



## MDRIVE 17™ MOTOR+DRIVER *Plus* MOTION CONTROL

### STANDARD FEATURES

- Highly Integrated Microstepping Driver, Motion Controller and NEMA 17 High Torque Brushless Motor
- *Advanced 2nd Generation Current Control for Exceptional Performance and Smoothness*
- Single Supply: +12 to +48 VDC
- Low Cost
- Extremely Compact
- Available Options:
  - Long Life Linear Actuator\*
  - Internal Magnetic Encoder for Closed Loop Control
  - Integrated Planetary Gearbox
  - Control Knob for Manual Positioning
  - Linear Slide\*
- Three Rotary Motor Lengths Available
- Auxiliary Logic Power Supply Input
- 20 Microstep Resolutions up to 51,200 Steps Per Rev Including: Degrees, Metric, Arc Minutes
- Open or Optional Closed Loop Control
- Programmable Motor Run and Hold Currents
- Four +5 to +24 VDC I/O Lines Accept Sourcing or Sinking Outputs
- One 10 Bit Analog Input Selectable: 0 to +10VDC, 0 to +5VDC, 0-20mA, 4-20mA
- 0 to 5MHz Step Clock Rate Selectable in 0.59Hz Increments
- RS-422/485 or Optional CANopen\*\* Communications
- 62 Software Addresses for Multi-Drop Communications
- Simple 1 to 2 Character Instructions
- Interface Options:
  - Pluggable Terminal Strip
  - 12.0" (30.5cm) Flying Leads

### EXPANDED PLUS<sup>2</sup> FEATURES

- +24 VDC Tolerant I/O Lines Sourcing or Sinking, Inputs and Outputs:
  - 8 I/O Lines with Electronic Gearing (or)
  - 4 I/O Lines with External/Remote Encoder for Closed Loop Control
- High Speed Position Capture Input or Trip Output
- Pluggable Locking Wire Crimp Interface
- IP65 Sealed Configuration with M12/M23 Circular Connectors\*

\*Consult Factory for Availability.

\*\*CANopen does not Support all Features.

NOTE: Red italic text denotes new product enhancements.

### DESCRIPTION

The MDrive17Plus Motion Control offers system designers a low cost, intelligent motion controller integrated with a NEMA 17 high torque brushless motor and a +12 to +48 volt microstepping driver.

*The unsurpassed smoothness and performance delivered by the MDrive17Plus Motion Control are achieved through IMS's advanced 2nd generation current control. By applying innovative techniques to control current flow through the motor, resonance is significantly dampened over the entire speed range and audible noise is reduced.*

*The MDrive17Plus accepts a broad input voltage range from +12 to +48 VDC, delivering enhanced performance and speed. Oversized input capacitors are used to minimize power line surges, reducing problems that can occur with long runs and multiple drive systems. An extended operating range of -40° to +85°C provides long life, trouble free service in demanding environments.*

Standard features available in the MDrive17Plus Motion Control include four +5 to +24 volt general purpose I/O lines, one 10 bit analog input, 0 to 5MHz step clock rate, 20 microstep resolutions up to 51,200 steps per revolution, and full featured easy-to-program instruction set.

*Expanded features in the MDrive17Plus<sup>2</sup> version include up to eight +5 to +24 volt general purpose I/O lines and the capability of electronic gearing by following a rotary or linear axis at an electronically controlled ratio, or an output clock can be generated fixed to the internal step clock.*

*For use in environments where exposure to chemical, dust and liquids may occur, a sealed assembly MDrive17Plus<sup>2</sup>-65 version is designed to meet IP65 specifications.\**

All MDrive17Plus Motion Control are available with optional closed loop control. This increases functionality by adding stall detection, position maintenance and find index mark.

The closed loop configuration is added via a 512 line (2048 edge) magnetic encoder with index mark, internal to the unit so there is no increase in length. Or, for an expanded choice of line counts and resolutions with MDrive17Plus<sup>2</sup> versions only, closed loop control is available with an interface to a remotely mounted user-supplied external encoder.

The MDrive communicates over RS-422/485 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 4.8 to 115.2kpbs.

*Optional communication protocols include CANopen. The CAN bus is 2.0B active (11 and/or 29 bit) and is capable of all standard frequencies from 10kHz to 1MHz. CANopen features include node guarding, heartbeat producer, SDOs and PDOs. Highlights include variable PDO mapping and extended node identifier.*

Available motor configurations include a single shaft rotary motor and a linear actuator with long life Acme screw\*. Rotary versions are available in three motor lengths. Interface connections are accomplished using 12.0" (30.5cm) flying leads or a 7 position terminal strip. Plus<sup>2</sup> versions come with pluggable locking wire crimp connectors. Plus<sup>2</sup>-65 sealed versions come with M12/M23 circular connectors.

