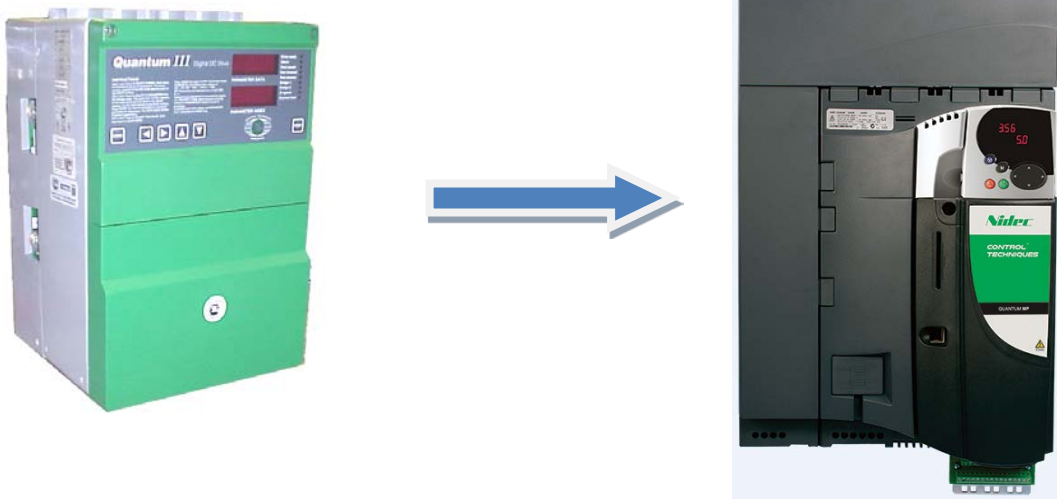
This Application Note applies to Size 1 Quantum III and Quantum MP

Quantum III to Quantum MP Conversion Guide

The Quantum III series was a popular 3 phase digital DC motor speed control introduced in the United States back around 1994. The Quantum III was retired after a good 16 year drive life. The new generation Quantum MP series of DC motor Drives was designed to replace the Quantum III. The Quantum MP brings a whole new range of application possibilities due in large to the ability of the QMP to utilize the wide offering of standard option modules our AC drive family enjoys. This application note provides a cross-reference guide for the new drive as well as mechanical dimension comparisons to aid in the replacement of the Quantum III drive. In addition, wiring conversion and jumper settings are discussed to facilitate changeover.



Software Requirements

CT Soft and CT Scope

Communication Cables

The same communications cable that is used with the Mentor MP, Unidrive SP, Affinity, Commander SK, Commander SE and SX can be used with the Quantum MP. The cable can either have a USB or 9 pin serial connection

