

**CONTROL**   
**TECHNIQUES**



# DC DRIVES

MENTOR MP & QUANTUM MP  
HIGH PERFORMANCE DC SOLUTIONS

**DRIVE OBSESSED**

## MENTOR MP

# OPTIMUM PERFORMANCE, FLEXIBLE SYSTEM

### The ultimate DC drive

**As a world leader in DC drive technology, our innovative products are used in the most demanding applications requiring performance, reliability & energy efficiency.**

Mentor MP integrates the control platform from the world's leading intelligent AC drive technology making it one of the most flexible DC drives available. With optimum performance and flexible system interfacing capability, the Mentor MP drive allows you to maximize motor performance & enhance system reliability. Interface digitally with modern control equipment using Ethernet & fieldbus networks. It is very easy to retrofit from Mentor II & for high power configuration.

#### Benefits:

- Easy to set-up and commission
- Drive intelligence and system integration
- Machine communications flexibility



# QUANTUM MP

# PACKAGED MENTOR MP

# DC DRIVE SYSTEM

### The packaged Mentor MP drive

The Quantum MP is a packaged Mentor MP that integrates the control functionality of the Mentor MP with a design that incorporates a DC loop contactor, high-speed input fuses, 120 Vac control logic and DC output fuses (on all regenerative models). A dynamic braking contactor is also included in drives up to and including 350 A models. The Quantum MP saves engineering time and panel space.

Existing Mentor II and Quantum III customers can easily migrate to the new MP platform. All Mentor MP power terminal locations and mounting points are the same as those of the Mentor II. Similarly, all Quantum MP control terminals are the same format as the Quantum III. Both drives include complimentary software tools to assist in transferring drive parameters and programs from older products to new ones.



# MENTOR MP & QUANTUM MP

## KEY FEATURES

**Drive rating label**

**Armature voltage feedback for use with DC contactor and inverter common DC bus systems**

**Output power connections to motor with removable covers**

**Fuses for field protection (removable cartridge)**

**Integrated field controller**





**AC supply input connections with removable safety covers**

**Drive identification marker rail**

**Optional keypad, available as high brightness LED or multilanguage LCD with plain text**

**Smartcard for parameter and custom application program storage**

**Standard onboard Modbus communications port for PC programming & device interfacing**

**Safety terminal cover**

**Safety finger guard**

# MENTOR MP & QUANTUM MP

## KEY FEATURES

**Modbus Communications port for PC programming and device interfacing**

**Communications port for external field controller**

**Sturdy cable management system providing a grounding point for shielded control cables**





**3 universal option module slots for communications, I/O, additional feedback devices and automation / motion controllers**

**Pluggable terminals for I/O, relays, tach feedback, encoder and a current feedback test pin for fine tuning armature current loop**

**Communication ports for paralleling drives (Size 2 only)**

# ADDITIONAL QUANTUM MP

# KEY FEATURES

**Motor armature connections**

**Control power supply**







**AC supply fuses**

**Customer 120 Vac  
control connections**

# EASY SET-UP OF ENHANCED CONTROL AND MONITORING

## Greater motor field control

Built in field controller as standard

- Gives excellent field control for the majority of DC motors
- Reduces the need for external components

## Enhanced system design

- The heatsink cooling fans are intelligently controlled and only run when required, thus increasing reliability and reducing maintenance
- Eighteen different option modules allow customisation of the drive, including fieldbus, Ethernet, I/O, extra feedback devices and motion controllers
- The drive system designer is able to embed automation and motion control within the drive, eliminating communications delays that reduce performance

## Enhanced field control with FXMP25

- The optional FXMP25 may be controlled digitally by using a standard RJ45 connection, allowing set-up by standard drive parameters
- The FXMP25 can also function in standalone mode using its integrated keypad and display

## Fast set-up, configuration and monitoring

- Quick and easy to set-up
- Can be configured using optional removable keypads
- Advanced auto-tune features help you get the best performance from your machine



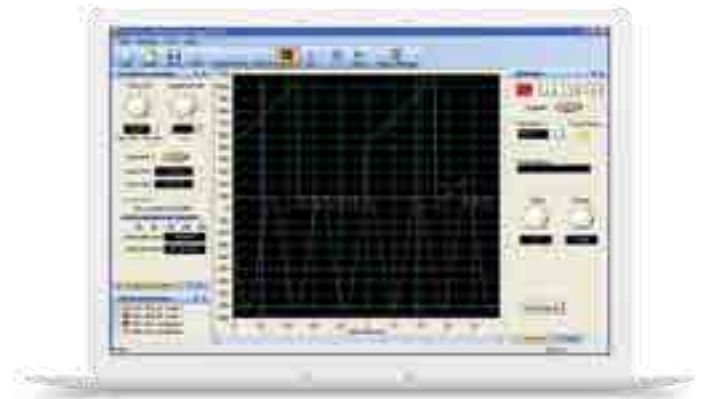
# PC SOFTWARE & SMARTCARD TOOLS: **RAPID COMMISSIONING**

**Control Techniques' software makes it easy to access the drive's feature set. It allows you to optimize drive tuning, back-up the configuration and set-up a communications network.**

## CTScope

Drive oscilloscope software for viewing & analysing changing values within the drive.

- The time base can be set to give high speed capture for tuning or for longer term trends
- Based on a traditional oscilloscope, making it easy to use for all engineers



## Smartcard

The smartcard is a backup memory device that brings the following benefits:

- Parameter and program storage
- Simplify drive maintenance and commissioning
- Quick set-up for sequential build of machines
- Machine upgrades can be stored on a smartcard & sent to the customer for installation