The MDrive17Plus is a compact, powerful and inexpensive solution that will reduce system cost, design and assembly time for a large range of brushless motor applications.

# MDrive17Plus MOTION CONTROL

## STANDARD SPECIFICATIONS (Plus Versions)

<b>INPUT VOLTAGE (+V)</b>	Range	+12 to +48 VDC <i>Power supply current requirements = 2A (maximum) per MDrive17Plus. Actual power supply current will depend on voltage and load.</i>		
	<b>AUX. LOGIC INPUT VOLTAGE</b>	Range	+12 to +24 VDC <i>Maintains power to control and feedback circuits (only) when input voltage is removed.</i>	
<b>ANALOG INPUT</b>	Resolution	10 Bit		
	Voltage Range	0 to +5 VDC, 0 to +10 VDC, 0-20 mA, 4-20 mA		
<b>GENERAL PURPOSE I/O</b>	Number/Type	4 Sinking Outputs/4 Sourcing or Sinking Inputs		
	Logic Range	Inputs and Outputs Tolerant to +24VDC, Inputs TTL Level Compatible		
	Output Sink Current	Up to 600 mA per Channel		
	Protection	Over Temp, Short Circuit, Transient Over Voltage, Over Voltage, Inductive Clamp		
<b>COMMUNICATION</b>	Type (Standard)	RS-422/485		
	Baud Rate	4.8 to 115.2kbps		
	Type (Optional)	CANopen DSP-402 (V2.0), DS-301 (V3.0), 2.OB Active		
	ID	11 and/or 29 Bit		
	Isolation	Galvanic		
<b>MOTION</b>	Open Loop Configuration	Number of Settings	20	
		Steps Per Revolution	200, 400, 800, 1000, 1600, 2000, 3200, 5000, 6400, 10000, 12800, 20000, 25000, 25600, 40000, 50000, 51200, 36000 (0.01 deg/μstep), 21600 (1 arc minute/μstep), 25400 (0.001mm/μstep)	
	Closed Loop Configuration (Optional)	Internal Encoder	Type	Internal, Magnetic
			Steps Per Revolution	51200
	Counters	Type	Position, Encoder/32 Bit	
		Edge Rate (Max)	5 MHz	
	Velocity	Range	+/- 5,000,000 Steps Per Second	
		Resolution	0.5961 Steps Per Second	
	Accel/Decel	Range	1.5 x 10 <sup>9</sup> Steps Per Second <sup>2</sup>	
		Resolution	90.9 Steps Per Second <sup>2</sup>	
	<b>SOFTWARE</b>	Program Storage	Type/Size	Flash/6384 Bytes
User Registers		(4) 32 Bit		
User Program Labels and Variables		192		
Math Functions		+, -, x, ÷, >, <, =, <=, >=, AND, OR, XOR, NOT		
Branch Functions		Branch & Call		
General Purpose I/O Functions		Inputs	Home, Limit Plus, Limit Minus, Go, Stop, Pause, Jog Plus, Jog Minus, Analog In, General Purpose	
		Outputs	Moving, Fault, Stall, Velocity Change, General Purpose	
Trip Functions		Trip on Input, Trip on Position, Trip on Time, Trip Capture		
Party Mode Addresses		62		
Encoder Functions	Stall Detection, Position Maintenance, Find Index			
<b>THERMAL</b>	Operating Temperature	-40° to +85°C		

## EXPANDED SPECIFICATIONS (Plus<sup>2</sup> & Plus<sup>2</sup>-65 Versions)

<b>GENERAL PURPOSE I/O</b>	Number/Type	8 Sourcing or Sinking Outputs/Inputs (or 4 when Remote Encoder Option is Selected)			
	Logic Range	Sourcing Outputs +12 to +24 VDC, Inputs and Sinking Outputs Tolerant to +24 VDC, Inputs TTL Level Compatible			
	Output Sink/Source Current	Up to 600 mA per Channel			
<b>MOTION</b>	Electronic Gearing	Range <sup>‡</sup> /Resolution/Threshold (External Clock In)	0.001 to 2.000/32 Bit/TTL		
		Input Filter Range	50 nS to 12.9 μS (10 MHz to 38.8 kHz)		
		Range <sup>‡</sup> (Secondary Clock Out)	1 to 1		
	High Speed I/O	Position Capture	Input Filter Range	50 nS to 12.9 μS (10 MHz to 38.8 kHz)	
			Resolution	32 Bit	
		Trip Output – Speed/Resolution/Threshold	150 nS/32 Bit/TTL		
	Closed Loop Configuration (Optional)	Remote Encoder	Type	User-Supplied Differential Encoder	
Steps Per Revolution			See "Standard Specs Open Loop Steps/Rev" Above		
		Resolution	User-Defined <i>Note: μstep/rev 2X the encoder count/rev minimum</i>		

<sup>‡</sup> Adjusting the microstep resolution can increase the range.