Drive Cross References

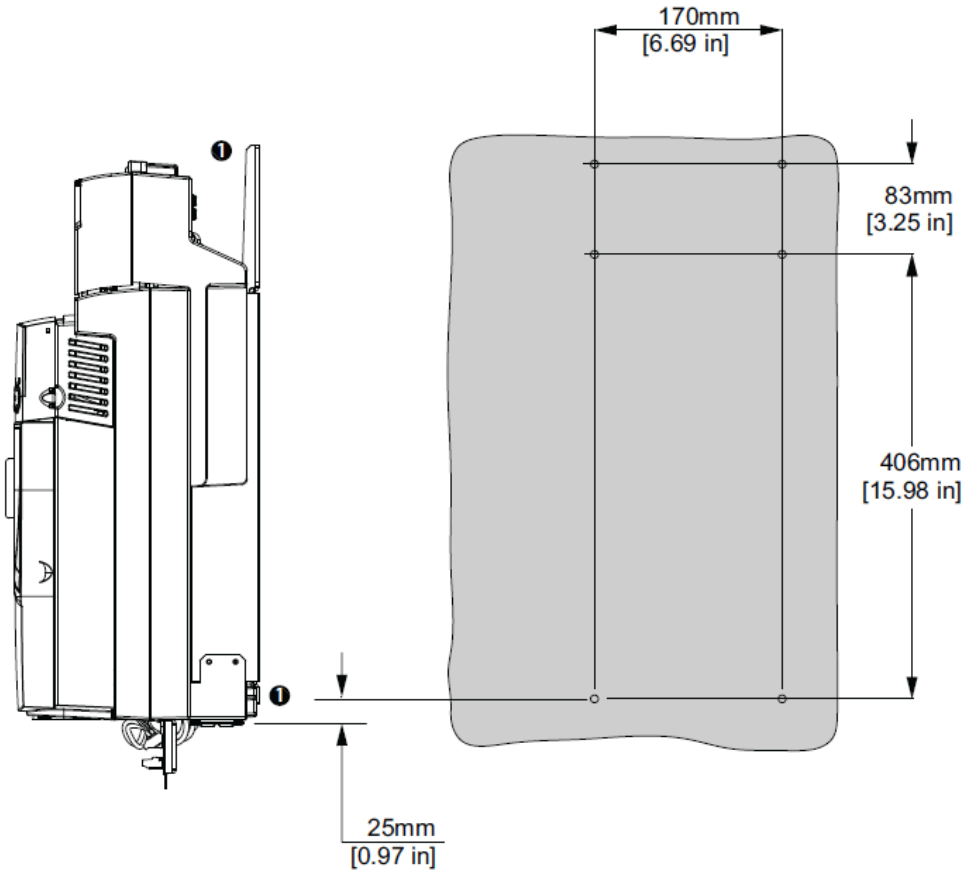
Armature Voltage		Quantum III				Armature Voltage		Quantum MP			
240 Vdc	500 Vdc					240 Vdc	500 Vdc				
HP	HP	Output A 55°C	Frame	Non Regen Order Code	Regen Order Code	HP	HP	Non Regen Order Code	Regen Order Code	Frame	Output A 40°C
10	20	38	1A	9500-8302	9500-8602	10	25	QMP45A4	QMP45A4R	1A	45
15	30	55		9500-8303	9500-8603	20	40	QMP75A4	QMP75A4R		75
30	60	106	1B	9500-8305	9500-8605	40	75	QMP155A4	QMP155A4R	1B	155
50	100	172		9500-8306	9500-8606	60	125	QMP210A4	QMP210A4R		210
75	150	277	2A	9500-8307	9500-8607	100	200	QMP350A4	QMP350A4R	2A	350
100	200	338		9500-8308	9500-8608						
125	250	428		9500-8309	9500-8609	100	225	QMP400A4	QMP400A4R	2B	400
150	300	508	2B	9500-8310	9500-8610	150	300	QMP550A4	QMP550A4R	2C	550
200	400	675		9500-8311	9500-8611	200	400	QMP700A4	QMP700A4R		700
250	500	820	3	9500-8315	9500-8615	250	500	Contact the Systems Center for Mentor MP packaged pricing			
300	600	985		9500-8316	9500-8616	300	600				
350	700	1150		9500-8317	9500-8617	350	700				
400	800	1250		9500-8318	9500-8618	400	800				
450	900	1470		9500-8319	9500-8619	450	900				
500	1000	1620		9500-8320	9500-8620	500	1000				

Dimensions

CAD drawings can be found on our website.

Dimensions: (in)	Quantum III			Quantum MP	
	Frame	H x W x D		Frame	H x W x D
	1A	15 x 10 x 10.5		1A	22.6 x 13 x 8.7
	1B	15 x 10 x 12.3		1B	22.6 x 13 x 9.8
	2A	35 x 20.3 x 12		2A	35 x 20.3 x 12.9
				2B	36.8 x 20.3 x 12.9
	2B	36 x 20.3 x 14		2C	38.7 x 20.3 x 12.9

