

# MDRIVE17™ MOTOR+DRIVER

## MOTION CONTROL



### FEATURES

- Integrated Microstepping Drive/Motion Controller with Optional Encoder/NEMA 17 High Torque Motor
- +12 to +48 VDC Input Voltage
- Low Cost
- Extremely Compact
- Available Configurations:
  - Internal Encoder for Closed Loop Control
  - Single Shaft
  - Linear Actuator\*
- 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 MDrive17 Motion Control offers the system designer a low cost, intelligent motion controller integrated with a NEMA 17 high torque stepping motor and a +12 to +48 volt microstepping drive.

The MDrive17 Motion Control adds a versatile array of functions by combining a complete, programmable motion controller with our already compact and cost effective standard MDrive17, 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 MDrive17 Motion Control communicates over RS485 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 MDrive17 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 MDrive 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 external linear actuator with long life ACME screw\*. Rotary versions are available in three motor lengths: 13, 15 & 19. Interface connections are accomplished using 12" (30.5 cm) flying leads.

The MDrive17 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.

\*External Linear Actuator Only. Consult Factory for Availability.

# MDRIVE17 MOTION CONTROL SPECIFICATIONS

## GENERAL SPECIFICATIONS

**Input Voltage (+V)\***  
 Range ..... +12 to +48 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

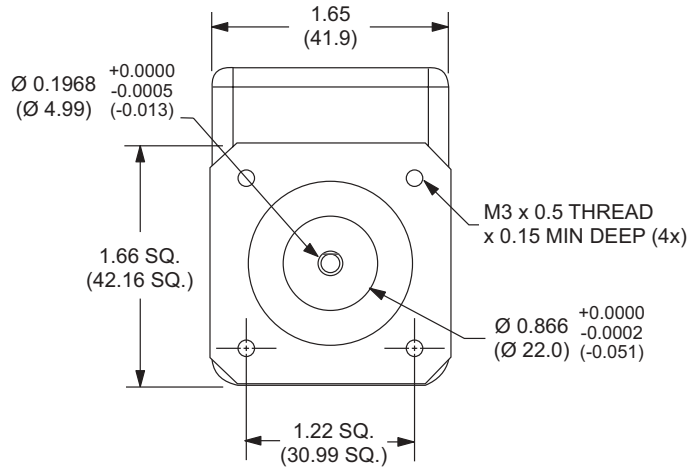
**Communication**  
 Type ..... RS-485  
 Baud Rate ..... 4800 to 115K

**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>

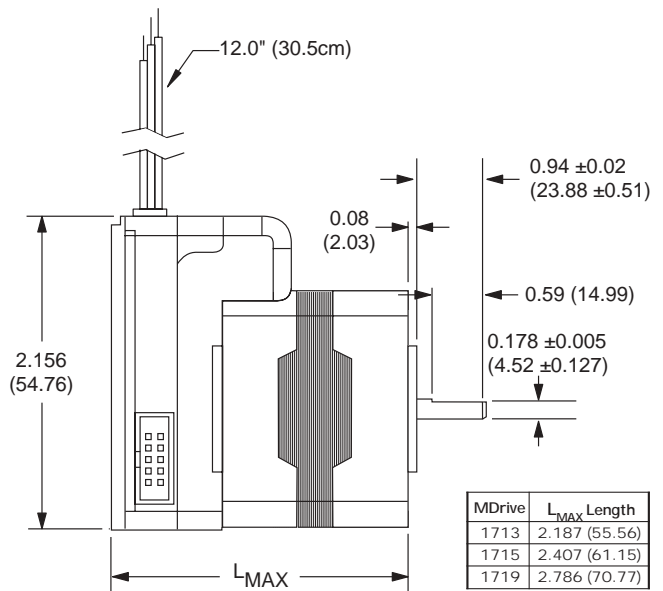
**Software**  
 Program and Data Storage ..... Non-Volatile  
 User Registers ..... 4, 32 Bit  
 User Program Labels and Variables ..... 22  
 Math Functions ..... +, -, ×, ÷, <, >, =, <=, >=, AND, OR, XOR, NOT  
 Branch Functions ..... Branch & Call (conditional)  
 Predefined I/O Functions  
 Inputs ..... 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

## MECHANICAL SPECIFICATIONS

Dimensions in Inches (mm)



## Rotary MDrive17 - Single Shaft



## WIRE/PIN ASSIGNMENTS

FLYING LEADS / FUNCTION	
White/Yellow	I/O 1
White/Orange	I/O 2
White/Violet	I/O 3
White/Blue	I/O 4
Green	ANALOG INPUT
Black	POWER GROUND
Red	+V (+12 TO +48 VDC)