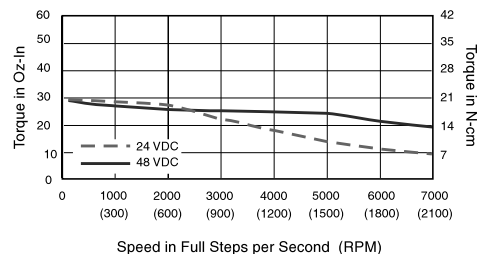
## MOTOR SPECIFICATIONS

	Holding Torque	Detent Torque	Rotor Inertia	Weight (Motor+Driver)
<b>SINGLE LENGTH</b>	32 oz-in / 22.6 N-cm	1.66 oz-in / 1.17 N-cm	0.00053 oz-in-sec <sup>2</sup> / 0.038 kg-cm <sup>2</sup>	10.4 oz / 294.8 g
<b>DOUBLE LENGTH</b>	60.0 oz-in / 42.4 N-cm	2.08 oz-in / 1.47 N-cm	0.00080 oz-in-sec <sup>2</sup> / 0.057 kg-cm <sup>2</sup>	12.0 oz / 340.2 g
<b>TRIPLE LENGTH</b>	74.9 oz-in / 52.9 N-cm	3.47 oz-in / 2.45 N-cm	0.00116 oz-in-sec <sup>2</sup> / 0.082 kg-cm <sup>2</sup>	15.2 oz / 430.9 g
	Maximum Thrust	Backlash	Maximum Screw Deflection	Weight (without screw)
<b>LINEAR ACTUATOR</b>	50 lbs / 222 N	0.005 in / 0.127 mm	± 1°	11.0 oz / 311.8 g

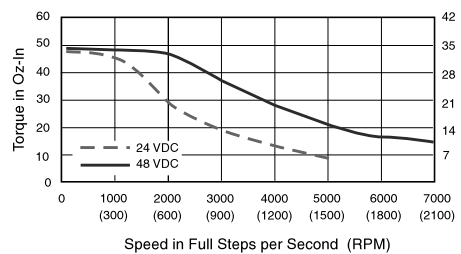
# MOTOR PERFORMANCE

## Speed-Torque

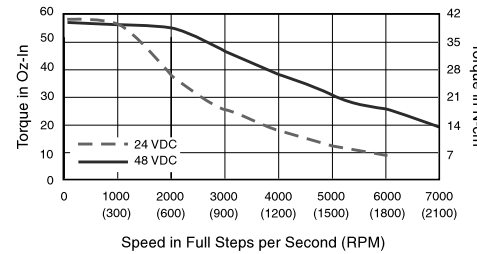
### Single Length Rotary Motor



### Double Length Rotary Motor

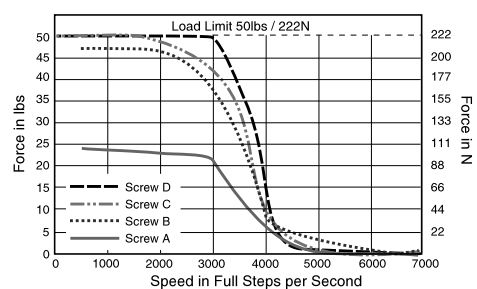


### Triple Length Rotary Motor

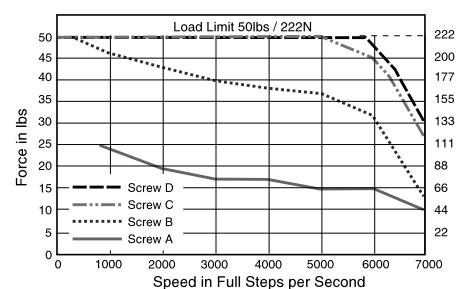


## Speed-Force

### Linear Actuator – 24 VDC



### Linear Actuator – 45 VDC



## PIN/WIRE ASSIGNMENTS – MDrive17Plus Motion Control

### Plus

P1: I/O & POWER CONNECTOR		
Pluggable Terminal Strip	Flying Leads Wire Colors	Function
Pin 1	White/Yellow	I/O 1
Pin 2	White/Orange	I/O 2
Pin 3	White/Violet	I/O 3
Pin 4	White/Blue	I/O 4
Pin 5	Green	Analog Input
Pin 6	Black	Power/Aux-Ground
Pin 7	Red	+V (+12 to +48 VDC)