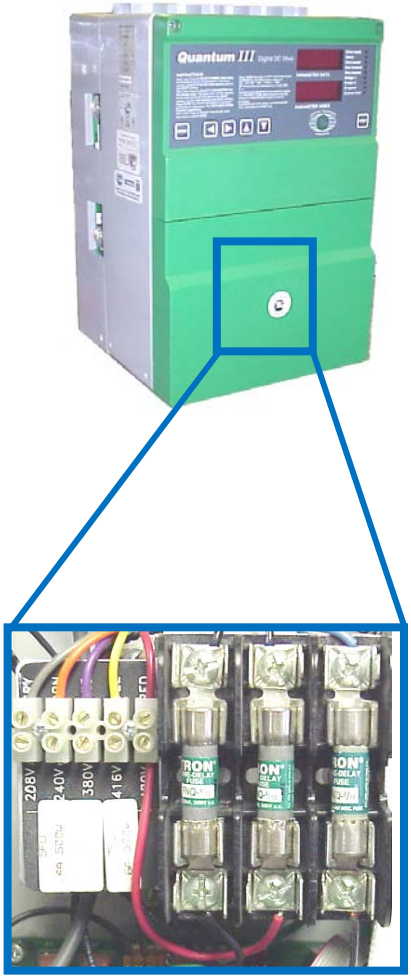
Mounting



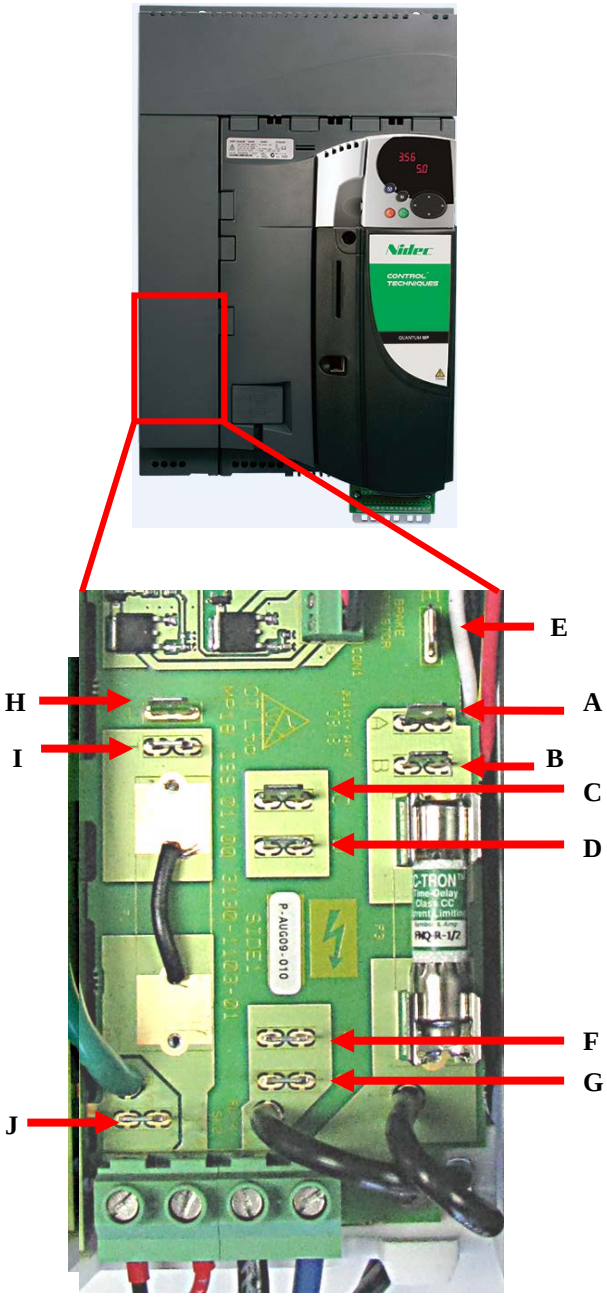
Transformer Configuration

Both Quantum III and the Quantum MP drives are preconfigured for 480Vac input from manufacturing. The original setting of the red wire on the Quantum III drive will dictate what jumpers need to be changed on the Quantum MP.

