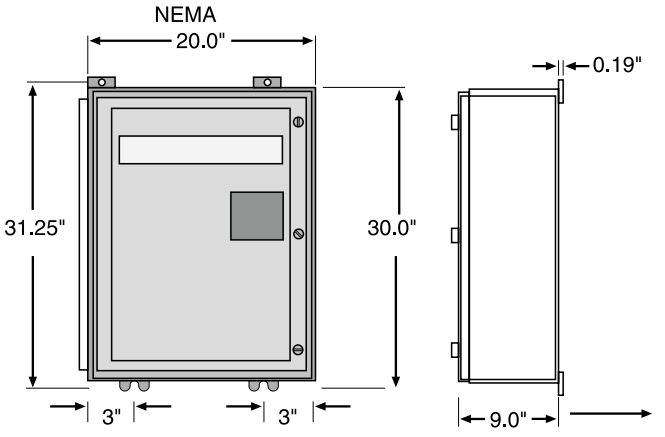


Chassis



5-10HP 240VDC and 5-20HP 500VDC with FXM - 5 Field Regulator

Enclosed



5-10HP 240VDC and 5-20HP 500 VDC with Optional FXM-5 Field Controller use 36" x 11" x 9"

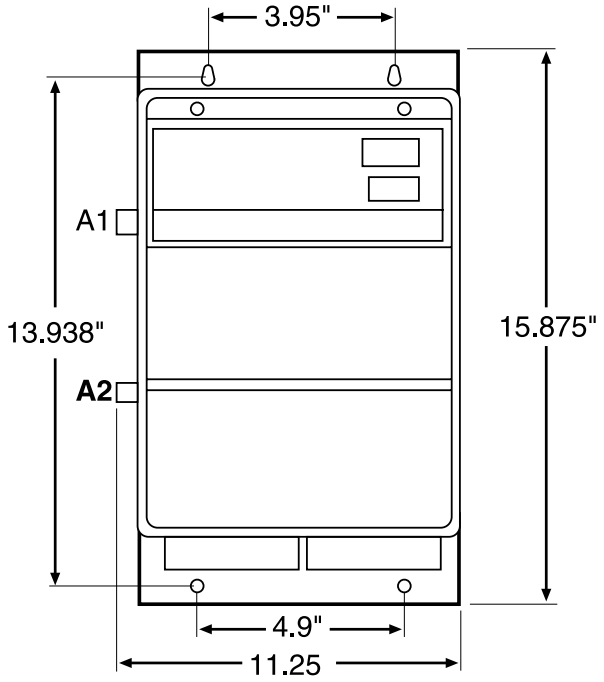
Add 3" for through Door Circuit Breaker or Disconnect Option.

DIMENSIONS

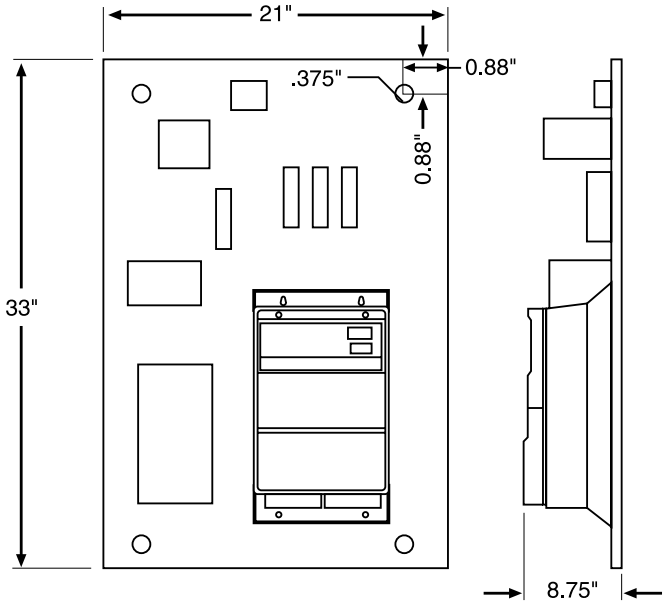
All dimensions supplied are for estimating purposes only. Contact Danaher Motion Engineered Systems Center for certified dimensions.

