

# **M**DRIVE 34<sup>TM</sup> MOTOR+DRIVER MOTION CONTROL



## **FEATURES**

- Integrated Microstepping Drive/Motion Controller with Optional Encoder/NEMA 34 High Torque Motor
- +24 to +75 VDC Input Voltage
- Low Cost
- Extremely Compact
- Available Configurations:
  - Integral Encoder for Closed Loop Control
  - Single Shaft
  - Knob for Manual Positioning
- Three Motor Lengths Available
- Single Supply
- Microstep Resolution up to 51,200 Steps Per Rev
- Open or Optional Closed Loop Control
- Programmable Motor Run and Hold Currents
- Four 5 to 24 VDC I/O Lines
- One 10 Bit Analog Input
- 0 to 5 MHz Step Clock Rate Selectable in .59Hz Increments
- RS-485 Communications with Selectable Baud Rate to 115K
- 62 Software Addresses for Multi-Drop Communications
- Simple 1 to 2 Character Instructions
- 12" (30.5 cm) Flying Lead Interface

## **DESCRIPTION**

The MDrive34 Motion Control offers the system designer a low cost, intelligent motion controller integrated with a NEMA 34 high torque stepping motor and a +24 to +75 volt microstepping drive.

The MDrive34 Motion Control adds a versatile array of functions by combining a complete programmable motion controller with our already compact and cost effective standard MDrive34, adding little cost and no increase in size. Standard offerings include four 5 to 24 volt general purpose I/O lines, one 10 bit analog input, 0 to 5 MHz step clock rate, microstep resolution up to 51,200 steps per revolution, and a full featured easy-to-program instruction set.

The MDrive34 Motion Control communicates over RS-485 which allows for point-to-point or multiple unit configurations utilizing one communication port. Addressing and hardware support up to 62 uniquely addressed units communicating over a single line. Baud rate is selectable from 4,800 to 115K.

The MDrive34 Motion Control is available with optional closed loop control. The closed loop configuration adds a 512 line (2048 edge) encoder with index mark, internal to the MDrive34 without increasing the length of the unit. Functionality increases to add stall detection, position maintenance, and find index mark.

Available motor configurations include: single shaft and a knob for manual positioning. The MDrive34 Motion Control is available in three motor lengths: 24, 31 & 47. Interface connections are accomplished using 12" (30.5 cm) flying leads.

The MDrive34 Motion Control is a compact, powerful and inexpensive solution that will reduce system cost, design and assembly time for a large range of stepping motor applications.

# MDRIVE34 MOTION CONTROL SPECIFICATIONS

## GENERAL SPECIFICATIONS

**Input Voltage (+V)\***  
 Range ..... +24 to +75 VDC

**Analog Input**  
 Resolution ..... 10 Bit  
 Voltage Range ..... 0 to +5 VDC

**General Purpose I/O**  
 Number/Type ..... 4/Open Collector  
 Voltage Range ..... 0 to +24 VDC  
 Output Sink Current ..... 700 mA  
 Protection ..... Over Temp, Short Circuit, Inductive Clamp

**Communication**  
 Type ..... RS-485  
 Baud Rate ..... 4800 to 115K

**Motion**  
 Resolution – Open Loop Configuration  
 # of Settings ..... 14  
 Steps Per Rev .. 400, 800, 1000, 1600, 2000, 3200, 5000, 6400, 10000, 12800, 25000, 25600, 50000, 51200  
 Resolution – Closed Loop Configuration†  
 Steps Per Rev ..... 51200  
 Encoder†  
 Type ..... Internal, Magnetic  
 Resolution ..... 512 Lines/2048 Edges Per Rev  
 Counters  
 Type ..... Position, Encoder/32 Bits  
 Edge Rate (Max) ..... 5 MHz  
 Velocity  
 Range ..... +/- 5,000,000 Steps Per Second  
 Resolution ..... 0.5961 Steps Per Second  
 Accel/Decel  
 Range .....  $1.5 \times 10^9$  Steps Per Second<sup>2</sup>  
 Resolution ..... 90.9 Steps Per Second<sup>2</sup>

**Software**  
 Program and Data Storage ..... Non-Volatile  
 User Registers ..... 4, 32 Bit  
 User Program Labels and Variables ..... 22  
 Math Functions ..... +, -, x, ÷, <, >, =, <=, >=, AND, OR, XOR, NOT  
 Branch Functions ..... Branch & Call (conditional)  
 Predefined I/O Functions  
 Inputs ..... Home, Limit Plus, Limit Minus, Go, Stop, Pause, Job Plus, Jog Minus, Analog In  
 Outputs ..... Moving, Fault  
 Trip Functions ..... Trip on Input & Trip on Position  
 Party Mode Names ..... 62  
 Encoder Functions ..... Stall Detection, Position Maintenance, Find Index