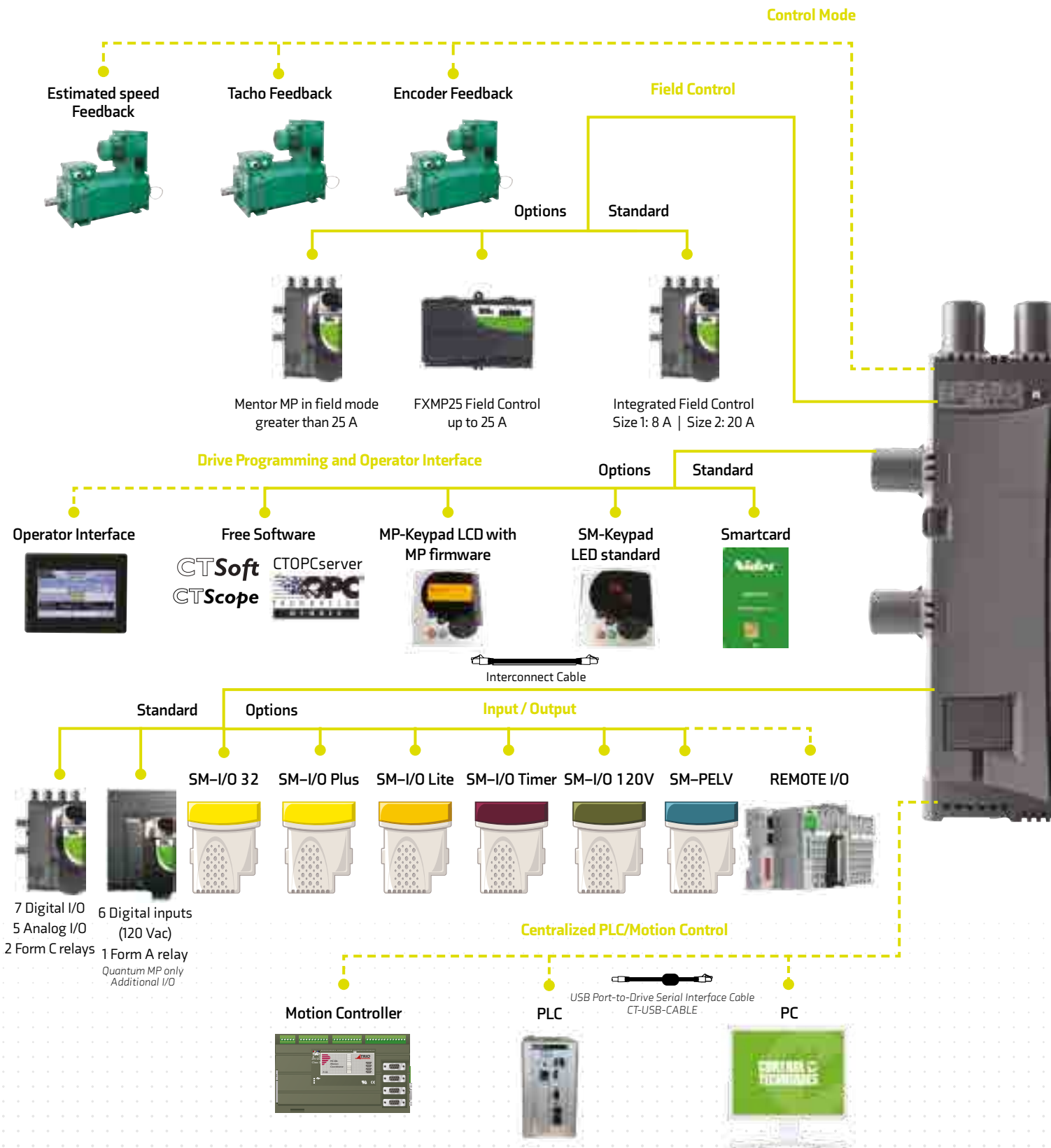
## CTSoft

Our drive configuration tool for commissioning, optimising and monitoring allows you to:

- Use configuration wizards to commission your drive
- Read, save and load drive configuration settings
- Manage the drive's smartcard data
- Visualize and modify the configuration with live animated diagrams
- All motor data is entered in real units and the current limit window will calculate parameter settings based on ambient temperature and required overload rating

