

MEET THE NEW **marathon®**



MARATHON® CONTROLMAX™ CM3 & CM5 DRIVES

OCTOBER 2025 | BROCHURE

SOLUTIONS CLOSER THAN YOU THINK



CONTACT US TODAY



833-697-3203

**Do you want to send
us an email ?**

Orders | industrialmotororders@marathonelectric.com

Quotes | IndustrialMotorQuotes@marathonelectric.com

Technical Support | ind.motorstechnicalsupport@marathonelectric.com

Warranty Questions | industrialwarranty@marathonelectric.com

Parts | Parts.Orders@marathonelectric.com

General Questions | ind.motorinquiries@marathonelectric.com

Generator Support | Generatorinquiries@marathonelectric.com

At Marathon Electric, we power progress by keeping your operations running smoothly with dependable industrial motor solutions. From expert advice to quick turnaround on orders, our dedicated team is just one contact away, ready to help with motors over NEMA®*182T and IEC 112 frame series and higher.



CONTROLMAX™ CM3 SERIES AC DRIVES

The ULTIMATE combination & Marathon

Pair up a Marathon 3-Phase General Purpose Motor with a CONTROLMAX drive and improve system efficiencies with a Performance Matched Solution

High

Value

General purpose
3 phase
ODP, TEFC
RS & CI
10:1 VT & CT*



Globetrotter®
TEFC or ODP
RS or CI
10:1 VT & CT*



Aluminum
TEFC
10:1 VT & 4:1 CT*



**XRI® Severe Duty
&
Crusher Duty**
TEFC – CI
10:1 VT & CT*



**XRI® Severe
Duty IEEE-841**
TEFC – CI
10:1 VT & CT*



XRI® EXP Hazardous Duty®
EPFC/EPNV – CI
10:1 VT & CT*



* 10:1 CT Most Ratings,
verify either in catalog or
call office before quoting.

Features

CONTROLMAX™ Drives Can be Used:

- CM3: 0.33 to 10HP or 15.2 Amps
- CM3 Typical for MICROMAX to 10H
- CM3 is not for use with PMAC
- CM5: 0.33 to 175HP or 211 Amps (More Features)
- CM5 Typical for ALL MAX Family including PMAC

Low

High

The CM3 replaces direct online starters or star-delta starters:

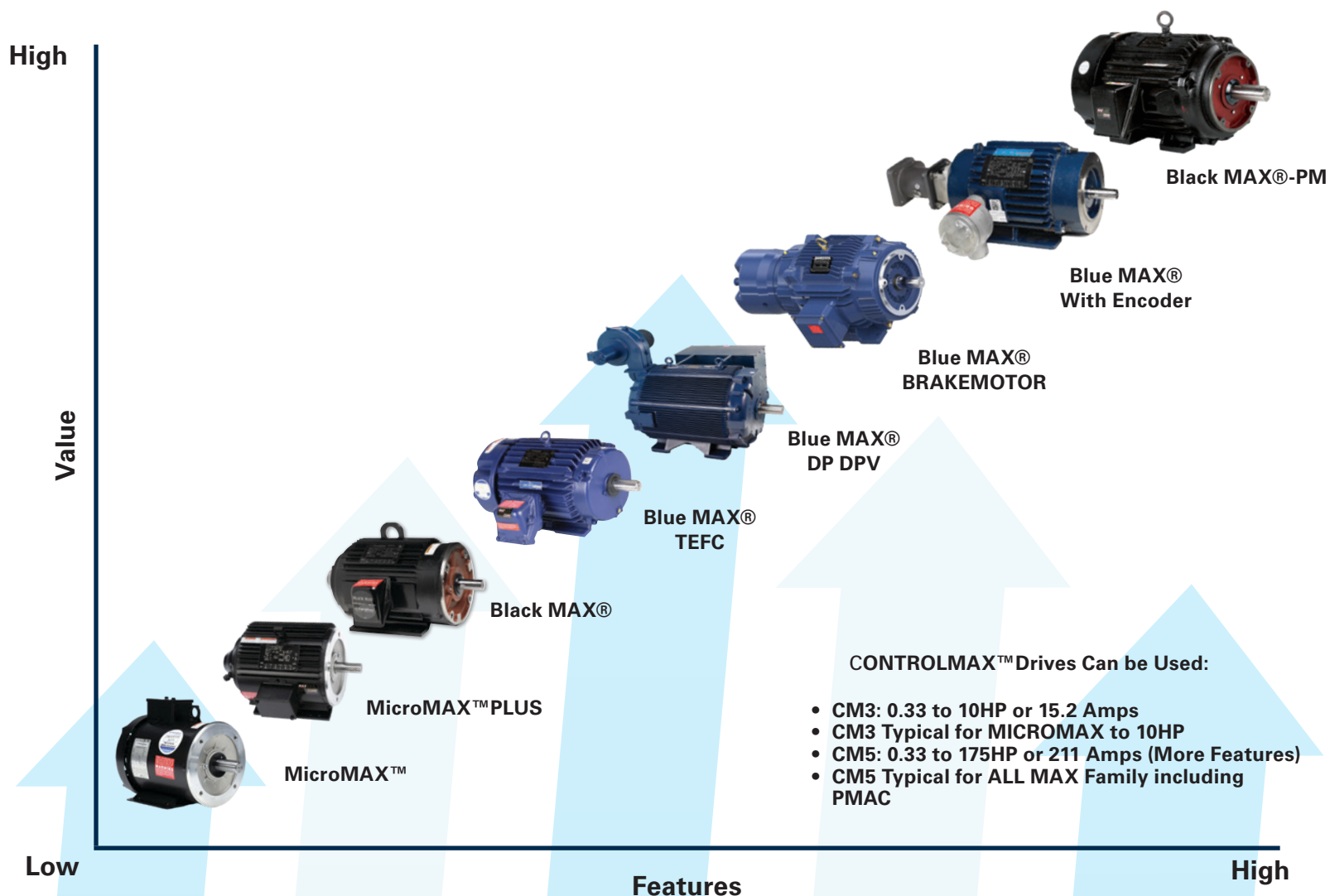
- Electric energy savings
- Precise speed control
- Protection and increased useful life of the electric motor
- Fault log and diagnostics
- Easy operation and installation



**On selected models, please refer to our general catalog for more info

Combination CM3 drives on[®] motors

Pair up a Marathon 3-Phase Motor with a CONTROLMAXdrive
Higher Speed Ratios / Turn Down Ratios with the Vector Family!



MAX GUARD® Insulation System

- Unlimited lead length between the motor and drive
- Surpasses the requirements of NEMA® MG1, Part 30 and 31
- An exclusive patented feature

MAXimum Performance

- Performance matched for operation with any AC Drive
- Preferred by leading drive manufacturers

MAXimum Flexibility

- Designed-in flexibility for easy addition of encoders and brakes
- Innovative patented "fracket" provides option for mounting brakes, encoders, blowers, or combinations of any of the three
- NEMA frame sizes maintained



CM3 SERIES AC DRIVES

CONVENIENCE ALL THE TIME



Select

Rated output current from 1.1 to 15.2 A (0.25 HP to 10HP), 100-127 V, 200-240 V, 380-480 V or 513-650 V dc

4 configurable (PNP or NPN) digital inputs, 1 relay output 0.5 A / 250 V ac, 1 analog input 0-10 V dc / 4-20 mA

3C2 class coating (IEC 60721-3-3) on the internal circuits

UL, CE, IRAM, EAC, UKCA

Electric energy savings



Install and Program

Easy installation

Flash memory module (accessory)



Operate

Built-in operating interface (HMI)

SoftPLC

Potentiometer module (accessory)



Monitor

WPS software

Modbus-TCP, RS485, RS232, CANopen, Profibus-DP, USB, encoder, infrared, I/O expansion, Bluetooth®

