



MFORCE™ POWER DRIVE

Plus
MICROSTEPPING



FEATURES

- High Performance Microstepping Driver
- Advanced 2nd Generation Current Control for Exceptional Performance and Smoothness
- Single Supply: +12 to +75 VDC
- Low Cost
- Compact Package
- High Output Current up to 5 Amps RMS, 7 Amps Peak (Per Phase)
- 20 Microstep Resolutions up to 51,200 Steps Per Rev Including: Degrees, Metric, Arc Minutes
- Optically Isolated Logic Inputs will Accept +5 to +24 VDC Signals, Sourcing or Sinking
- Automatic Current Reduction
- Configurable:
 - Motor Run/Hold Current
 - Motor Direction vs. Direction Input
 - Microstep Resolution
 - Clock Type: Step and Direction, Quadrature, Step Up and Step Down
 - Programmable Digital Filtering for Clock and Direction Inputs
- Setup Parameters May Be Switched On-The-Fly
- Dual Mounting Configurations
- Interface via Pluggable Locking Wire Crimp Connectors
- Graphical User Interface (GUI) for Quick and Easy Parameter Setup

DESCRIPTION

The **Microstepping MForce PowerDrive** is a high performance, low cost microstepping driver that delivers unsurpassed smoothness and performance achieved through IMS's advanced 2nd generation current control. By applying innovative techniques to control current flow through the motor, resonance is significantly dampened over the entire speed range and audible noise is reduced.

Microstepping MForce PowerDrives accept a broad input voltage range from +12 to +75 VDC, delivering enhanced performance and speed. Oversized input capacitors are used to minimize power line surges, reducing problems that can occur with long runs and multiple drive systems. An extended operating range of -40° to +85°C provides long life, trouble free service in demanding environments.

The high, per phase output current of up to 5 Amps RMS, 7 Amps Peak, allows the extremely compact MForce PowerDrive to control a broad array of motors from size 23 to size 42.

The microstepping drive accepts up to 20 resolution settings from full to 256 microsteps per full step, including: degrees, metric and arc minutes. These settings may be changed on-the-fly or downloaded and stored in nonvolatile memory with the use of a simple GUI which is provided. This eliminates the need for external switches or resistors. Parameters are changed via an SPI port.

The versatile Microstepping MForce PowerDrive comes with dual mounting configurations to fit various system needs. All interface connections are accomplished using pluggable locking wire crimp connectors.

MForce connectivity has never been easier with options ranging from **all-inclusive QuickStart Kits** to **individual interfacing cables** and **mating connector kits** to build your own cables. *See pg 3.*

The Microstepping MForce PowerDrive is a compact, powerful and inexpensive solution that will reduce system cost, design and assembly time for a large range of applications.

CONFIGURING

The IMS SPI Motor Interface software is an easy to install and use GUI for configuring Microstepping MForce from a computer's USB port. GUI access is via the IMS SPI Motor Interface available at www.imshome.com.

The IMS SPI Motor Interface features:

- Easy installation.
- Automatic detection of MForce version and communication configuration.
- Will not set out-of-range values.
- Tool-tips display valid range setting for each option.
- Simple screen interfaces.

STANDARD SPECIFICATIONS

INPUT VOLTAGE (+V)	Range	+12 to +75 VDC		
OUTPUT CURRENT	RMS (Max)	5 Amps		
	Peak (Per Phase)	7 Amps		
ISOLATED INPUT	Step Clock, Direction and Enable			
	Voltage Range	+5 to +24 VDC Sourcing or Sinking		
MOTION	Digital Filter Range	50 nS to 12.9 μS (10 MHz to 38.8 kHz)		
	Clock Types	Step/Direction, Quadrature, Step Up/Step Down		
	Step Frequency	2 MHz Default (5 MHz Max)		
	Resolution	Number of Settings	20	
	Steps Per Revolution	200, 400, 800, 1000, 1600, 2000, 3200, 5000, 6400, 10000, 12800, 20000, 25000, 25600, 40000, 50000, 51200, 36000 (0.01 deg/μstep), 21600 (1 arc minute/μstep), 25400 (0.001mm/μstep)		
THERMAL	Heat Sink Temperature	-40° to +85°C		

