

Short form product catalog

Leading innovations in drives, controls
and integrated motion solutions



MDrive® overview



Motor with integrated electronics

MDrive® products consist of a 1.8° 2-phase stepper motor integrated with microstepping drive, controller and encoder.* Compact, powerful and cost effective, MDrive products may reduce system cost, design and assembly time in a wide range of motion control applications.

MDrive motion control products deliver exceptional smoothness and performance, ideal for machine builders who want an optimized motor with on-board electronics. The integrated electronics of MDrive products reduce the potential for problems due to electrical noise by eliminating the cable between motor and drive.

Numerous MDrive product options are offered to meet varied system needs. And, for rapid design verification, connectivity accessories are available individually or bundled into all-inclusive QuickStart Kits.

MDrive product groupings

MDrive Plus

High torque rotary stepper motor with integrated microstepping drive, controller and encoder form a single, compact unit.* Integration of motor and electronics reduces cabling and the potential for electrical noise interference. User-friendly PC commissioning software is provided for rapid communication and programming.

MDrive Hybrid

Hybrid Control Technology™ combines the best of servo and stepper motor technologies, while also delivering unique capabilities and enhancements over both. This revolutionary control technology, included in all MDrive Hybrid motion systems, is changing the rules of motion control.

MDrive Linear Actuator

Leading all-in-one integrated stepper motor plus electronics technology has been combined with linear motion mechanical systems, delivering long life, high accuracy and repeatability. All in an extremely compact, low cost package.

Integrated motion

Save up to

50%

of space in the control cabinet

Reduce cabling by up to

40%

Cut installation time by up to

25%

With

100,000s

of MDrive products operating reliably all over the globe, they are the world market leader for compact, low cost integrated motion

MDrive		size 14	size 17	size 23	size 34	size 34ac
Input voltage	VDC	+12 to +48	+12 to +48	+12 to +75	+12 to +75	—
	VAC	—	—	—	—	120 or 240
Motor stack lengths		1 and 3	1, 2 and 3	1, 2, 3 and 4	1, 2 and 3	1, 2 and 3
Motor frame size	NEMA	14	17	23	34	34
	inch	1.4	1.7	2.3	3.4	3.4
	mm	36	42	57	86	86
Holding torque maximum	oz-inch	36	75	239	1090	750
	N-cm	25	53	169	770	529
Availability						
MDrive Plus		✓	✓	✓	✓	✓
MDrive Hybrid			✓	✓	✓	✓
MDrive Linear Actuator		✓	✓	✓		

* Integrated components vary with product version and options selected.



MDrive® Plus

Rotary motor with integrated electronics

MDrive® Plus products integrate high torque rotary stepper motors with electronics. This very broad offering of low cost motion products comes in versions:

Step/direction input

The MDrive product's integrated stepper motor and microstepping drive convert step/direction signals from a central controller directly into motion via SPI communication protocol. An optional encoder is available.

Motion Control

A fully programmable motion controller integrated with stepper motor and microstepping drive eliminates the need for a central controller. RS-422/485 communication allows point-to-point or multiple unit operation.

Ethernet

ODVA-compliant MDrive EtherNet/IP products integrate motor, drive and programmable I/O with standardized Ethernet protocol IP addressing. These adapter class products are capable of explicit or implicit messaging.

CANopen

Integrated stepper motor and electronics form a compact package that supports CiA DS301 and DSP402.

Speed Control

Integrated stepper motor, drive and programmable velocity control using voltage, current or PWM input signals.

MDrive Plus		size 14	size 17	size 23	size 34	size 34ac (1)
Input voltage		+12 to +48 VDC	+12 to +48 VDC	+12 to +75 VDC	+12 to +75 VDC	120 or 240 VAC
Motor stack lengths		1 and 3	1, 2 and 3	1, 2, 3 and 4	1, 2 and 3	1, 2 and 3
Step frequency default		2.5 MHz				
Microsteps 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 (0.001 mm/μstep)				
Options		Encoder, control knob, industrial connectors with IP54 rating, interface cables, QuickStart Kit, Drive Protection Module, Ethernet Gateway				
Versions						
Step/direction input	Isolated inputs	+5 to +24 VDC sourcing or sinking, or +5 VDC clockwise/counterclockwise			+5 to +24 VDC sourcing or sinking	
	Setup parameters	Motor Run/Hold, Current, Microstep Resolution, Motor Direction, Hold Current Delay Time, Clock Type, Clock and Direction Filter, User ID, Enable Active				
Motion Control	Programmable I/O	Up to 8 lines, tolerant to +24 VDC, TTL level compatible				
	Communication	RS-422/485 standard				
Ethernet	Protocols	—		EtherNet/IP and ModbusTCP	—	
CANopen	Communication	CANopen CiA DS301 (V3.0), DSP402 (V2.0), 2.0B active				
Speed Control	Input signals	—	Voltage, Current or PWM			—

(1) 34ac products include an integrated power supply.