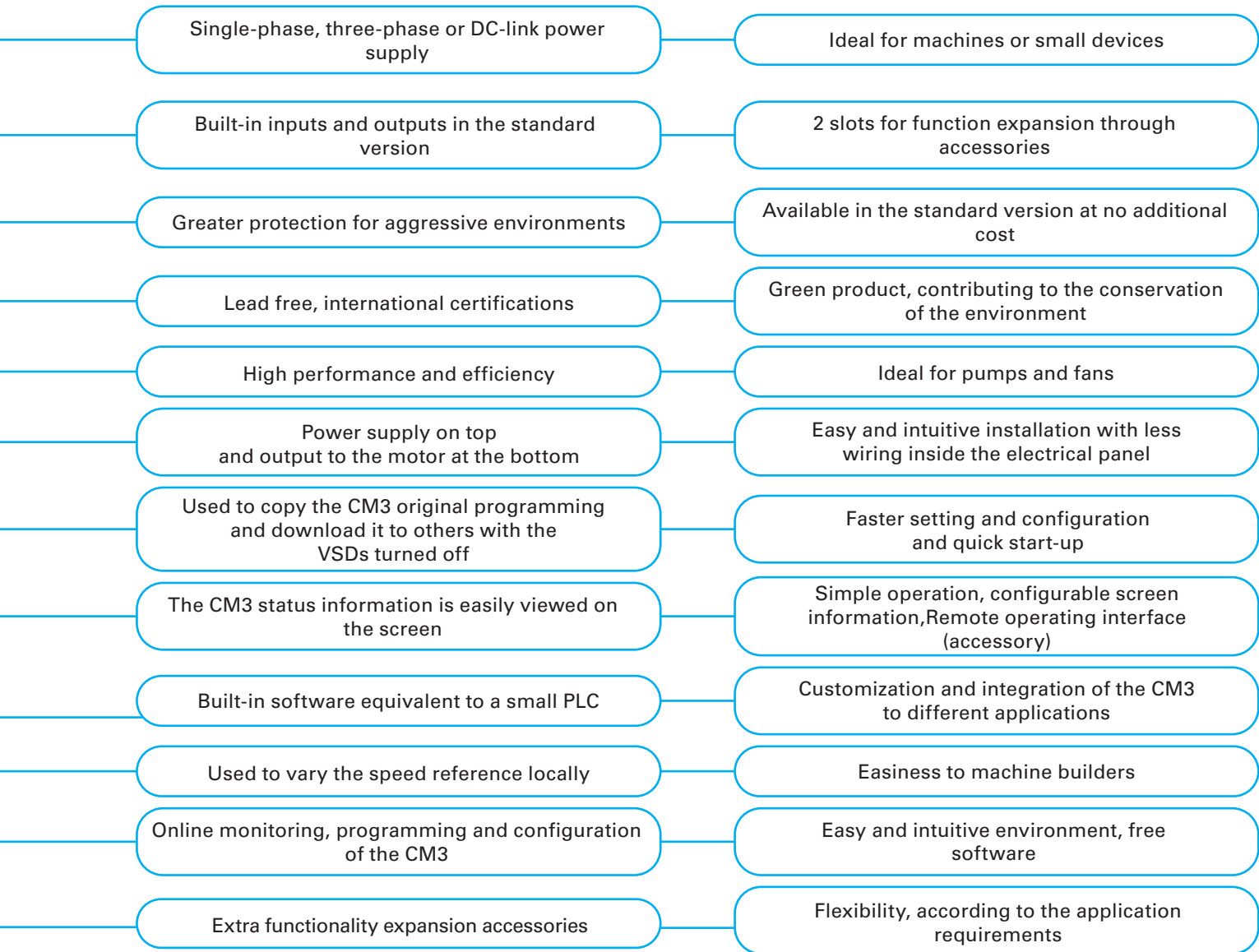


The **CONTROLMAX CM3** series is a reliable variable-speed drive (VFD) for three-phase induction motors. It offers precise control, easy setup, and smooth operation for various applications.

With a compact, space-saving design and contactor-style connections (top in / bottom out), the CM3 series supports Voltage Vector Control (VVW) or Scalar Control (V/F) to meet your needs.

Its built-in operator interface (HMI), SoftPLC, and free WPS programming software simplify custom control. Optional plug-in modules for extra I/O and communication protocols add scalability.

For precision, flexibility, and value, the **CONTROLMAX CM3** series is the perfect VFD choice.



CM3 Series AC Drives Flexibility

Flash Memory Module (MMF-uDrives Accessory)
It downloads the original parameter setting to several CM3 variable speed drives turned off.

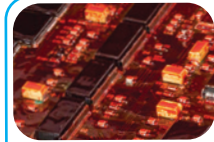
Slots for accessibility and network communication module

2 Slots for Function Expansion with Accessories

Slots for input and output (I/O) expansion module



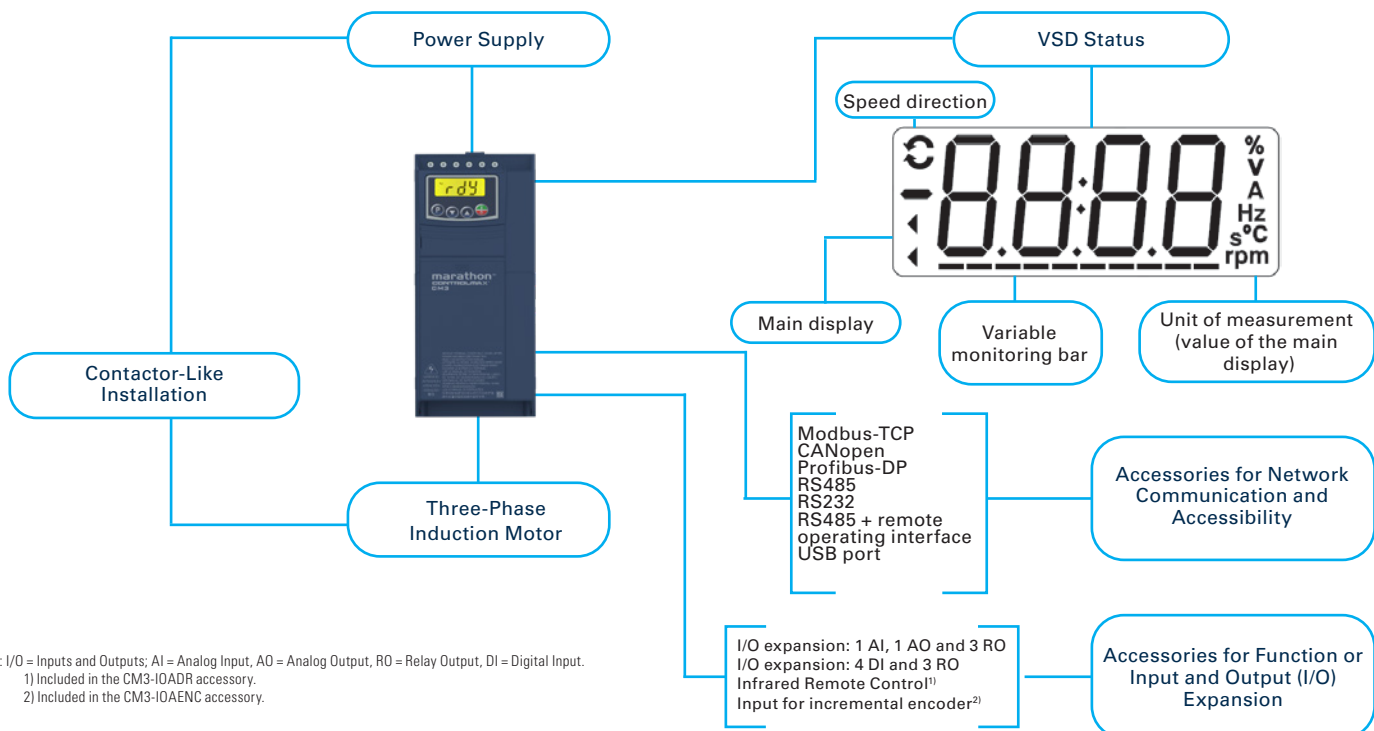
Fan Easily Removable



Greater Protection for Aggressive Environments
Standard coating classified as 3C2 according to IEC 60721-3-3 on all versions, ensuring greater protection to the internal circuits against corrosive atmospheres.

RFI Filter (Accessory CM3 - KFA / B / C)
Category C2 or C3 to reduce the electromagnetic interference emission level

Connectivity



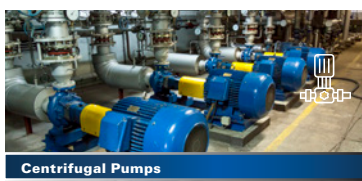
Notes: I/O = Inputs and Outputs; AI = Analog Input, AO = Analog Output, RO = Relay Output, DI = Digital Input.