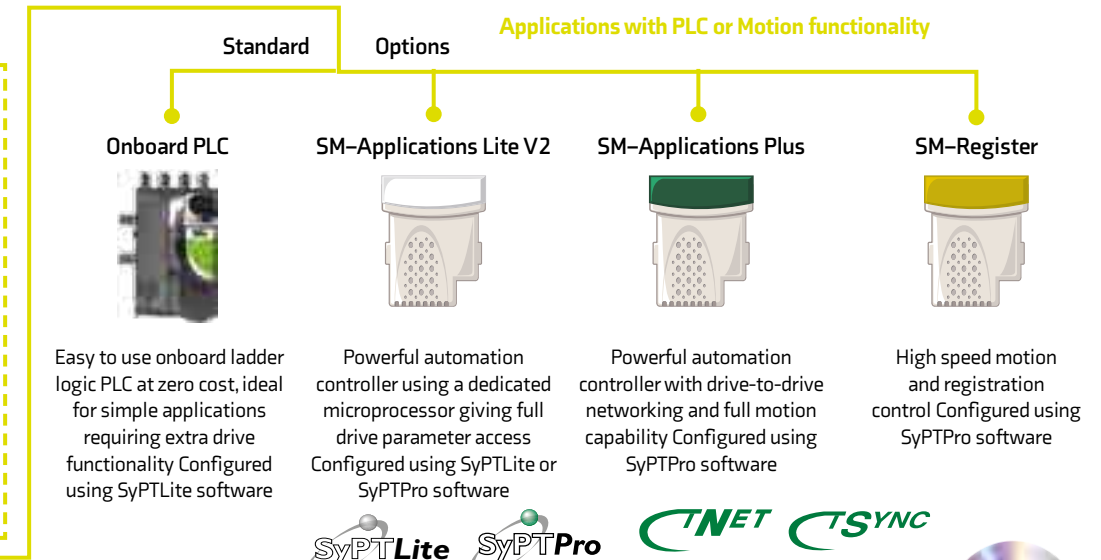


# Unrivalled integration flexibility

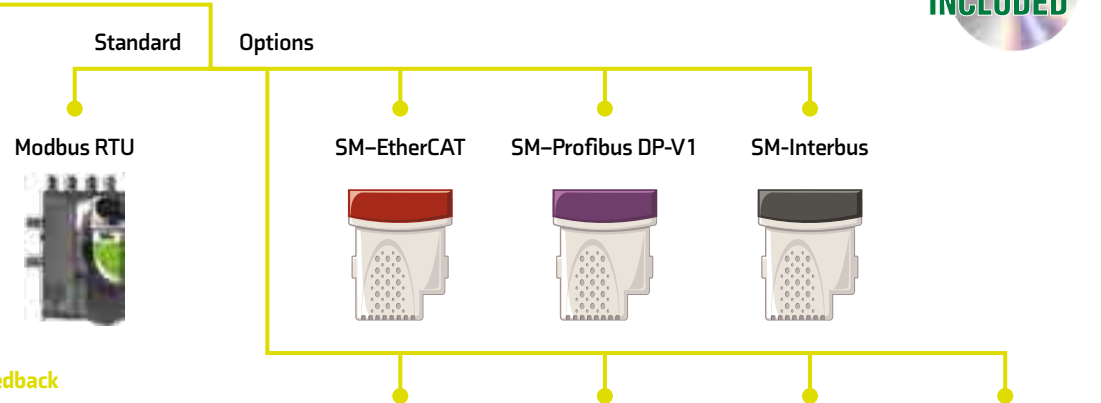


**Dynamic Braking Options**

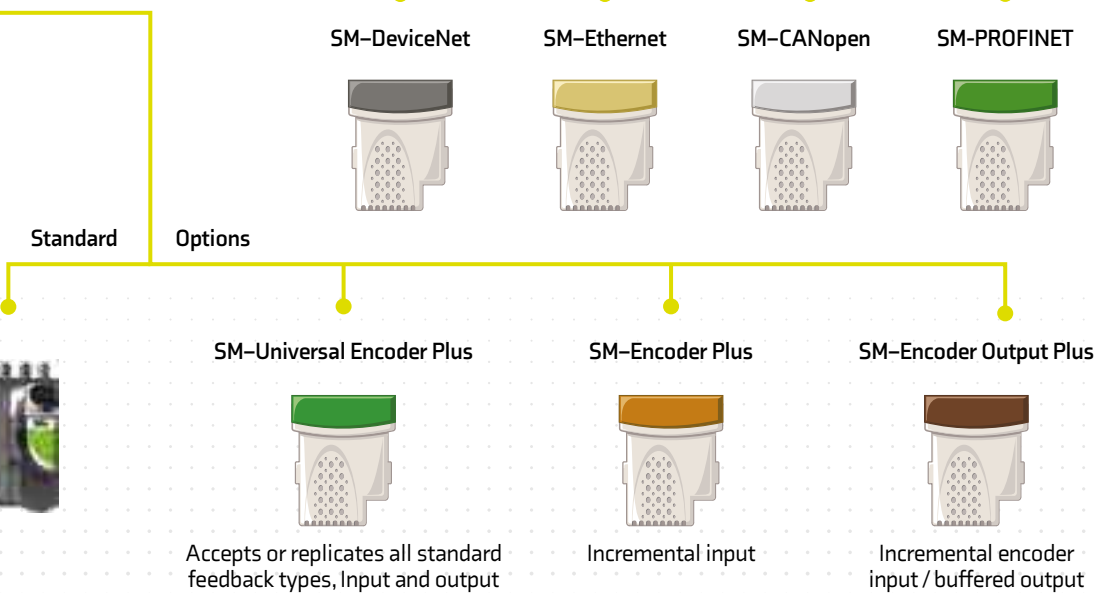
Dynamic Brake Resistors  
E-Stop or Cyclic Duty



**Communications**



**Feedback**



## MP SERIES

# DRIVE INTELLIGENCE & SYSTEM INTEGRATION

### Inbuilt controller programmable with SyPTLite

- Mentor MP has an inbuilt programmable controller. It is configured using SyPTLite, an easy to use ladder logic program editor, suitable for replacing relay logic or a micro PLC for simple drive control applications.

### Develop tailored solutions for applications modules with SyPTPro

- SyPTPro is a fully featured automation development environment that can be used for developing tailored solutions for single or multiple drive applications.
- The programming environment fully supports three industry standard languages: Function Block, Ladder and Structured Text. Motion control is configured using the new PLCOpen motion language, supporting multiple axes.

### Create an intelligent networked system with CNet

- CNet, a high-speed, deterministic drive-to-drive network links the drives, SCADA and I/O together to form an intelligent networked system, with SyPTPro managing both the programming and communications.



SyPTLite



SyPTPro



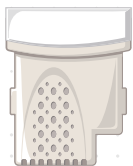


## High performance automation

Control Techniques' SM-Applications option modules contain a separate high performance microprocessor enabling the execution of application programs. This leaves the drive's own processor to give the best possible motor performance.

The SM-Application modules include the SM-Application Plus and the SM-Application Lite V2 variants.

- Both modules can be used to tackle automation problems from simple start/stop sequencing with a single drive to more complex machine and motion control application.
- The SM-Applications modules give you real-time access to all of the drive's parameters, plus access to data from I/O and other drives.



