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MDrive® Plus

Stepper motors with integrated electronics



MDrive 23 Plus Step / direction input

IMS
INTELLIGENT MOTION
SYSTEMS, INC.

Schneider Electric

MDrive® Plus
Step / direction input



MDrive® Plus with step / direction input

Presentation

The MDrive® Plus with step / direction input is a 1.8° 2-phase stepper motor with on-board control electronics. Step/direction signals of a master controller, e.g. a motion controller, or A/B signals of an encoder are converted directly into motion.

Settings for MDrive Plus step / direction input products may be changed on-the-fly or downloaded and stored in nonvolatile memory using the IMS SPI Motor Interface software provided. This eliminates the need for external switches or resistors. Parameters are changed via an SPI port.

Application areas

The MDrive Plus with step / direction input is ideal for machine builders who want an optimized motor with on-board electronics. The integrated electronics of the MDrive Plus with step / direction input reduces 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 2-phase stepper motor applications.

Features

- Highly integrated microstepping drive and high torque 1.8° 2-phase stepper motor
- Advanced current control for exceptional performance and smoothness
- Single supply: from +12 up to +75 VDC or 120 and 240 VAC
- Cost effective
- Extremely compact
- 20 microstep resolutions up to 51,200 steps per rev including: Degrees, Metric, Arc Minutes
- Optically isolated input options:
  - Universal +5 to +24 VDC signals, sourcing or sinking
  - Differential +5 VDC signals *(1)*
- Automatic current reduction
- Configurable:
  - Motor run / hold current
  - Motor direction via direction input
  - Microstep resolution
  - Clock type: step and direction, quadrature, step up and step down, clockwise and counterclockwise *(1)*
  - Programmable digital filtering for clock and direction inputs
- Available options:
  - Long life linear actuators *(2)*
  - Hybrid Motion Technology™ *(2)*
  - Encoders
  - Control knob for manual positioning
  - Industrial connectors with IP54 rating *(3)*
- Several motor stack lengths available
- Setup parameters may be switched on-the-fly
- Numerous connector interface choices
- Graphical user interface provided for quick and easy parameter setup

(1) CW / CCW input unavailable for MDrive34 or MDrive34ac products.
(2) See separate documentation.
(3) Industrial connectors are unavailable for MDrive14 or MDrive34 products.

MDrive® Plus
Step / direction input

Plus specifications

			MDrive 14	MDrive 17	MDrive 23 *(1)*	MDrive 23 *(1)*	MDrive 34	MDrive 34ac	
Input power	Voltage	VDC	12 to 48	12 to 48	12 to 75	12 to 60	12 to 75	—	—
		VAC	—	—	—	—	—	120	240
	Current maximum *(2)*		1A	2A	2A	3.5A	4A	95 to 132 VAC @ 50/60 Hz	95 to 264 VAC @ 50/60 Hz
Thermal	Operating temp non-condensing	Heat sink	–40° to +85°C				–40° to +75°C		
		Motor	–40° to +100°C				–40° to +90°C		
Temp output warning	Open-drain type		not applicable				+5 to +24 VDC, 50 mA current		
Protection	Type		not applicable					- Thermal - Over voltage / current	
Isolated input	Universal		Voltage range: +5 to +24 VDC sourcing or sinking step clock, direction and enable						
	Differential		Voltage range: +5 VDC clockwise and counterclockwise				not applicable		
Motion	Digital filter range		50 nS to 12.9 µS (10 MHz to 38.8 kHz)						
	Clock types		Step / direction, quadrature, step up / step down, clockwise / counterclockwise				Step / direction, quadrature, step up / step down		
	Step frequency		2 MHz default / 5 MHz maximum					2 MHz default	
	Resolution	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 (0.001 mm/µstep)						

