Quick Reference

MDrive® 14 Step / direction input

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

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									
200	400	800	1000	1600	2000	3200	5000	6400	10000
12800	20000	25000	25600	40000	50000	51200	36000[1]	21600[2]	25400[3]

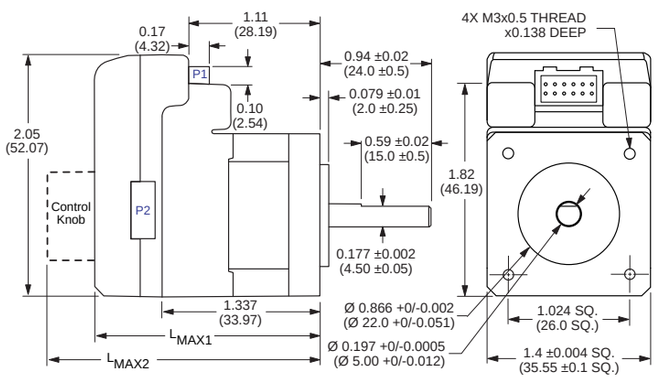
1=0.01 deg/µstep 2=1 arc minute/µstep 3=0.001 mm/µstep

Setup Parameters

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

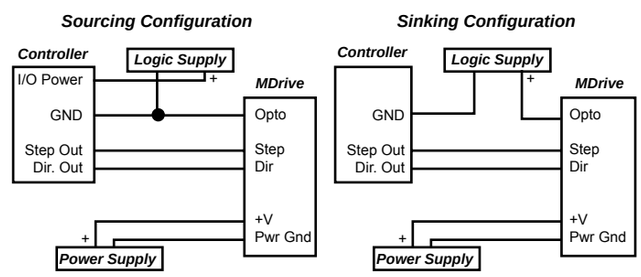
Mechanical Specifications

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



	Dimensions in inches (mm)	
Motor Length	**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



Notes and Warnings

Installation, configuration and maintenance must be carried out by qualified technicians only. You must have detailed information to be able to carry out this work. This information can be found in the user manual.

- Unexpected dangers may be encountered when working with this product!
- Incorrect use may destroy this product and connected components!

The user manual is not included, but may be obtained from the Internet at: http://www.imshome.com/downloads/manuals.html.

Required for Setup*

- PC running Microsoft® Windows XP Service Pack 2 or greater.
- SPI Motor Interface (available online).
- +12 to +48 VDC unregulated 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 (recommended: MD-CC305-001 communication converter).

Depending on your MDrive connectors configuration, you may also need:

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

** If you purchased your MDrive with a QuickStart Kit, you have received all of the connecting cables needed for initial functional setup and system testing.*

Getting Started

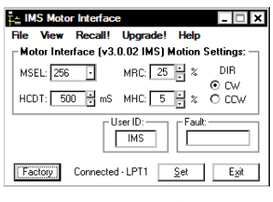
All documentation, software and resources are available online at: http://www.imshome.com/products/mdrive_motor_driver.html.

Connecting Power and I/O

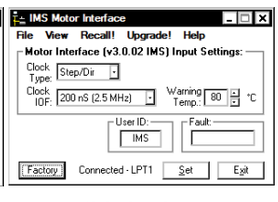
Your MDrive is configured with power and I/O combined on a single connector. Please refer to the opposite side of this document for connecting details and available connectivity options including prototype development cables and mating connector kits.

Connecting Communications

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

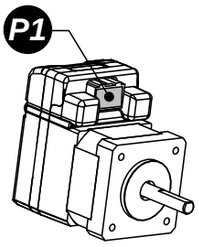


Motor Settings Screen



I/O Settings Screen

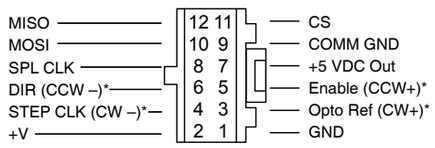
MDrive 14
Step / direction input
Connectivity Options



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

P1 I/O, Power and Communications

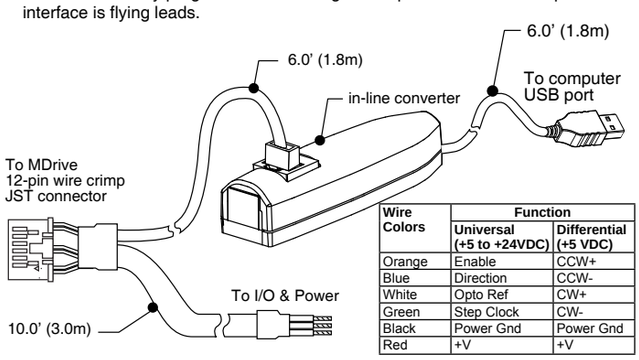
12-pin wire crimp



*Differential inputs shown in parenthesis

Communications Converter p/n: MD-CC305-001

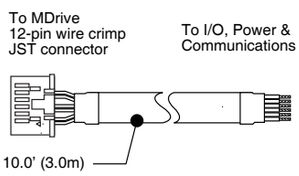
Electrically isolated in-line USB to SPI converter pre-wired with mating connector to conveniently program and set configuration parameters. I/O and power interface is flying leads.



Wire Colors	Function	
	Universal (+5 to +24VDC)	Differential (+5 VDC)
Orange	Enable	CCW+
Blue	Direction	CCW-
White	Opto Ref	CW+
Green	Step Clock	CW-
Black	Power Gnd	Power Gnd
Red	+V	+V

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

Speed test and development with pre-wired mating connector.



Pair	Wire Colors	Universal	Differential (+5 VDC)
1	Red	+V	+V
	Black	GND	GND
2	White	MOSI	MOSI
	Black	Comm GND	Comm GND
3	Green	MISO	MISO
	Black	CS	CS
4	Blue	+5 VDC Out	+5 VDC Out
	Black	Opto Ref	CW+
5	Yellow	Enable	CCW+
	Black	Step Clock	CW –
6	Brown	SPI Clock	SPI Clock
	Black	Direction	CCW –

Mating Connector Kit p/n: CK-08

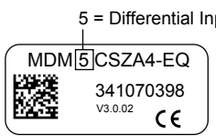
Use to make your own cables, kit contains 5 mating connector shells with crimp pins. JST crimp tool recommended.

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.



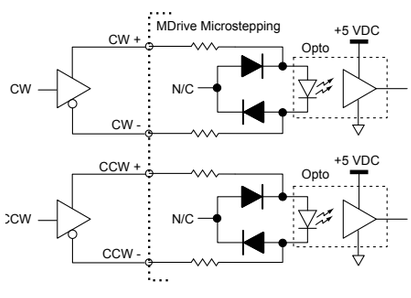
Interface Connections

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

NOTE! The differential inputs have a maximum input voltage of 5.75 VDC!

DO NOT EXCEED THIS LEVEL!

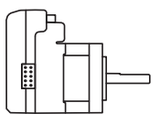
Universal Input	Differential Input
Opto Reference	CW +
Step Clock Input	CW –
CW/CCW Direction Input	CCW –
Enable Input	CCW +



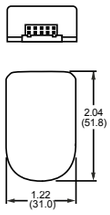
Encoder Options

Three (3) different encoder styles are available, detailed below. Please see the product manual for pin numbering if building your own interface cable.

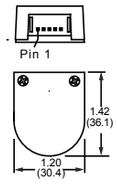
Internal
Differential Magnetic



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

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