SM-Applications Lite V2

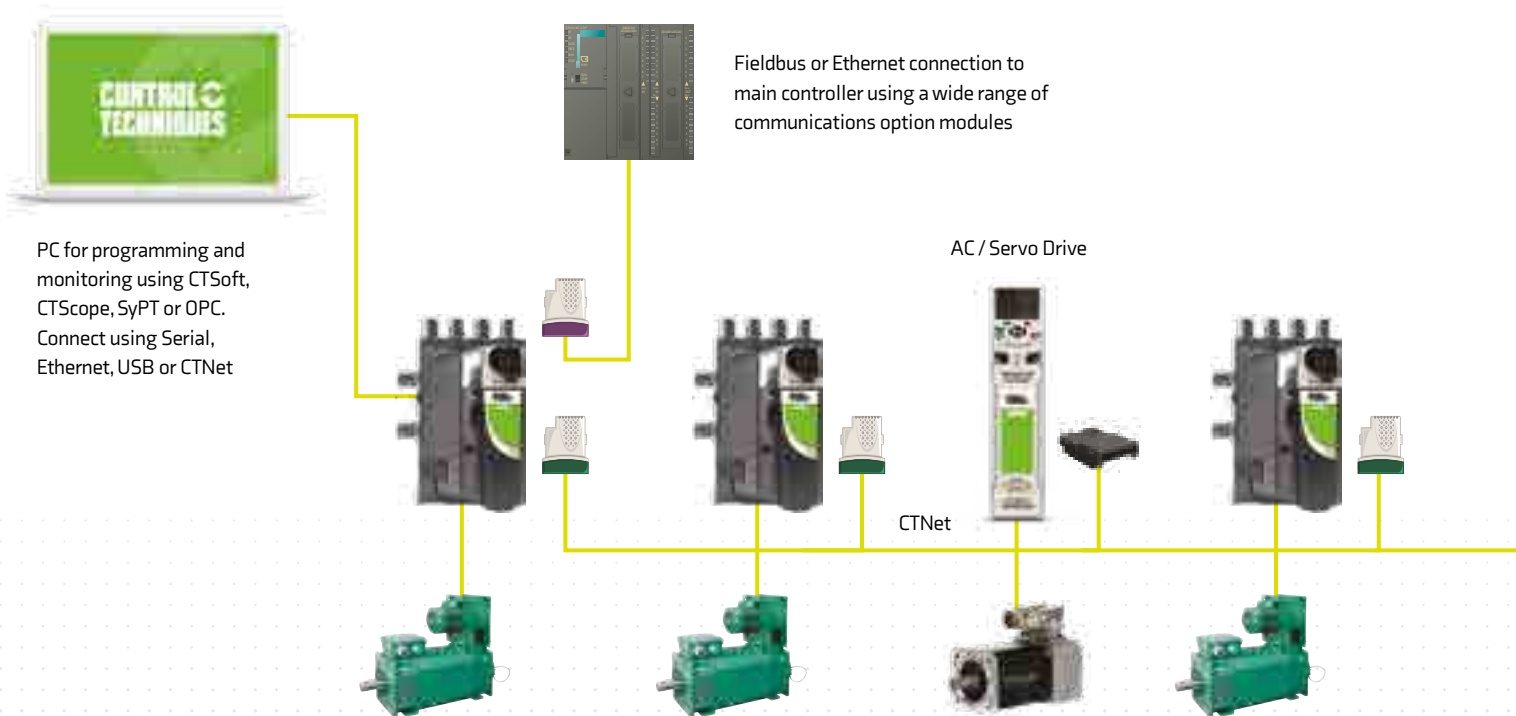


SM-Applications Plus

### SM-Applications Plus adds:

- Inputs/Outputs – The module has two digital inputs and two digital outputs for high-speed I/O operations such as position capture and actuator firing.
- High speed serial port – The module features a serial communications port supporting a number of built-in protocols for connection to external devices such as operator interface panels. These are CT-ANSI slave,
- Modbus RTU in master and slave modes, Modbus ASCII in master and slave modes and 3 user modes. Both two and four wire configurations are possible.
- Drive-to-drive communications – SM-Applications Plus option modules include a high speed drive-to-drive network called CTNet. This network is optimized for intelligent drive systems offering flexible peer-to-peer communications.

# MP SERIES MACHINE COMMUNICATIONS FLEXIBILITY



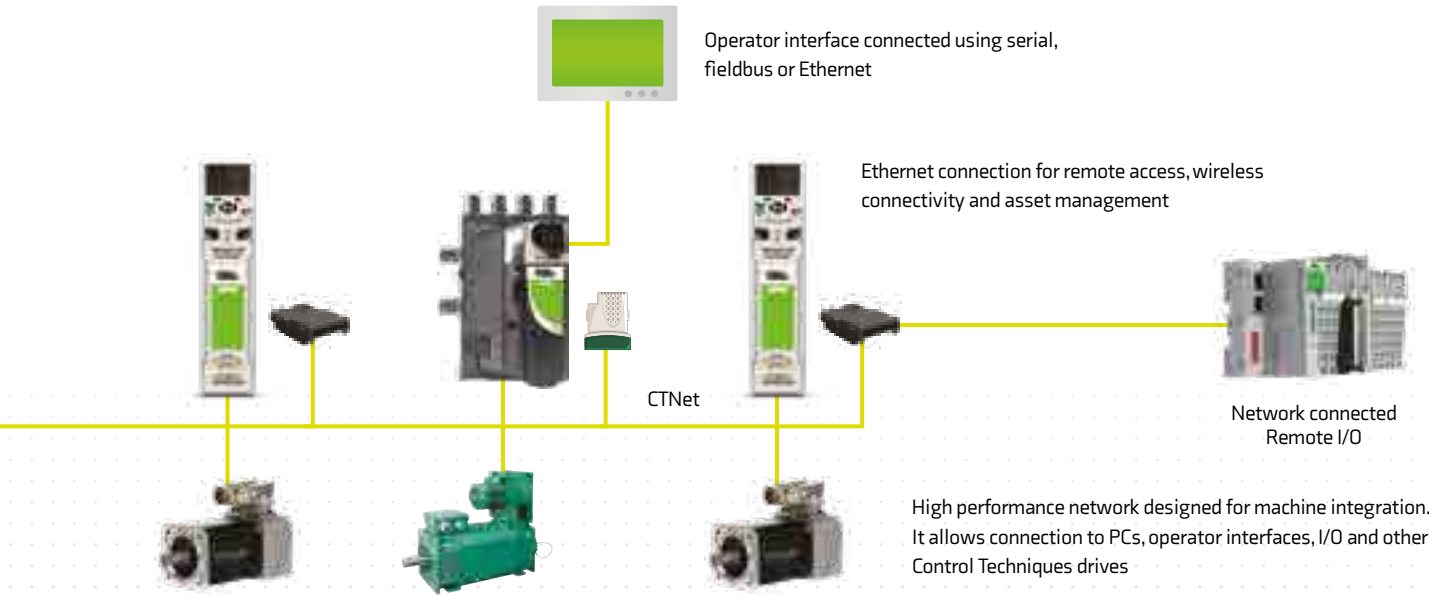
### Fieldbus communications

Option modules for all common Industrial Ethernet fieldbus networks such as Ethernet IP & ProfiNet. Servo networks such as Ethercat are also available.