QuickStart Kits
speed your design verification with bundled all-inclusive connectivity

Industrial level I/O
from +5 VDC to

+24 VDC

eliminates the relay required in lower voltage systems

Up to

8 I/O

programmable

Industrial connectors
with IP54 rating

MDrive® Hybrid

Integrated motion systems with hybrid technology

Included in all MDrive® Hybrid systems, Hybrid Motion Technology™ combines servo and stepper motors best features, while delivering unique capabilities and enhancements over both. ★

MDrive Hybrid motion systems feature rotary and linear stepper motors integrated with microstepping drive, integral encoder and Hybrid Motion Technology, all in a compact package. Choose from versions:

Step • Torque • Speed

User-selectable operating modes – step/direction, speed, velocity and torque – deliver unique features for a wide range of applications. This system provides encoder feedback to the user. Communication is RS-422/485.

Motion Control

Integration of a fully programmable controller makes this a stand-alone motion control solution for use without a PLC. Up to 8 programmable I/O lines. Communication is RS-422/485.

Ethernet

The benefits of integrated motion and 4 I/O lines for EtherNet/IP or ModbusTCP systems. ODVA compliant.

CANopen

Integrated stepper motor and electronics form a compact package that supports CiA DS301 and DSP402.

MDrive Hybrid	size 17	size 23	size 34	size 34ac (1)
Input voltage	+12 to +48 VDC	+12 to +60 VDC	+12 to +75 VDC	120 or 240 VAC
Motor stack lengths	1, 2 and 3	1, 2, 3 and 4	1, 2 and 3	1, 2 and 3
Options	Control knob, interface cables, QuickStart Kit, Drive Protection Module, Ethernet Gateway			
Versions				
Step • Torque • Speed	4 operating modes, RS-422/485 communication			
Motion Control	8 programmable I/O lines, RS-422/485 communication			
Ethernet	4 I/O lines, EtherNet/IP or ModbusTCP protocol			
CANopen	CiA DS301 and DSP402 standards supported			

(1) 34ac products include an integrated power supply.

Hybrid Motion Technology control

Allows

100%

use of a step motor's maximum torque rating

Eliminates motor derating of up to

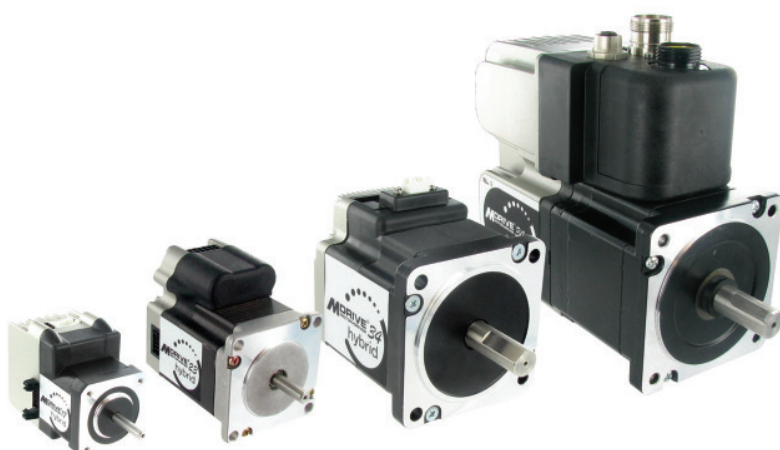
50%

as buffer to avoid stalling in standard step motor systems

Variable current control:



- save energy
- reduce heat
- lower costs



System benefits

- Quick reaction to large changes in loads without loss of synchronization
- No tuning required
- Higher inertia mismatch allowed
- High starting torque
- Smooth motion, even at extremely slow speeds
- Minimized impact of system resonance

Enhanced motor performance

- Real time closed loop control intervenes as required
- Eliminates loss of synchronization
- Allows full use of motor's torque
- Never loses functional control of the motor
- Controllable motor torque via Torque Mode
- Variable current control applies only the current needed thereby reducing motor heating, lowering energy consumption and saving money

MDrive® Linear Actuator

All-in-one linear motion systems

MDrive® Linear Actuators combine leading all-in-one integrated motor technology with linear motion to deliver long life, high accuracy and repeatability, all in an extremely compact, low cost package.

