

Short form product catalog

Leading innovations in drives, controls
and integrated motion solutions



IMS
INTELLIGENT MOTION
SYSTEMS, INC.

Schneider
Electric

MDrive® overview



Motor with integrated electronics

MDrive® products consist of a 1.8° 2-phase stepper motor and electronics, 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.

These compact, powerful and cost effective motion control solutions deliver unsurpassed smoothness and performance that will reduce system cost, design and assembly time for a large range of motion control applications.

A wide range of MDrive product options are offered to meet your 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, plus encoder, controller and power supply* form a single, compact unit. Integration of motor and electronics reduces installation costs and the potential for electrical noise interference. User-friendly PC commissioning software is provided for rapid communication and programming. * Integrated components vary with product version and options selected.

MDrive Hybrid

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

MDrive Linear Actuator

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

| MDrive | Drive voltage | Stack lengths | Motor flange | Holding torque maximum | Product availability | | |
|-----------|----------------|---------------|--------------|------------------------|----------------------|--------|--------|
| | | | | | Plus | Hybrid | Linear |
| size 14 | +12 to +48 VDC | up to 2 | 1.4" / 36 mm | 36 oz-in / 25 N-cm | yes | — | yes |
| size 17 | +12 to +48 VDC | up to 3 | 1.7" / 42 mm | 75 oz-in / 53 N-cm | yes | yes | yes |
| size 23 | +12 to +75 VDC | up to 4 | 2.3" / 57 mm | 239 oz-in / 169 N-cm | yes | yes | yes |
| size 34 | +12 to +75 VDC | up to 3 | 3.4" / 86 mm | 1061 oz-in / 749 N-cm | yes | yes | — |
| size 34ac | 120 or 240 VAC | up to 3 | 3.4" / 86 mm | 750 oz-in / 529 N-cm | yes | yes | (1) |

(1) Consult factory for availability.

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, we are the world market leader in the area of compact, low cost integrated motion



Ethernet now available

MDrive® Plus

Rotary motor with integrated electronics

MDrive® Plus products integrate high torque 1.8° 2-phase rotary stepper motors with electronics. This very broad offering of low cost products is available in three versions: Step/direction input, Motion Control and Speed Control.

Step/direction input – motor + driver

The simplicity of a stepper motor with integrated microstepping drive, these products accept a broad input voltage range and deliver enhanced performance and speed. Oversized input capacitors are used to minimize power line surges, reducing problems that can occur with long cable runs and multiple drive systems.

Motion Control – motor + driver + fully programmable controller

A fully programmable motion controller integrated with stepper motor and microstepping drive eliminates the need for a central controller. Programming over RS-422/485 allows for point-to-point or multiple unit configuration utilizing one communication port. Communication options include CANopen or Ethernet (1).

Speed Control – motor + driver + programmable velocity control

Integrated stepper motor and microstepping drive with programmable velocity control that uses voltage, current or PWM input signals. Setup parameters are programmable and may be changed on-the-fly, utilizing a supplied intuitive communication interface GUI.



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 Plus | size 14 | size 17 | size 23 | size 34 | size 34ac |
|---|---|---|----------------|-----------------------------------|----------------|
| Input voltage | +12 to +48 VDC | +12 to +48 VDC | +12 to +75 VDC | +12 to +75 VDC | 120 or 240 VAC |
| Stack lengths available | 2 | 3 | 4 | 3 | 3 |
| Step frequency maximum | 5 MHz | | | | 2 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) | | | | |
| Operating temp at heat sink | -40° to +85°C | | | -40° to +75°C | |
| Options | Encoder, control knob, industrial connectors with IP54 rating, interface cables, QuickStart Kit, Drive Protection Module | | | | |
| 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 with programmable controller | | | | | |
| Programmable I/O | Up to 8 lines, tolerant to +24 VDC, TTL level compatible | | | | |
| Communication protocols | RS-422/485 standard; optional CANopen or Ethernet (1) | | | | |
| Speed Control with programmable velocity control | | | | | |
| Input signals | — | Voltage, Current or PWM | | | — |
| Setup parameters | — | Acceleration, Deceleration, Analog Input Mode, Analog Deadband, Analog Full Scale, Analog Input Filter, Joystick Center, Motor Direction, Fault/Checksum Error, Motor Hold Current, Motor Settling Delay Time, Motor Run Current, Hold Current Delay Time, Microstep Resolution, Stop/Start Debounce, Initial Velocity, Maximum Velocity, User ID | | | — |

(1) Consult factory for availability.