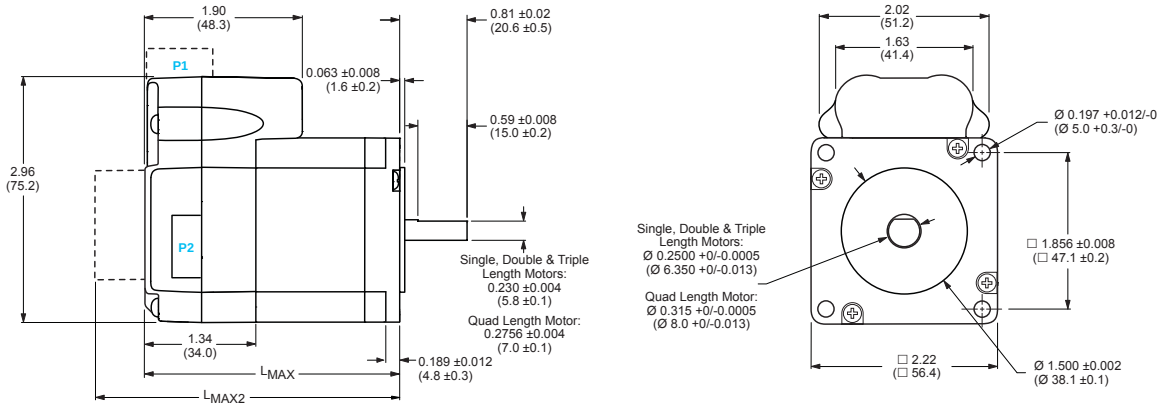
Setup parameters *(3)*

		Function	Range	Units	Default
SPI communication					
	MHC	Motor hold current	0 to 100	percent	5
	MRC	Motor run current	1 to 100	percent	25
	MSEL	Microstep resolution	1, 2, 4, 5, 8, 10, 16, 25, 32, 50, 64, 100, 108, 125, 127, 128, 180, 200, 250, 256	µsteps per full step	256
	DIR	Motor direction override	0 / 1	—	CW
	HCDT	Hold current delay time	0 or 2 – 65535	mSec	500
	CLK TYPE	Clock type	Step / Dir, Quadrature, Up / Down, CW / CCW	—	Step / Dir
	CLK IOF	Clock and direction filter	50 nS to 12.9 µS (10 MHz to 38.8 kHz)	nS (MHz)	200 nS (2 MHz)
	USER ID	User ID	Customizable	1–3 characters	IMS
	EN ACT	Enable active	High / Low	—	High
	WARN TEMP *(4)*	Over temperature warning	0 to 125°C	°C	80°C

(1) Only quad stack NEMA 23 motors have +12 to +60 VDC drives, all other NEMA 23 motors have +12 to +75 VDC drives.
(2) Actual power supply current will depend on voltage and load.
(3) All parameters are set using the supplied IMS SPI Motor Interface GUI and may be changed on-the-fly. An optional Communication Converter is recommended with first orders.
(4) Only with MDrive34 and MDrive34ac products.

See User Manual for complete details: www.imshome.com/manuals.html

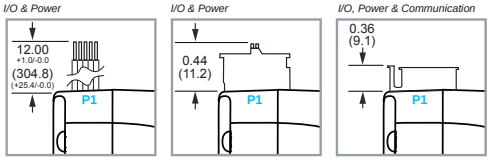
– Plus – mechanical specifications, dimensions in inches (mm)



Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	2.65 (67.31)	3.36 (85.34)
Double	3.02 (76.71)	3.73 (94.74)
Triple	3.88 (98.55)	4.59 (116.59)
Quad	5.28 (134.15)	5.99 (152.19)

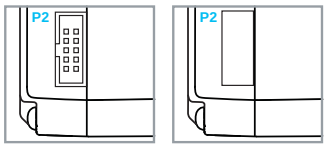
(1) Single shaft.
(2) Control knob or external encoder.

P1 connector options



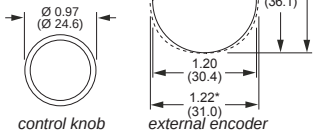
12.0" (305mm) flying leads
7-pin non-locking spring clamp terminal strip
*12-pin locking wire crimp connector***

P2 connector options



10-pin non-locking IDC connector
*no connector***

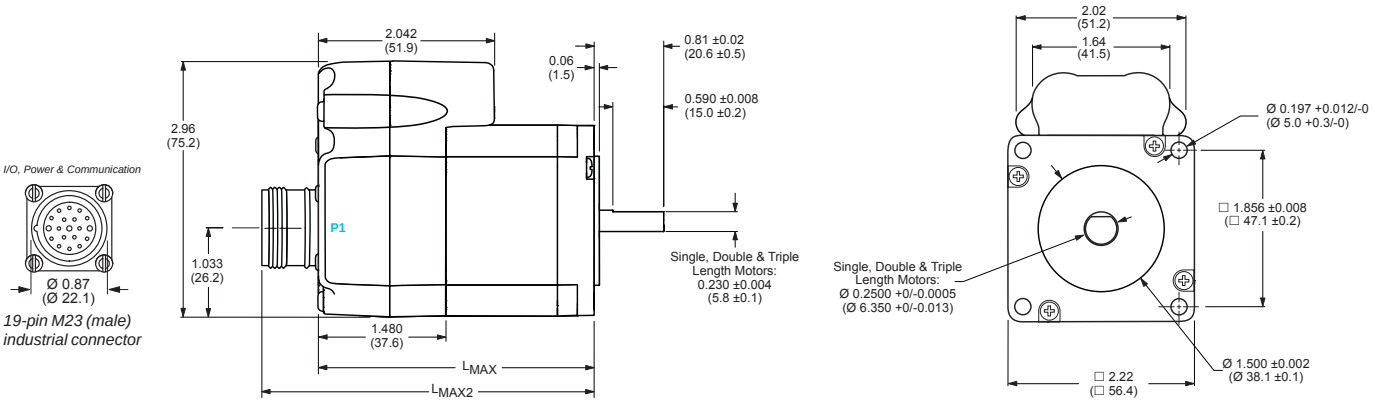
Lmax2 options



control knob
external encoder

***12-pin locking wire crimp connector at P1 eliminates the P2 connector*

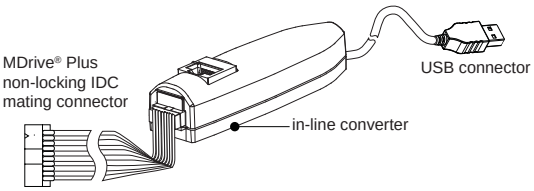
– Plus with industrial connector – mechanical specifications, dimensions in inches (mm)



