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艾默生CT变频器中国核心一级代理商 电话: 021-34172694

Mentor II
Digital DC Drive
25 A-1850 A



Mentor II: the most versatile DC systems drive in the world



The Mentor II provides a wide power range of fully programmable DC drives with a unified control interface.

Simple stand-alone applications are quickly configured with a minimum of parameters. Add the application module (MD29) to implement high performance drive systems with local intelligence. This intelligence can then be utilised to eliminate the master PLC by constructing

a distributed control system, using the CTNet fieldbus with the System Programming Tool (SYPT). When integration with a master PLC system is required, a range of fieldbus adapters is available.

- Wide range of network communication options
- Integrated communication to PLC and host computer
- User configurable analogue and digital drive inputs
- Reduced commissioning time with simplified drive set-up
- Elongation or shrinkage control through position synchronisation
- Constant 'web' tension by continuous torque adjustment
- Easy to use PC configuration Software: Mentorsoft.

Simple Operation

Easy set up of the drive can be done using the main control panel or via a standard communications interface from a host computer.

All operating parameters are organised into logically structured function menus.

Fast configuration of standard applications can be achieved using 10 parameters or less.

Faster Drive Set-Up

Programming the Mentor II has never been easier. Designed to save commissioning time the drive has comprehensive data displays, easily assimilated function menus and a five-key control panel.

Better Control

A comprehensive self-tuning algorithm gives improved current loop performance for a more uniform response at all speeds. Drive performance is also enhanced with full PID digital speed control.

More Functions

The main circuit board has been developed to incorporate many additional features as standard not as costly options. These include serial communications and a field-weakening controller for constant power applications (M25 - M210 R).

Massive Systems Potential

All analogue inputs and most of the digital control inputs are user-configurable, making Mentor II a true systems drive having more versatility and flexibility than ever before.

Wide Ranging, More Flexible Communications

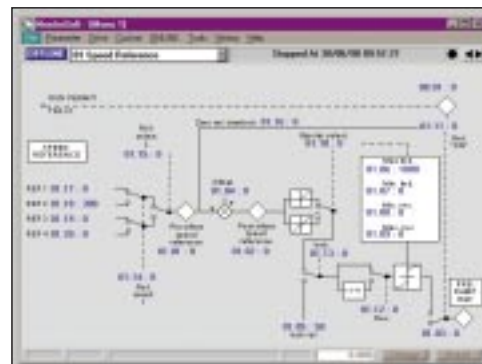
A standard RS485 port enables Mentor II to communicate directly with PLCs and host computers.

Optical Isolation means that a number of drives can be multi-dropped onto a standard RS485 interface for networking with other control devices.

A port is also provided to accept interface cards for CT Net, Profibus-DP, Interbus S and DeviceNet.

Mentorsoft

WINDOWS™ Based commissioning tool



A flexible digital DC drive for multiple plant applications



Standard Features

- Microprocessor based control circuits
- Logical push-button programming
- Advanced auto-diagnostics
- Software expandable
- Regeneration up to $1.15 \times V_{RMS}$
- Serial interface - RS232/485
- Non-volatile memory for parameter storage
- Single and four quadrant models
- Armature voltage, tacho or encoder feedback
- Phase sequence tolerant
- 0.025% resolution for analogue speed demand
- 0.1% speed holding for 100% load change with tacho feedback
- Field loss protection
- Electronic motor-overload protection
- Feedback loss protection
- Phase loss protection
- 150% overload capacity for 30 seconds
- Taper current limit
- Armature current slew rate limiting

Easy Expansion

Application Module (MD29)

- Easy plug in second processor
- Cost saving facility to write application specific programs without the need to use a PLC or stand alone controller
- Programmed using DPL or SYPT an IEC 1131 compliant programming tool incorporating ladder and function block programming.
- Embedded single axis position controller

CT Net Interface (MD29AN)

- High speed network protocol
- De-centralised "peer-to-peer" networking requiring no master PLC controller
- Programmed using SYPT