MDrive® Hybrid

Integrated motion systems with hybrid technology

Hybrid Motion Technology™ (HMT) combines the best of servo and stepper motor technologies, while delivering unique capabilities and enhancements over both.★ HMT control technology is included in MDrive® Hybrid motion systems which solve many servo applications with a low cost stepper solution.

The integrated design of MDrive Hybrid systems feature HMT control with a 1.8° 2-phase stepper motor, microstepping drive, internal encoder, controller (1) and power supply (2) in a single compact package. Both rotary and linear motor systems are available. RS-422/485 communication is standard for all MDrive Hybrid systems which are available in two versions: Step•Torque•Speed and Motion Control.

Step • Torque • Speed – HMT + motor + driver + encoder

This version has three operating modes. Step/Direction mode is set to reach a position. Torque/Force mode maintains a constant motor torque set by the user. Speed Control mode maintains velocity/speed with a precision digital velocity controller. This system also provides encoder feedback to the user.

Motion Control – HMT + motor + driver + encoder + fully programmable controller

A fully programmable controller makes this a stand-alone motion control solution that can be used without a PLC. There are up to 8 programmable +5 to +25VDC I/O lines along with 10-bit analog input and high speed position capture input or trip output. Communication options include CANopen or Ethernet (3).

| MDrive Hybrid | size 17 | size 23 | size 34 | size 34ac (2) |
|-----------------------------|---|----------------|----------------|----------------|
| Input voltage | +12 to +48 VDC | +12 to +60 VDC | +12 to +75 VDC | 120 or 240 VAC |
| Stack lengths available | 3 | 4 | 3 | 3 |
| Communication protocols | RS-422/485 standard; optional CANopen or Ethernet (3) | | | |
| Options | Linear motor, control knob, interface cables, QuickStart Kit, Drive Protection Module | | | |
| Version availability | | | | |
| Step • Torque • Speed | — | yes | yes | yes |
| Motion Control (1) (3) | yes | yes | — | yes |

(1) Motion Control products include an integrated controller that is fully programmable using RS-422/485 or Ethernet protocols.

(2) MDrive 34ac products include an integrated power supply.

(3) Motion Control products are available with optional CANopen or Ethernet communication. Consult factory for availability.

HMT 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

With

1000s

of axes operated by MDrive Hybrid today, this technology is proving it's a motor control rules changer



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 high accuracy, unsurpassed repeatability and long life, all in an extremely compact, low cost package.

These innovative linear motion systems feature high torque 1.8° 2-phase stepper motors with a choice of two linear actuator styles: Non-Captive Shaft and External Shaft. High quality precision rolled lead screws used with MDrive Linear Actuators are manufactured from premium grade stainless steel, designed specifically for motion control applications to deliver long life and quiet operation.

MDrive Linear Actuator motion systems are available with a rugged internal encoder option. This powerful feature adds closed loop feedback, but does not increase the MDrive product's compact footprint.

MDrive Linear Actuators are offered in two operating platforms, each with 2 product versions. Linear actuators with MDrivePlus operating platform are available with Step/direction input or Motion Control versions. With the MDrive Hybrid operating platform, choose either Step•Torque•Speed or Motion Control versions.



Innovative
integrated linear motion
= more motion success

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

2/2/2

2 linear shaft styles in
2 operating platforms
each with
2 product versions

| MDrive Linear Actuator | | size 14 | size 17 | size 23 |
|-------------------------------------|----------------------|--|--------------|---------------|
| Length without screw | inches | 2.3 | 2.2 | 2.65 |
| | mm | 58.4 | 55.9 | 67.3 |
| 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 available | | 4 | 4 | 4 |
| Options | | Teflon coated screws, encoder, interface cables, QuickStart Kit, Drive Protection Module | | |
| Shaft styles | | | | |
| Non-captive shaft | | yes | yes | yes |
| External shaft | | yes | yes | yes |
| Operating platforms/versions | | | | |
| MDrivePlus | Step/direction input | yes | yes | yes |
| | Motion Control | yes | yes | yes |
| MDrive Hybrid | Step•Torque•Speed | — | — | yes |
| | Motion Control | — | yes | yes |



Drives and Controllers

MForce

Drives with integrated controller option

Compact MForce microstepping drives incorporate the same patented technology and programming as industry leading all-in-one MDrive® Plus integrated motion products, but without the stepper motor.

