# Mentor II
The Intelligent Drive

DC drives are widely used in applications that require regeneration, precise speed control, dynamic performance, and constant torque over wide speed ranges. The Mentor II delivers the universal DC drive solution.

Simple stand-alone applications are easily configured to control motor speed, voltage or current using standard internal settings. Set-up is convenient using the drive keypad, or MentorSoft, a Windows based drive configuration tool. The Mentor II has extensive diagnostic and communication abilities that enhance system reliability. The drive's standard yet powerful microprocessor is a versatile system component that can eliminate the need for a PLC with integral functions such as thresholds, timers and logic gates that perform basic control.

The simple addition of the MD29, a 32-bit application coprocessor card, provides high performance drive systems with local intelligence for true distributed control. The MD29 enables users to incorporate custom or proprietary process control application programs to their drive. The Mentor II also provides a wide range of communication protocol options.

Mentor II systems have proven to be extremely reliable and are ideally suited to web handling, winders, slitters, extruders, wire drawing, converting lines, and plastics production. The Mentor II's integrated design and highly programmable features make it an ideal choice for OEMs and System Integrators, as well as replacement or retrofit drives for End Users.

Mentor II

—**Extrusion**
—*Intelligent*
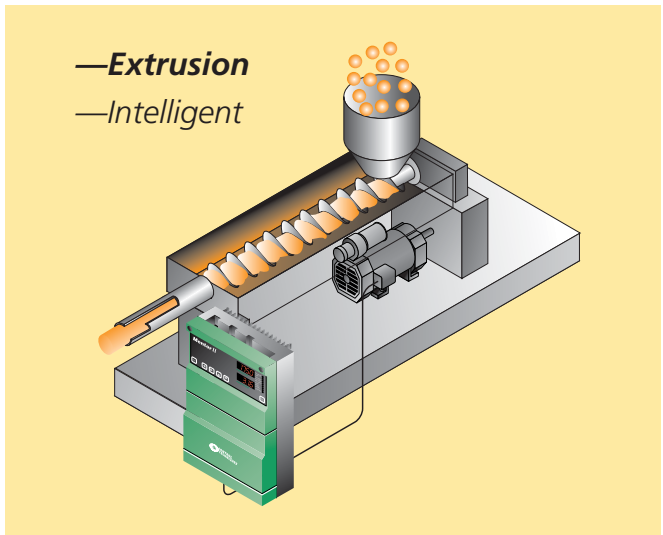
- **Microprocessor Based Digital DC Drive**
- **5 to 1000 hp, 3 phase, 208 to 660 VAC**
- **Regenerative and non-regenerative models**
- **RS485 serial communications**
- **Extensive fieldbus communication capabilities**
- **Plug-in 32-bit application coprocessor card (MD29)**
- **MentorSoft Windows-based drive configuration tool**
- **Complete Motor Solutions**

ISO 9002 APPROVAL

CE

C (N1652)

c UL us LISTED

2 YEAR Digital Drive Warranty

5 YEAR Extended Warranty

FREE Software

Note: UL only available through 400 hp @ 460V and 200 hp @ 230V

FEATURE/PERFORMANCE ADVANTAGE

Accepts wide range of supply voltage (208 to 660 VAC)
Can be applied to worldwide voltages

Non-regen and regen models share the same footprint
Allows for common mechanical design and mounting

MentorSoft Windows based drive configuration tool
Provides easy programming and diagnostics of the drive

32-bit application coprocessor card (MD29)
Enables customized applications for distributed control system architectures

Profibus-DP, Modbus+, Modbus RTU, Interbus-S, DeviceNet, and CTNet plug-in communication cards
Communicates on user's preferred network

Built-in RS485 serial communications
Allows for easy programming and control of drive

Extensive and configurable analog and digital I/O
Customizes drive to specific applications

Programmable boolean logic (AND, NAND, OR, NOR) gates with delay outputs
Assists with general system interface logic needs, expanding application possibilities

Programmable threshold comparators
Expands application possibilities by providing a pair of independent numerical comparators with adjustable hysteresis

Built-in digital lock function for frequency following
Allows accurate master/follower applications