1) Included in the CM3-IOADR accessory.
2) Included in the CM3-IOAENC accessory.

CM3 Series AC Drives Main Features

- Listed under new UL61800-5-1.
- Power Range:
 - 1/4HP to 2HP @ 1PH in 110-127 Vac Without Dynamic Braking Transistor / Chopper
 - 1/4HP to 3HP @ 1PH in 200-240 Vac 3HP Only With Dynamic Braking Transistor / Chopper
 - 1/4HP to 5HP @ 3PH in 200-240 Vac 3HP & 5HP Only With Dynamic Braking Transistor / Chopper
 - 1/2HP to 10HP @ 3PH in 380-480 Vac All Items With Dynamic Braking Transistor/Chopper
- Din rail or surface mounting with screws
- Control mode: Scalar (V/Hz) or Voltage Vector (VVW)
- Switching frequency: 2.5 to 15kHz
- Overload capacity: 150% for 60 sec. every 10 min or 200% for 3 sec. every 10min.
- Degree of protection: IP20
- 460VAC Models available with and without dynamic braking chopper.
- Conformal coated circuit board as per Class 3C2 in compliance with IEC 60721-3-3.
- Built-in SoftPLC (PLC functionality).
- Built-in 4 Digital inputs, 1 analog input, and one Form-C relay output.
- Two independent slots: one for communication and another to expand drive I/O capability.
- Selectable V/F, quadratic V/F or VVW vector control
- Password to protect the setting
- Special engineering units (V, A, Hz, rpm, s, °C, %)
- Backup of all parameters (via WPS software, memory card or internal memory of the CM3)
- Setting of the switching frequency according to the application requirements
- Speed reference via electronic potentiometer (EP)
- Speed reference via frequency input signal
- Multispeed with up to eight programmable speeds
- Slip compensation
- Manual or automatic torque boost (V/F scalar mode) or self-adjustment (VVW vector mode)
- 2 acceleration/deceleration ramps and emergency deceleration ramp
- "S" type ramp
- Brake resistors available as Kits.
- Internal dynamic brake choppers (frame sizes B and C)
- Infrared control (via CM3-IOAR accessory)
- PID controller to control processes in closed loop (via WPS)
- Flying start / ride through
- Skip frequency or frequency ranges
- Overload and overtemperature protection on the motor and IGBTs
- Overcurrent protection
- DC link voltage supervision
- Self-diagnosis alarm
- Fault log
- SoftPLC programming via free WPS software
- Fan control
- Energy Saving function
- Fire Mode function
- Modbus Master function
- Wide variety of communication options.
- One year Warranty

Applications

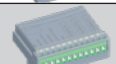


CM3 Series AC Drives

Accessories

The CM3 has inputs and outputs in the standard version and allows installing Plug & Play accessories, which makes it flexible and increases its capacity to adapt to the requirements of different applications.

In the front part there are two independent slots: the upper slot, which can be used to add network communication or accessibility, and the lower slot, which can be used for input and output (I/O) expansion, incremental encoder input or infrared remote control kit.

Reference	Description	Illustrative figures
CM3-CRS485	RS485 communication module	
CM3-CUSB	USB communication module (with 2 m cable)	
CM3-CRS232	RS232 communication module	
CM3-CCAN	CANopen or DeviceNet communication module	
CM3-CPDP	Profibus-DP communication module	
CM3-IOP	Reference module via potentiometer	
CM3-CETH	Ethernet communication module	
CM3-CBLT	Communication module	
Lower slot - input and output (I/O) expansion		
CM3-IOAR	1 analog input, 1 analog output and 3 relay outputs	
CM3-IODR	4 digital inputs and 3 relay outputs	
CM3-IOAENC	1 analog input, 2 analog outputs and 1 incremental encoder input	
CM3-IOADR	1 NTC input, 3 relay outputs and 1 input for infrared sensor (infrared sensor, NTC and remote control with battery included)	
CM3-IODF	Multipump application: 3 digital inputs in frequency, 3 digital outputs in frequency	
Remote operating interface (HMI)		
CM3-KHMIR	Kit with remote HMI (CM3-CRS485 + 3 m cable included)	
Flash memory		
CM3-MMF-uDrives	Flash memory module (1 m cable included)	

Please refer to the Motor Catalog for accessories and for Brake Resistor Options

CM3 Series AC Drives Accessories & Dimensions

Accessories Option Cards

Reference	Slots ⁵⁾	Inputs			Outputs			Potentiometer for speed reference	USB ⁴⁾	Infrared sensors and NTC ³⁾	Blue-tooth ⁶⁾	Encoder Input ²⁾	Network communication		
		Analog	Digital	Frequency	Analog	Relay digital	Frequency						RS485	RS232	Others
CM3-CRS485	Upper slot	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CM3-CRS232		-	-	-	-	-	-	-	-	-	-	-	-	1	-
CM3-CCAN		-	-	-	-	-	-	-	-	-	-	-	-	-	CANopen or Device-Net
CM3-CPDP		-	-	-	-	-	-	-	-	-	-	-	-	-	Profibus-DP
CM3-CUSB		-	-	-	-	-	-	-	1	-	-	-	-	-	-
CM3-IOP		-	-	-	-	-	-	1	-	-	-	-	-	-	-
CM3-CETH		-	-	-	-	-	-	-	-	-	-	-	-	-	Modbus-TCP
CM3-CBLT		-	-	-	-	-	-	-	-	-	1	-	-	-	-
CM3-IOAR	Lower slot	1	-	-	1	3	-	-	-	-	-	-	-	-	-
CM3-IODR ¹⁾		-	4	-	-	3	-	-	-	-	-	-	-	-	-
CM3-IOAENC		1	-	-	2	-	-	-	-	-	-	1	-	-	-
CM3-IOADR		1	-	-	-	3	-	-	-	1	-	-	-	-	-
CM3-IOADR-D		-	-	-	-	3	-	-	-	1	-	-	-	-	-
CM3-IODF		-	-	3	-	-	3	-	-	-	-	-	-	-	-

Notes: 1) Configurable isolated digital inputs (NPN or PNP).

2) Incremental Encoder (A/A - B/B), power supply of +5 V @ 100 mA for the encoder, maximum frequency of 400 kHz.

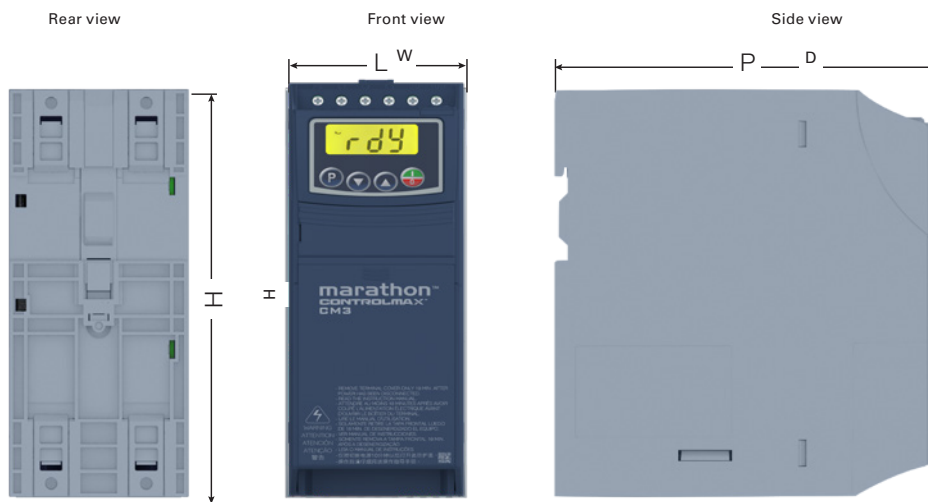
3) Remote control and battery included.

4) USB cable included.

5) It allows 1 plug-in module in the upper slot (network communication or accessibility) and 1 plug-in module in the lower slot (input/output expansion).

6) The standard version of the CM3 already has 4 (configurable) PNP or NPN digital inputs, 1 analog input 0-10 V dc / 4-20 mA and 1 relay output 0.5 A / 250 V ac.

