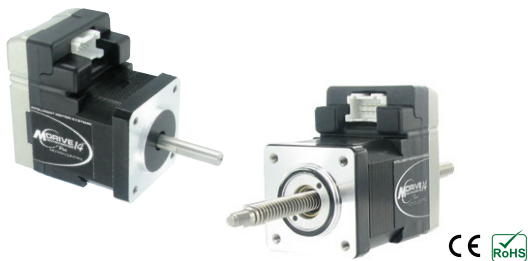


Quick Reference

MDrive® 14 Step/Direction Input



Notes and Warnings

Installation, configuration and maintenance must be carried out by qualified technicians only.

- Unexpected dangers may be encountered when working with this product!
- Incorrect use may destroy this product and connected components!
- The drives are not protected from reverse polarity power connection!

Detailed information on installation can be found in the user manuals. The user manuals are available for download from: <https://novantaims.com/downloads/>

Required for Setup*

- IBM compatible PC running Microsoft® Windows 7 or higher with available USB port.
- Monitor with a minimum of 1024 x 768 resolution.
- SPI Motor Interface (available online).
- +12 to +48 VDC linear or switching power supply.
- 0 to 5 MHz clock signal for step clock, may be a controller high speed output or signal generator.
- SPST switch or controller I/O point to control axis direction.
- SPI communications interface (e.g., MD-CC305-001 communication converter).

Depending on the MDrive connectors configuration, the following may be required:

- I/O, Power and Communications interface to 12-pin wire crimp connector (e.g., PD12-1434-FL3 prototype development cable).

* If the MDrive is purchased with a QuickStart Kit, all the connecting cables needed for initial functional setup and system testing are included.

Getting Started

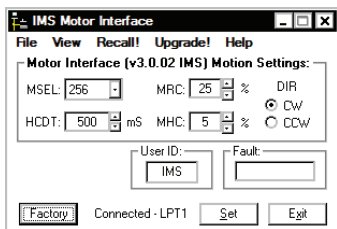
All documentation, software, and resources are available online at: <https://novantaims.com/>

Connecting Power and I/O

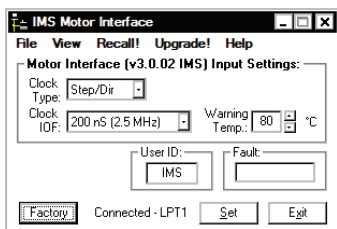
The MDrive is configured with power and I/O combined on a single connector. Refer to "Step/Direction Input Connectivity Options" on page 2 for connecting details and available connectivity options, including prototype development cables and mating connector kits.

Connecting Communications

1. Connect the USB of the SPI communications converter to the PC.
2. Connect the 12-pin connector of the SPI communications converter to the MDrive.
3. Install the communication converter drivers (available online) onto the PC.
4. Install and open the SPI Motor Interface.
5. Apply power to the MDrive.
6. Parameters may be adjusted via two screens, the Motor Settings screen or the I/O Settings screen (shown below), accessible via the View menu.



Motor Settings Screen



I/O Settings Screen

General Specifications

Electrical Specifications	
Input Voltage (+V) Range*	+12 to +48 VDC
Max Power Supply Current (Per unit)*	1 A

*Actual Power Supply Current will depend on voltage and load.

Environmental Specifications		
Operating Temperature (non-condensing)	Heat Sink	-40°C to +85°C
	Motor	-40°C to +100°C
IP Rated Sealing		IP20

Isolated Input Specifications		
Step Clock, Direction and Enable	Universal	Differential
Voltage Range (Sinking or Sourcing)	+5 to +24 VDC	0 to +5VDC
Input High Level Voltage	—	3.75 to 5.75 VDC
Input Low Level Voltage	—	≤1.2 VDC
Current (+5V Max)	8.7 mA	11.7 mA
Current (+24V Max)	14.6 mA	—

Motion Specifications	
Digital Filter Range	50 nS to 12.9 μS (10 MHz to 38.8 kHz)
Clock Types	Step/Direction, Up/Down, Quadrature
Step Frequency (Max)	5 MHz
Step Frequency Minimum Pulse Width	100 nS
Number of Microstep Resolution Settings	20