Quantum III Transformer Configuration



QuantumMP Transformer Configuration



Quantum III Transformer Configuration
(Pictured Above shows a unit set for 480 V)

The Quantum MP can be configured for the same voltages as the Quantum III Drive, but there will be multiple wires that need to be changed.

Place colored wires to letter spade terminals as listed per table to the right.

Transformer	AC Supply Voltage L1/L3				
Lead Color	208V	240V	380V	416V	480V
Red	B	B	B	B	B
Yellow	F	F	D	D	D
Orange	A	A	E	C	C
Gray	E	E	C	E	E
Black	G	G	G	G	G
White	J	J	J	J	J
Blue	H	I	H	H	I
Purple	I	H	I	I	H

Default Programming

Like its' predecessor, the Quantum MP has several parameters that need to be set within the drive. This programs the drive to be configured to the SM-120 V option module and armature contactor. The Quantum MP default parameters are listed below.

Quantum MP Default File

Parameter	Quantum MP default	Mentor MP default	Description
5.16	**1**	0	Selects where the drive reads Armature voltage
6.40	**1**	0	Sequencer Latching
7.15	**Volt**	th	Analog Input Configured for Voltage
8.22	**0**	10.33	Unselect the Digital Input Destination
8.23	**0**	6.30	
8.24	**0**	6.32	
8.26	**0**	6.31	
9.04	**17.06**	0	External Trip Configuration
9.05	**1**	0	
9.09	**0.1**	0	
9.10	**10.32**	0	
9.37	**1**	0	
17.21	**6.39**	0	Not Stop
17.22	**6.34**	0	Run command Input
17.23	**6.31**	0	Jog Forward Input
17.24	**6.33**	0	Forward / Reverse Input
17.25	**10.33**	0	Drive Reset Input
17.28	**6.55**	0	Contactor Enabled Input

If you set these manually, perform a store to make them take effect.

Also, if the SMARTCARD that was shipped with the drive is available, the defaulted parameters are loaded to that card.

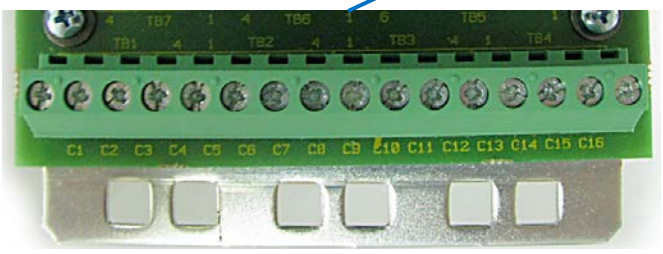
To load the Quantum MP default parameters:

1) Insert the SMARTCARD into the drive
2) Then using Menu XX.00, Set the Data value to 6200
3) Press the **M** (Mode) button then Press the Red Reset button
4) Save Parameters to the drive

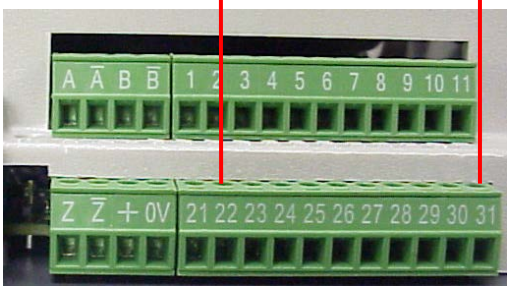
Quantum MP Control Wiring (MP 10 User Interface)

Quantum III 9500-4025 120 V Terminal	Quantum MP MP10 Board 120 V Terminal	Functions
1	C1	120 Vac Output
2	No connection	Dead Terminal
3	No connection	Dead Terminal
4	C4	External Trip
5	C5	120 Vac Output
6	C6, C7 or C9	/Stop
7	C8	Run
8	C11	120 Vac Output
9	C10	Jog
10	C13	120 Vac Output
11	C12	Rev
12	C14	Drive Reset
13	C15	120 Vac Output
14	C16	Drive On Output
15		*
16		*
17		*
18		*
19		*
20		*
21		*
22		*
23		*
24		*
25	C15	Neutral