Dimensions



CM3 Dimensions

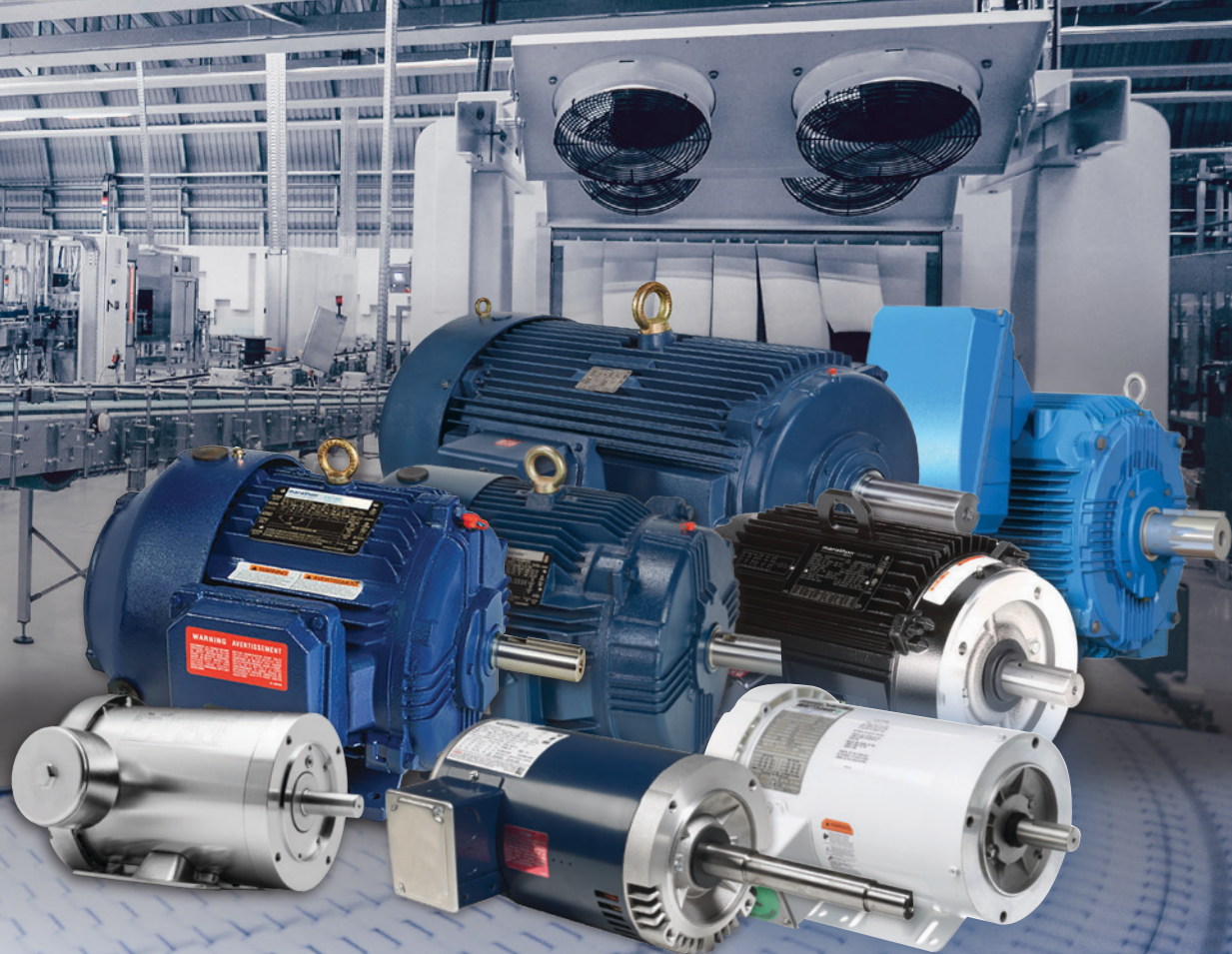
Size	H mm (in)	W mm (in)	D mm (in)	Weight kg (Lb)
A	157.9 (6.22)	70.0 (2.76)	148.4 (5.84)	0.90 (1.98)
B	198.9 (8.08)	70.0 (2.76)	158.4 (6.24)	1.34 (2.95)
C	214.0 (8.43)	89.0 (3.50)	164.0 (6.45)	1.50 (3.30)

Note: tolerance of the dimensions: ± 1.0 mm (± 0.039 in).

MARATHON MOTORS PERFORMANCE MATTERS WE HAVE THE DRIVE



**AND DRIVES OFFERS
TCHED SOLUTIONS
VE YOU NEED.**



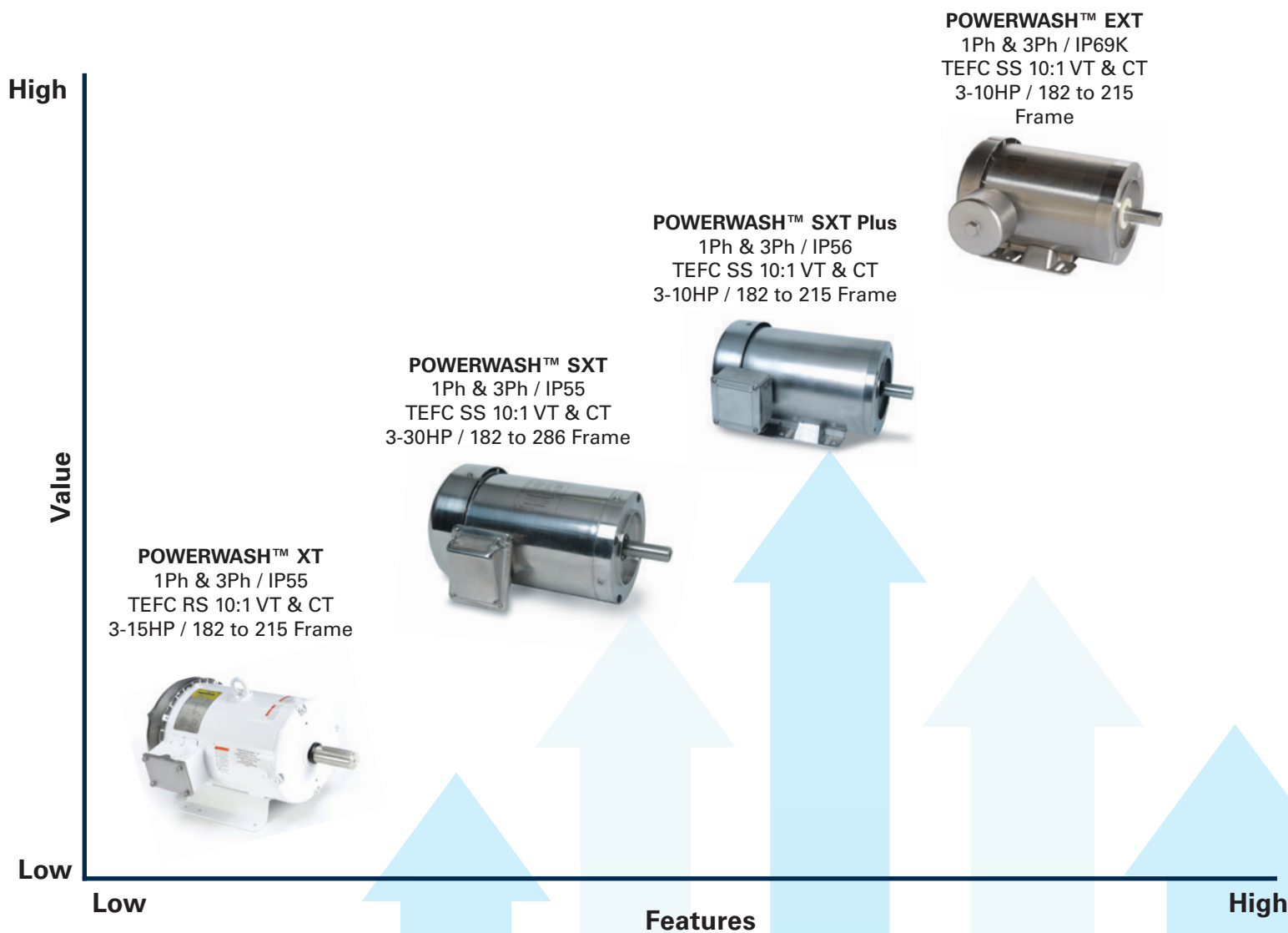
marathon®



CONTROLMAX™ CM5 SERIES AC DRIVES

Pictures are for representative purposes only.
Data and Dimensions are typical values and subject to change at any time without notice.