Profibus-DP Interface (MD24)

- High speed network protocol
- Works on a centralised network system
- Generic configuration file available for Siemens S5 PLC

DeviceNet Interface (MD25)

- High speed network protocol using the CAN hardware layer
- Works on a centralised network system
- EDS files available

Interbus-S Interface (MDIBS)

- Easyfit interface card for Interbus-S network communications
- Works as a centralised master controller
- 500 kbit/sec fixed data rate
- Network loss detection

Expansion I/O Module (I/O box)

- Connects to the MD29 using RS485 comms and provides remote I/O capability
- 5 analog inputs
- 3 analog outputs
- 8 digital inputs
- 8 digital outputs
- Digital I/O expandable to 32 inputs and 32 outputs
- Up to 15 I/O Boxes can be controlled on one serial communications link
- 100 metres (330 feet) maximum serial - communications cable length

Field Controller For DC Motors (FXM5)

- Armature voltage feedback 220 V to 600 V DC
- Field current to 20 A
- 1phase input
- Half or fully controlled thyristor output

Multiple application solutions

Digital Speed And Position Loop

This allows several drives to be run in speed or position synchronisation. Shaft positions can be offset or an adjustable speed ratio introduced to control elongation or shrinkage in applications such as plastics extrusion, wire drawing and textile manufacture.

Centrewinder

Designed for maintaining a constant 'web' tension in coiling and uncoiling applications mainly in the paper, wire, plastics and metals industries.

The drive torque is continuously adjusted to compensate for changing 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 datum, for example 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.

Field Controller

On drives from M25 - M210/R the MDA3 controller is fitted as standard. The field controller provides total control over the motor field current such that a constant kW characteristic can be obtained.



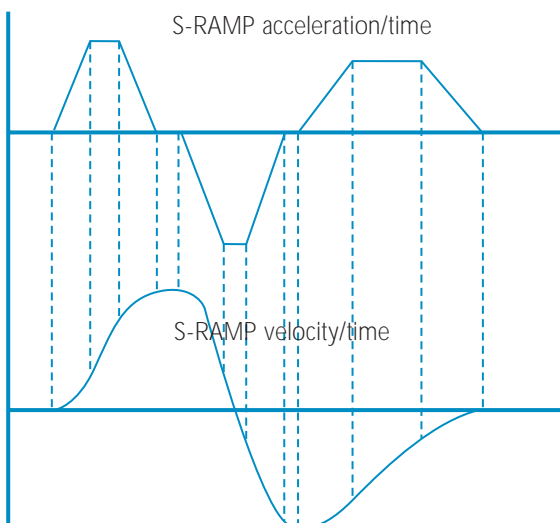
This facility is particularly useful for constant power applications such as machine tools, mixers, coilers and winders.

An integral field failure detector ensures full protection, and full digital control assists commissioning and operation. A fixed field supply is provided on units in the range M350 - M1850. For applications requiring a field controller of up to 20 A the FXM5 is available.

'S' Ramp

This facility provides a curved function at each end of a user defined acceleration/ deceleration ramp. The 'S' ramp in each quadrant is determined by parameters which control the linear part and the curved part of the 'S' respectively.

Due to the greater smoothness and progressive speed transitions, typical applications are lifts, hoists, cranes and conveyors.