P2: COMM CONNECTOR				
RS-422/485			CANopen	
10-Pin IDC	Wire Crimp	Function	DB9	Function
Pin 1	Pin 9	TX +	Pin 1	No Connect
Pin 2	Pin 10	TX -	Pin 2	CAN Low
Pin 3	Pin 7	RX +	Pin 3	CAN -V
Pin 4	Pin 8	RX -	Pin 4	No Connect
Pin 5	Pin 5	Aux-Logic (+12 to +24 VDC)	Pin 5	Shield
Pin 6	Pin 6	RX +	Pin 6	CAN -V
Pin 7	Pin 3	RX -	Pin 7	CAN High
Pin 8	Pin 4	TX -	Pin 8	No Connect
Pin 9	Pin 1	TX +	Pin 9	CAN +V
Pin 10	Pin 2	Comm Ground		

### Plus2

P1: I/O & POWER CONNECTOR		
Wire Crimp	Function	
	Expanded I/O	Remote Encoder Closed Loop Control
Pin 1	I/O Power	I/O Power
Pin 2	I/O Ground	I/O Ground
Pin 3	I/O 1	I/O 1
Pin 4	I/O 2	I/O 2
Pin 5	I/O 3	I/O 3
Pin 6	I/O 4	I/O 4
Pin 7	I/O 9	Channel A +
Pin 8	I/O 10	Channel A -
Pin 9	I/O 11	Channel B +
Pin 10	I/O 12	Channel B -
Pin 11	Capture/Trip I/O	Capture/Trip I/O
Pin 12	Analog In	Analog In
Pin 13	Step/Clock I/O	Index +
Pin 14	Direction/Clock I/O	Index -
Pin 15	+V (+12 to +48 VDC)	+V (+12 to +48 VDC)
Pin 16	Power/Aux-Ground	Power/Aux-Ground

P2: COMM CONNECTOR				
RS-422/485			CANopen	
10-Pin IDC	Wire Crimp	Function	DB9	Function
Pin 1	Pin 9	TX +	Pin 1	No Connect
Pin 2	Pin 10	TX -	Pin 2	CAN Low
Pin 3	Pin 7	RX +	Pin 3	CAN -V
Pin 4	Pin 8	RX -	Pin 4	No Connect
Pin 5	Pin 5	Aux-Logic (+12 to +24 VDC)	Pin 5	Shield
Pin 6	Pin 6	RX +	Pin 6	CAN -V
Pin 7	Pin 3	RX -	Pin 7	CAN High
Pin 8	Pin 4	TX -	Pin 8	No Connect
Pin 9	Pin 1	TX +	Pin 9	CAN +V
Pin 10	Pin 2	Comm Ground		

### Plus2-65 (sealed)\*

P1: I/O & POWER CONNECTOR		
M23 Circular (Male)	Function	
	Expanded I/O	Remote Encoder Closed Loop Control
Pin 1	I/O 9	Channel A +
Pin 2	I/O 11	Channel B +
Pin 3	Step/Clock I/O	Index +
Pin 4	I/O 1	I/O 1
Pin 5	Direction/Clock I/O	Index -
Pin 6	+V (+12 to +48 VDC)	+V (+12 to +48 VDC)
Pin 7	Aux-Logic (+12 to +24 VDC)	Aux-Logic (+12 to +24 VDC)
Pin 8	Comm Ground	Comm Ground
Pin 9	I/O 3	I/O 3
Pin 10	I/O Ground	I/O Ground
Pin 11	I/O Power	I/O Power
Pin 12	Earth Ground	Earth Ground
Pin 13	I/O 12	Channel B -
Pin 14	Capture/Trip I/O	Capture/Trip I/O
Pin 15	Analog In	Analog In
Pin 16	I/O 2	I/O 2
Pin 17	I/O 4	I/O 4
Pin 18	I/O 10	Channel A -
Pin 19	Power/Aux-Ground	Power/Aux-Ground