CONNECTOR P2 (RS-485)	
Pin #	Function
1-5	NC
6	RX+
7	RX-
8	TX-
9	TX+
10	GROUND

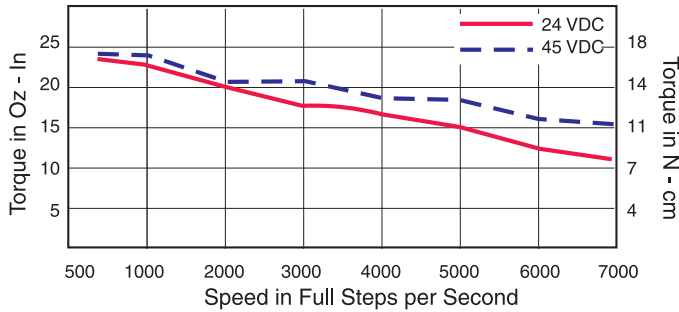
† Optional

\* Max power supply current per MDrive17: 2 Amps (Actual power supply current will depend on load and duty cycle.)

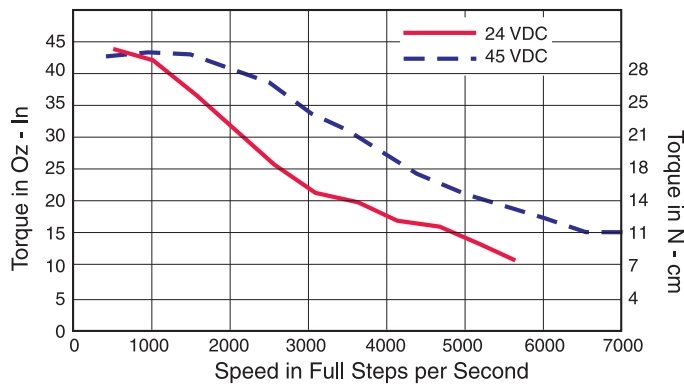
## TORQUE-SPEED CURVES

### Rotary Motor

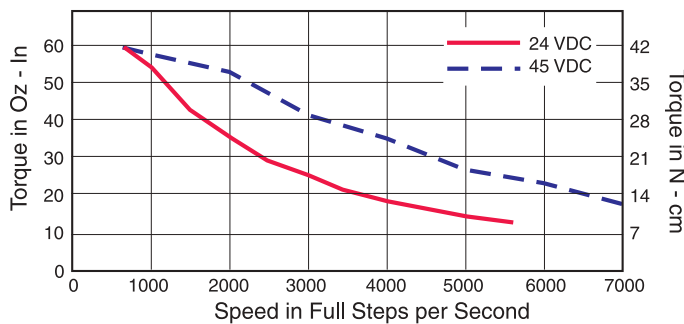
#### MDI1713



#### MDI1715



#### MDI1719



## MOTOR SPECIFICATIONS

### MDI1713

Holding Torque oz-in (N-cm) ..... 32 (22.6)  
 Detent Torque oz-in (N-cm) ..... 1.66 (1.17)  
 Rotor Inertia oz-in-sec<sup>2</sup> (kg-cm<sup>2</sup>) ..... 0.00053 (0.038)  
 Weight (Motor+Driver) oz (gm) ..... 8.26 (234.2)

### MDI1715

Holding Torque oz-in (N-cm) ..... 60 (42.4)  
 Detent Torque oz-in (N-cm) ..... 2.08 (1.47)  
 Rotor Inertia oz-in-sec<sup>2</sup> (kg-cm<sup>2</sup>) ..... 0.0008 (0.057)  
 Weight (Motor+Driver) oz (gm) ..... 10.42 (295.4)

### MDI1719

Holding Torque oz-in (N-cm) ..... 74.9 (52.9)  
 Detent Torque oz-in (N-cm) ..... 3.47 (2.45)  
 Rotor Inertia oz-in-sec<sup>2</sup> (kg-cm<sup>2</sup>) ..... 0.00116 (0.082)  
 Weight (Motor+Driver) oz (gm) ..... 11.80 (334.5)

## 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**.

### ENCODER OPTION

The MDrive17 Motion Control is available with an internal 512 line magnetic encoder with index mark.

### EXTERNAL LINEAR ACTUATOR VERSION

MDrive1713 Motion Control External Linear Actuator with long life ACME Screw is available as a custom product. *Please consult factory for availability.*

## ORDERING INFORMATION

MDrive17 Motion Control	
Stack Size 32 oz-in = 13 60 oz-in = 15 75 oz-in = 19	
MDIF 17 <input type="checkbox"/> OPTION	
<b>Example #1:</b> Part Number <b>MDIF1715</b> is an MDrive17 Motion Control with a 15 stack size motor.	

OPTIONS	
Factory Mounted Encoder <b>E</b>	<b>Example #3: MDIF1715E</b> Adds an internal 512 line magnetic encoder to the part shown in example #1.
External Linear Actuator <b>L</b>	Consult Factory for Availability