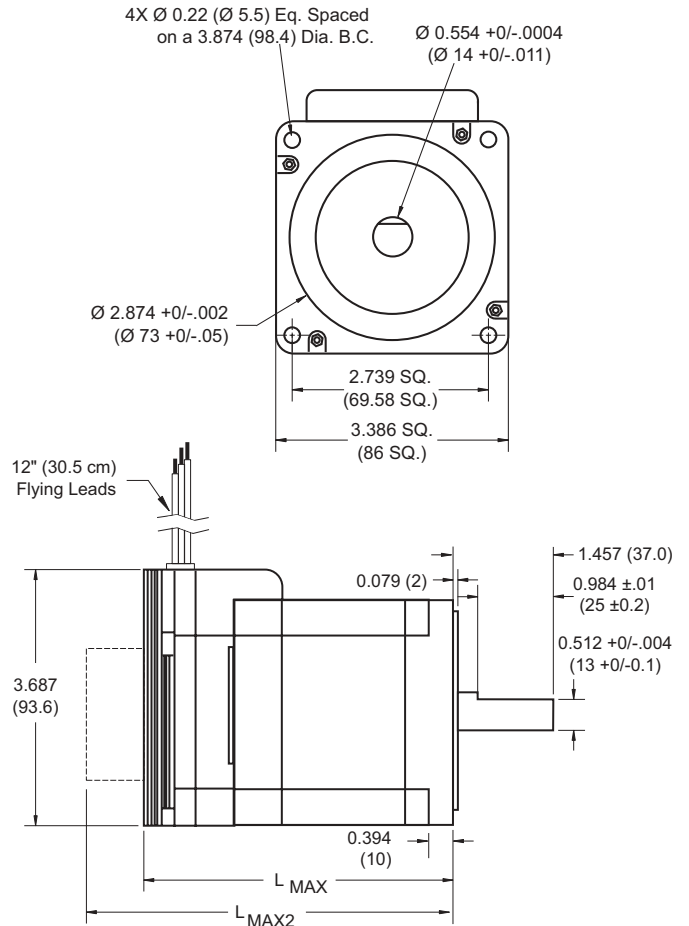
**Protection** ..... Over Voltage

† Optional  
 \* Max supply current per MDrive34: 4 Amps  
 (Actual power supply current will depend on load and duty cycle.)

## MECHANICAL SPECIFICATIONS

Dimensions in Inches (mm)

### Rotary MDrive34: Single Shaft/Internal Encoder & Control Knob



Lengths in Inches (mm)

Size	L <sub>MAX</sub> TABLE		L <sub>MAX2</sub> TABLE	
	ROTARY VERSION	CONTROL KNOB	ROTARY VERSION	CONTROL KNOB
3424	3.973 (100.91)	5.083 (129.10)	3.973 (100.91)	5.083 (129.10)
3431	4.551 (115.60)	5.661 (143.79)	4.551 (115.60)	5.661 (143.79)
3447	6.073 (154.25)	7.183 (182.44)	6.073 (154.25)	7.183 (182.44)

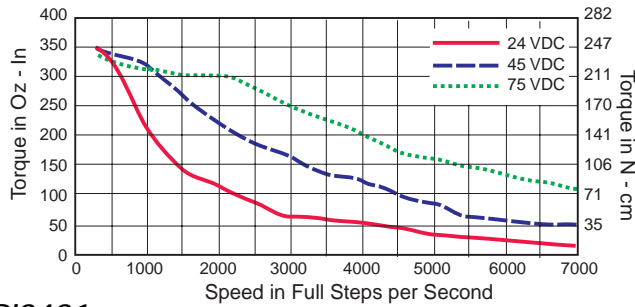
## WIRE/PIN ASSIGNMENTS

FLYING LEADS / FUNCTION		CONNECTOR P2 (RS-485)	
White/Yellow	I/O 1	Pin #	Function
White/Orange	I/O 2	1-5	NC
White/Violet	I/O 3	6	RX+
White/Blue	I/O 4	7	RX-
Green	ANALOG INPUT	8	TX-
Black	POWER GROUND	9	TX+
Red	+V (+24 TO +75 VDC)	10	GROUND