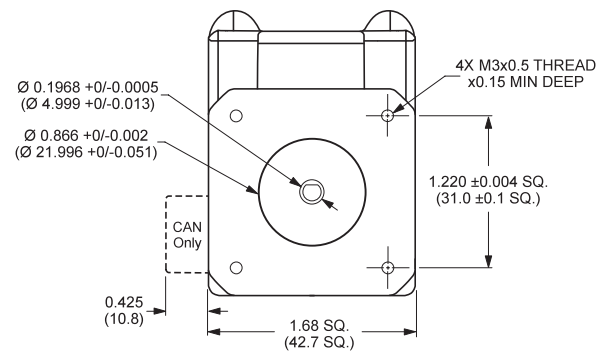
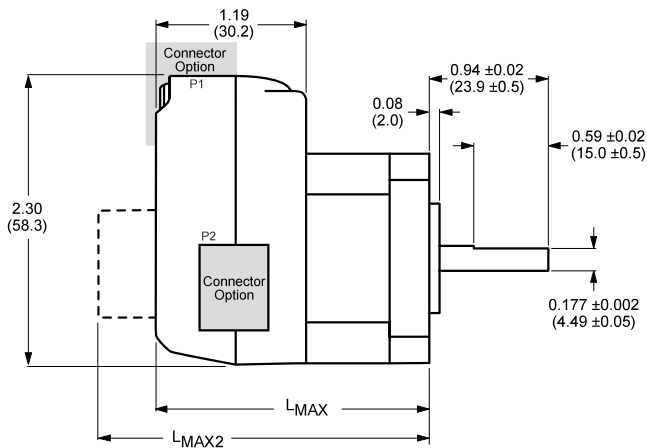
P2: COMM CONNECTOR			
RS-422/485		CANopen	
M12 Circular (Female)	Function	M12 Circular (Male)	Function
Pin 1	TX -	Pin 1	Shield
Pin 2	TX +	Pin 2	CAN +V
Pin 3	RX +	Pin 3	CAN -V
Pin 4	RX -	Pin 4	CAN High
Pin 5	Comm Ground	Pin 5	CAN Low

\*Consult Factory for Availability.

# MECHANICAL SPECIFICATIONS

Dimensions in Inches (mm)

## MDrive17Plus & Plus<sup>2</sup> Motion Control

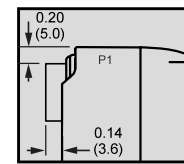
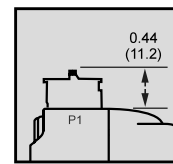
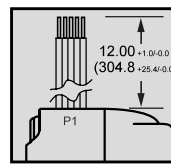


### MDrivePlus Lengths Inches (mm)

Motor Length	LMAX SINGLE SHAFT, ENCODER or LINEAR ACTUATOR VERSION	LMAX2 CONTROL KNOB VERSION
Single	2.20 (55.9)	2.79 (70.9)
Double	2.43 (61.7)	3.02 (76.7)
Triple	2.77 (70.4)	3.37 (85.6)

### P1 Connector Options MDrivePlus

### MDrivePlus<sup>2</sup> (Only)

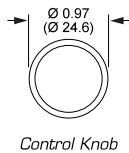


Flying Leads

7-Pin Pluggable Clamp Type Terminal Strip

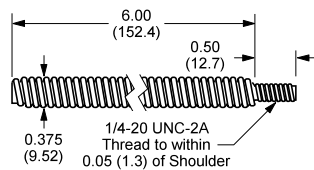
16-Pin Pluggable Locking Wire Crimp

### LMAX2 Option



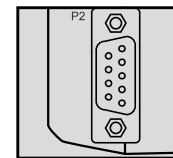
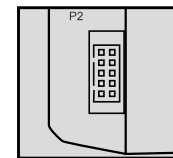
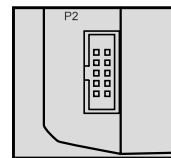
Control Knob