Technical data

| DRIVE RATINGS | | | | | |
|--------------------|---------------|-----------------------------------|------|--|-----------|
| Drive type & Model | | Typical (1) Motor Rating @ 400 DC | | Maximum Continuous Current Rating (Amps) | |
| Single Quadrant | Four Quadrant | KW | HP | AC Input | DC Output |
| M25 | M25R | 7.5 | 10 | 21 | 25 |
| M45 | M45R | 15 | 20 | 38 | 45 |
| M75 | M75R | 30 | 40 | 60 | 75 |
| M105 | M105R | 37.5 | 50 | 88 | 105 |
| M155 | M155R | 56 | 75 | 130 | 155 |
| M210 | M210R | 75 | 100 | 175 | 210 |
| M350 | M350R | 125 | 168 | 292 | 350 |
| M420 | M420R | 150 | 200 | 350 | 420 |
| M550 | M550R | 200 | 268 | 460 | 550 |
| M700 | M700R | 250 | 335 | 585 | 700 |
| M825 | M825R | 300 | 402 | 690 | 825 |
| M900 | M900R | 340 | 456 | 750 | 900 |
| M1200 | M1200R | 450 | 603 | 1000 | 1200 |
| M1850 | M1850R | 750 | 1105 | 1540 | 1850 |

- (1) This rating may be increased at higher armature voltage.
- (2) DC fuses must be fast semiconductor type, with a rated voltage of 500V DC for 400V supply and 700V DC for 480V supply.
- (3) The cable sizes are for 3-core (3-wire) and 4-core (4-wire) pvc-insulated armoured (conduited) cable with copper conductors, and laid in accordance with defined conditions.
- (4) Typical wire gauge sizes based on 300C (860F) ambient, 1.25 x rated current, 750C (1670F) copper wire with no more than 3 conductors in a conduit or raceway. Branch circuit protection must be provided by the user. All wiring must conform to NEC Art. 310 and applicable electrical codes.
- (5) Not required for Single Quadrant. May not be required in applications where load inertia is low and regeneration infrequent.
- (6) Refer to NEC Table 310-16 for wire sizes.
- (7) M25 - M210 fitted with MDA3 field controller as standard.
- (8) Fixed voltage. Optional field controller FXM5 available.

| INSTALLATION DATA | | | | | | | | |
|--------------------|---------------|--------------------------|-----------|------------|---|---------|----------------|------------------------------|
| Drive Type & Model | | Recommended Fuse Ratings | | | Typical Cable Size AC Input & DC Output | | Cooling Method | Max Field Current Rating (A) |
| Single Quadrant | Four Quadrant | HRC AC In (A) | AC In (A) | DC Out (A) | mm ² (3) | AWG (4) | | |
| M25 | M25R | 32 | 35 | 40 (5) | 4mm ² | 10 | Convection | 8 (7) |
| M45 | M45R | 50 | 60 | 70 (5) | 6mm ² | 6 | Convection | 8 (7) |
| M75 | M75R | 100 | 100 | 125 (5) | 25mm ² | 2 | Convection | 8 (7) |
| M105 | M105R | 100 | 125 | 175 (5) | 35mm ² | 1/0 | Fan Cooled | 8 (7) |
| M155 | M155R | 160 | 175 | 250 (5) | 50mm ² | 3/0 | Fan Cooled | 8 (7) |
| M210 | M210R | 200 | 250 | 300 (5) | 95mm ² | 300MCM | Fan Cooled | 8 (7) |
| M350 | M350R | 355 | 400 | 550 (5) | 150 mm ² | (6) | Fan Cooled | 10 (8) |
| M420 | M420R | 450 | 500 | 700 (5) | 185mm ² | (6) | Fan Cooled | 10 (8) |
| M550 | M550R | 560 | 700 | 900 (5) | 300mm ² | (6) | Fan Cooled | 10 (8) |
| M700 | M700R | 630 | 900 | 1000 (5) | 2x185mm ² | (6) | Fan Cooled | 10 (8) |
| M825 | M825R | 800 | 1000 | 1200 (5) | 2x240mm | (6) | Fan Cooled | 10 (8) |
| M900 | M900R | 1000 | 1200 | 2x700 (5) | 2x240mm ² | (6) | Fan Cooled | 20 (8) |
| M1200 | M1200R | 1250 | 2x700 | 2x900 (5) | 3x400mm ² | (6) | Fan Cooled | 20 (8) |
| M1850 | M1850R | 2000 | 2x1200 | 2x1000 (5) | 3x400mm ² | (6) | Fan Cooled | 20 (8) |



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