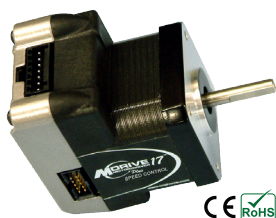


# Quick Reference MDrive17Plus Speed Control



**IMS™ INTELLIGENT MOTION SYSTEMS, INC.**

by Schneider Electric

## 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 manuals.

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

The user manuals are not included. You can obtain them from the Internet at: [http://www.imshome.com/mdrive17plus\\_mdo.html](http://www.imshome.com/mdrive17plus_mdo.html).

## Required for Setup\*

- PC running Microsoft® Windows XP Service Pack 2 or greater.
- IMS SPI Motor Interface (available online)
- +12 to +48 VDC unregulated linear or switching power supply. (Recommended: IMS IP404 or ISP200-4)
- 10 kΩ Potentiometer for velocity control (or appropriate current source if using current mode)
- Two (2) SPST switches or controller I/O points to control axis direction and the on/off state of the internal clock generator.
- SPI communications interface (Recommended: IMS MD-CC300-001 or MD-CC302-001 Communication Converters)

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

- If using a 7-pin pluggable terminal IMS recommends 22 AWG shielded twisted pairs for logic wiring. Wire gauge for power connection varies with the distance from the MDrive and current. See MDrivePlus product manual.

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

## Getting Started

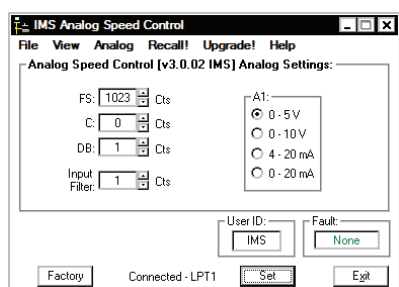
All documentation, software and resources are available online at: [http://www.imshome.com/mdrive17plus\\_mdo.html](http://www.imshome.com/mdrive17plus_mdo.html)

## Connecting Power and I/O

Your MDrivePlus 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 IMS connectivity options including Prototype Development Cables and Mating Connector Kits.

## Connecting Communications

1. Connect IMS USB to SPI communications converter to MDrivePlus and PC.
2. Install the communication converter drivers onto PC (available online).
3. Install and open SPI Motor Interface.
4. Apply power to MDrivePlus.
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.



## MDrive17Plus Speed Control Specifications

Electrical Specifications		
Input Voltage (+V) Range*	+12 to +48 VDC	
Max Power Supply Current (Per MDrive17Plus)*	2 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
Input Specifications		
Analog Input		
A/D Resolution	10 Bit	
Range (Voltage Mode)	0 to +5VDC, 0 to +10 VDC	
Range (Current Mode)	0 to 20 mA, 4 to 20 mA	
Range (PWM)	15 to 20 kHz	
Stop/Start and Direction		
Range	TTL	
Logic Threshold (Logic 0)	< 0.8 VDC	
Logic Threshold (Logic 1)	> 2.2 VDC	
Internal Pull-Up Resistance	20 kΩ	
Protection	Transient	

Communications Specifications	
Protocol	SPI

Motion Specifications	
Velocity	
Oscillator Frequency (Max.)	5 MHz
Resolution	0.5961 Steps/Second
Acceleration/Deceleration	
Range	1.5 x 10 <sup>9</sup> Steps/Second <sup>2</sup>
Resolution	90.9 Steps/Second <sup>2</sup>
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 <sup>1</sup>	21600 <sup>2</sup>	25400 <sup>3</sup>

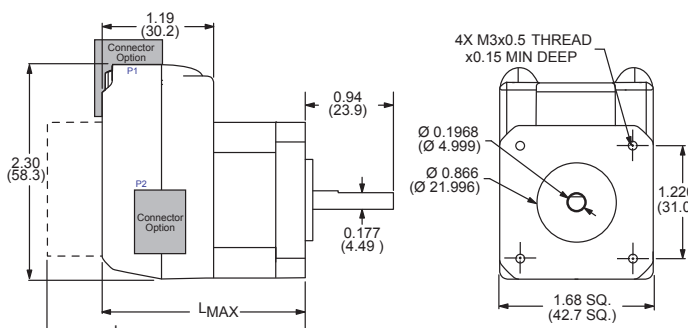
1=0.01 deg/μstep 2=1 arc minute/μstep 3=0.001 mm/μstep