### Linear Actuator



Standard Screw

### P2 Connector Options MDrivePlus & Plus<sup>2</sup>

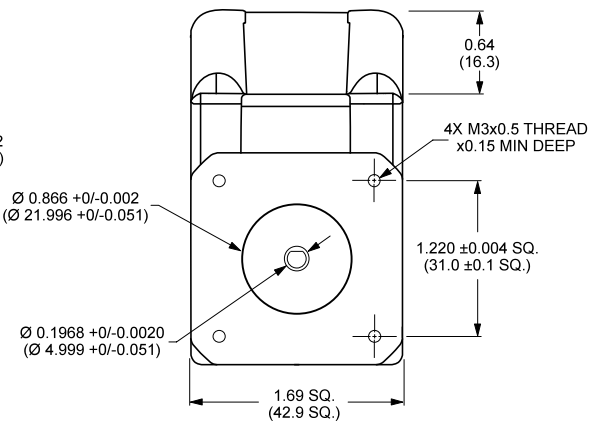
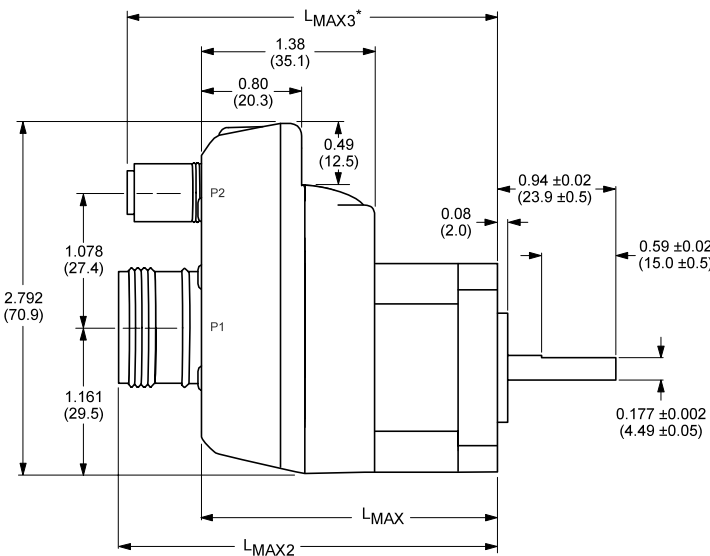


10-Pin IDC

10-Pin Friction Lock Wire Crimp

DB9 (CANopen Only)

## MDrive17Plus<sup>2</sup>-65 Motion Control (sealed)

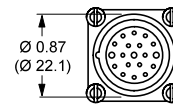


### Sealed MDrivePlus Lengths Inches (mm)

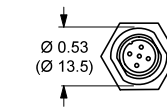
Motor Length	LMAX	LMAX2	LMAX3*
Single	2.39 (60.71)	3.06 (77.72)	2.99 (75.95)
Double	2.62 (66.55)	3.29 (83.57)	3.22 (81.79)
Triple	2.96 (75.18)	3.63 (92.20)	3.56 (90.42)

\*CANopen increases measurement by 0.09"/2.0mm

### Connectors



P1: 19-Pin M23 (Male)



P2: 5-Pin M12 (Female) (or CANopen - Male)

## OPTIONS

### Linear Actuator ‡ \*

The MDrive17Plus with non-captive style linear actuator is available with the following long life Acme screws:

- Screw A ..... 0.00125" (0.032mm)/full step
- Screw B ..... 0.000625" (0.016mm)/full step
- Screw C ..... 0.0003125" (0.008mm)/full step
- Screw D ..... 0.00015625" (0.004mm)/full step

Standard screw length is 6.0" (152.4mm) plus the mounting end thread. Custom lengths from 2.0" to 24.0" (50.8 to 609.6mm) are available without mounting end thread. Contact the factory regarding captive shaft or external style linear actuators.

NOTE: May not be combined with other options.

### Internal Encoder

All MDrive17Plus Motion Control versions are available with an optional internal 512-line (2048 count) magnetic encoder with index mark.

### Remote Encoder (Plus<sup>2</sup> versions only)

MDrive17Plus<sup>2</sup> Motion Control versions are available with differential encoder inputs for use with a remote encoder (not supplied).

### Control Knob ‡

The MDrive17Plus Motion Control is available with a factory-mounted rear control knob for manual shaft positioning.

### Planetary Gearbox

Efficient, low maintenance planetary gearboxes are offered assembled with the MDrive17Plus. Refer to details and part numbers on the back cover.

### Linear Slide

Integrated linear slides are available factory installed for precision linear movement. Screw pitches are 0.1", 0.2", 0.5" or 1.0" of travel per rev. Slides are 10.0" (25.4cm) to 36.0" (91.44cm) long. Contact factory for custom lengths. Refer to separate datasheet for complete details.

## ACCESSORIES

### Communications Converter Cables

These convenient accessory cables connect a PC's USB Port to the MDrive's P2 Connector. Total cable length is 12.0' (3.6m). An in-line RS-422 converter enables parameter setting to a single MDrive Motion Control. Purchase recommended with first orders.

- USB to 10-Pin IDC ..... MD-CC400-000
- 10-Pin IDC to Wire Crimp Adapter... MD-ADP-H
- USB to 5-Pin M12 (sealed version)... MD-CC401-000

### Prototype Development Cable

To speed prototyping, these 10' (3m) cables are available:  
I/O: 16-pin Wire Crimp Cable ..... PD16-1417-FL3  
Comm: 10-pin Wire Crimp Cable... PD10-1434-FL3

### Cordsets (sealed version only)

19-pin M23 single-ended cordsets are offered to speed prototyping of sealed MDrivePlus units. Measuring 13.0' (4.0m) long, either straight or right angle termination is available. PVC jacketed cables come with a foil shield and unconnected drain wire.