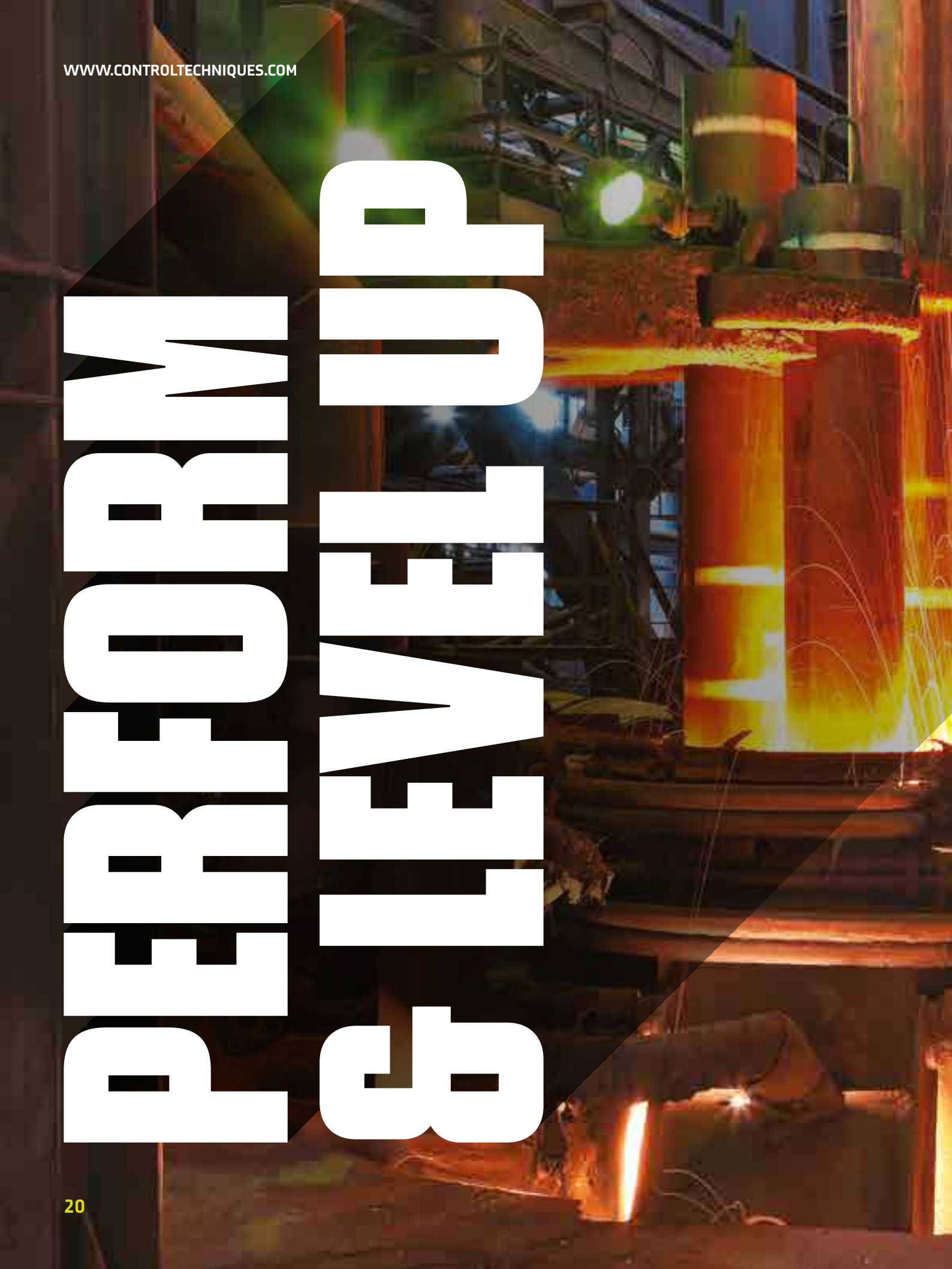
### Easy gateway

SM-Applications & CNet allow machine designers to design an easy gateway into which customers are able to interface using their preferred fieldbus or Ethernet interface. This solution improves the machine performance, simplifies the problem of being able to meet customer specifications for different fieldbus communications & helps to protect your intellectual property.

	Onboard PLC	SM-Applications Lite V2	SM-Applications Plus
Intellectual property protection	●	●	●
SyPTLite Programming	●	●	
SyPTPro Programming		●	●
Multi-tasking environment		●	●
Motion control capabilities		●	●
CNet drive-to-drive network			●
Serial port			●
High Speed I/O			●



# PERFORMANCE LEVEL UP



# MENTOR MP

# SECURE PLANT

# AVAILABILITY

**Mentor II has had its day and the simplest way to secure plant availability is to level up with Mentor MP.**

## Retro-fit projects

- We ensure easy integration with your existing motor, power supply, application equipment and communication networks from the design stage
- Mentor MP brings performance and possibilities to your application with minimum migration costs

## Motor field control

- Built in field controller as standard in every Mentor MP
  - i. Gives excellent field control for the majority of DC motors
  - ii. Reduces the need for external components

We recommend an external motor field controller when:

- The required field current is greater than that offered by the standard drive, up to 25 A. For example, older motors with low field voltages
- The field needs to be forced down more quickly than a standard half controlled field bridge can manage
- Applications can be implemented with simple field current reversal, without armature reversal, if machine dynamics can still be met

## Ease of migration

- Mentor MP is designed for existing Mentor II customers to easily migrate to the new platform
- All power terminal locations and mounting points have been retained
- At 900 A, Mentor MP has a much smaller frame size than Mentor II with smaller cable requirements. This allows for high power density paralleled configurations without custom-made bus bars.
- CT Soft has a built in migration wizard to assist with the transfer of drive parameters and programs.

### Note:

The control section of Mentor MP frame 2C and 2D is 90 mm deeper than Mentor II.

If a depth extension is not possible, then for other solutions, please contact your Control Techniques supplier.

# MENTOR MP

# TECHNICAL DATA

## Environment

Ambient Operating	32 to 131 °F (0 to 55 °C) Some models are derated above 104 °F (40 °C)
Cooling Method	MP25-MP45 natural convection; MP75 and larger forced convection
Humidity	90% relative humidity at 122 °F (50 °C)
Storage Temperature	-40 to 131 °F (-40 to 55 °C)
Altitude	0 to 9,842 ft (0 to 3,000 m), derate 1% per 328 ft (100 m) between 3,280 ft (1,000 m) and 9,842 ft (3,000 m)
Enclosure	MP25-MP210: IP20; MP350 to MP900 = IP10; MP1200 and larger = IP00

## AC Supply Requirements

SCR Supply Voltage	24 to 480 Vac -20% +10%, MP500 to 575 Vac, 500 to 690 Vac ±10%, 3Ø
Frequency	45 to 65 Hz
Supply Fault Current	100 kA
Auxiliary Supply Voltage	208 to 480 Vac ±10%, 1Ø
Armature Voltage (max.)	2-quadrant drives 1.35 X input Vac; 4-quadrant drives 1.15 X input Vac
Field Voltage (max.)	0.9 X input Vac with 1Ø input MP in field mode - 1.35 X input Vac with 3-phase input