## Setup Parameters

MDrivePlus Speed Control Setup Parameters				
Name	Function	Range	Units	Default
A1	Analog Input Mode	0 to +5 VDC, 0 to +10 VDC, 4 to 20 mA, 0 to 20 mA, 15 to 25kHz PWM	—	0 to +5 VDC
ACCL	Acceleration	91 to 1.5 X 10 <sup>9</sup>	steps/sec <sup>2</sup>	1,000,000
C	Joystick Center	0 to 1022	counts	0
DB	Deadband	0 to 255	counts	1
DECL	Deceleration	91 to 1.5 X 10 <sup>9</sup>	steps/sec <sup>2</sup>	1,000,000
DIR	Motor Direction Override	Clockwise/Counterclockwise	—	CW
FAULT	Fault/Checksum Error	Error Code	—	None
FS	Full Scale	1 to 1023 (205 to 1023 – 4 to 20 mA mode)	counts	1023
HCDT	Hold Current Delay Time	HCDT + MSDT <= 65535	milliseconds	500
IF	Analog Input Filter	1 to 1000	counts	1
MHC	Motor Hold Current	0 to 100	percent	5
MRC	Motor Run Current	1 to 100	percent	25
MSDT	Motor Settling Delay Time	MSDT + HCDT <= 65535	milliseconds	0
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
SSD	Stop/Start Debounce	0 to 255	milliseconds	0
VI	Initial Velocity	0 to < VM	steps/sec	1000
VM	Maximum Velocity	VI to 5,000,000	steps/sec	768000
USER ID	User ID	Customizable	1-3 characters	IMS

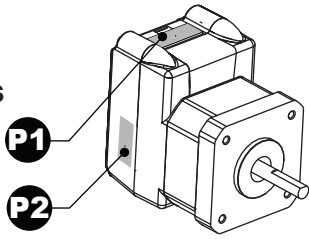
Note: Parameter settings may be changed on-the-fly.

## Mechanical Specifications



Motor Length	Dimensions in inches (mm)	
	LMAX1 (Single Shaft or Internal Encoder)	LMAX2 (Control Knob or External Encoder)
Single	2.20 (55.9)	2.79 (70.9)
Double	2.43 (61.7)	3.02 (76.7)
Triple	2.77 (70.4)	3.37 (85.6)

# MDrive17Plus Speed Control Connectivity Options



## Connector Style

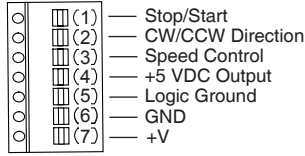
## Function

<b>P1</b>	Pluggable Terminal.....	I/O and Power
	Flying Leads.....	I/O and Power
<b>P2</b>	10-pin IDC.....	Communications
	10-pin Wire Crimp.....	Communications

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

Pluggable terminal or flying leads

### Pluggable Terminal



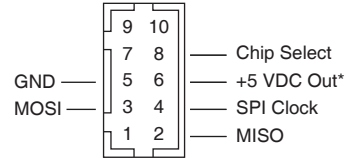
User Supplied Recommended  
Wire: 22 AWG Stranded

### Flying Lead Colors

Wire Color	Function
Violet	Stop/Start
Blue	CW/CCW Direction
Green	Speed Control
Yellow	+5 VDC Output
Gray	Logic Ground
Black	Ground
Red	+V

## **P2** Communications

10-pin Wire Crimp

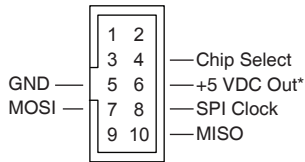


pins not labeled are no connect.

\*used to power the MD-CC302-001.

## **P2** Communications

10-pin IDC

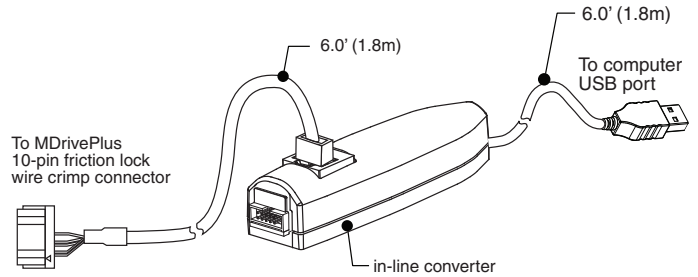


pins not labeled are no connect.

\*used to power the MD-CC300-001 only.

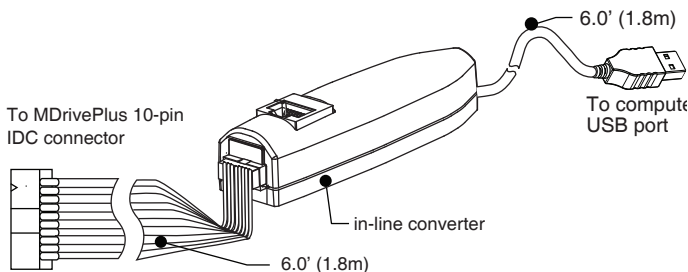
### Communications Converter p/n: MD-CC302-001

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



### Communications Converter p/n: MD-CC300-001

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



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

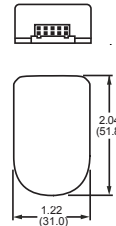
Use to make your own cables, kit contains 5 mating connector shells for making interface cables.

Hirose Parts	Shell:	DF11-10DS-2C
	Pins:	DF11-2428SC
	Crimp Tool:	DF11-TA2428HC

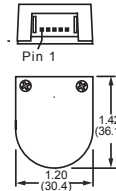
## Encoder Options

External Optical (Differential or Single-End)

### Differential Optical



### Single-End Optical



## Optional Encoder Cables

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

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