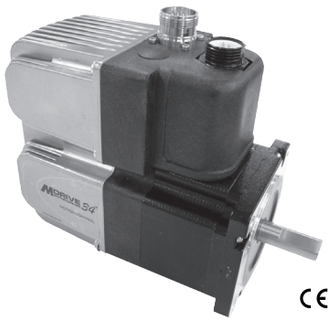
Quick Reference

MDrive® 34AC Step/Direction Input



Novanta IMS

Notes and Warnings

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

- Motor overload protection and over temperature sensing is required.
- 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/dloads/

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).
- MD-CS200/201-000 or equivalent Lumberg mating connector/cordset for AC power.
- 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.
- I/O and SPI communications interface (e.g., MD-CC301-001).

** 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

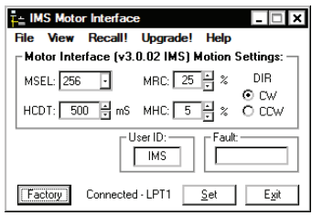
All documentation, software, and resources are available online at: https://novantaims.com/

Connecting Power and I/O

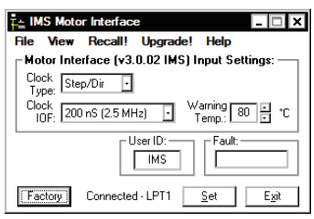
The MDrive is configured with power and I/O on separate connectors. Refer to "Step/Direction Input Connectivity Options" on page 2 for connecting details and available connectivity recommendations.

Connecting Communications

1. Connect the USB of the SPI communications converter to the PC.
2. Connect the 19-pin M23 connector of the SPI communications converter to the MDrive.
3. Install and open SPI Motor Interface.
4. Apply power to 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

General Specifications

Electrical Specifications	
Input Voltage Range (120 VAC MDrive)	95 to 132 VAC @ 50/60 Hz
Input Current (120 VAC MDrive)	4.2 Amps
Input Voltage Range (240 VAC MDrive)	95 to 264 VAC @ 50/60 Hz
Input Current (240 VAC MDrive)	2.1 Amps

Environmental Specifications		
Operating Temperature (non-condensing)	Heat Sink	-40°C to +75°C
	Motor	-40°C to +90°C
IP Rated sealing		IP54

Isolated Input Specifications	
Step Clock, Direction and Enable	
Voltage Range (Sinking or Sourcing)	+5 to +24 VDC
Current (+5V Max)	8.7 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

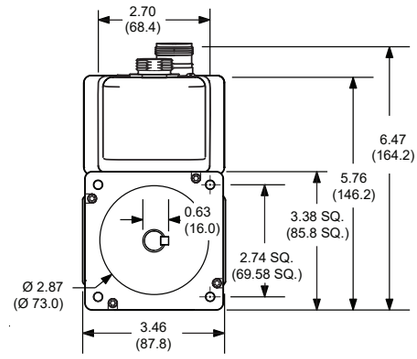
Protection Specifications
Thermal
Internal Fuse (Line-Neutral Systems Only, Line-Line Systems Require External Fusing)

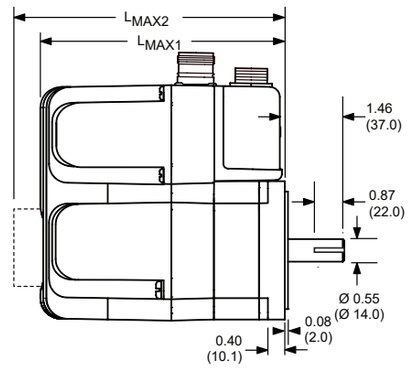
Temp. Warning Output Specifications	
Type	Open Drain
Drain-Source Voltage	+5 to +24 VDC
Drain Current	50 mA

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
WARN TEMP	Over Temperature Warning	0 to 125	°C	80

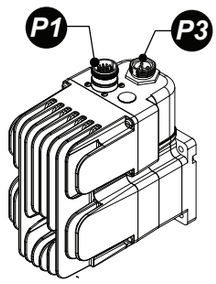
Mechanical Specifications





	Dimensions in inches (mm)	
Motor Length	**LMAX1 (Single Shaft or Internal Encoder)**	**LMAX2 (Control Knob)**
Single	6.1 (155.0)	7.1 (180.4)
Double	6.9 (174.3)	7.9 (199.7)
Triple	8.4 (214.3)	9.4 (239.79)

MDrive 34AC
Step/Direction Input Connectivity Options

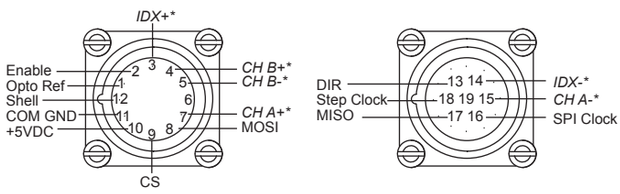


	Connector Style	Function
P1	19-pin M23 Circular.....	I/O, Communications and Encoder
P3	3-pin Euro AC.....	Power

P1 I/O, Communications and Optional Internal Encoder

19-pin M23 industrial connector (male)