MForce drives have up to 20 resolution settings from full to 256 microsteps per full step, an extended operating temperature range from -40° to $+85^{\circ}\text{C}$, and advanced current control to significantly dampen resonance and reduce audible noise. Two drive versions are available:

- Step/direction input — drive only
- Motion Control — drive and programmable controller

MForce MicroDrive 3A RMS / 4A peak

Huge power from an ultra compact product: 3A RMS/4A peak per phase output current from a package measuring only 1.7x2.3x1.3" (42x59x33 mm). With an input voltage range of +12 to +48 VDC, this microstepping drive can control a wide range of motors.

MForce PowerDrive

A broad +12 to +75 VDC input voltage range and high, per phase output current of up to 5A RMS/7A peak deliver enhanced performance and speed.



Ultra miniature stepper motor drives

IB462He, IM481H Plus, IM483H Plus and IM805H Plus

This series of PCB mountable stepper motor drives delivers high performance, low cost products that utilize advanced technology to greatly reduce size without sacrificing features. All are exceptionally small, easy to interface and use, and powerful enough to handle the most demanding applications.

These products are designed to be soldered directly into a PC board. This eliminates the need for wiring and mounting, thus saving design and assembly time, reducing system cost and increasing reliability. The ultra small size reduces the overall space required in your system.

IB462He

High performance, ultra-miniature bipolar half/full step +12 and +48 VDC drive with outputs up to 2A per phase. Options include interface board and heat sink.

IM481H Plus IM483H Plus IM805H Plus

Featuring advanced current control for exceptional smoothness, these high performance microstepping drives have 16 built-in microstep resolutions, both binary and decimal, ranging from full step to 1/256 step. High output currents RMS are 1.5A (IM481H), 3A (IM483H) and 5A (IM805H).

Resolutions may be switched on-the-fly without loss of position. This feature allows the user to rapidly move long distances, yet precisely position the motor at the end of travel without the expense of high performance controllers. Options to simplify prototyping include interface board, heat sink, and an assembly of heat sink, fan and clip for IM483H Plus/IM805H Plus drives.



MicroLYNX

Integrated controller/drive

A compact integrated controller/drive for single and multi-axis stepper motor applications. Two power configurations are available. The -4 version has output current of 3A RMS/4A peak with +12 to +48 VDC input voltage. The -7 version has output current of 5A RMS/7A peak with +24 to +75 VDC input voltage. Both versions have 6 points of isolated I/O programmable with an easy-to-use language.

MicroLYNX may be configured and field upgraded with plug-in modules to add: analog input and output, high speed differential I/O for closed loop control, electronic gearing for registration applications, and additional isolated I/O points.



Motors

Hybrid rotary stepper motors

Hybrid rotary 1.8° 2-phase stepper motors are available in four flange sizes: NEMA 14 (1.4"/36mm), NEMA 17 (1.7"/42mm), NEMA 23 (2.3"/57mm) and NEMA 34 (3.4"/86mm). Choose from single, double and triple motor stack lengths.

These enhanced hybrid stepper motors have higher torque output than conventional hybrid stepper motors. Holding torques for these powerful, low inductance motors range from 10 oz-in with a NEMA 14 to 750 oz-in with a NEMA 34. These high performance motors are perfectly matched with our microstepping drives.

Optional dual channel incremental optical rotary encoders are available for closed loop feedback. These small but very reliable encoders come standard with quadrature style outputs and an index mark, and are available in a broad range of line counts. Single-end or differential output styles are available as are interface cables.



Linear actuator stepper motors

Linear actuator 2-phase stepper motors deliver long life, high accuracy and unsurpassed repeatability in a package that is extremely compact and low cost. These motors without electronics are also used in our MDrive Linear Actuators with integrated electronics.

Linear actuators have high torque 1.8° stepper motors that are available in two flange sizes: NEMA 17 (1.7"/42mm) and NEMA 23 (2.3"/57mm). And to meet the needs of a wide range of linear motion applications, two linear actuator shaft styles are offered:

- Non-captive shaft — a threaded shaft extends through the motor and moves axially as the motor rotates
- External shaft — a rotating screw, integral to the motor's rotor, moves the nut axially along the threaded shaft

Precision rolled lead screws deliver maximum life and quiet operation in combination with the linear actuator's self-lubricating nut. Lead screws are manufactured from premium grade stainless steel that is non-magnetic, corrosion resistant and available with an optional teflon coating.





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

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