## Control

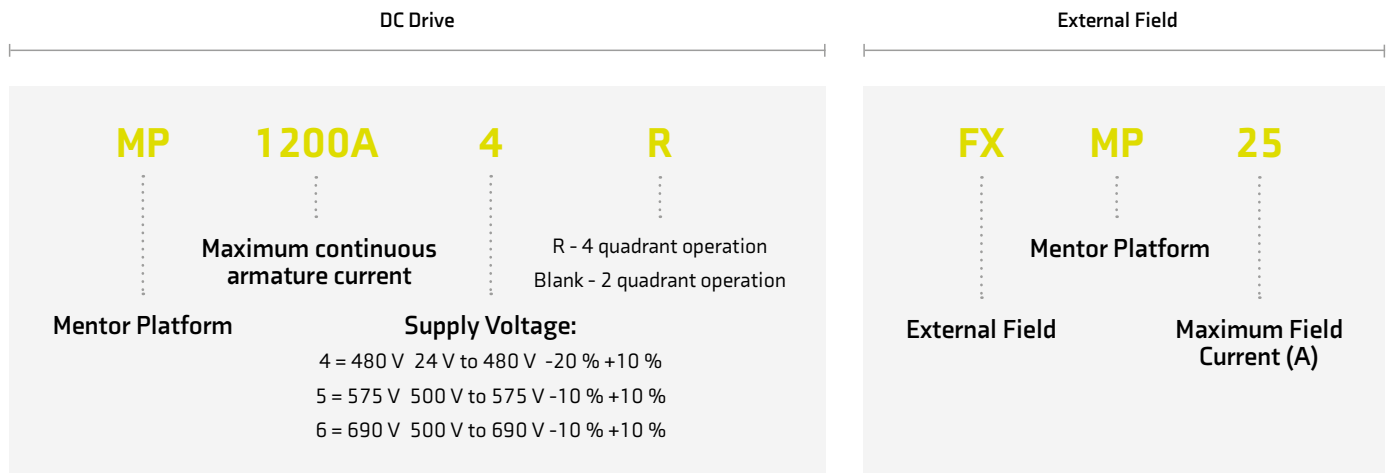
Analog Inputs	Qty 1, high precision differential voltage ± 10 V, 14 bit + sign Qty 2, general purpose voltage or current ±10 V, 0 to 20 mA, 4 to 20 mA, thermistor (analog 3 only), 10 bit + sign
Analog Outputs	Qty 2, ±10 V, 0 to 20 mA, 4 to 20 mA, 10 bit + sign

Digital I/O	Qty 3, 24 Vdc inputs Qty 3, 24 Vdc input/outputs
Drive Enable	Digital input 24 Vdc
Relays	Qty 2, 5 A @240 Vac, 5 A @30 Vdc resistive, 0.5 A @30 Vdc inductive (L/R = 40 ms)
Speed Loop	250 µs loop update
Current Loop	35 µs current sampling time
Feedback Methods	Encoder (resolution 0.01%) DC tach (resolution 0.1%); AC tach (resolution 1%) (300 V max.) Armature voltage (resolution 5%) Qty 3, optional additional incremental & absolute encoders
Field Control	Current regulated with flux control MP25-MP210 8 A MP350-MP1850 20 A MP optional FXMP25 25 A
Serial Communications	2- or 4-wire RS422 or RS485, optically-isolated Protocol is ANSI x 3.28-2.54-A4 or Modbus RTU Baud rate is 300 to 115,200

## Protection and Diagnostics

Control	Patent-pending galvanic electrical isolation, 24 Vdc power supply
Supply	Loss, undervoltage, overvoltage, transient suppression
Armature	Open circuit, I <sup>2</sup> t overload, instantaneous overcurrent, semiconductor fuse (regen only)
Field	Loss, overcurrent
Motor	Motor overtemperature switch or thermistor overtemperature trips
Drive Thermal	Heatsink, SCR junction, control board and option module(s)
Current Loop Loss	Loss of analog current reference

## Order String



**Note:** At the time of ordering, please select the required interface option. Order strings do not include drive keypad. Refer to page 14 for keypad order codes.

## Ratings

Frame	Order Code	Input Voltage						Armature Current (A)*	Field Current (A)	Quadrants of Operation
		230 V	460 V	575 V		690 V				
		Motor (HP)		Order Code	Motor (HP)	Order Code	Motor (HP)			
		240 Vdc	500 Vdc		600 Vdc		700 Vdc			
1A	MP25A4(R)	5	10	MP25A5(R)	15			25		
	MP45A4(R)	10	25	MP45A5(R)	30		n/a	45	8	2 and 4
	MP75A4(R)	20	40	MP75A5(R)	50			75		
1B	MP105A4(R)	30	60	MP105A5(R)	75			105		
	MP155A4(R)	40	75	MP155A5(R)	100		n/a	155	8	2 and 4
	MP210A4(R)	60	125	MP210A5(R)	150			210		
2A	MP350A4(R)	100	200	MP350A5(R)	250	MP350A6(R)	300	350		
	MP420A4(R)	125	250		n/a		n/a	420		
		n/a		MP470A5(R)	350	MP470A6(R)	400	470**	20	2 and 4
	MP550A4(R)	150	300		n/a		n/a	550		
2B	MP700A4(R)	200	400	MP700A5(R)	500	MP700A6(R)	600	700		
	MP825A4(R)	225	500	MP825A5(R)	600	MP825A6(R)	700	825**	20	2 and 4
	MP900A4(R)	250	550		n/a		n/a	900		
2C	MP1200A4	350	750	MP1200A5	900	MP1200A6	1000	1200	20	2
	MP1850A4	550	1150	MP1850A5	1400	MP1850A6	1600	1850		
2D	MP1200A4R	350	750	MP1200A5R	900	MP1200A6R	1000	1200	20	4
	MP1850A4R	550	1150	MP1850A5R	1400	MP1850A6R	1600	1850		

**7030 A is achieved by parallel connection of Mentor MP drives**

\* Current ratings are at 104°F (40°C) with 150% overload for 30s.

\*\* For this rating at 575 V and 690 V, 150% overload time is 20s at 104°F (40°C) and 30s at 95°F (35°C).

(R) indicates optional order code for 4-quadrant operation.

HP provided for convenience. Always size drive based on motor Amps.

# MENTOR MP

# TECHNICAL DATA

## Dimensions

Frame Size	Height (H)*		Width (W)		Depth (D)	
	in	mm	in	mm	in	mm
1A	17.5	444	11.5	293	8.7	222
1B	17.5	444	11.5	293	9.9	251
2A	25.2	640	19.5	495	11.9	301
2B	25.2	640	19.5	495	11.9	301
2C	41.3	1050	21.9	555	24.1	611
2D	59.4	1510	21.9	555	24.1	611

\* Height including optional fit exhaust duct cover is:  
49.29 in (1252 mm) for size 2C and 67.40 in (1712 mm) for size 2D.



All Mentor MP and Quantum MP DC drives up to 575 V ratings are cULus certified. These drives are the most flexible DC drive available today.