These innovative linear motion systems integrate high torque 1.8° 2-phase stepper motor linear actuators with mechanicals and electronics. Two linear shaft styles are available: Non-Captive Shaft and External Shaft. The high quality, precision rolled lead screws used with MDrive Linear Actuators are manufactured from premium grade stainless steel with optional Teflon coating. Lead screws are designed specifically for motion control applications, delivering long life and quiet operation. An encoder option adds closed loop feedback to these compact products.

Two operating platforms:

MDrivePlus Linear Actuator

All the benefits of integrated MDrivePlus products, with the addition of linear motion. MDrivePlus Linear Actuator products are available in versions: Step/direction input, Motion Control, Ethernet and CANopen.

MDriveHybrid Linear Actuator

MDriveHybrid Linear Actuators add linear motion to feature-rich MDriveHybrid systems with Hybrid Motion Technology. These integrated linear motion systems are available in versions: Step•Torque•Speed, Motion Control, Ethernet and CANopen.



Innovative
integrated linear motion
= more motion success

Compact all-in-one
linear stepper motor
+ microstepping drive
+ programmable control
+ encoder

2x2x4

2 linear shaft styles
2 operating platforms
4 product versions

MDrive Linear Actuator		size 14	size 17	size 23
Motor stack length		1	1	1
Screw length	inches	3.0 to 18.0	3.0 to 18.0	3.0 to 24.0
	mm	76 to 457	76 to 457	76 to 610
Screw diameter	inches	0.25	0.25	0.375
	mm	6.35	6.35	9.525
Nominal load limit		up to 50 lbs	up to 50 lbs	up to 200 lbs
Screw ends		threaded metric end, threaded UNC end, smooth unthreaded end, none		
Shaft styles		Non-captive shaft, external shaft		
Options		Teflon coated screws, encoder, interface cables, QuickStart Kit, Drive Protection Module, Ethernet Gateway		



Ethernet systems

Bringing the advantages of integrated motion to a wide range of industrial motion applications

EtherNet/IP™, the widely used solution for factory automation, is an ODVA-managed open communication protocol ensuring a common, consistent standard between vendors and products. MDrive® EtherNet/IP products are ODVA compliant and readily interface with EtherNet/IP systems, as well as ModbusTCP. MDrive EtherNet/IP products deliver the advantages of integrated motion, including reduced size, cost, design and assembly time, to industrial automation systems.



MDrive EtherNet/IP

Integrated motor, microstepping drive and programmable I/O

MDrive EtherNet/IP products integrate a high torque 1.8° 2-phase stepper motor, microstepping drive, programmable I/O, and optional encoder to form a compact, low cost motion solution. ODVA conformance tested, these products deliver the benefits of integrated motion – including reduced size, cost and time to market – to Ethernet networks.

MDrive EtherNet/IP products are adapter class devices capable of explicit or implicit messaging. Standardized IP addressing eliminates the complicated wiring and programming of traditional multi-drop systems with RS-422/485 communications, while standard RJ45 connectors and CAT5/6 cabling simplify connectivity.

MDrive EtherNet/IP products feature size NEMA23 motors, both rotary and linear. Hybrid Motion Technology is also available, delivering the best attributes of servo and stepper motors plus unique capabilities and enhancements.

Ethernet Gateway

MDrive serial products over Ethernet

Ethernet systems can operate a wide range of MDrive integrated motion products via the Ethernet Gateway, enabling interface of RS-422/485 serial products over TCP/IP networks. The Ethernet Gateway is ODVA compliant, and controls MDrive serial products as slave devices. Applicable MDrive serial products include rotary and linear motors in NEMA sizes 14, 17, 23 and 34. Choose either MDrive Plus, or MDrive Hybrid with the enhanced performance features of Hybrid Motion Technology.



Integrated motion advantages

Compact

integrated motor and electronics may require less space in applications

Simplify

system design, installation effort, time and cost, while reducing cabling and the potential for electrical noise

Flexible

features and options of MDrive products can benefit a wide range of industrial motion applications



Up to 2 standard MDrive products
ship within 5 working days.

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