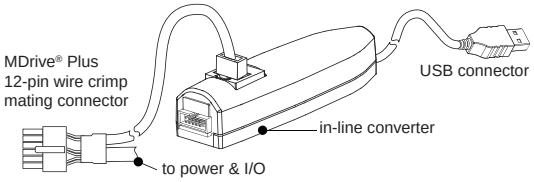
19-pin M23 (male) industrial connector

Motor stack length	Lmax	Lmax2
Single	2.82 (71.63)	3.48 (88.39)
Double	3.16 (80.26)	3.82 (97.03)
Triple	4.02 (102.11)	4.67 (118.62)

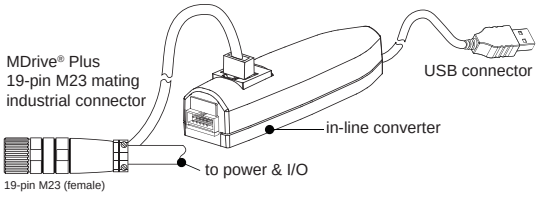
MDrive® 23 Plus
Step / direction input



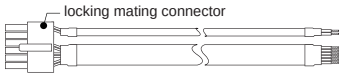
MD-CC300-001



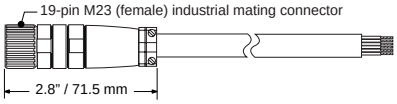
MD-CC303-001



MD-CC301-001



PD12-1434-FL3



MD-CS100-000

Installation accessories

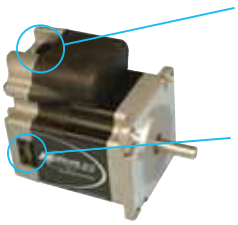
Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive Plus initial functional setup and system testing.		
■ For all MDrive23 step / direction input products	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 10-pin non-locking IDC connector	12.0 (3.6)	**MD-CC300-001**
■ Mates to 12-pin locking wire crimp connector	12.0 (3.6)	**MD-CC303-001**
■ Mates to 19-pin male M23 industrial connector	12.0 (3.6)	**MD-CC301-001**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 12-pin locking wire crimp connector for I/O, communication and power	10.0 (3.0)	**PD12-1434-FL3**
■ Mates to 19-pin male M23 industrial connector with straight termination for I/O, communication and power	13.0 (4.0)	**MD-CS100-000**
■ Mates to 19-pin male M23 industrial connector with right angle termination for I/O, communication and power	13.0 (4.0)	**MD-CS101-000**
Encoder cables *(2)*		
Pre-wired mating connector with other cable end open.		
■ For external single-end optical encoder with non-locking connector	1.0 (0.3)	**ED-CABLE-2**
■ For external differential optical encoder with locking connector	6.0 (1.8)	**ED-CABLE-6**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 10-pin non-locking IDC connector for communication	—	**CK-01**
■ 12-pin locking wire crimp connector for I/O, communication and power	—	**CK-03**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive23 step / direction input products	—	**DPM75**

(1) See next page.

Connectivity details: www.imshome.com/connect.html

MDrive® 23 Plus
Step / direction input

MDrive® 23 Plus



P1: I/O & Power
F = 12" flying leads
P = non-locking spring clamp terminal strip
C = 12-pin locking wire crimp (includes I/O, Power & Comm)

P2: Communication
D = SPI with 10-pin IDC non-locking connector
Z = None. Used with 12-pin locking wire crimp in position P1, which includes communication.

MDrive® 23 Plus
with industrial connector



P1: I/O, Power & Communication
19-pin M23 male industrial connector

Part numbers

Example:	K	M	D	M	1	F	S	D	2	3	A	7	–E1
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	M	1	F	S	D	2	3	A	7	–E1
MDrive Plus version **MDM** = Step / direction input	K	**M**	**D**	**M**	1	F	S	D	2	3	A	7	–E1
Input **1** = Universal input **2** = Universal input with industrial connector, IP54-rated **5** = Differential CW/CCW input *(1)*	K	M	D	M	**1**	F	S	D	2	3	A	7	–E1
P1 connector **F** = flying leads **P** = pluggable **C** = wire crimp **M** = industrial connector *(2)*	K	M	D	M	1	**F**	S	D	2	3	A	7	–E1
Communication **S** = SPI	K	M	D	M	1	F	**S**	D	2	3	A	7	–E1
P2 connector *(3) (4)* **D** = IDC **Z** = none	K	M	D	M	1	F	S	**D**	2	3	A	7	–E1
Motor size **23** = NEMA 23 (2.3" / 57 mm)	K	M	D	M	1	F	S	D	**2**	**3**	A	7	–E1
Motor length *(5)* **A** = single stack **B** = double stack **C** = triple stack **D** = quad stack	K	M	D	M	1	F	S	D	2	3	**A**	7	–E1
Drive voltage *(5)* **7** = +12 to +75 VDC **6** = +12 to +60 VDC	K	M	D	M	1	F	S	D	2	3	A	**7**	–E1
Options Leave blank if not wanted Options may not be combined													**–E1**