# Mentor MP Terminal Connections

**Power - Armature**

Pin #	Function
A1	Armature +
A2	Armature -

**Motor Armature Voltage Feedback**

Pin #	Function
MA1	Armature +
MA2	Armature -

**RS485**

Pin #	Function
1	120Ω Termination Resistor
2	RX TX
3	Isolated 0 V
4	+24 V (100 mA)
5	Isolated 0 V
6	TX Enable
7	RX\ TX\
8	RX\ TX\ (if termination resistors are required, link to pin 1)
Shell	Isolated 0 V

**External Field Supply RS485**

Pin #	Function
1	120Ω Termination Resistor
2	RX TX
3	Isolated 0 V
4	+24 V (100 mA)
5	Isolated 0 V
6	TX Enable
7	RX\ TX\
8	RX\ TX\ (if termination resistors are required, link to pin 1)
Shell	Isolated 0 V

**Power - Field**

Pin #	Function
E1	Control Electronics Supply
E3	Control Electronics Supply
L12	Field On/Off
L11	Field On/Off
F+	Field +
F-	Field -

**Power - Line**

Pin #	Function
L1	Line In
L2	Line In
L3	Line In
	Ground Connection

**Control Terminals - Top Row**

Pin #	Function
1	0 V Common
2	24 Vdc External Input
3	0 V Common
4	10 Vdc Source, 10 mA
5	Analog Input 1 +
6	Analog Input 1 -
7	Analog Input 2
8	Analog Input 3
9	Analog Output 1
10	Analog Output 2
11	0 V Common

**Control Terminals - Bottom Row**

Pin #	Function
21	0 V Common
22	24 Vdc Output, 200 mA
23	0 V Common
24	Digital I/O 1
25	Digital I/O 2
26	Digital I/O 3
27	Digital Input 4
28	Digital Input 5
29	Digital Input 6
30	0 V Common
31	Drive Enable

**Control Terminals - Encoder Feedback**

Pin #	Function
A	Channel A
A\	Channel A\
B	Channel B
B\	Channel B\
Z	Marker Pulse Z
Z\	Marker Pulse Z\
+	Encoder Supply
0 V	Encoder 0 V

**Control Terminals - Relays & Tach Feedback**

Pin #	Function
51	Relay 1 Common
52	Relay 1 N/C Contact
53	Relay 1 N/O Contact
61	Relay 2 Common
62	Relay 2 N/C Contact
63	Relay 2 N/O Contact
41	Tach +
42	Tach -

Frame Size 1 layout  
Refer to the product User Guide for other sizes

# QUANTUM MP

# TECHNICAL DATA

## Environment

Ambient Operating	32 to 131 °F (0 to 55 °C) Some models are derated above 104 °F (40 °C)
Cooling Method	QMP45 natural convection; QMP75 and larger forced convection
Humidity	90% relative humidity at 122 °F (50 °C)
Storage Temperature	-40 to 131 °F (-40 to 55 °C)
Altitude	0 to 9,842 ft (0 to 3,000 m), derate 1% per 328 ft (100 m) between 3,280 ft (1,000 m) and 9,842 ft (3,000 m)
Enclosure	IP00

## AC Supply Requirements

SCR Supply Voltage	208 to 480 Vac -20% +10%, 3Ø
Frequency	48 to 65 Hz
Supply Fault Current	QMP45-QMP210 = 30kA; QMP350 and larger = 5 kA
Auxiliary Supply Voltage	208 to 480 Vac ±10%, 1Ø
Armature Voltage (max.)	2-quadrant drives 1.35 X input Vac; 4-quadrant drives 1.15 X input Vac
Field Voltage (max.)	0.9 X input Vac with 1Ø input

## Control

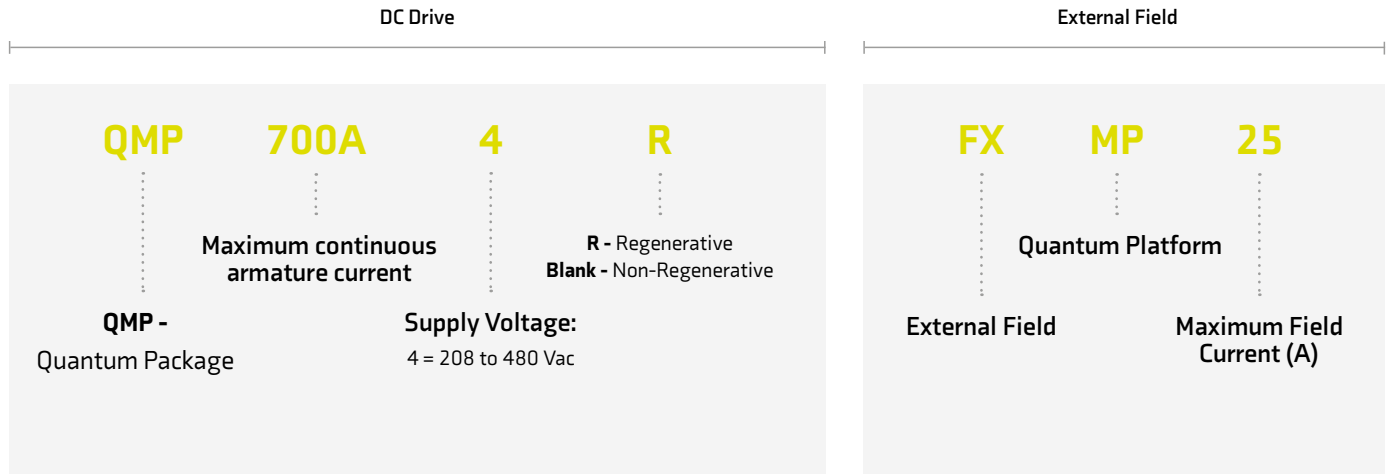
Analog Inputs	Qty 1, high precision differential voltage ± 10 V, 14 bit + sign Qty 2, general purpose voltage or current ± 10 V, 0 to 20 mA, 4 to 20 mA, thermistor (analog 3 only), 10 bit + sign
Analog Outputs	Qty 2, ±10 V, 0 to 20 mA, 4 to 20 mA, 10 bit + sign Qty 1, instantaneous armature current feedback pin, 10 V = 2x motor rated current
Digital I/O	Qty 3, 24 Vdc inputs Qty 3, 24 Vdc input/outputs Qty 7, 120 Vac Inputs

Drive Enable	Digital input 24 Vdc
Relays	Qty 2, 5 A @240 Vac, 5 A @30 Vdc resistive, 0.5 A @30 Vdc inductive (L/R = 40 ms) Qty 1, 120 Vac
Speed Loop	250 µs loop update
Current Loop	35 µs current sampling time
Feedback Methods	Encoder (resolution 0.01%) DC tach (resolution 0.1%); AC tach (resolution 1%) (300 V max.) Armature voltage (resolution 5%) Qty 3, optional additional incremental and absolute encoders
Field Control	Current regulated with flux control QMP25-QMP210 8 A QMP350-QMP700 20 A QMP Optional FXMP25 25 A
Serial Communications	2- or 4-wire RS422 or RS485, optically-isolated Protocol is ANSI x 3.28-2.54-A4 or Modbus RTU Baud rate is 300 to 115,200

## Protection and Diagnostics

Control	Patent-pending galvanic electrical isolation, 24 Vdc power supply
Supply	Loss, undervoltage, overvoltage, transient suppression, semiconductor fuses
Armature	Open circuit, I <sup>2</sup> t overload, instantaneous overcurrent, semiconductor fuse (regen only)
Field	Loss, overcurrent
Motor	Motor overtemperature switch or thermistor overtemperature trips
Drive Thermal	Heatsink, SCR junction, control board and option module(s)
Current Loop Loss	Loss of analog current reference

## Order String



**Note:** At the time of ordering, please select the required interface option. Order strings do not include drive keypad. Refer to page 14 for keypad order codes.