Accepts DC tachometer and encoder feedback
Enables precise speed control

Extensive diagnostics and fault indicators

Special Field supply

Three Phase Input   Field Output
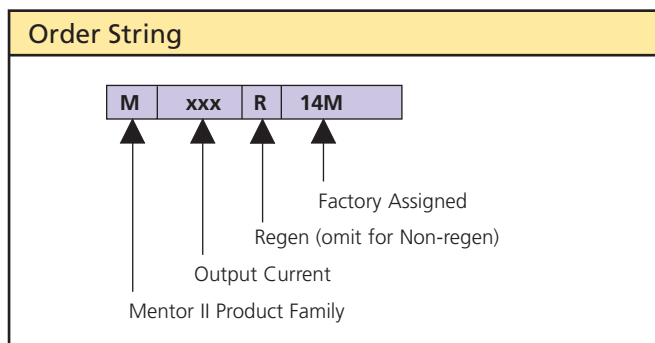(208-230VAC)   (240VDC)

RATINGS: MENTOR II

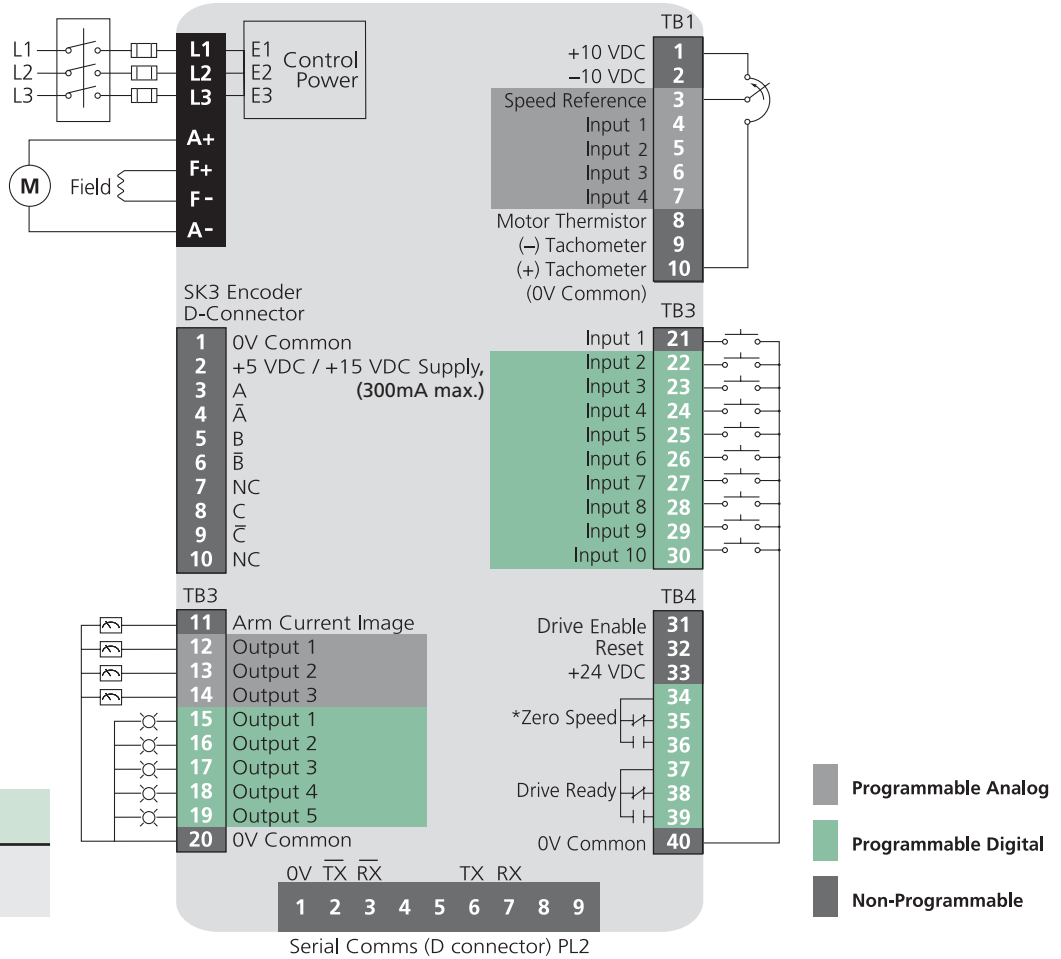| THREE PHASE INPUT	DC Arm Output	Field Output
3 to 500 hp (208-230 VAC)	(240VDC)	(150VDC)
5 to 1000 hp (380-460 VAC)	(500VDC)	(300VDC)