–E___ = external optical encoder with index mark *(1)*

line count	100	200	250	256	400	500	512	1000	1024
single-end part #	E1	E2	E3	EP	E4	E5	EQ	E6	ER
differential part #	EAL	EBL	ECL	EWL	EDL	EHL	EXL	EJL	EYL

–N = rear control knob for manual positioning *(1)*

(1) Not available with industrial connector products.
(2) Only available with industrial connector products.
(3) Wire crimp connector at P1 includes communication, so the P2 designator is Z=none.
(4) Industrial connector at P1 includes communication, so the P2 designator is Z=none.
(5) Only quad stack motors have +12 to +60 VDC drives, all other motors have +12 to +75 VDC drives.

Easy MDrive part numbers via an interactive tool at:
www.imshome.com/MDrivePlus.html

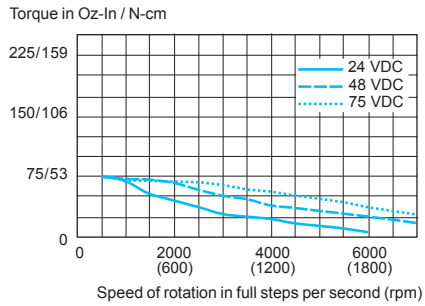
MDrive® 23 Plus
Step / direction input

Motor specifications MDrive 23

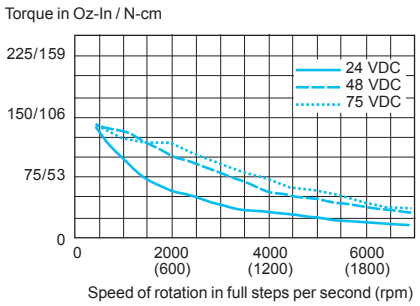
		Holding torque	Detent torque	Rotor inertia	Weight (motor + driver)
Motor stack length	Single	90.0 oz-in / 64.0 N-cm	3.9 oz-in / 2.7 N-cm	0.0025 oz-in-sec^2 / 0.18 kg-cm^2	21.6 oz / 612.3 g
	Double	144.0 oz-in / 102.0 N-cm	5.6 oz-in / 3.92 N-cm	0.0037 oz-in-sec^2 / 0.26 kg-cm^2	26.4 oz / 748.4 g
	Triple	239.0 oz-in / 169.0 N-cm	9.7 oz-in / 6.86 N-cm	0.0065 oz-in-sec^2 / 0.46 kg-cm^2	39.2 oz / 1111.3 g
	Quad	283.0 oz-in / 200.0 N-cm	14.2 oz-in / 10.0 N-cm	0.0108 oz-in-sec^2 / 0.76 kg-cm^2	61.6 oz / 1746.3 g

Speed torque characteristics MDrive 23

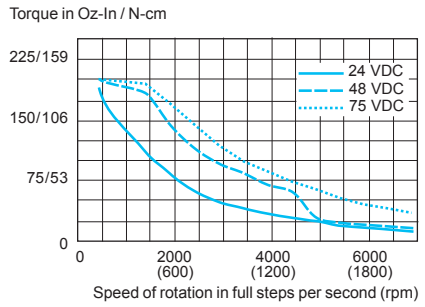
Single stack length



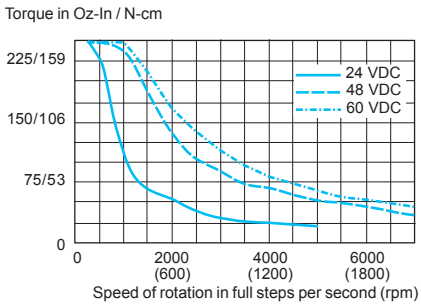
Double stack length



Triple stack length



Quad stack length



MDrive® Plus
Motion Control
fully programmable



MDrive®Plus Motion Control, fully programmable

Presentation

The MDrive® Plus Motion Control is a 1.8° 2-phase stepper motor with on-board fully programmable motion controller, drive electronics and optional encoder. This means MDrive Plus Motion Control products are stand-alone motion control solutions that can be used without any external controller.

Programming of MDrive Plus Motion Control products with RS-422/485 interface is accomplished with MCode, simple 1 to 2 character instructions, using the IMS Terminal software tool. MDrive Plus Motion Control products may also be equipped with encoders for stall detection, position maintenance and find index mark.

MDrive Plus Motion Control programming for Ethernet is accomplished with the same MCode instruction set used for the RS-422/485 products. Ethernet products also support MODBUS/TCP application protocol, per specification Version 1.1b, with operation in immediate mode, not as programmable products.