- Straight Termination ..... MD-CS100-000
- Right Angle Termination ..... MD-CS101-000


Accessories details at: [www.imshome.com/cables\\_cordsets.html](http://www.imshome.com/cables_cordsets.html)

‡ Not Available with Sealed -65 Versions.

\* Consult Factory for Availability.

NOTE: Red italic text denotes new product enhancements.

## ORDER INFORMATION – MDrive17Plus Motion Control




**MDI1**    **17**  **4** - **OPTION**

**P1: I/O & Power**  
F = 12" Flying Leads  
P = Pluggable Clamp Type Terminal Strip

**P2: Communications**  
RD = RS-422/485 with 10-Pin IDC Connector  
RL = RS-422/485 with 10-Pin Friction Lock Wire Crimp  
CB = CANopen with DB9 Connector

**Motor Lengths**  
A = Single Length & Linear Actuator\*  
B = Double Length  
C = Triple Length

**Example #1:** Part Number **MDI1PRD17A4** is an MDrive17Plus Motion Control with pluggable I/O & power interface, RS-422/485 communications with 10-pin IDC connector, and NEMA 17 single length motor.




**MDI3C**    **17**  **4** - **OPTION**

**P1: I/O & Power**  
16-Pin Locking Wire Crimp

**P2: Communications**  
RD = RS-422/485 with 10-Pin IDC Connector  
RL = RS-422/485 with 10-Pin Friction Lock Wire Crimp  
CB = CANopen with DB9 Connector

**Motor Lengths**  
A = Single Length & Linear Actuator\*  
B = Double Length  
C = Triple Length

**Example #2:** Part Number **MDI3CRD17C4** is an MDrive17Plus<sup>2</sup> Motion Control with 16-pin I/O & power interface, RS-422/485 communications with 10-pin IDC connector, and NEMA 17 triple length motor.



**MDI4M**    **17**  **4** - **OPTION**

**P2: Communications**  
RQ = RS-422/485 with 5-Pin M12 Circular Connector  
CQ = CANopen with 5-Pin M12 Circular Connector

**P1: I/O & Power**  
19-Pin M23 Circular Connector

**Motor Lengths**  
A = Single Length  
B = Double Length  
C = Triple Length

**Example #3:** Part Number **MDI4MRQ17B4** is an MDrive17Plus<sup>2</sup>-65 Motion Control sealed with IP65 rating, 19-pin M23 I/O & power interface, RS-422/485 communications with 5-pin M12 circular connector, and NEMA 17 double length motor.

† Linear Actuator available ONLY with single length motor. Not available with sealed -65 versions.

\* Consult Factory for Availability.

**Linear Actuator\*** -L

Acme Screw Type (Travel/Full Step)  
A = 0.00125"  
B = 0.000625"  
C = 0.0003125"  
D = 0.00015625"

Custom Screw Lengths  
Range 2.0" to 24.0"  
Example: 095 for 9.5" Screw (6.0" Screw Length Standard)

Example: **MDI1PRD17A4-LA** adds standard 6" long, 0.00125" screw.

NOTE: MAY NOT be combined with any other option.  
Available ONLY with single length motor.  
Not available with sealed -65 versions.

**Internal Encoder** -EQ

Example: **MDI4MRQ17B4-EQ** adds a 512-line internal magnetic encoder with index mark to example #3.

**Remote Encoder** -EE

Example: **MDI4MRQ17B4-EE** adds differential encoder inputs for use with remote encoder (not supplied). Available with Plus<sup>2</sup> versions only. May not be combined with internal encoder option.

**Control Knob** -N

Example: **MDI3CRD17C4-N** adds a rear control knob for manual positioning to example #2. Not available with sealed -65 versions.

**Planetary Gearbox** -G    -F

Refer to gearbox page for complete table of ratios and part numbers. Optional NEMA Flange

Example: **MDI3CRD17C4-G1A2** adds a 1-stage planetary gearbox with 5.18:1 ratio to example #2. Add -F for optional NEMA flange.

**Linear Slide** -R

Screw Lead (inches/rev)  
A = 0.10"  
B = 0.20"  
C = 0.50"  
D = 1.00"

Standard Screw Lengths  
10", 12", 15", 18", 24" or 36"  
For Custom Lengths, Consult Factory

NOTE: 10" lengths only with A or B leads.  
15" lengths only with A, B or C leads.  
36" lengths only with D leads.

Example: **MDI1PRD17A4-RA10** adds a Linear Slide with 0.10" screw lead, 10" long to example #1.