Special Order (525 / 660 VAC), Models M350(R)–M1850(R) only)

208 / 240 VAC

Motor HP	Output Current (A) (@40°C)	Output Current (A) (@55°C)	Field Output Current	Non-Regen Order Code	Regen Order Code
3 - 7	25	20	8A Current Regulated	M25-14M	M25R-14M
7.5 - 10	45	38		M45-14M	M45R-14M
15	75	55		M75-14M	M75R-14M
20 - 35	105	89		M105-14M	M105R-14M
30	155	125		M155-14M	M155R-14M
40 - 50	210	172		M210-14M	M210R-14M
75	350	255	10A Fixed Voltage ①	M350-14M	M350R-14M
100	420	338		M420-14M	M420R-14M
125	550	428		M550-14M	M550R-14M
150	700	508		M700-14M	M700R-14M
200	825	675		M825-14M	M825R-14M
250	900	820	20A Fixed Voltage ①	M900-14M	M900R-14M
300 - 350	1200	1150		M1200-14M	M1200R-14M
400 - 500	1850	1620		M1850-14M	M1850R-14M

380 / 480 VAC

Motor HP	Output Current (A) (@40°C)	Output Current (A) (@55°C)	Field Output Current	Non-Regen Order Code	Regen Order Code
5 - 10	25	20	8A Current Regulated	M25-14M	M25R-14M
15 - 20	45	38		M45-14M	M45R-14M
25 - 30	75	55		M75-14M	M75R-14M
40 - 50	105	89		M105-14M	M105R-14M
60 - 75	155	125		M155-14M	M155R-14M
100	210	172		M210-14M	M210R-14M
150	350	255	10A Fixed Voltage ①	M350-14M	M350R-14M
200	420	338		M420-14M	M420R-14M
250	550	428		M550-14M	M550R-14M
300	700	508		M700-14M	M700R-14M
400	825	675		M825-14M	M825R-14M
500	900	820	20A Fixed Voltage ①	M900-14M	M900R-14M
600 - 700	1200	1150		M1200-14M	M1200R-14M
800 - 1000	1850	1620		M1850-14M	M1850R-14M

① For field control, add external field regulator P/N 9500-9035.

Order String

M	xxx	R	14M

Factory Assigned

Regen (omit for Non-regen)

Output Current

Mentor II Product Family

Mentor II

TERMINAL DIAGRAM: MENTOR II

NOTE

* Zero Speed Relay Programmable.

Programmable Analog

Programmable Digital

Non-Programmable

Serial Comms (D connector) PL2

Terminal Description

Pin#	Function	Type/Description	Notes
1	+10 VDC	Reference Supply	10 mA max
2	-10 VDC		
3	Speed Reference	Analog Input, 12 bit	±10 VDC, 100k Ohms or 4-20 mA, 100 Ohms
4	Analog Input # 1		
5	# 2	Analog Input Bi-polar, 10 bit + sign	±10 VDC, 100k Ohms
6	# 3		
7	# 4		
8	Motor Thermistor	Analog Input	3k Ohms trip point, 1.8k Ohm reset level
9	DC Tachometer (-)	Analog Input	
10	DC Tachometer (+)	Circuit Common	
11	Armature Current Image	Analog Output	6.6 VDC @ 150% current
12	Analog Output # 1		
13	# 2	Analog Output Bi-polar, 10 bit + sign	±10 VDC, 5 mA
14	# 3		
15	Digital Output # 1		
16	# 2		
17	# 3	Digital Output Open Collector	+24 VDC, 100 mA
18	# 4		
19	# 5		

Pin#	Function	Type/Description	Notes
20	0V Common	Circuit Common	
21	F1 (Run Permit)	Digital Input	+24 VDC, 10k Ohms
22	F2 (Inch / Jog Reverse)		
23	F3 (Inch / Jog Forward)		
24	F4 (Run Reverse (latched))		
25	F5 (Run Forward (latched))		
26	Digital Input F6	Digital Input	+24 VDC, 10k Ohms
27	F7		
28	F8		
29	F9		
30	F10		
31	Drive Enable	Digital Input	30 mSec inhibit delay
32	Reset	Digital Input	Fault Reset
33	+24 VDC Supply	User Supply	200 mA max
34	Form C Status Relay (Zero Speed)	Relay Common	110 VAC, 5A resistive
35		N. C. Contact	
36		N. O. Contact	
37	Form C Status Relay (Drive Ready)	Relay Common	110 VAC, 5A resistive
38		N. C. Contact	
39		N. O. Contact	
40	0V Common	Circuit Common	