15 - 20HP - 240VDC / 25 - 40HP - 500VDC

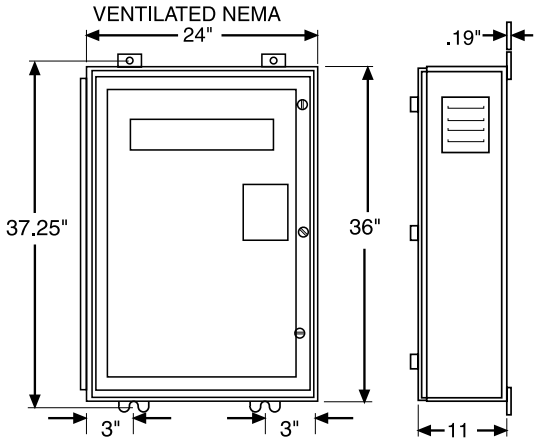
Power Units



Chassis



Enclosed



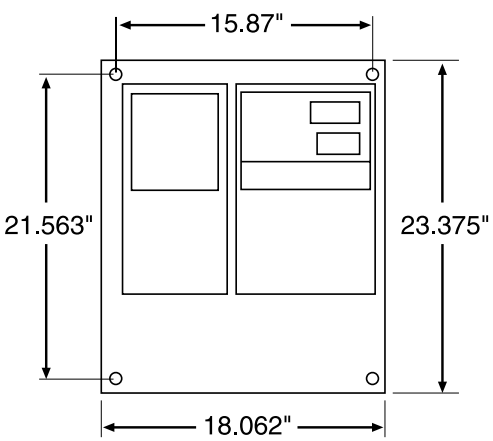
Add 3" for through Door Circuit Breaker or Disconnect Option.

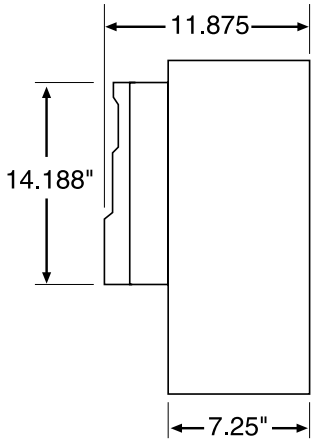
DIMENSIONS

All dimensions supplied are for estimating purposes only. Contact Danaher Motion Engineered Systems Center for certified dimensions.

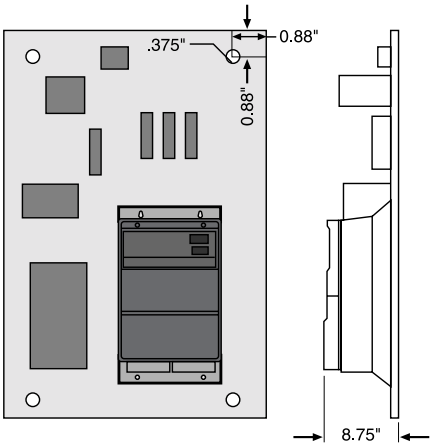
25 - 50HP - 240VDC / 50 - 100HP - 500VDC

Power Units





Chassis



240VDC

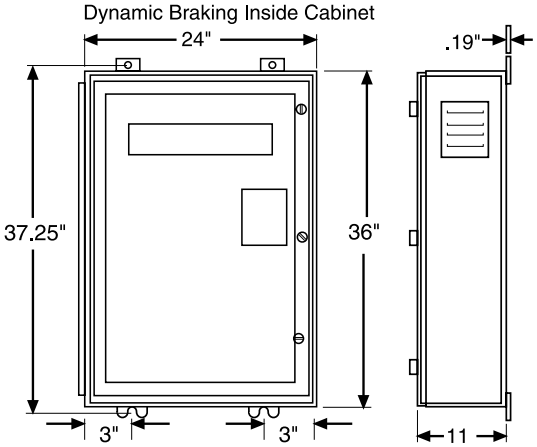
HP	LENGTH	WIDTH
25 -30	33”	21”
40 - 50	45”	33”