## MDRIVE17PLUS WITH PLANETARY GEARBOX

The MDrive17Plus is available with a Planetary Gearbox option developed to increase torque at lower speeds, enable better inertia matching and produce finer positional resolutions. These efficient, low

maintenance Planetary Gearbox come fully assembled with the MDrive and are offered in a large number of reduction ratios in 1-, 2- and 3-stage configurations. An optional NEMA Output Flange allows

mounting the Planetary Gearbox to the load using a standard NEMA bolt circle. Planetary Gearbox may be combined with other MDrive17Plus options, however are unavailable with Linear Actuators.

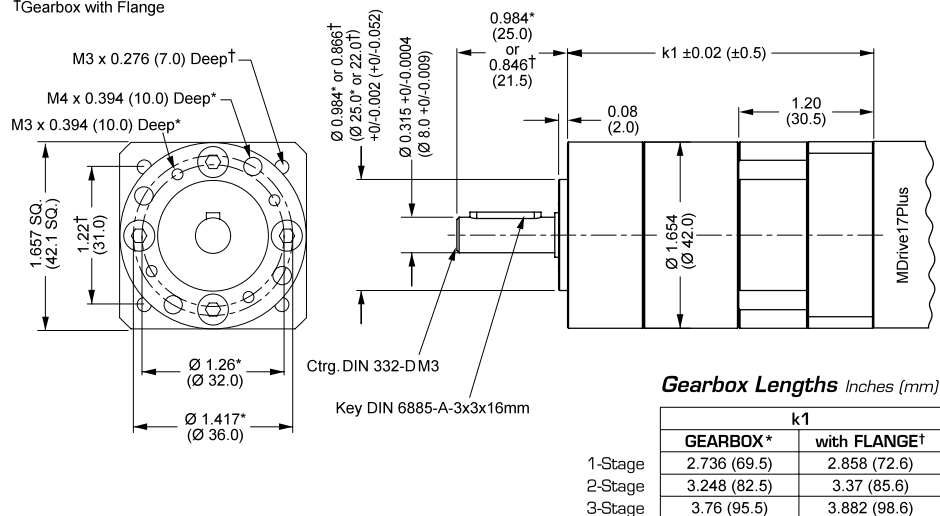
### Planetary Gearbox Parameters

	Permitted Output Torque (oz-in./Nm)	Gearbox Efficiency	Maximum Backlash	Output Side with Ball Bearing			
				Maximum Load (lb-force/N)		Weight (oz./g)	
				Radial	Axial	Gearbox	with Flange
<b>1-STAGE</b>	425/3.0	0.80	0.80°	36/160	11/50	14.3/406	14.8/420
<b>2-STAGE</b>	1062/7.5	0.75	0.85°	52/230	18/80	17.9/508	18.5/525
<b>3-STAGE</b>	2124/15.0	0.70	0.90°	67.5/300	25/110	18.5/525	22.2/630

### Planetary Gearbox for MDrive17Plus

Dimensions in Inches (mm)

\*Gearbox without Flange  
†Gearbox with Flange



### Ratios and Part Numbers

Planetary Gearbox	Ratio (Rounded)	Part Number**
1-Stage	3.71:1	G1A1
1-Stage	5.18:1	G1A2
1-Stage	6.75:1	G1A3
2-Stage	13.73:1	G1A4
2-Stage	15.88:1	G1A5
2-Stage	18.37:1	G1A6
2-Stage	19.20:1	G1A7
2-Stage	22.21:1	G1A8
2-Stage	25.01:1	G1A9
2-Stage	26.85:1	G1B1
2-Stage	28.93:1	G1B2
2-Stage	34.98:1	G1B3
2-Stage	45.56:1	G1B4
3-Stage	50.89:1	G1B5
3-Stage	58.86:1	G1B6
3-Stage	68.07:1	G1B7
3-Stage	71.16:1	G1B8
3-Stage	78.72:1	G1B9
3-Stage	92.70:1	G1C1
3-Stage	95.18:1	G1C2
3-Stage	99.51:1	G1C3
3-Stage	107.21:1	G1C4
3-Stage	115.08:1	G1C5
3-Stage	123.98:1	G1C6
3-Stage	129.62:1	G1C7
3-Stage	139.14:1	G1C8
3-Stage	149.90:1	G1C9
3-Stage	168.85:1	G1D1
3-Stage	181.25:1	G1D2
3-Stage	195.27:1	G1D3
3-Stage	236.10:1	G1D4
3-Stage	307.55:1	G1D5

\*\*Include optional planetary gearbox by adding -G plus 3 characters to the end of an MDrive part number.



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