Application areas

The MDrive Plus Motion Control is ideal for machine builders who want an optimized motor with on-board electronics. The integrated electronics of the fully programmable MDrive Plus Motion Control reduces 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 2-phase stepper motor applications.

Features

Standard Plus

- Highly integrated microstepping drive and high torque 1.8° 2-phase stepper motor
- Advanced current control for exceptional performance and smoothness
- Single supply: from +12 up to +75 VDC or 120 and 240 VAC
- Cost effective
- Extremely compact
- 20 microstep resolutions to 51,200 steps/rev including: Degrees, Metric, Arc Minutes
- Auxiliary logic power supply input
- 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 +10 VDC, 0 to +5 VDC, 0-20 mA, 4-20 mA
- 0 to 5 MHz step clock rate selectable in 0.59 Hz increments
- RS-422/485 or Ethernet communication protocols *(1)*
- 62 software addresses for multi-drop communications *(2)*
- Simple 1 to 2 character instructions
- Available options:
  - Long life linear actuators *(3)*
  - Hybrid Motion Technology™ *(3)*
  - Encoders
  - Control knob for manual positioning
  - Industrial connectors with IP54 rating *(4)*
- Several motor stack lengths available
- Graphical user interface provided for quick and easy configuration and programming

Expanded Plus²

- +24 VDC tolerant I/O sourcing or sinking, inputs and outputs with up to 8 I/O lines and electronic gearing
- Closed loop control available with external / remote encoder option
- High speed position capture input or trip output

(1) Ethernet only available for MDrive23 products.
(2) Only with RS-422/485 products.
(3) See separate documentation.
(4) Industrial connectors are unavailable for MDrive14 or MDrive34 products.

MDrive® Plus
Motion Control
fully programmable

Standard Plus specifications

			MDrive 14	MDrive 17	MDrive 23 *(1)*	MDrive 23 *(1)*	MDrive 34	MDrive 34ac	
Input power	Voltage	VDC	12 to 48	12 to 48	12 to 75	12 to 60	12 to 75	—	—
		VAC	—	—	—	—	—	120	240
	Current maximum *(2)*		1A	2A	2A	3.5A	4A	95 to 132 VAC @ 50/60 Hz	95 to 264 VAC @ 50/60 Hz
Thermal	Operating temp non-condensing	Heat sink	–40° to +85°C				–40° to +75°C		
		Motor	–40° to +100°C				–40° to +90°C		
Protection	Type		not applicable					- Thermal - Over voltage/current	

Aux. logic input voltage	Range	+12 to +24 VDC *When input voltage is removed, maintains power only to control and feedback circuits.*		
Analog input	Resolution	10 bit		
	Voltage range	0 to +5 VDC, 0 to +10 VDC, 0-20 mA, 4-20 mA		
General purpose I/O	Number	4		
	Type	sourcing or sinking inputs, or sinking outputs		
	Logic range	Inputs and outputs tolerant to +24 VDC, inputs TTL level compatible		
	Output sink current	Up to 600 mA		
	Protection	Over temp, short circuit, transient over voltage, over voltage, inductive clamp		
Communication	Type	RS-422/485 or Ethernet *(3)*		
	Baud rate	4.8 to 115.2 kbps		
Motion	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 (requires encoder option)	Encoder resolution	512 lines/2048 edges per rev	
	Counters	Type	position, encoder/32 bit	
		Edge rate maximum	5 MHz	
	Velocity	Range	+/- 5,000,000 steps per second	
		Resolution	0.5961 steps per second	
	Accel/Decel	Range	1.5 x 10^9 steps per second^2	
		Resolution	90.9 steps per second^2	
Software	Program storage	Type/size	flash/6384 bytes	
	User registers	Four 32 bit		
	User program labels & variables	192		
	Math functions	+, –, ×, ÷, >, <, =, <=, >=, AND, OR, XOR, NOT		
	Branch functions	Branch and Call		
	General purpose I/O functions	Inputs	home, limit plus, limit minus, go, stop, pause, jog plus, jog minus, general purpose	
		Outputs	moving, fault, stall, velocity change, general purpose	
	Trip functions	Trip on input, trip on position, trip on time, trip capture, trip on relative position		
	Party mode addresses	62 *(4)*		
	Encoder functions	Stall detection, position maintenance, find index		