## Ratings

Frame	Order Code	Input Voltage		Armature Current (A)*	Field Current (A)	Quadrants of Operation
		230 V	460 V			
		Motor (HP)				
		240 Vdc	500 Vdc			
<b>1A</b>	QMP25A4(R)	5	10	25	8	2 and 4
	QMP45A4(R)	10	25	45		
	QMP75A4(R)	20	40	75		
<b>1B</b>	QMP155A4(R)	40	75	155	8	2 and 4
	QMP210A4(R)	60	125	210		
<b>2A</b>	QMP350A4(R)	100	200	350	20	2 and 4
<b>2B</b>	QMP550A4(R)	150	300	550	20	2 and 4
	QMP700A4(R)	200	400	700		

\* Current ratings are at 40°C with 150% overload for 30s.

(R) indicates optional order code for 4-quadrant operation.

Horsepower (HP) provided for reference - always size drive based on motor Amps.

\*\* For this rating at 575 V and 690 V, 150% overload time is 20s at 40°C and 30s at 35°C.

# QUANTUM MP

# TECHNICAL DATA

## Dimensions

Frame Size	Height (H)*		Width (W)		Depth (D)	
	in	mm	in	mm	in	mm
1A	22.6	573	13.0	330	8.7	272
1B	22.6	578	13.0	330	9.9	251
2A	38.5	978	20.3	516	13.5	343
2B	43.0	1092	20.3	516	13.5	343



Frame Size 1



Quantum MP 350 A  
Frame Size 2

The Quantum MP packages are designed for easy system integration into new or existing DC motor applications.

# Quantum MP Terminal Connections

RS485	
Pin	Function
1	120Ω Termination Resistor
2	RX TX
3	Isolated 0 V
4	+24 V (100 mA)
5	Isolated 0 V
6	TX Enable
7	RX\ TX\
8	RX\ TX\ (if termination resistors are required, link to pin 1)
Shell	Isolated 0 V



Top view

Power - Line & Armature	
Pin #	Function
DB+*	Dynamic Braking Resistor +
A1	Armature +
A2	Armature -
DB-*	Dynamic Braking Resistor -
L1	AC Line
SR1	Line Suppressor Resistor
L2	AC Line
SR2	Line Suppressor Resistor
L3	AC Line
GND	Ground Connection

Power - Field	
Pin #	Function
E1	Control Electronics Supply
E3	Control Electronics Supply
L12	Field On/Off
L11	Field On/Off
F+	Field +
F-	Field -



Control Terminals - Top Row	
Pin #	Function
1	0 V Common
2	24 Vdc External Input
3	0 V Common
4	10 Vdc Source
5	Analog Input 1 +
6	Analog Input 1 -
7	Analog Input 2
8	Analog Input 3
9	Analog Output 1
10	Analog Output 2
11	0 V Common

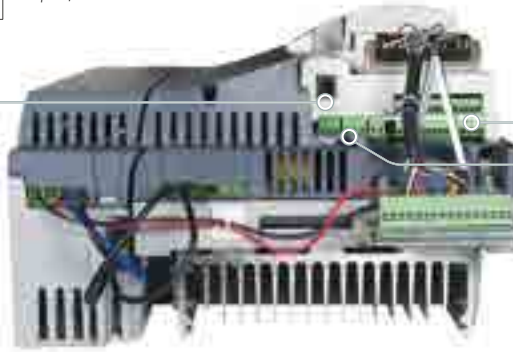
Control Terminals - 120 Vac		
Pin #	Function	
C1	120 Vac Supply	User Output
C2	E-Stop	Input
C3	120 Vac Supply	Feed from C2
C4	System Interlocks	Input
C5	120 Vac Supply	User Output
C6	Digital Input1 (Stop)	Input
C7	120 Vac Supply	Feed from C6
C8	Digital Input2 (Start)	Input
C9	120 Vac Supply	Feed from C6
C10	Digital Input3 (Jog)	Input
C11	120 Vac	User Output
C12	Digital Input4 (Fwd/Rev)	Input
C13	120 Vac	User Output
C14	Digital Input5 (Reset)	Input
C15	120 Vac	Relay Common
C16	Relay Output (Drive On)	Relay Output

Control Terminals - Bottom Row	
Pin #	Function
21	0 V Common
22	24 Vdc Output, 200 mA
23	0 V Common
24	Digital I/O 1
25	Digital I/O 2
26	Digital I/O 3
27	Digital Input 4
28	Digital Input 5
29	Digital Input 6
30	0 V Common
31	Drive Enable

Control Terminals - Encoder Feedback	
Pin #	Function
A	Channel A
A\	Channel A\
B	Channel B
B\	Channel B\
Z	Marker Pulse Z
Z\	Marker Pulse Z\
+	Encoder Supply
0 V	Encoder 0 V

\*See Mentor MP terminal connections on page 29 for specific terminal location.

External Field Supply RS485	
Pin #	Function
1	120Ω Termination Resistor
2	RX TX
3	Isolated 0 V
4	+24 V (100 mA)
5	Isolated 0 V
6	TX Enable
7	RX\ TX\
8	RX\ TX\ (if termination resistors are required, link to pin 1)
Shell	Isolated 0 V



Bottom view

Control Terminals - Relays & Tach Feedback	
Pin #	Function
51	Relay 1 Common
52	Relay 1 N/C Contact
53	Relay 1 N/O Contact
61	Relay 2 Common
62	Relay 2 N/C Contact
63	Relay 2 N/O Contact
41	Tach +
42	Tach -

Frame Size 1 layout  
Refer to the product User Guide for other sizes

\*NOTE: Dynamic braking terminals not included in models QMP550A4(R) and AMP700A4(R).

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**Employees**

**70**

**Countries**

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**109K**

**Employees**

**\$14.6B**

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**70+**

**Countries**

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**Companies**



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