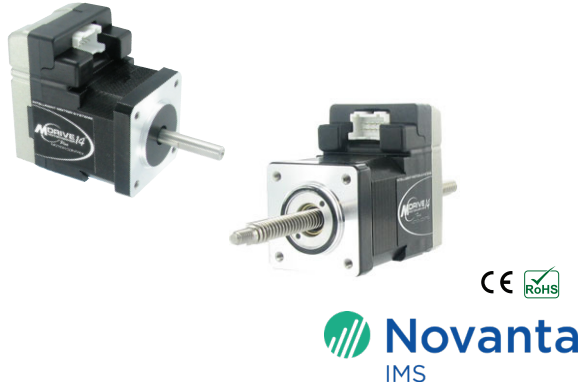


## Quick Reference

# MDrive® 14 IP20 Motion Control



### 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.
- SEM Terminal integrated program editor and terminal emulator (available online).
- Monitor with a minimum of 1024 x 768 resolution.
- +12 to +48 VDC linear or switching power supply.
- RS-422/485 communications interface (e.g., MD-CC403-001 or MD-CC402-001 Communication Converters) or CANopen communications converter (e.g., MD-CC500-000).

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

- I/O, Power and Communications interface to the 12-pin wire crimp connector (e.g., PD12B-1434-FL3 prototype development cable).
- I/O and Power interface to 16-pin wire crimp connector (e.g., PD16-1417-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

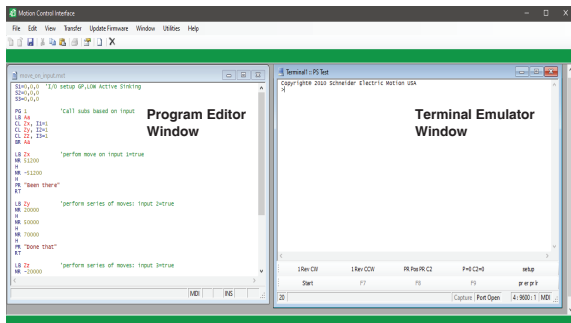
All documentation, software and resources are available online at: <https://novantaims.com/downloads/>.

#### Connecting Power and I/O

The MDrive is configured with power and I/O combined on a single connector. Refer to the "Motion Control Connectivity Options" on page 2 for connection details and available connectivity options, including Prototype Development Cables and Mating Connector Kits.

#### Connecting Communications — RS-422/485

1. Connect RS-422/485 communications converter to MDrive and PC.
2. Install the communication converter drivers onto PC (available online).
3. Install and open SEM Terminal.
4. Apply power to MDrive.
5. Within SEM Terminal, click into the Terminal Window (shown below).
6. Key in CTRL+C. The MDrive sign-on message: "Copyright XXXX Schneider Electric Motion USA." should appear, verifying that communications is active.



#### Connecting Communications — CANopen

A "Getting Started" tutorial using the CANopen Tester GUI with the MD-CC500-000 USB to CANopen dongle is located in the CANopen implementation manual, available online at: <https://novantaims.com/downloads/>

### General Specifications

#### Electrical Specifications

Input Voltage (+V) Range*	+12 to +48 VDC
Max Power Supply Current (Per MDrive 14)*	1 A
Aux-Logic Input Voltage**	+12 to +24 VDC
Aux-Logic Input Current**	161 mA Max

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

\*\*Used to power logic circuitry in the absence of +V.