500VDC

HP	LENGTH	WIDTH
50 - 60	33”	21”
75 - 100	45”	33”

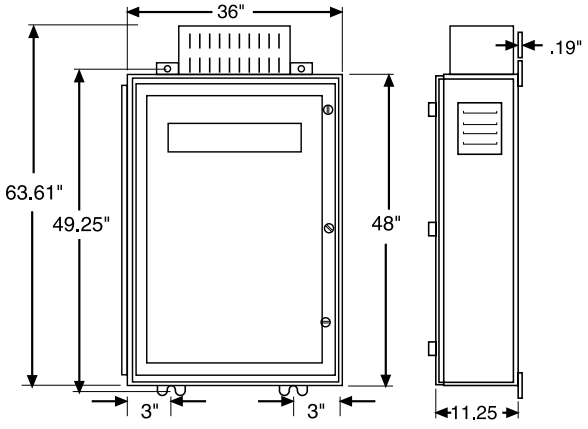
Enclosed

Ventilated NEMA 12
25-30HP - 240VDC
50-60HP - 500VDC
Dynamic Braking Inside Cabinet



Add 3" for through Door Circuit Breaker or Disconnect Option.

Ventilated NEMA 12
40-50HP - 240VDC
75-100HP - 500VDC
Shown with Dynamic Braking
Cage Rated at NEMA 1



For Units without Dynamic Braking the Same Enclosure is used without DB Tophat Mounted Cage

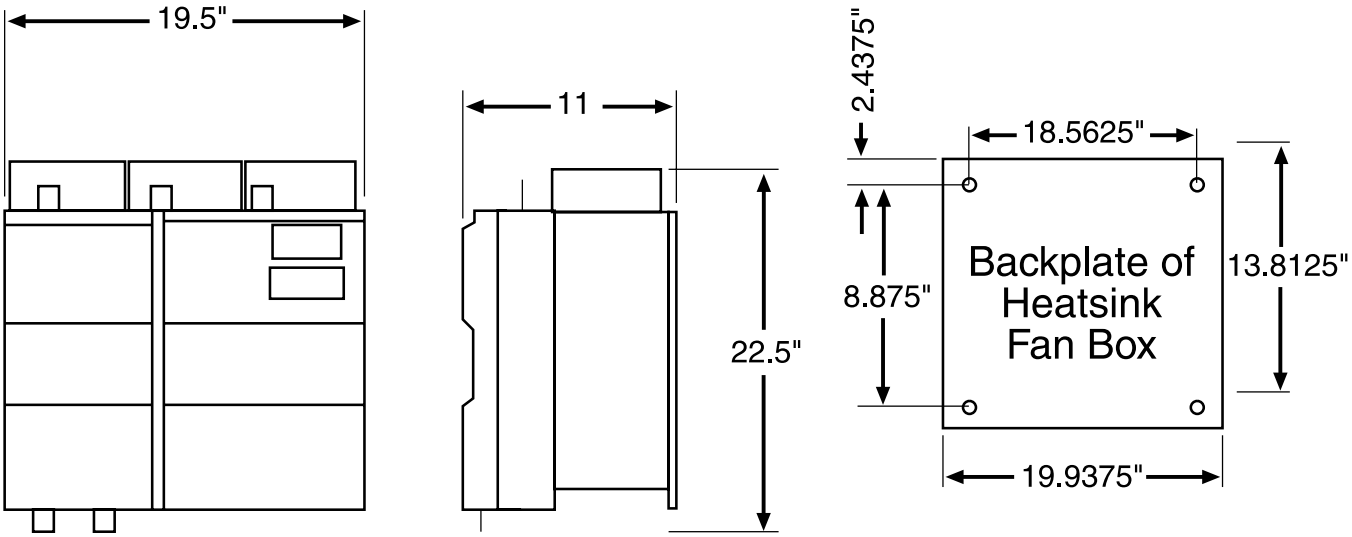
Add 3" for through Door Circuit Breaker or Disconnect Option.

DIMENSIONS

All dimensions supplied are for estimating purposes only. Contact Danaher Motion Engineered Systems Center for certified dimensions.