Programmable Analog   Programmable Digital   All Analog I/O is scalable

SPECIFICATIONS: MENTOR II

Environment

Ambient Operating Temperature	0 to 40°C (32 to 104°F) Derate current 1.5% per °C to 55°C (32 to131°F)
Cooling Method	Convection and forced convection, model dependent
Humidity	95% non-condensing at 40°C (104°F)
Storage Temperature	-40 to 55°C (-40 to 131°F)
Altitude	0 to 4000m (13,120 ft). Derate 1% per 100m (328 ft) between 1000m (3,280 ft) and 4000m (13,120 ft).
Enclosure	Chassis (IP00)

AC Supply Requirements

Voltage	208 to 480 VAC -5%, +10% 525/575/660 VAC ±10% (Optional M350 and above)
Phase	3Ø
Frequency	45 to 62 Hz
Efficiency	98%
Standard Field Output Voltage	Size 1 – 0.9 X input VAC (Regulated), Size 2-3 – .67 X input VAC (Non-Regulated) Non-Standard Field – Consult Factory
Armature Output Voltage	Non-Regen – 1.15 X input VAC, Regen – 1.05 X input VAC

Control

Feedback Methods	Armature Voltage (resolution .83 volts) DC Tachometer (resolution 0.1%) Encoder (resolution .01%)
Field Control	Current regulated 8 Amps max (M210/M210R and smaller) Voltage regulated .675 or .9 X Line-to-line voltage (M350/M350R and larger)
Analog Input Resolution	12 bit (Qty 1), 10 bit (Qty 4)
Serial Communications	4-wire RS422 or RS485, optically-isolated Protocol is ANSI x 3.28-2.5-A4 Baud rate is 4800 or 9600

Protection

AC Line Undervoltage Trip	180 VAC
MOV Voltage Transient Protection	Input transient suppression
Instantaneous Overcurrent Trip	300% armature current
Armature Open Circuit	Armature circuit is open
Drive Overload Trip	Inverse time, 150% for 30 seconds
Phase Loss Trip	Loss of input phase
Overtemperature Trip	Heatsink exceeds 100°C (212°F)
Motor Thermal Trip	Motor over-temp switch or Thermistor
Feedback Loss	Loss of motor feedback
Feedback Reversal	Tachometer or Encoder wired backwards
Field Loss	No field current
Field On	Field current during auto-tune
Field Overcurrent	Field current greater than field demand
Current Loop Loss	Loss of 4-20 mA reference
External Power Supply	Short circuit on +24 VDC user power supply
Power Supply	Internal power supply out of tolerance

Protection *continued*

Serial Communications Loss	Mode 3 serial comms data loss
Processor 1 Watchdog Trip	Main control processor fault
Processor 2 Watchdog Trip	Second control processor fault (MD29)
Hardware Fault	Hardware malfunction on control board
Memory Fault	Stored parameter checksum fault
External Trip	User interlock fault (programmed)
Software Fault (A29)	MD29 software fault

Approvals & Listings

UL, cUL	File #E58592 Vol. 5C Section 1 (Partial - check with factory for details)
CE	Designed for marking

DIMENSIONS

Size	Order Code	Size* (in) H x W x D	Approx. Weight (lbs.)
1	M25-14M thru M75-14M	15 x 10 x 6	22
	M25R-14M thru M75R-14M	15 x 10 x 6	24
	M105-14M thru M210-14M	15 x 10 x 8	31
	M105R-14M thru M210R-14M	15 x 10 x 8	33
2	M350-14M thru M420-14M	16 x 18 x 11	48
	M350R-14M thru M420R-14M	16 x 18 x 11	51
	M550-14M thru M825-14M	17 x 18 x 11	59
	M550R-14M thru M825R-14M	17 x 18 x 11	66
3	M900-14M thru M1850-14M	41 x 18 x 20	154
	M900R-14M thru M1850R-14M	61 x 18 x 20	264

* Approximate, not to be used for construction purposes.

Mentor II