#### Environmental Specifications

Operating Temperature (non-condensing)	Heat Sink	-40°C to +85°C
	Motor	-40°C to +100°C
IP-rated sealing		IP20

#### I/O Specifications

General Purpose I/O - Number and Type	
I/O Points 1-4	4 I/O programmable as inputs (sinking or sourcing) or outputs (sinking)
I/O Points 1-4, 9-12 (Plus <sup>2</sup> expanded feature)	8 I/O programmable as inputs or outputs (sinking or sourcing)
General Purpose I/O - Electrical	
Inputs	TTL up to +24 VDC
Sinking Outputs	Up to +24 VDC
Sourcing Outputs (Plus <sup>2</sup> expanded feature)	+12 to +24 VDC
Output Sink Current	up to 600 mA (one channel)
Output Sink Current (Plus <sup>2</sup> expanded feature)	up to 600 mA (one channel in each I/O bank)
Logic Threshold (Logic 0)	< 0.8 VDC
Logic Threshold (Logic 1)	> 2.2 VDC
Protection (Sinking)	Over Temp, Short Circuit
Protection (Sourcing)	Transient Over Voltage, Inductive Clamp
Analog Input	
Resolution	10 Bit
Range (Voltage Mode)	0 to +5 VDC, 0 to +10 VDC
Range (Current Mode)	4 to 20 mA, 0 to 20mA
Clock I/O	
Types	Step/Direction, Up/Down, Quadrature
Logic Threshold	+5V TTL Input, TTL Output (with 2 kΩ load to ground)
Trip Output/Capture Input	
Logic Threshold	+5V TTL Input, TTL Output (with 2 kΩ load to ground)

#### Communications Specifications

Protocol	RS-422/RS-485
BAUD Rate	4.8k, 9.6k, 19.2k, 38.4k, 115.2 kbps
CANopen Option	
Protocol	CAN 2.0B Active
Communications Profile	CiA DS-301
BAUD Rate	10, 20, 50, 125, 250, 500, 800 kBit/s, 1MBit/s (default)
<b>NOTE: 800 kbps not supported by the MD-CC500-000 USB to CANopen dongle.</b>	

#### Motion Specifications

Microstep Resolution - Open Loop	
Number of Resolutions	20

	Available Microsteps Per Revolution				
	1	2	4	5	8
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 <sup>1</sup>	21600 <sup>2</sup>	25400 <sup>3</sup>

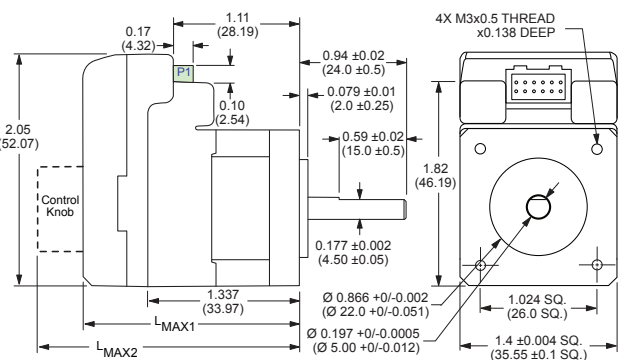
1=0.01 deg/μstep 2=1 arc minute/μstep 3=0.001 mm/μstep

#### Software Specifications

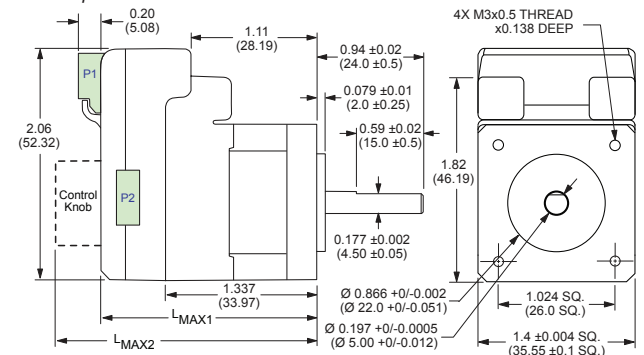
Program Storage Type/Size	Flash/6384 Bytes
User Program Labels and Variables	192
Party Mode Addresses	62

### Mechanical Specifications

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



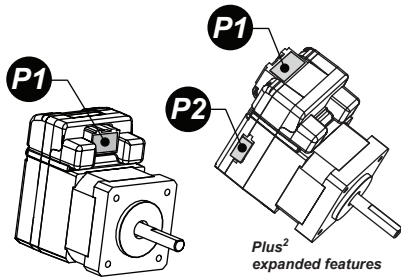
#### Plus<sup>2</sup> expanded feature



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)