POWERWASH™ (Washdown Duty) Motors Combined With CM5 IP66 Drives



Choose an **IP66** Drive with a **Power Wash Motor™**, Perfectly Designed for Your Food and Beverage Applications





CM5 SERIES AC DRIVES- ENDLESS **POSSIBILITIES**



High performance

Safety functions via accessory STO / SS1

Wide power range and high overload capacity

High performance control methods



Flexible

Connectivity

Advanced resources and functions

Assembly options



Robust

Version with IP66 / NEMA type 4x



Innovative

SoftPLC - built-in PLC functionalities

Free programming softwares



Reliable

Marathon quality

Protection against ground fault, short circuit, over temperature and others

Internal RFI filter to reduce high-frequency electromagnetic interference



With modern design, the variable speed drive CM5 is a **high performance** VSD for applications that require speed and torque control of three-phase induction motors. The equipment has **sensorless vector control**, **closed loop vector control** or **scalar V/F**. It also has SoftPLC, which adds PLC (programmable logic controller) functions, safety functions (STO and SS1) - making easier to comply the machine and application safety requirements.

Integrated STO (Safe Torque Off) and SS1 (Safe Stop 1) fulfils requirements for safety performance SIL 3 / PL e, according to IEC 61800-5-2, EN ISO 13849-1, EN 62061, IEC 61508 and IEC 60204-1

Provides machine builders a cost-effective solution to design protective measures to reduce the risk from unexpected and hazardous movement in industrial machines

Models from 1.0 to 211 A (0.25 kW / 0.33 HP to 132 kW / 175 HP) at supply voltages 200z-240, 380-480 or 500-600 V

Sensorless or closed loop vector control, VVW or Scalar V/F and permanent magnet motor control: VVW PM

Allows the CM5 to be used in a large variety of applications, improving their overall performance

USB and fieldbus communication modules for the most used industrial networks, like CANopen, DeviceNet, Profibus-DP, EtherNet/IP, PROFINET IO or Modbus-RTU

Full integration with process network

Surface or DIN rail mounting, including side-by-side installation

Complete protection against contact with internal live parts, avoiding the entrance of dust or water coming from jets

The high protection degree dispenses the panel, reducing installation costs

The VSD, motor and application can work in an interactive way, because it is possible to make customized logic and applications

WPS softwares available at www.marathonelectric.com

Ideal for machinery manufacturer

100% of the VSDs are tested at the factory under full load and maximum temperature

High reliability

Conformal Coating (Tropicalization) as standard, class 3C2 according to IEC 60721-3-3 and 3C3 as an option, to protect against corrosive gases in harsh environments

It prevents damage to the inverter which can be caused by adverse situations, normally external factors

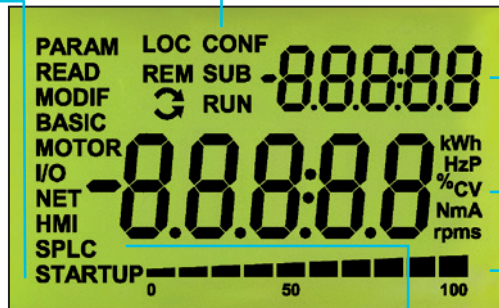
VSD lifetime is extended

CM5 Series AC Drives Simplified programming and operation

Operating interface (HMI)

- Monitoring, setting of all parameters as well as commands
- Up to three parameters indication on the display, according to user selection
- Oriented start-up and grouped parameters

Menu to select the group of parameters



CM5 status

Secondary display

Unit of measurement
(value of the main display)

Bar for variable monitoring

Main display

Soft keys function



Note: the operating interface (HMI) of the CM5 is not removable. For remote operation of the HMI, use the CM5-HMIR accessory, according to the accessory table in Marathon Catalog or below in accessory list.

Remote operating interface (HMI)¹⁾

Solutions for machine consoles and panels.



Interface tools

- Graphic display with backlight
- Soft keys for easy operation
- Real time clock (RTC)
- Language selection
- Remote keypad

Accessory
CM5-HMIR accessory kit

Note: 1) Accessories HMI-01 and CM5-RHMIF must only be used with the main software version equal to or above version 3.5x.

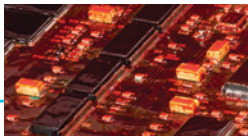
CM5 Series AC Drives

Flexibility and performance

The CM5 has a modern design and it can be selected according to the application requirements, providing flexibility with excellent performance. The VSD gives the user the possibility to choose the plug-in module that best fits his application, or to use the standard version, that comes with the CM5-IOS plug-in module. All plug-in modules come with one RS485 port as standard. The installation of the CM5 is simple and its configuration and operation is intuitive with the navigation menus of the operating interface (HMI) with built-in LCD display. By using the flash memory module, it is possible to download the existing settings from one CM5 to other units without powering them up.

Plug-in safety module

Safety functions STO (Safe Torque Off) and SS1 (Safe Stop 1).



Conformal coating

Improved 3C2 class of coating on the internal circuits of all versions and extra 3C3 Class coating (optional) according to IEC 60721-3-3 ensures improved protection in environments with corrosive chemicals.



Flash memory module

(CM5-MMF accessory)
Download/upload the settings to other CM5 units without the need to power them up.

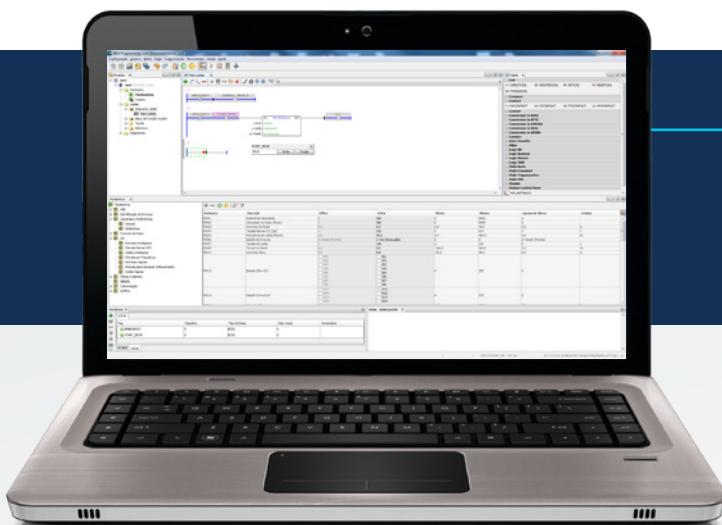


Plug-in modules

Selectable according to the application.

Easily removable fan

The quick change system ensures simple and fast fan maintenance.



SoftPLC

It is a software resource added to the CM5 which allows the user to implement and debug logic projects equivalent to a small PLC (Programmable Logic Controller), customizing and integrating the CM5 to the application. The free WPS programming software is available at: www.marathonelectric.com

CM5 Series AC Drives Connectivity



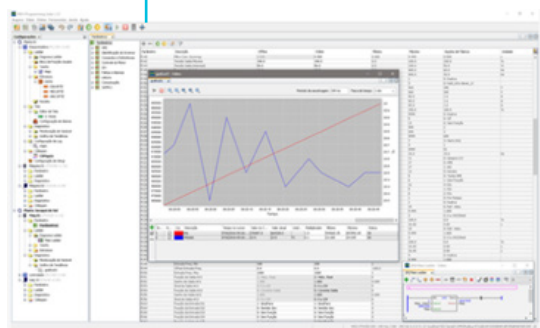
Remote operating interface
(CM5-HMIR accessory kit)

Easy operation and view



Free at
www.marathonelectric.com

Software WPS



USB Connection
(CM5-CUSB accessory)

The CM5 can be connected to the main fast industrial Fieldbus communication networks, with protocols used worldwide such as CANopen, Profibus-DP, DeviceNet, PROFINET IO, EtherNet/IP and Modbus-TCP, according to the plug-in module selected.

In addition, all plug-in modules come with serial interface RS485 Modbus-RTU built-in.