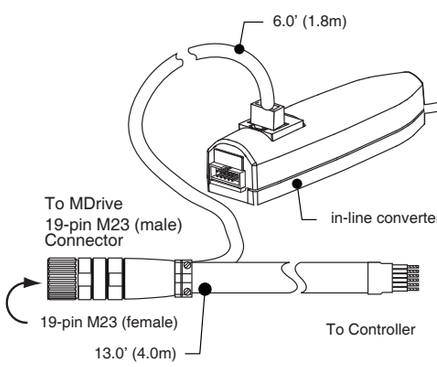
Outside: Pins 1 -12 **Inside: Pins 13 -19**



**No Connect unless populated for the optional internal magnetic differential encoder*

Communications Converter p/n: MD-CC301-001

Electrically isolated in-line USB to SPI converter pre-wired with mating connector to conveniently program and set configuration parameters. A secondary cable from the mating connector provides interface to power and I/O.

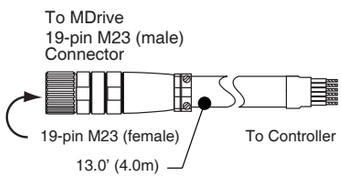


Wire Colors	Function
Violet	Opto Ref.
Red	Enable
Blue	N/C
Black	Comm GND
Green/Yellow	Shell
Yellow/Brown	Direction
Gray/Brown	Step Clock
Brown	N/C

Optional Internal Encoder	
Wire Colors	**Function**
Gray	IDX+
Red/Blue	CH B+
Green	CH B-
Gray/Pink	CH A+
Brown/Green	IDX -
White	CH A-

Prototype Development Cordset p/n: MD-CS100/101-000

Speed test and development with pre-wired mating connector.



Wire Colors	Function
Violet	Opto Ref.
Red	Enable
Blue	N/C
White/Green	MOSI
White/Yellow	CS
White/Gray	+5 VDC
Black	Comm GND
Green/Yellow	Shell
Yellow/Brown	Direction
Yellow	SPI Clock
Pink	MISO
Gray/Brown	Step Clock
Brown	N/C

Optional Internal Encoder	
Wire Colors	**Function**
Gray	IDX+
Red/Blue	CH B+
Green	CH B-
Gray/Pink	CH A+
Brown/Green	IDX -
White	CH A-

Mating Connector Recommendations

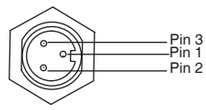
The MD-CS100-000 is recommended with 19-pin M23 connector.

For comparable connector only, shop vendors:

Lumberg
Phoenix
Turck
RDE Connectors

P3 AC Power

3-pin Euro AC connector (male)

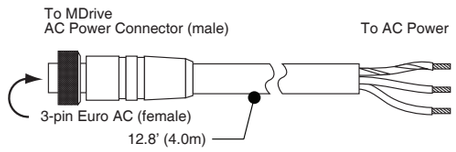


Prototype Development Cordset

p/n (straight connector): MD-CS200-000
p/n (right-angle connector): MD-CS201-000

Pre-wired mating connector interfaces to an MDrive's 3-pin circular EuroAC connector, with flying leads other end, for quick test/development.

Note that this cable or equivalent Lumberg mating connector/cable must be used to meet UL conditions of acceptability.



Wire Colors	Function
Green/Yellow	Earth
Brown	AC Line
Blue	AC Neutral

Mating Connector Recommendations

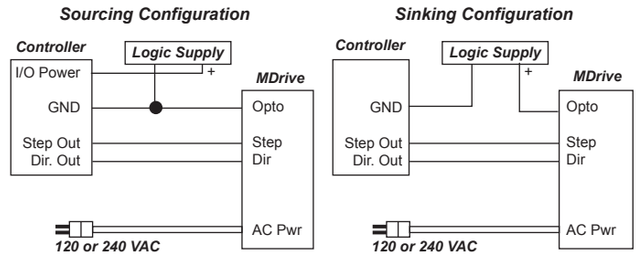
The following field-solderable mating connector is recommended for use with the MDrive AC. Use of this connector meets UL Acceptability requirements.

Lumberg: RKC 30/11

Minimum Required Connections

The diagrams below represent the minimum connections required to operate the MDrive Microstepping.

Sourcing Configuration ***Sinking Configuration***



UL Conditions of Acceptability

When used in end-product equipment, the following are among the considerations to be made:

The temperature tests were conducted with the device's face mounted to an aluminum heat sink. For devices with the frame designation 34, the dimensions for the heat sink were 10" x 10" x ¼". The shaft was also provided with aluminum wheels, approximately 4" in diameter and ¼" thick.

These devices are intended for installation in a Pollution Degree 2 (controlled) environment. Suitability of the spacings shall be considered in end-use application.

The enclosure of this device is intended as the final end-use enclosure.

These devices do not provide motor overload protection.

These devices have not been subjected to the short circuit test. This test shall be considered in the end-product investigation.

The following MDrive AC products are excluded from UL Recognition:

1. MDrive AC models with a rear motor shaft extension, i.e. Control Knob versions.