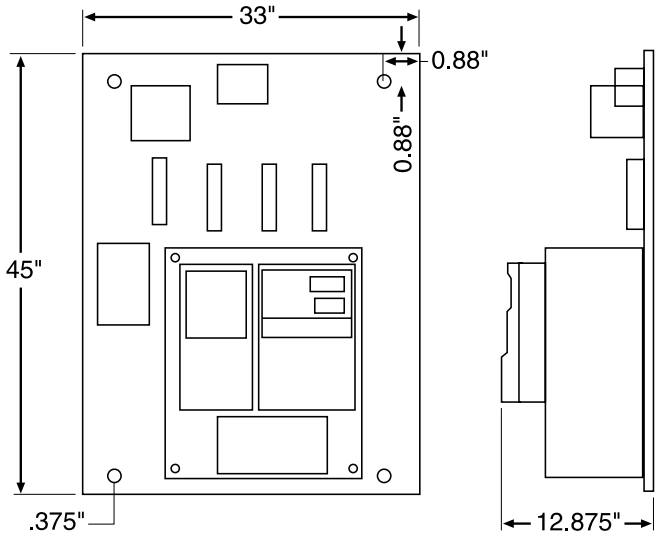
60 - 100HP - 240VDC / 125 - 200HP - 500VDC

Power Units

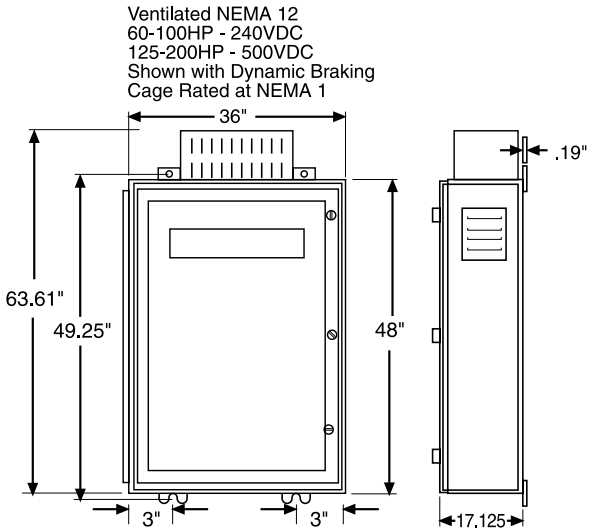


All Power Terminal Bolt Holes are 0.5" Clearance in Diameter.

Chassis



Enclosed



For Units without Dynamic Braking the Same Enclosure is used without DB Tophat Mounted Cage

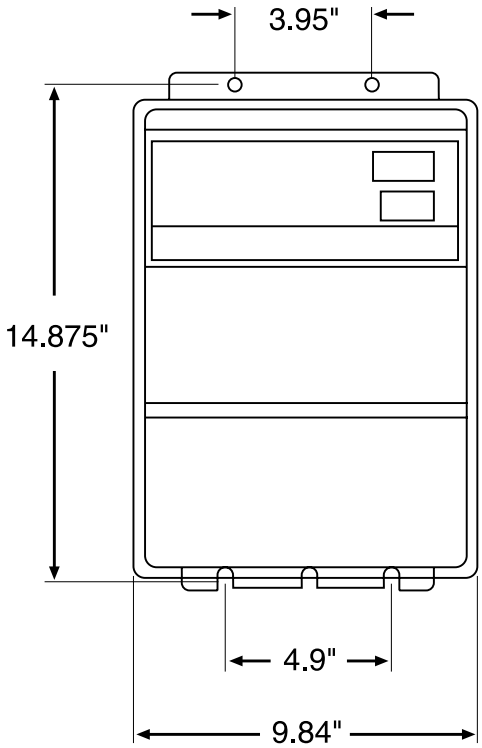
Add 3" for through Door Circuit Breaker or Disconnect Option.