I/O expansion:
IOS (standard, included in the version with plug-in),
IOD, IOAD, IOR

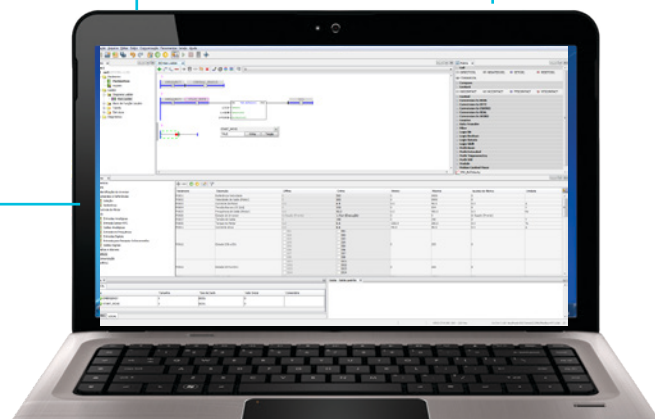
Functionality expansion:
Incremental encoder
USB

Fieldbus communication protocols:
CANopen
DeviceNet
RS232
RS485
Profibus-DP
EtherNet/IP
Modbus-TCP
PROFINET IO
BACnet
SymbiNet

Selectable
plug-in
modules

Easy and intuitive
environment

Free at
www.marathonelectric.com



CM5 Series AC Drives Features

IP20 or NEMA 1 (IP31) - With Accessory Kits

Plastic & Metal

- 1/3 to 2HP @ 1PH in / 200 - 240VAC
- 1/3 to 3HP @ 1PH or 3PH in / 200 - 240VAC
- 2 to 75HP @ 3PH in / 200 - 240VAC
- 1/2 to 175HP @ 3PH in / 380 - 480VAC
- 1-1/2 to 10HP @ 3PH in / 500 - 600VAC
- 2 to 75HP @ 3PH in / 200 - 240VAC With Dynamic Braking @ 20% Duty
- 2 to 175HP @ 3PH in / 380 - 480VAC With Dynamic Braking @ 20% Duty
- 2 to 75HP @ 3PH in / 200 - 240VAC With Dynamic Braking @ 50% Duty
- 2 to 175HP @ 3PH in / 380 - 480VAC With Dynamic Braking @ 50% Duty

IP66 NEMA 4X - With Accessory Kits

Plastic & Metal

- 1/3 to 3HP @ 1PH or 3PH in / 200 - 240VAC
- 5 to 25HP @ 3PH in / 200-240VAC
- 1/2 to 50HP @ 3PH in / 380 - 480VAC
- 1-1/2 to 10HP @ 3PH in / 500 - 600VAC
- 1/3 to 3HP @ 1PH or 3PH in / 200 - 240VAC W/O Disconnect Switch
- 5 to 25HP @ 3PH in / 200 - 240VAC W/O Disconnect Switch
- 1/2 to 50HP @ 3PH in / 380 - 480VAC W/O Disconnect Switch
- 1-1/2 to 10HP @ 3PH in / 500 - 600VAC W/O Disconnect Switch
- 1/3 to 3HP @ 1PH or 3PH in / 200 - 230VAC With Disconnect Switch
- 5 to 25HP @ 3PH in / 200 - 230VAC With Disconnect Switch
- 1/2 to 50HP @ 3PH in / 380 - 480VAC With Disconnect Switch
- 1-1/2 to 10HP @ 3PH in / 500 - 600VAC With Disconnect Switch
- 1/3 to 25HP @ 3PH in / 200 - 240VAC With Dynamic Braking @ 20% Duty
- 1/2 to 50HP @ 3PH in / 380 - 480VAC With Dynamic Braking @ 20% Duty
- Listed under UL508C
- 230, 460, 575VAC Models available with and without dynamic braking chopper
- Pertains to IP20 Drives NEMA 1 (IP31) For Drive Frame Sizes A,B,C,D,E,F and G Require NEMA 1 Kit (See Accessories & Kits)
- CM5 Series Drives will work with PMAC Motors
- Heavy Duty rated - 150% current overload capacity
- Output frequency (0-500) HZ
- Switching frequency is adjustable: (2.5 to 15) kHz and (5 kHz standard)
- Overload capacity: 150% for 60 sec. every 10 min or
- Internal dynamic brake choppers (frame sizes B,C,D,E,F & G)
- Brake resistors available as Kits.
- PID controller to control processes in closed loop (via WPS)
- Flying start / ride through
- Skip frequency or frequency ranges
- 8 Programable Speeds
- Four isolated programmable digital inputs; Built-in 24Vdc Power supply (max. 150 mA); One programmable relay output (1NO, 1NC, 240vac 0.5A). One programmable transistor output. One isolated programmable analog input (0-10V, 0/4-20mA).

One isolated programmable analog output (0-10V, 0/4-20mA)

- Din rail or surface mounting with screws
- V/F Scalar, Vector Control (Sensorless and closed loop with encoder feedback) & VVW PM Control (PMAC) (suitable for fan, Pump and compressor)
- Using the FlashMemory - Plug in load and remove
- Built-in RS-485 (Modbus RTU/BACnet) communication; I/O (Cat# CFW500-IOS) - CFW500 I/O Module; 4 DI, 1 AI, 1 AO, 1 DOR, 1 DOT, 1 RS485, 10vdc, 24vdc
- Optional I/O plug-in Modules; One (1) analog isolated input & Four (4) digital inputs
- Wide variety of communication options/ Optional Communication; Standard Communication: One (1) RS485 (Modbus RTU / BACnet) Port; Optional: CANopen, DeviceNet, Profibus-DP, EtherNet/IP, ModbusTCP, ProfiNet IO, USB, RS485 (two Ports) and RS232 port Modbus RTU, BACnet, DeviceNet, Profibus DP, CANopen, ModbusTCP, Ethernet/IP
- Ref Encoder Module = 1 input IOAENC; Or IODF Module with 3 Freq Inputs and 3 Freq Outputs.
- Optional Safe Torque off Module
- Records the last 3 Faults; Fault Log
- Speed reference via electronic potentiometer (EP)
- Energy Saving function
- Fire Mode function
- Overload and overtemperature protection on the motor and IGBTs
- Overcurrent protection
- Slip compensation
- 1 relay with NO/NC contact, Maximum voltage: 240 Vac, Maximum current of 0.5A Programmable functions
- Conformal coated circuit board as per Class 3C2 in compliance with IEC 60721-3-3
- NEMA 4X (IP66) Washdown Enclosure with and without disconnect switch, suitable for indoor and outdoor use (in direct sunlight)
- Built-in SoftPLC; Programming software "WPS" is free
- Scalar Control VVW
- Ladder Program - WLP compatible
- Programming Suite - WPS compatible
- One year Warranty

CM5 Series AC Drives

Embedded safety functions¹⁾



Used to reduce risk and to guarantee the safety of personnel and environment if there is a hazardous event due to a fault in operating machines. The embedded safety functions **STO** and **SS1** provide machine builders a cost-effective solution to design protective measures and reduce the risk from unexpected and hazardous movement in industrial machines and processes.

Advantages

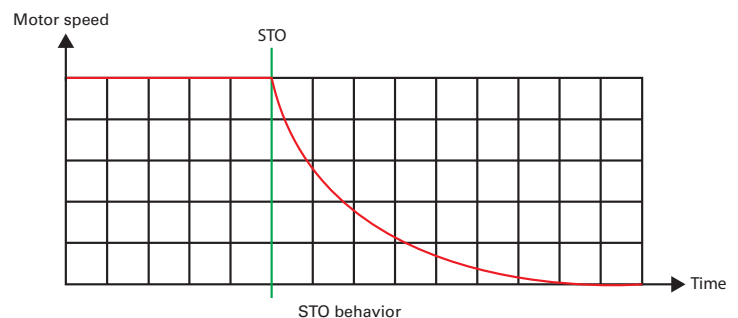
- Safety functions integrated in the CM5 drive, making easier to comply with the machine and application safety requirements
- Less components, no need for additional wiring, saving space and installation costs
- Easier installation, commissioning and maintenance
- No electromechanical components, meaning faster responses and higher degree of productivity
- Due to the high safety performance level SIL3, the CM5 with Safety module may avoid the use of external safety relays for cables and emergency pushbuttons monitoring

Safety functions

STO (Safe Torque Off)

This function immediately switches off the drive output to the motor, disabling the supply of torque-generating energy. STO is also used to prevent an unexpected startup of machinery or for an emergency stop, fulfilling stop category 0 (IEC 60204-1).