# MDrive 14

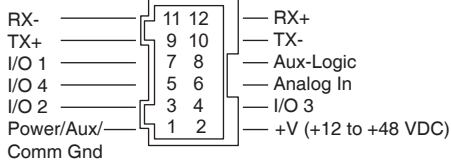
## Motion Control Connectivity Options



Connector Style	Function
<b>P1</b> 12-pin Wire Crimp.....	I/O, Power & Communications
<i>with Plus² expanded features</i>	
16-pin Wire Crimp.....	I/O & Power
<b>P2</b> <i>with Plus² expanded features</i>	
10-pin Wire Crimp.....	Communications
DB-9M.....	Communications (CANopen version)

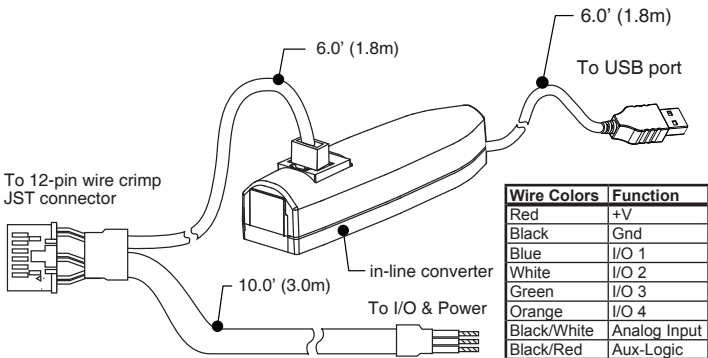
### **P1** I/O, Power & Communications

#### 12-pin wire crimp



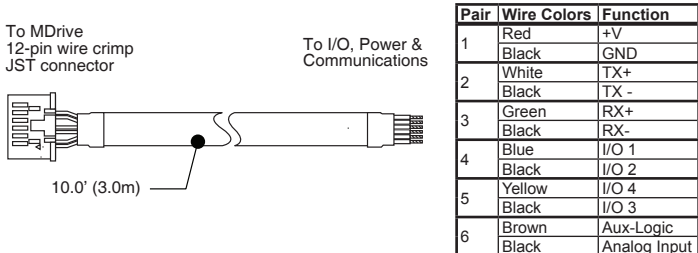
#### Communications Converter p/n: MD-CC403-001

Electrically isolated in-line USB to RS-422/485 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

### **P2** Communications — CANopen Version

#### DB-9 (Female)

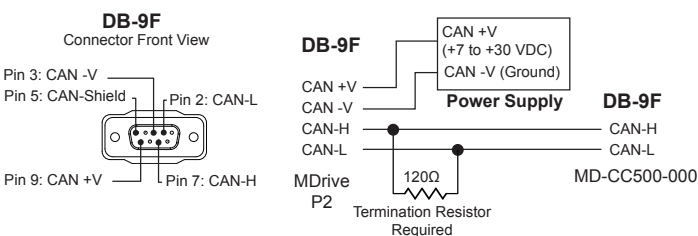
#### Communications Converter p/n: MD-CC500-000

Electrically isolated in-line USB to CANopen converter. USB "A" Type connector to DB-9 (Male). An Interface cable must be constructed by the user to interface to the MDrive.

#### Mating Cable Requirements

The following diagram illustrates the parts and connections for an interface cable connecting the MD-CC500-000 to the MDrive.