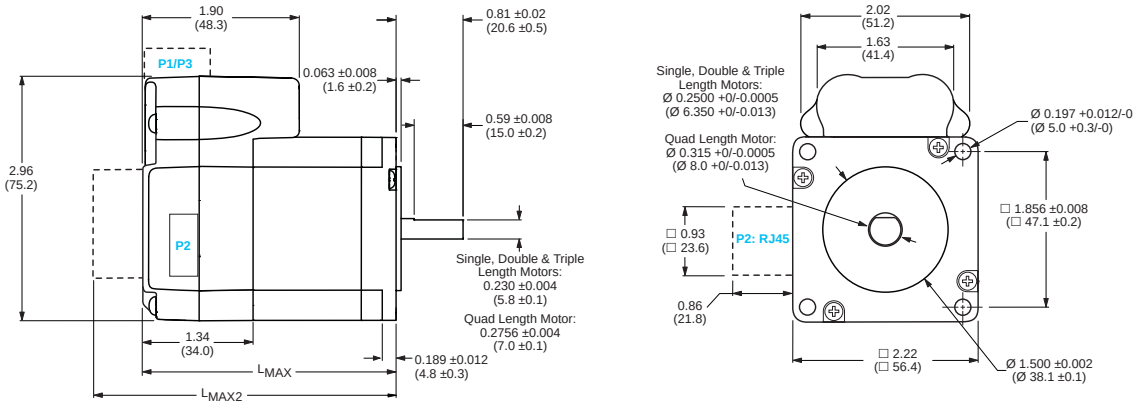
Expanded Plus^2 specifications *(5)*

General purpose I/O	Number	8 (or 4 when remote encoder option or Ethernet communications is selected)		
	Type	sourcing or sinking outputs/inputs		
	Logic range	Sourcing outputs +12 to +24 VDC, inputs and sinking outputs tolerant to +24 VDC, inputs TTL level compatible		
	Output sinking current	Up to 600 mA		
Motion	Electronic gearing	Range/resolution/ threshold – external clock in *(6)*		0.001 to 2.000/32 bit/TTL
		Input filter range		50 nS to 12.9 µS (10 MHz to 38.8 kHz)
		Range – secondary clock out *(6)*		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/input – speed/resolution/threshold		150 nS/32 bit/TTL
	Closed loop configuration (requires remote encoder)	Steps per revolution		Same as Standard Plus specification shown in section above
		Encoder type		User-supplied differential encoder
		Encoder resolution		User-defined

(1) Only quad stack NEMA 23 motors have +12 to +60 VDC drives, all other NEMA 23 motors have +12 to +75 VDC drives.
(2) Actual power supply current will depend on voltage and load.
(3) Ethernet only available with MDrive23 Plus products.
(4) Only with RS-422/485 products.
(5) MDrive34ac products available only as Plus^2 versions.
(6) Adjusting the microstep resolution can increase the range.

See User Manual for complete details: www.imshome.com/manuals.html

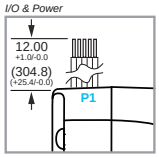
– Plus & Plus² – mechanical specifications, dimensions in inches (mm)



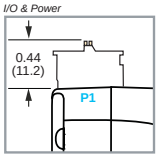
Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	2.65 (67.31)	3.36 (85.34)
Double	3.02 (76.71)	3.73 (94.74)
Triple	3.88 (98.55)	4.59 (116.59)
Quad	5.28 (134.15)	5.99 (152.19)

(1) Single shaft or internal encoder.
(2) Control knob or external encoder.

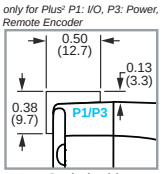
P1 connector options



12.0" (305mm) flying leads

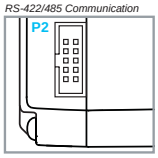


7-pin non-locking spring clamp terminal strip

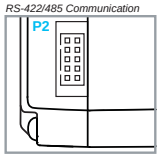


14- & 2-pin locking wire crimp connectors

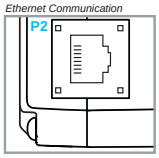
P2 connector options



10-pin non-locking IDC connector

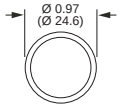


10-pin friction lock wire crimp connector



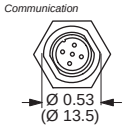
RJ45 connector for Ethernet only

Lmax2 option

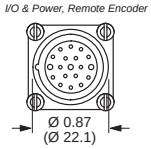


control knob

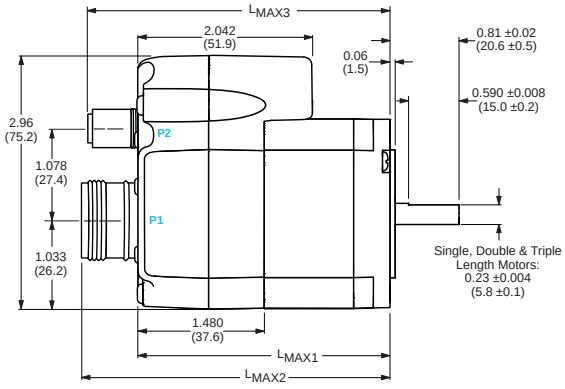
– Plus² with industrial connectors – mechanical specifications, dimensions in inches (mm)

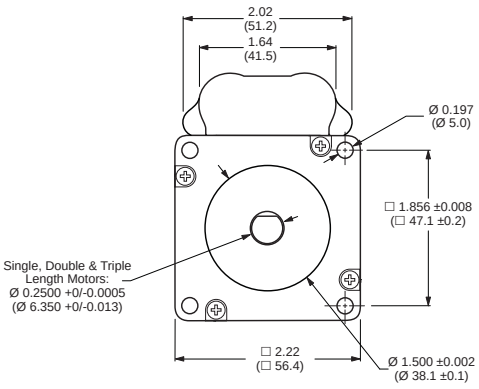


P2: 5-pin M12 (female) industrial connector



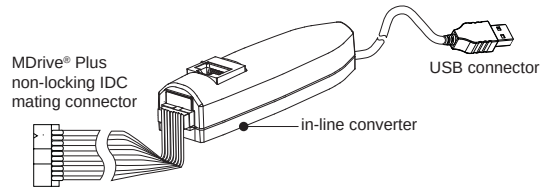
P1: 19-pin M23 (male) industrial connector