*** Each individual program will need to be examined to determine how this function can now be implemented with the new Quantum MP. An additional SM-120 module may be needed.**



MP 10 User Interface

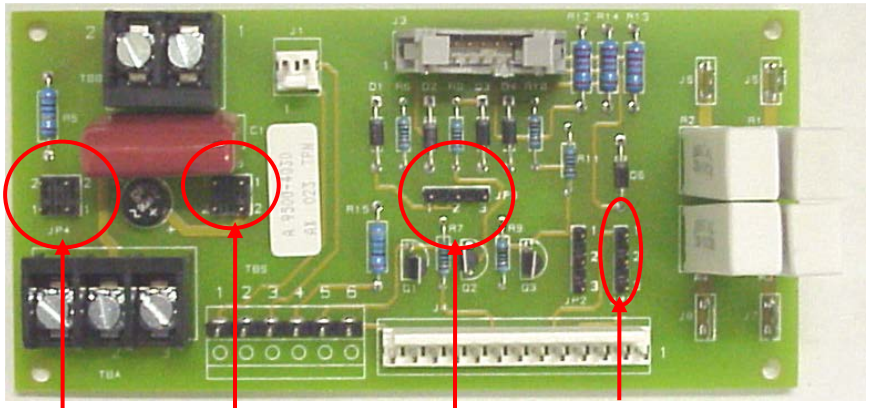


On the main control pod an Enable will need to be added connecting Terminals 22 – 31. The unit will not run with out this connection.

Quantum III Jumper Settings

Quantum III used multiple links and jumpers throughout the entire drive to arrange for a specific application. All of the previous link settings are now configured inside the drive digitally. The link positions will determine the parameters that are set in the new Quantum MP.

Tach Board (9500-4030)

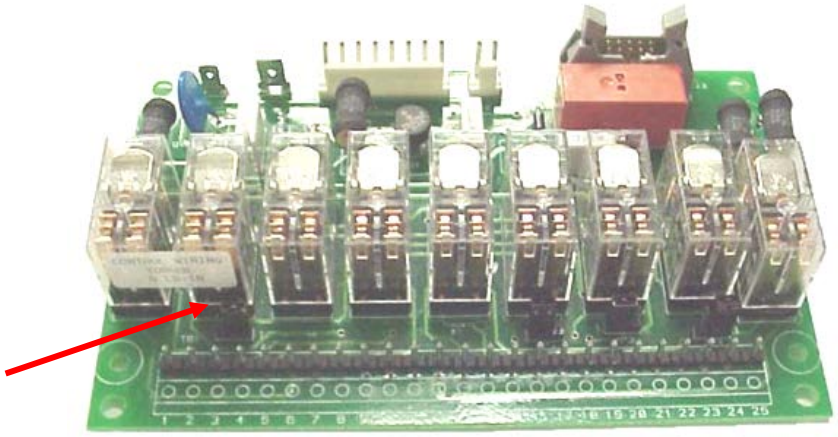


JP1 **1 – 2** additional digital input. The value of **Pr 8.15** from the Quantum III will be needed. This value will determine what function of this digital input and what will be placed into the **QMP Pr 17.25**
2 – 3 Drive reset (**QMP Pr 17.25** will be set for **10.33**)

JP3 **1 – 2** Opens the contactor and Coasts to a Stop (**QMP Pr 6.01 = 0**)
2 – 3 Contactor will remain close until Zero Speed is reached and then open the contactor. (**QMP Pr 6.01 = 1)**

JP4 & JP5 **1 – 1** Configures the drive for a DC Tach (**QMP** Pr 3.53 to 1)
2 – 2 Configures the drive for a AC Tach (**QMP** Pr 3.53 to 2)