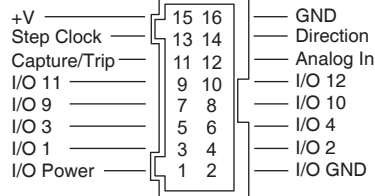
Parts Required Connectors: (2) DB-9 (female)  
Power Supply: +7 to +30 VDC  
Terminating Resistor: 120 Ω 1%



Pin	Function	Description
1	N/C	Not Connected
2	CAN low	CAN_L Bus Line (Low Dominant)
3	CAN -V	CAN Communication GND
4	N/C	Not Connected
5	Shield	Optional CAN Shield
6	CAN -V	Optional GND
7	CAN high	CAN_H Bus Line (high dominant)
8	N/C	Not Connected
9	CAN +V	+7 to +30 VDC Power Supply

### **P1** I/O & Power

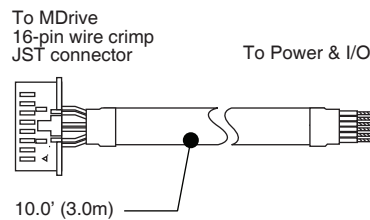
#### 16-pin wire crimp



Remote Encoder Option	
Pin	Function
7	CH A+
8	CH A-
9	CH B+
10	CH B-
13	IDX +
14	IDX -

#### Prototype Development Cable p/n: PD16-1417-FL3

Speed test and development with pre-wired mating connector.



Pair	Wire Colors	Function	Encoder Function
1	White	Step Clock	IDX-
	Black	Direction	IDX+
2	Green	Capt/Trip	Capt/Trip
	Black	Analog In	Analog In
3	Blue	I/O 11	CH B+
	Black	I/O 12	CH B-
4	Yellow	I/O 9	CH A+
	Black	I/O 10	CH A-
5	Brown	I/O 3	I/O 3
	Black	I/O 4	I/O 4
6	Orange	I/O 1	I/O 1
	Black	I/O 2	I/O 2
7	Red	I/O Power	I/O Power
	White	I/O Ground	I/O Ground
8	Red	+V	+V
	Black	Power GND	Power GND

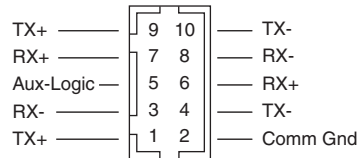
#### Mating Connector Kit p/n: CK-10

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

JST Parts Shell: PADP-16V-1-S  
Pins: SPH-001T-P0.5L

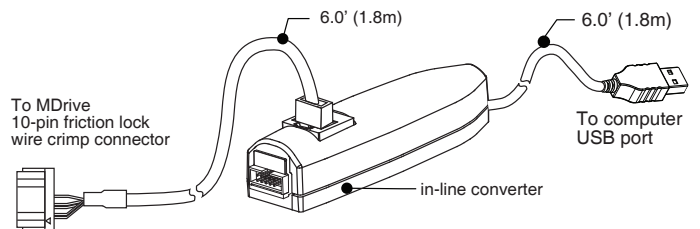
### **P2** Communications — RS-422/485

#### 10-pin wire crimp



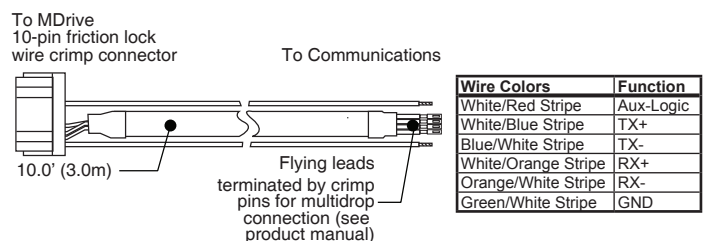
#### Communications Converter p/n: MD-CC402-001

Electrically isolated in-line USB to RS-422/485 converter pre-wired with mating connector to conveniently program and set configuration parameters.



#### Prototype Development Cable p/n: PD10-1434-FL3

Speed test and development with pre-wired mating connector. Recommended for multi-drop systems, can be used in conjunction with the MD-CC402-001.



#### Mating Connector Kit p/n: CK-02

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

Hirose Parts Shell: DF11-10DS-2C  
Pins: DF11-2428SC