Available Microsteps Per Revolution					
per step	1	2	4	5	8
per rev.	200	400	800	1000	1600
per step	10	16	25	32	50
per rev.	2000	3200	5000	6400	10000
per step	64	100	125	128	200
per rev.	12800	20000	25000	25600	40000
per step	250	256	180	108	127
per rev.	50000	51200	36000 ¹	21600 ²	25400 ³

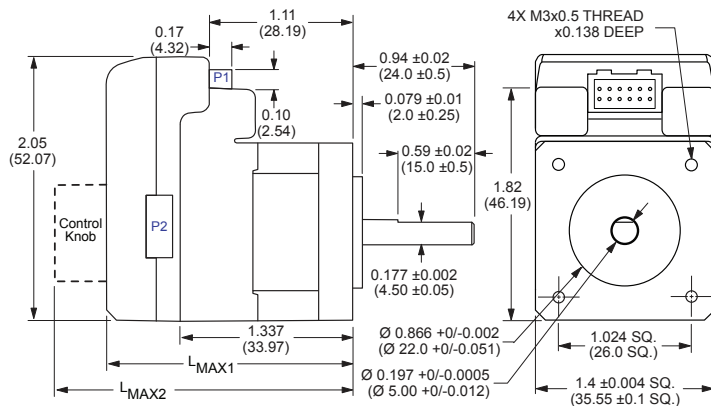
1=0.01 deg/μstep 2=1 arc minute/μstep 3=0.001 mm/μstep

Setup Parameters

Name	Function	Range	Units	Default
MHC	Motor Hold Current	0 to 100	Percent	5
MRC	Motor Run Current	1 to 100	Percent	25
MSEL	Microstep Resolution	See Motion Specifications	μsteps/ 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	See Motion Specifications	—	Step/ Direction
CLK IOF	Clock Input Filter	50 nS to 12.9 μS (10 MHz to 38.8 kHz)	nS (MHz)	200 nS (2.5MHz)
EN ACT	Enable Active High/Low	High/Low	—	High
USER ID	User ID	3 Characters Viewable ASCII	Viewable ASCII	IMS

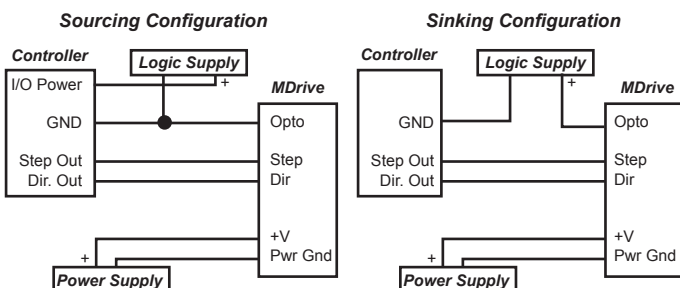
Mechanical Specifications

NOTE: For linear actuator products, see manual for screw specifications.



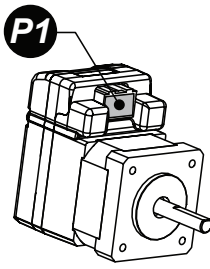
Motor Length	Dimensions in inches (mm)	
	LMAX1 (Single Shaft or Internal Encoder)	LMAX2 (Control Knob)
Single	1.93 (49.02)	2.62 (66.55)
Triple	3.03 (76.96)	3.73 (94.74)

Minimum Required Connections



MDrive 14

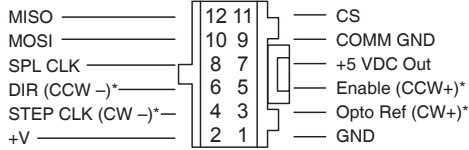
Step/Direction Input Connectivity Options