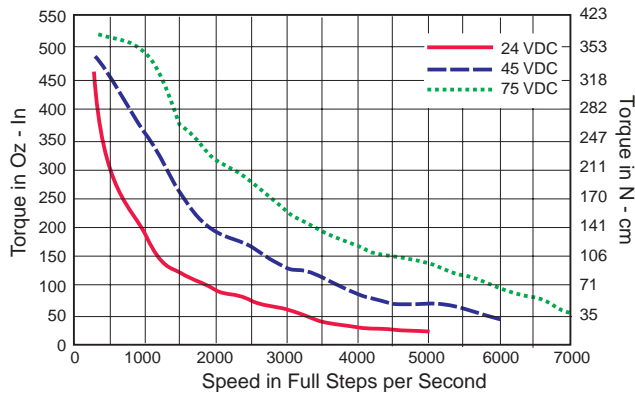
## TORQUE-SPEED CURVES

### Rotary Motor

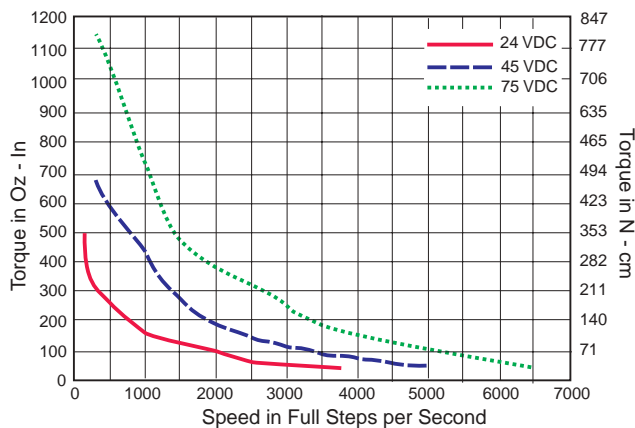
#### MDI3424



#### MDI3431



#### MDI3447



## MOTOR SPECIFICATIONS

### MDI3424

Holding Torque oz-in (N-cm) ..... 381 (269)  
 Detent Torque oz-in (N-cm) ..... 10.9 (7.7)  
 Rotor Inertia oz-in-sec<sup>2</sup> (kg-cm<sup>2</sup>) ..... 0.01416 (1.0)  
 Weight (Motor+Driver) oz (gm) ..... 51.1 (1450)

### MDI3431

Holding Torque oz-in (N-cm) ..... 575 (406)  
 Detent Torque oz-in (N-cm) ..... 14.16 (10.0)  
 Rotor Inertia oz-in-sec<sup>2</sup> (kg-cm<sup>2</sup>) ..... 0.02266 (1.6)  
 Weight (Motor+Driver) oz (gm) ..... 72.3 (2050)

### MDI3447

Holding Torque oz-in (N-cm) ..... 1061 (749)  
 Detent Torque oz-in (N-cm) ..... 19.83 (14.0)  
 Rotor Inertia oz-in-sec<sup>2</sup> (kg-cm<sup>2</sup>) ..... 0.04815 (3.4)  
 Weight (Motor+Driver) oz (gm) ..... 128.7 (3650)

## OPTIONS

### CONVERTER COMMUNICATIONS CABLE

This communications accessory is an in-line RS-232 to RS-485 converter with integrated cable. This product is used to communicate to a single MDrive Motion Control Device. The added convenience of the integrated RS-232 to RS-485 converter allows the device to be connected to a PC's standard 9 pin serial port. Order Part Number **MD-CC200-000**

### CONTROL KNOB VERSION

The MDrive34 Motion Control is available with a factory-mounted knob for manual shaft positioning.

### ENCODER OPTION

The MDrive34 Motion Control is available with an internal 512 line magnetic encoder with index mark.

## ORDERING INFORMATION

MDrive34 Motion Control	
Stack Size 381 oz-in = 24 575 oz-in = 31 1061 oz-in = 47	
<b>MDIF 34</b>	<input type="checkbox"/> <b>OPTION</b>
<b>Example #1:</b> Part Number <b>MDIF3431</b> is an MDrive34 Motion Control with a 31 stack size motor.	

OPTIONS	
<i>Add ONE of the options below to the MDrive Motion Control part number</i>	
<i>Stock items shown in bold italics. Lead times may apply to other versions.</i>	
Control Knob <b>N</b>	<b>Example #2: MDIF3431N</b> Adds a Control Knob to the part shown in example #1.
Factory Mounted Encoder <b>E</b>	<b>Example #3: MDIF3431E</b> Adds an internal, 512 line magnetic encoder to the part shown in example #1.