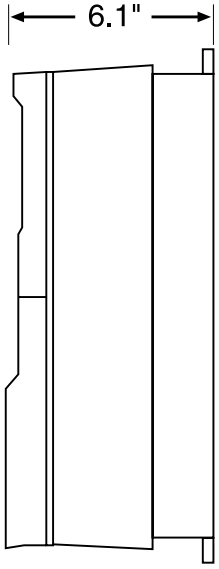
DIMENSIONS

All dimensions supplied are for estimating purposes only. Contact Danaher Motion Engineered Systems Center for certified dimensions.

125 - 200HP - 240VDC / 250 - 400HP - 500VDC

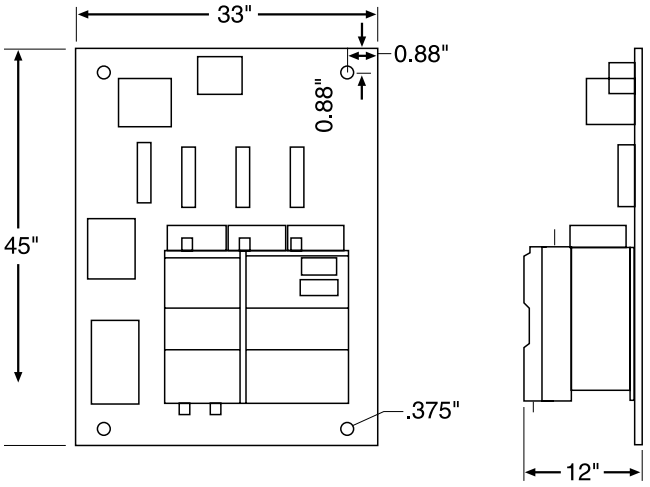
Power Units





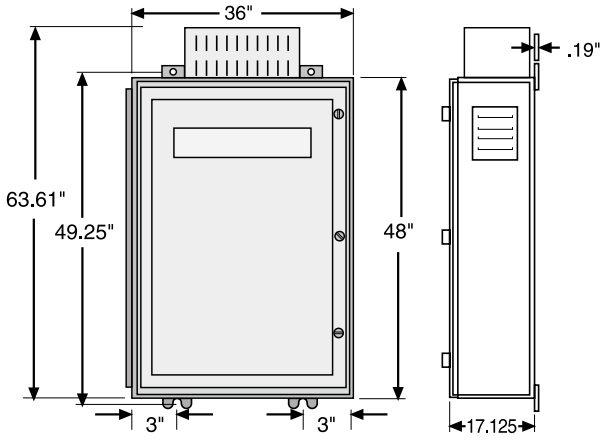
Chassis

125 - 150HP - 240VDC / 250 - 300HP - 500VDC
The 200HP at 240VDC and the 400HP at 500VDC



Enclosed

Ventilated NEMA 12
125 - 150HP - 240VDC
250 - 300HP - 500VDC
Shown with Dynamic Braking
Cage Rated at NEMA 1
For 200HP - 240VDC and 400HP - 500VDC Consult Warner Electric for Desired Freestanding Enclosure Needs



Add 3" for through Door Circuit Breaker or Disconnect Option.

300 - 500HP - 240VDC / 500 - 1000HP - 500VDC

Consult Danaher Motion Engineereed Systems Center for dimensions. These units are available and are normally placed in free-standing enclosures to meet the application requirements.

Applications

- Balancing Machines
- Coating & Laminating
- Converting
- Dynamometers
- Infeeds
- Material Handling
- Packaging
- Robotics
- Test Stands
- Winders/Unwinders

Wire & Cable

- Dead Block
- Bull Block
- Multi-Pass Draw Machines
- Spoolers
- Take-ups
- Inverted Bull Block

Textiles

- Warpers
- Bleachers
- Slashers
- Tenters
- Dye and Finishing Range

Motion Control Capabilities

Rotary Motion Control

- Electronic Line Shaft
- Tension Control

- Winding/Unwinding
- Slitting
- Printing
- Plating
- Coating
- Laminating
- M-G Set Replacement
- Pumping
- Extruding
- Common Armature

Linear Motion Control

- Pick & Place
- Cut-to-Length
- X-Y Positioning
- Indexing
- Oscillating
- Multi-Axis Interpolation
- Edge Guides
- Lift Tables
- Damper Control
- Chute Control
- Conveyor Gate Diverter
- Wheel Dressing
- Valve Actuation