Connector Style	Function
P1 12-pin Wire Crimp.....	I/O, Power and Communications

P1 I/O, Power and Communications

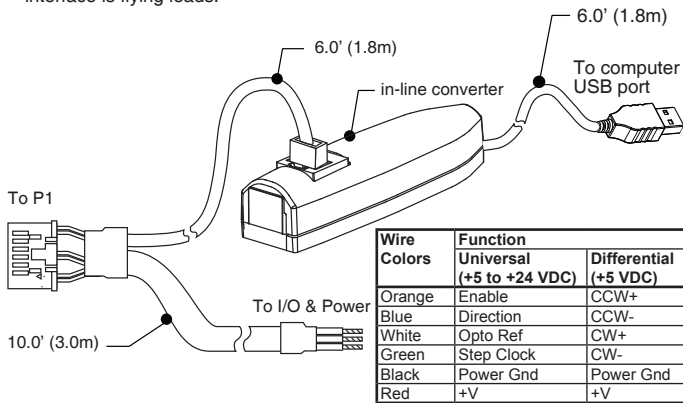
12-pin wire crimp



*Differential inputs shown in parenthesis

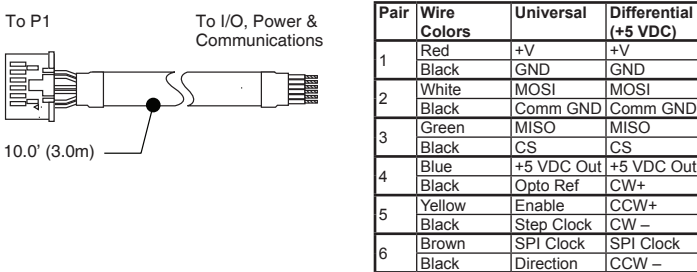
Communications Converter p/n: MD-CC305-001

Electrically isolated in-line USB to SPI converter pre-wired with mating connector to conveniently program and set configuration parameters. I/O and power interface is flying leads.



Prototype Development Cable p/n: PD12B-1434-FL3

Speed test and development with pre-wired mating connector.



Mating Connector Kit p/n: CK-08

Use to make cables, kit contains 5 mating connector shells with crimp pins. JST crimp tool recommended.

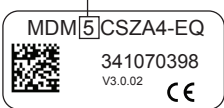
JST Parts Shell: PADP-12V-1-S Pins: SPH-001T-P0.5L

Differential Input Option

Replaces the 0 to 24VDC Universal inputs with +5 VDC tolerant line driven differential inputs.

The differential input version is recognizable by the number "5" in the fourth place in the part number label located on the bottom of the motor.

5 = Differential Inputs

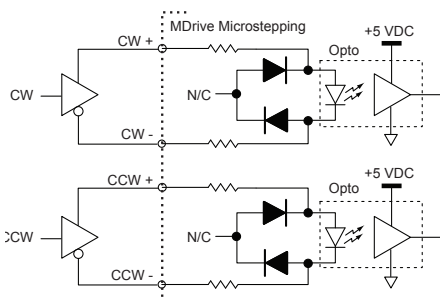


Interface Connections

The inputs replaced are shown in the table on the right with the differential input counterpart.

Universal Input	Differential Input
Opto Reference	CW +
Step Clock Input	CW -
CW/CCW Direction Input	CCW -
Enable Input	CCW +

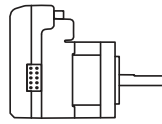
NOTE: The differential inputs have a maximum input voltage of 5.75 VDC! **DO NOT EXCEED THIS LEVEL!**



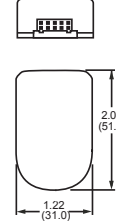
Encoder Options

Three (3) different encoder styles are available, detailed below. Refer to the product manual for pin numbering if building the interface cable.

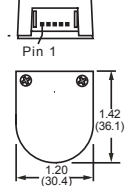
Internal Differential Magnetic



External Differential Optical



External Single-End Optical



Optional Encoder Cables

p/n: PD10-3400-FL3
10.0' (3.0 m)

wire color: signal
Orange/White: CH B-
White/Orange: CH B+
White/Blue: IDX+
Blue/White: IDX-
White/Green: CH A+
Green/White: CH A-
White/Brown: Ground
Brown/White: N/C

p/n: ED-CABLE-6
6.0' (1.8 m)

wire color: signal
Orange/White: +5 VDC In
White/Orange: Ground
White/Blue: CH A-
Blue/White: CH A+
White/Green: CH B-
Green/White: CH B+
White/Brown: IDX-
Brown/White: IDX+

p/n: ES-CABLE-2
12" (30.4 cm)

wire color: signal
(Pin 1) Brown: Ground
Violet: IDX
Blue: CH A
Orange: +5 VDC In
Yellow: CH B