It is applicable if the motor can be brought to a standstill in a sufficiently short time by the load torque or friction or where motor coast to a stop is not relevant to safety.



SS1 (Safe Stop 1)

This function enables motor deceleration and then, after a delay time, activates the STO function. SS1 can be used to implement a controlled stop and then removal of power, fulfilling stop category 1 according to IEC 60204-1. This function is used when, in the event of a safety related fault, the drive must stop as quickly as possible and then enter the STO state.

The stopping of a drive by means of SS1 function reduces the risk of danger, eliminates the need of external safety timers, increases the productivity of a machine and allows safety clearances in a machine to be reduced. The reason is the active stopping of the drive as compared with the use of the STO function only.



Note: 1) Safety Functions STO and SS1 are available in CM5 with the CM5-SFY2 plug-in module. It fulfils requirements for safety performance SIL 3 / PL e, according to IEC 61800-5-2, EN ISO 13849-1, EN 62061, IEC 61508 and IEC 60204-1.

CM5 Series AC Drives Applications



Food & beverage



Conveyour Belts



Food processing



Fans /Exhausters



Centrifugal Pumps



Palletizers



Cutting and welding machines



Granulators



Extruders



Stirrers /Mixers



Machinery



Winding / Uncoiling Machines



CM5 Series AC Drives Accessories

Optional items

These are hardware resources added to the CM5 in the manufacturing process, and they should be requested via smart code.

Internal dynamic braking (IGBT)¹⁾

Used for quick stop of the motor with external¹⁾ braking resistor.

The braking IGBT is available as standard for the whole line, except for frame A of IP20 version.

Note: 1) External braking resistor not included. To specify the correct braking resistor, please refer to the CM5 User's Manual.

NEMA 1 protection kit²⁾ (IP31)- See accessories

The NEMA 1 Kits are for the CM5 drive frame sizes A, B, C, D, E, F or G. According to the National Electrical Manufacturers Association (NEMA) standard, Type 1.

- Protects³⁾ against penetration of foreign solid objects (falling dust)
- Prevents access to hazardous parts
- Can also be acquired as an accessory (see accessories)

Notes: 2) Image of frame size A with NEMA 1 kit.

3) Not recommended for external use, only indoor applications or inside enclosures. The models of frames A to E with protection degree NEMA 1 are not compatible with safety function.

Disconnect switch⁴⁾

Built-in disconnect switch for in the product for easy and safe maintenance or switching the mains off.

Note: 4) Only available for models with IP66 protection degree.

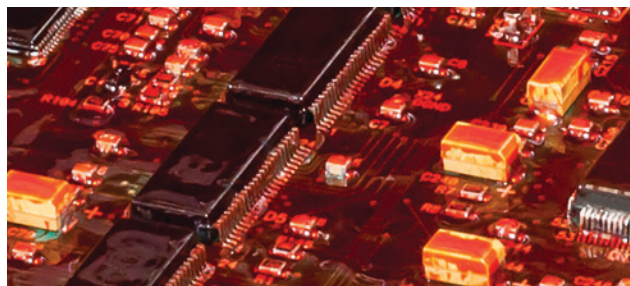
Internal RFI filter

Inverters with internal RFI filter (code C2 or C3) when installed, maintained and used on the application they were designed for, and in compliance with the relevant installation standards and manufacturer's instructions, reduce conducted disturbance from

the inverter to the main power supply in high frequency band (>150 kHz), complying to the relevant EMC standards, such as EN 61800-3 and EN 55011.

Conformal coating

The standard version of the CM5 offers protection class 3C2 - according to IEC 60721-3-3, ensuring greater protection for applications in environments with corrosive chemicals. It is possible to request an extra coating on the internal circuit boards, protection class 3C3 - according to IEC 60721-3-3, by adding EC to item 11.2 of the smart code, ensuring even greater protection for applications in harsh corrosive environment.



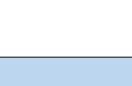
Note: in order to select the CM5 without plug-in module (H00) and with extra coating on the internal circuit boards (HEC), H00EC must be filled in item 11 of the smart code. Please refer to the Motor Catalog for accessories and for Brake Resistor Options

CM5 Series AC Drives Accessories

Plug-in module

On the CM5, it is possible leave to choose later the model of the internal plug-in module by entering H00 in item 11 of the smart code. In this case, it is necessary to select the plug-in module as an accessory, according to the table bellow. In case H00 is not selected in item 11 of the smart code, the CM5 will be supplied with the CM5-IOS plug-in. You must always use one plug-in module per CM5.

Due to the different connections, when equipped with the plug-in module with the STO/SS1 safety functions, the inverter will still be able to connect another plug-in module at the user's choice.

Reference	Description	Illustrative figures
	Input and output (I/O) expansion	
CM5-IOS ¹⁾	Standard plug-in module (included in the version with plug-in module)	
CM5-IOD	Digital input and output (I/O) expansion plug-in module	
CM5-IOAD	Digital and analog input and output (I/O) expansion plug-in module	
CM5-IOR-B	Relay output expansion plug-in module	
Functionality expansion		 
CM5-ENC	Plug-in module with encoder input	
CM5-CUSB	Plug-in module with USB port	
CM5-SFY2 ²⁾	Plug-in module with security function STO e SS1	
Communication on Fieldbus network		   
CM5-CCAN	CAN communication plug-in module (CANopen/DeviceNet)	
CM5-CRS232	RS232 communication plug-in module	
CM5-CRS485-B	RS485 communication plug-in module	
CM5-CPDP	Profibus-DP communication plug-in module	
CM5-CETH-IP	EtherNet/IP communication plug-in module	
CM5-CEMB-TCP	Modbus-TCP communication plug-in module	
CM5-CEPN-IO	PROFINET IO communication plug-in module	
CM5-CETH2	EtherNet Dual Port communication plug-in module	
Memory		
CM5-MMF	Flash memory module	
Interfaces		
CM5-HMIR	Remote operating interface (HMI)	 
HMI-01	Alphanumeric HMI	
CM5-RHMIF	Frame for remote HMI	
CM5-CCHMIR1M	1-meter cable set for remote operating interface (HMI)	
CM5-CCHMIR2M	2-meter cable set for remote operating interface (HMI)	
CM5-CCHMIR3M	3-meter cable set for remote operating interface (HMI)	
CM5-CCHMIR5M	5-meter cable set for remote operating interface (HMI)	
CM5-CCHMIR75M	7.5-meter cable set for remote operating interface (HMI)	
CM5-CCHMIR10M	10-meter cable set for remote operating interface (HMI)	
Description		
CM5-KN1A	NEMA1 kit - size A (standard for option N1)	    
CM5-KN1B	NEMA1 kit - size B (standard for option N1)	
CM5-KN1C	NEMA1 kit - size C (standard for option N1)	
CM5-KN1D	NEMA1 kit - size D (standard for option N1)	
CM5-KN1E	NEMA1 kit - size E (standard for option N1)	
CM5-KN1F	NEMA1 kit - frame F (standard for option N1)	
CM5-KN1G	NEMA1 kit - frame G (standard for option N1)	
CM5-KPCSA	Shielding kit for the power cables - size A (standard for option C2 and C3)	
CM5-KPCSB	Shielding kit for the power cables - size B (standard for option C2 and C3)	
CM5-KPCSC	Shielding kit for the power cables - size C (standard for option C2 and C3)	
CM5-KPCSD	Shielding kit for the power cables - size D (standard for option C2 and C3)	
CM5-KPCSE	Shielding kit for the power cables - size E (standard for option C2 and C3)	
CM5-KPCSF	Shielding kit for the power cables - size F (standard for option C3)	
CM5-KPCSG	Shielding kit for the power cables - size G (standard for option C3)	

Notes: 1) Accessory already included if the CM5 version with the standard plug-in module is selected.

The plug-in modules can also be sold separately as an accessory item or spare part.

2) Due to the different connections, when equipped with the plug-in module with the STO/SS1 safety functions, the inverter will still be able to connect another plug-in module at the user's choice.