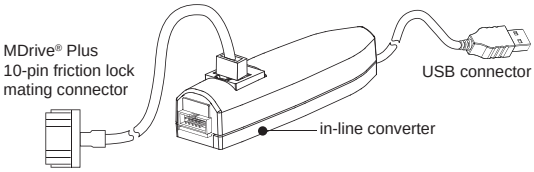


Motor stack length	Lmax	Lmax2	Lmax3
Single	2.82 (71.63)	3.48 (88.39)	3.42 (86.87)
Double	3.16 (80.26)	3.82 (97.03)	3.76 (95.5)
Triple	4.02 (102.11)	4.67 (118.62)	4.62 (117.35)

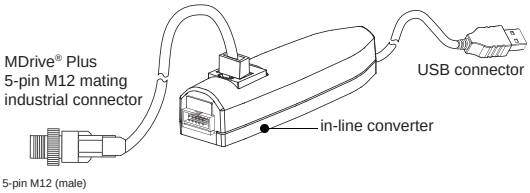
MDrive® 23 Plus
Motion Control
fully programmable



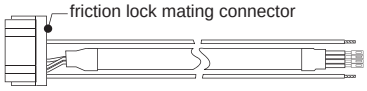
MD-CC400-001



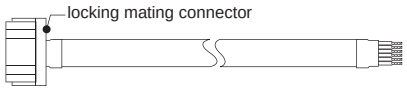
MD-CC402-001



MD-CC401-001



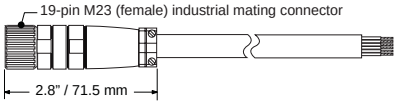
PD10-1434-FL3



PD14-2334-FL3



PD02-2300-FL3



MD-CS100-000

Installation accessories

Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive Plus initial functional setup and system testing.		
■ For MDrive23 Motion Control products	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 10-pin non-locking IDC connector	12.0 (3.6)	**MD-CC400-001**
■ Mates to 10-pin friction lock wire crimp connector	12.0 (3.6)	**MD-CC402-001**
■ Mates to 5-pin female M12 industrial connector	12.0 (3.6)	**MD-CC401-001**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 10-pin friction lock wire crimp connector for communication	10.0 (3.0)	**PD10-1434-FL3**
■ Mates to 14-pin locking wire crimp connector for I/O and remote encoder option	10.0 (3.0)	**PD14-2334-FL3**
■ Mates to 2-pin locking wire crimp connector for power	10.0 (3.0)	**PD02-2300-FL3**
■ Mates to 19-pin male M23 industrial connector with straight termination for I/O, power and remote encoder option	13.0 (4.0)	**MD-CS100-000**
■ Mates to 19-pin male M23 industrial connector with right angle termination for I/O, power and remote encoder option	13.0 (4.0)	**MD-CS101-000**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 10-pin friction lock wire crimp connector for communication	—	**CK-02**
■ 10-pin non-locking IDC connector for communication	—	**CK-01**
■ 14-pin locking wire crimp connector for I/O and remote encoder option	—	**CK-09**
■ 2-pin locking wire crimp connector for power	—	**CK-04**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive23 Motion Control products	—	**DPM75**

(1) See next page.

Connectivity details: www.imshome.com/connect.html

MDrive® 23 Plus
Motion Control
fully programmable

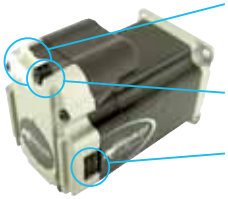
MDrive® 23 Plus



P1: I/O & Power
F = 12" flying leads
P = non-locking spring clamp terminal strip

P2: Communication
D = RS-422/485 with 10-pin IDC non-locking connector
L = RS-422/485 with 10-pin friction lock wire crimp connector

MDrive® 23 Plus²



P1: I/O, and optional remote encoder
C = 14-pin locking wire crimp connector

P3: Power
2-pin locking wire crimp connector

P2: Communication
D = RS-422/485 with 10-pin IDC non-locking connector
L = RS-422/485 with 10-pin friction lock wire crimp connector
R = Ethernet with RJ45 locking connector

MDrive® 23 Plus²
with industrial connectors



P2: Communication
Q = RS-422/485 with 5-pin M12 female industrial connector

P1: I/O & Power, and optional remote encoder
M = 19-pin M23 male industrial connector