Relay Board (9500-4025)



JP1

1 – 2 Two wire start/stop (**QMP** – Pr 6.40 **Off**)
2 – 3 Three wire start/stop (**QMP** – Pr 6.40 **On** default value)

Note: In most cases terminal 15-23 were not often used. An additional SM-120 module may need to achieve these additional functions of the Quantum III

Analog Inputs & Outputs

Inputs – All Quantum III drives came with the capability of **Five** analog inputs, although they were seldom used. The Quantum MP comes standard with 3 analog inputs, but with the addition of some SM Option Modules, you will be able to achieve the additional analog inputs if desired/needed.

Outputs – The Quantum III had 4 analog outputs, 3 of which could be programmed and scaled. The Quantum MP has 3 outputs, 2 of which are programmable and scalable.

Digital Inputs & Outputs

Inputs – Quantum III models came with the capability of **Four** digital inputs free for programming. The Quantum MP will allow for up to 6 digital inputs.

Outputs – The Quantum III had 4 digital outputs free for customer use.
The Quantum MP has 3 digital and 2 relay outputs that can be programmed for customer use.

Second Processor

MD 21 / MD 29 – The second processor was used to solve various applications beyond the intrinsic features within the Mentor II / Quantum III. Some examples of common applications that utilized the additional option module were external **PID Loop Control, S-ramp Acceleration and Digital Locking with Ratio Control.** Those and other simple applications can now be handled internally by the Mentor / Quantum MP. (PID control in Menu 14, S-Ramp in Menu 2 and Digital Lock with Ratio Control in Menu 13)

More complex applications that utilized the MD29 would be replaced using either SM-Apps Plus or possibly SM-Apps Lite. MD29AN modules would be replaced using SM-Apps Plus.

General module conversion list

MD24	→ SM- Profibus
MD25	→ SM-DeviceNet
MD29	→ SM- Apps Plus or possibly SM-Apps Lite
MD29AN	→ SM- Apps Plus

Resources: can be found on our website: www.controltechniques.com
For help contact techsupport.cta@mail.nidec.com, or
call Technical Support at 952-995-8000, 24/7/365

Quantum III to Quantum MP Conversion Start-Up/Information
Motor Application Data

Drive Model Information
Quantum III Drives will begin with **9500-8**_ _ _
Drive Software Version **V**_____ or parameter #11.15
Do you have your program from your original drive? Yes / No

Quantum MP Drives will begin with QMP_ _ _A4 _
Drive's Software & Power board Version Par# 11.29_____
11.34_____
11.56_____

Motor Nameplate Data
Rated Armature Voltage _____ Vdc
Rated Armature Amps _____ Adc

Rated Speed _____ RPM or _____ / _____RPM
Rated Weakened
Field Voltage _____Vdc
Field Amps _____Adc _____ / _____RPM
Rated Weakened
Field Ohms _____ Ω
Does the motor have 0, 1, or 2 field windings? _____ F1 & F2 or F1, F2, F3, F4
Does the motor have a series field? _____ S1, S2
Is there an External Field Regulator being used? Y/N If Yes FXM5 / FXMP25 / Other

Motor Feedback
Does the motor have a speed feedback device on the end of it? Y / N
If Yes, is it an AC or DC Tach _____ and what is the output of it _____v/1K RPM
If it's an Encoder, what is the Pulses/rev _____ PPR and voltage rating _____Vdc

Application Information
What is the line voltage for the drive? _____?
What kind of machine is this being used on? _____ ie Extruder, Lathe
What is the maximum motor speed required for this application? _____RPM
Is reversing required? Y / N
Is speed controlled using a Speed pot / Presets / or External Voltage?_____
How do you intend to Start/Stop? ___On/Off switch contacts or ____Start Stop Buttons.
Upon a Stop command, do you want the motor to ___Coast or Decel under control?
Will you be needing/using Dynamic Braking ? _____