Post-Project and Support Services

We have the staff, expertise, and subcomponent vendor qualification/ certification capabilities to deliver your project on time. You also have the satisfaction of knowing that you have access to the following post-project services:

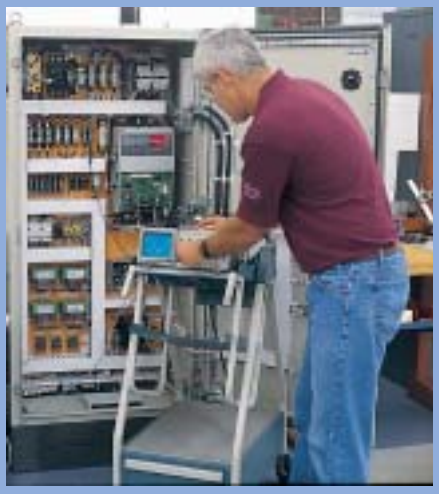
Technical Support

Application engineers are available 24 hours a day, seven days a week to assist you with everything from parts replacement to dispatching a service engineer to handle emergency situations. We maintain a large stock of parts and sub-assemblies to provide you with quick turn-around of returned merchandise. In addition, our customers have access to free telephone product support.

Training

Basic, intermediate and advanced classes, as well as configuration and programming training, can be provided at one of our facilities or at your facility. Witness testing can be provided at the Systems Center. Customized training for maintenance personnel can also be offered at your facility.

Commissioning



Commissioning and start-up assistance typically includes the visual inspection of the installation to ensure proper connections to all drive components, verification of the drive components for proper set-up and calibration, operation of the drive system, and tuning of all drives. The engineer or technician also monitors the operation of your line once it is up and running, and makes final calibrations or adjustments as required for satisfactory operation.

EMP

The EMP (Engineered Motion Product) is a pre-packaged solution for linear/positioning applications.

Features Include:

- **Stepper or Servo Motion Controller**
- **Rugged NEMA 12 Enclosure**
- **Easy to install and commission**
- **User-friendly Operator Interface**

Mechanical and Electro-Mechanical Product Solutions by Danaher Motion

Danaher Motion engineers, manufactures and markets a select combination of the world's top brands of mechanical and electro-mechanical products. Our principle brands and products include:

- **THOMSON** industrial, precision and rodless actuators, linear slide tables and systems, ball and lead screws, linear bearings and guides, precision balls, molded products, shafting and integrated solutions
- **THOMSON BSA** lead screws and precision miniature ball screws
- **MICRON** gearheads
- **HAROWE** resolvers
- **DELTRAN PT** electromagnetic friction and wrap spring clutches and brakes
- **SUPERIOR ELECTRIC** stepper and servo motors and controls
- **SECO** AC and DC variable speed drives

Designed to help increase productivity and improve performance, our products are incorporated into new equipment designs as well as machines already in service. From semiconductor assembly, packaging, robotics and industrial automation to medical, fitness and mobile off-highway equipment, our mechanical and electro-mechanical products bring flexibility, precision, efficiency, and reliability to a wide variety of industries.

Beyond our world-class product designs, one of our greatest strengths is our commitment to the Danaher Business System (DBS), which is comprised of a unique set of robust, repeatable processes that help us constantly improve the operational efficiency of our factories. Based upon the time-tested methods of Kaizen, the DBS is a team-based mindset that continuously and aggressively eliminates waste in every facet of our business operations. Furthermore, the DBS focuses the entire organization on breakthrough objectives that culminate in maintainable, results-oriented business processes, which, in turn, create advantages for our customers in the areas of quality, delivery and performance.

At Danaher Motion, we bring together best-in-class products, unsurpassed customization expertise, and innovative solutions to significantly improve and revolutionize the way things move. We are the experts in motion control. In short, Danaher Motion offers more choices, more application expertise and more integrated solutions than anyone else in the market.

Website: www.DanaherMotion.com/lms

Seco
AC/DC Drives

Solutions by DANAHER MOTION

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