Part numbers

Example:	K	M	D	I	1	F	R	D	2	3	A	7	–EQ
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	I	1	F	R	D	2	3	A	7	–EQ
MDrive Plus version **MDI** = Motion Control	K	**M**	**D**	**I**	1	F	R	D	2	3	A	7	–EQ
Input **1** = Plus, standard features **3** = Plus², expanded features **4** = Plus², expanded features, with industrial connectors, IP54-rated	K	M	D	I	**1**	F	R	D	2	3	A	7	–EQ
P1 connector **F** = flying leads **P** = pluggable **C** = wire crimp *(1)* **M** = M23 industrial connector *(2)*	K	M	D	I	1	**F**	R	D	2	3	A	7	–EQ
Communication **R** = RS-422/485 **E** = Ethernet *(1)*	K	M	D	I	1	F	**R**	D	2	3	A	7	–EQ
P2 connector **D** = IDC **L** = wire crimp **R** = RJ45 *(3)* **Q** = M12 industrial connector *(2)*	K	M	D	I	1	F	R	**D**	2	3	A	7	–EQ
Motor size **23** = NEMA 23 (2.3" / 57 mm)	K	M	D	I	1	F	R	D	**2**	**3**	A	7	–EQ
Motor length *(4)* **A** = single stack **B** = double stack **C** = triple stack **D** = quad stack	K	M	D	I	1	F	R	D	2	3	**A**	7	–EQ
Drive voltage *(4)* **7** = +12 to +75 VDC **6** = +12 to +60 VDC	K	M	D	I	1	F	R	D	2	3	A	**7**	–EQ
Options Leave blank if not wanted Options may be combined, unless noted													**–EQ**
–EQ = internal encoder, 512-line internal magnetic encoder with index mark													
–EE = remote encoder interface, differential encoder to be provided by user *(5)* *Available with Plus² versions only. May not be combined with internal encoder option.*													
–N = rear control knob for manual positioning *(5)*													

(1) Only available with Plus² products without industrial connectors.
(2) Only available with Plus² products with industrial connectors.
(3) Only available with products with Ethernet protocol.
(4) Only quad stack motors have +12 to +60 VDC drives, all other motors have +12 to +75 VDC drives.
(5) Not available with Ethernet or industrial connector products.

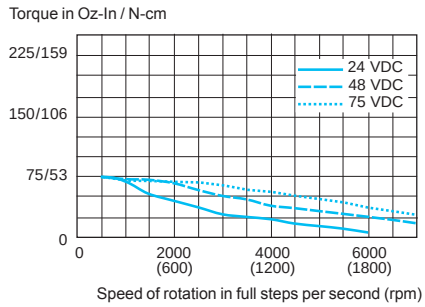
Easy MDrive part numbers via an interactive tool at:
www.imshome.com/MDrivePlus.html

Motor specifications MDrive 23

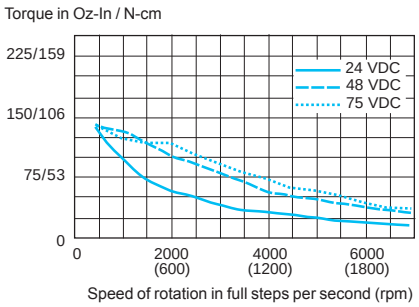
		Holding torque	Detent torque	Rotor inertia	Weight (motor + driver)
Motor stack length	Single	90.0 oz-in / 64.0 N-cm	3.9 oz-in / 2.7 N-cm	0.0025 oz-in-sec^2 / 0.18 kg-cm^2	21.6 oz / 612.3 g
	Double	144.0 oz-in / 102.0 N-cm	5.6 oz-in / 3.92 N-cm	0.0037 oz-in-sec^2 / 0.26 kg-cm^2	26.4 oz / 748.4 g
	Triple	239.0 oz-in / 169.0 N-cm	9.7 oz-in / 6.86 N-cm	0.0065 oz-in-sec^2 / 0.46 kg-cm^2	39.2 oz / 1111.3 g
	Quad	283.0 oz-in / 200.0 N-cm	14.2 oz-in / 10.0 N-cm	0.0108 oz-in-sec^2 / 0.76 kg-cm^2	61.6 oz / 1746.3 g

Speed torque characteristics MDrive 23

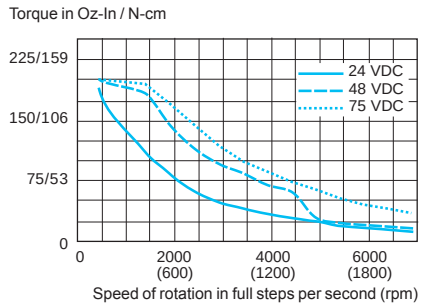
Single stack length



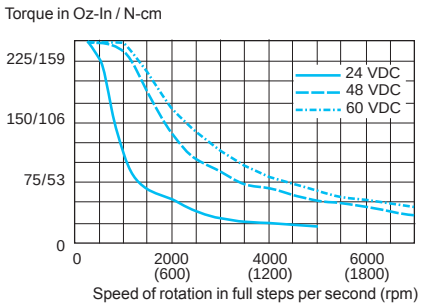
Double stack length



Triple stack length



Quad stack length



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