CM5 Series AC Drives Accessories

Configuration of the plug-in modules¹⁾

Plug-in module	Functions																	
	Inputs		Outputs			STO/SS1	USB port	Input for en-coder ³⁾	Fieldbus networks								Supply	
	Digital	Analog	Analog	Digital relay	Digital transistor				CANopen DeviceNet	RS232	RS485	Profibus-DP	EtherNet/IP	Modbus-TCP	PROFINET IO	BACnet ⁵⁾	10 V	24 V
CM5-IOS	4	1	1	1	1	-	-	-	-	-	1	-	-	-	-	1	1	1
CM5-IOD	8	1	1	1	4	-	-	-	-	-	1	-	-	-	-	-	1	1
CM5-IOAD	6	3	2	1	3	-	-	-	-	-	1	-	-	-	-	-	1	1
CM5-IOR-B	5 ²⁾	1	1	4	1	-	-	-	-	-	1	-	-	-	-	-	1	1
CM5-ENC	5 ²⁾	1	1	4	1	-	-	1	-	-	1	-	-	-	-	-	1 ⁶⁾	1
CM5-CUSB	4	1	1	1	1	-	1	-	-	-	1	-	-	-	-	-	1	1
CM5-SFY2 ⁴⁾	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CM5-CCAN	2	1	1	1	1	-	-	-	1	-	1	-	-	-	-	-	1	-
CM5-CRS232	2	1	1	1	1	-	-	-	-	1	1	-	-	-	-	-	-	1
CM5-CRS485-B	4	2	1	2	1	-	-	-	-	-	2	-	-	-	-	1	1	1
CM5-CPDP	2	1	1	1	1	-	-	-	-	-	1	1	-	-	-	-	-	1
CM5-CETH-IP	2	1	1	1	1	-	-	-	-	-	1	-	1	-	-	-	-	1
CM5-CEMB-TCP	2	1	1	1	1	-	-	-	-	-	1	-	-	1	-	-	-	1
CM5-CEPN-IO	2	1	1	1	1	-	-	-	-	-	1	-	-	-	1	-	-	1
CM5-CETH2	2	1	-	-	1	-	-	-	-	-	2	-	2	2	-	-	-	1

Notes: 1) All plug-in models have at least one RS485 port. The CM5-CRS485 plug-in module has two RS485 ports.

The CM5 allows the installation of one plug-in module per unit.

2) The digital input DI5 is always NPN, and it cannot be configured for PNP like the others.

3) Incremental encoder (A/A - B/B).

See the installation guides of the plug-in modules on the website www.marathonelectric.com

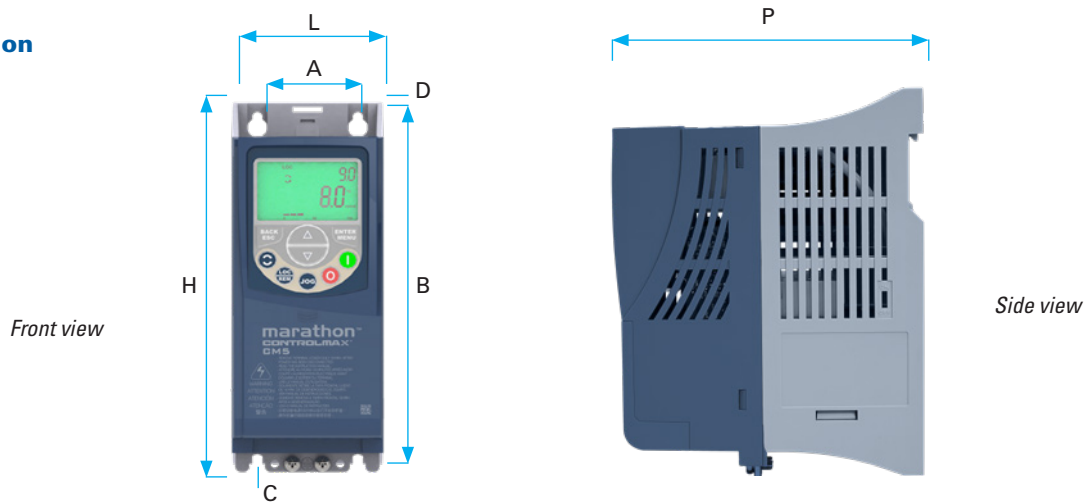
4) Due to the different connections, when equipped with the plug-in module with the STO/SS1 safety functions, the inverter will still be able to connect another plug-in module at the user's choice.

5) For products with software version above 3.7x.

6) Power supply of the encoder.

CM5 Series AC Drives Dimensions and Weights

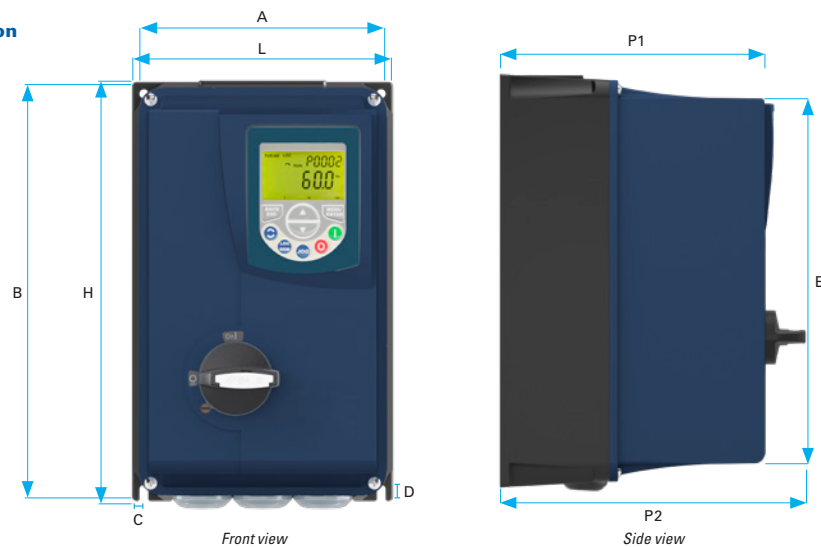
IP20 version



Size	A	B	C	D	H	L	P	Weight
	mm [in]	mm [in]	mm [in]	mm [in]	mm [in]	mm [in]	mm [in]	kg [lb]
A	50 [1.97]	175 [6.89]	11.9 [0.47]	7.2 [0.28]	189 [7.44]	75 [2.95]	150 [5.91]	0.8 [1.76]
B	75 [2.95]	185 [7.3]	11.8 [0.46]	7.3 [0.29]	199 [7.83]	100 [3.94]	160 [6.3]	1.2 [2.65]
C	100 [3.94]	195 [7.7]	16.7 [0.66]	5.8 [0.23]	210 [8.27]	135 [5.31]	165 [6.5]	2 [4.4]
D	125 [4.92]	290 [11.41]	27.5 [1.08]	10.2 [0.4]	306.6 [12.1]	180 [7.08]	166.5 [6.55]	4.3 [9.48]
E	150 [5.9]	330 [13]	34 [1.34]	10.6 [0.4]	350 [13.8]	220 [8.7]	191.5 [7.5]	10 [22.05]
F	200 [7.87]	525 [20.67]	42.5 [1.67]	15 [0.59]	550 [21.65]	300 [11.81]	254 [10]	26 [57.3]
G	200 [7.87]	650 [25.59]	57 [2.24]	15 [0.59]	675 [26.57]	335.3 [13.2]	314 [12.36]	52 [114.64]

Note: for the dimensions in the NEMA type 1 version, refer to the user manual.

IP66 version



Size	A	B	C	D	E	H	L	P		Weight
	mm [in]	mm [in]	mm [in]	mm [in]	mm [in]	mm [in]	mm [in]	P1 mm [in]	P2 mm [in]	kg [lb]
A	150 [5.9]	250 [9.83]	5.7 [0.22]	7.5 [0.3]	225 [8.86]	265 [10.43]	165 [6.5]	227 [8.93]	252.5 [9.94]	5.97 [13.16]
B	200 [7.86]	325 [12.79]	5.7 [0.22]	7.5 [0.3]	300 [11.82]	340 [13.39]	215 [8.46]	227 [8.93]	252.9 [9.96]	8.54 [18.82]
C	205.5 [8.08]	464.6 [18.28]	5.7 [0.22]	7.5 [0.3]	416 [16.41]	474 [18.66]	320 [12.6]	289.6 [11.4]	314.6 [12.39]	19.20 [42.32]

Notes: P1 = Measure without disconnect switch.

P2 = Measure with disconnect switch.

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