SETUP PARAMETERS

	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	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
DIR	Motor Direction Override	0/1	—	CW
HCDT	Hold Current Delay Time	0 or 2-65535	mSec	500
CLK TYPE	Clock Type	Step/Dir, Quadrature, Up/Down	—	Step/Dir
CLK IOF	Clock and Direction Filter	50 nS to 12.9 μS (10 MHz to 38.8 kHz)	nS (MHz)	200 nS (2.5 MHz)
USER ID	User ID	Customizable	1-3 characters	IMS
EN ACT	Enable Active	High/Low	—	High
WARN TEMP	Over Temperature Warning	0 to 125°C	°C	80°C

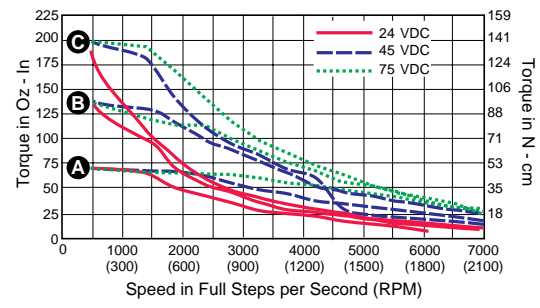
All parameters are set using the supplied IMS SPI Motor Interface GUI and may be changed on-the-fly. An optional Parameter Setup Cable is recommended with first orders.

MOTOR RECOMMENDATIONS

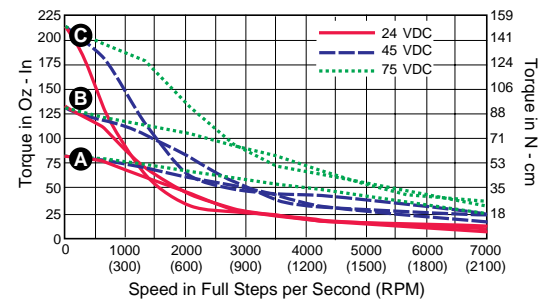
IMS PART NUMBERS	Size 23 (2.4 Amps)	Size 23 (3.0 Amps)	Size 23 (6.0 Amps)	Size 34 (6.4 Amps)
SINGLE LENGTH	M-2218-2.4	M-2218-3.0	M-2218-6.0	M-3424-6.3
DOUBLE LENGTH	M-2222-2.4	M-2222-3.0	M-2222-6.0	M-3431-6.3
TRIPLE LENGTH	M-2231-2.4	M-2231-3.0	M-2231-6.0	M-3447-6.3

MOTOR PERFORMANCE — Speed-Torque

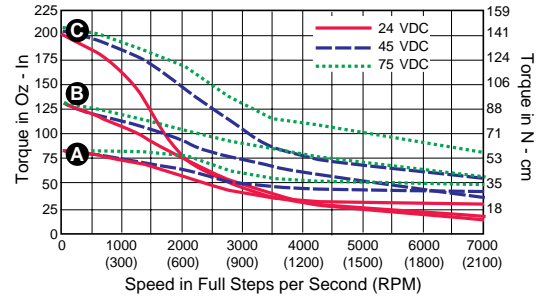
NEMA 23 — 2.4 Amps RMS



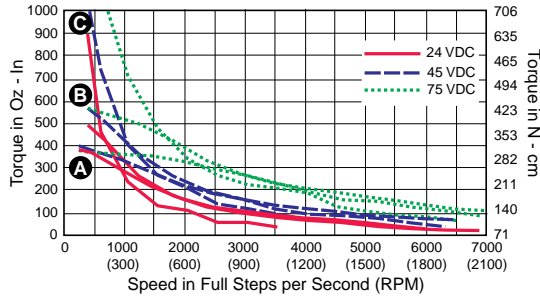
NEMA 23 — 3.0 Amps RMS



NEMA 23 — 6.0 Amps RMS



NEMA 34 — 6.3 Amps RMS



- A** Single Stack
- B** Double Stack
- C** Triple Stack

PIN ASSIGNMENTS

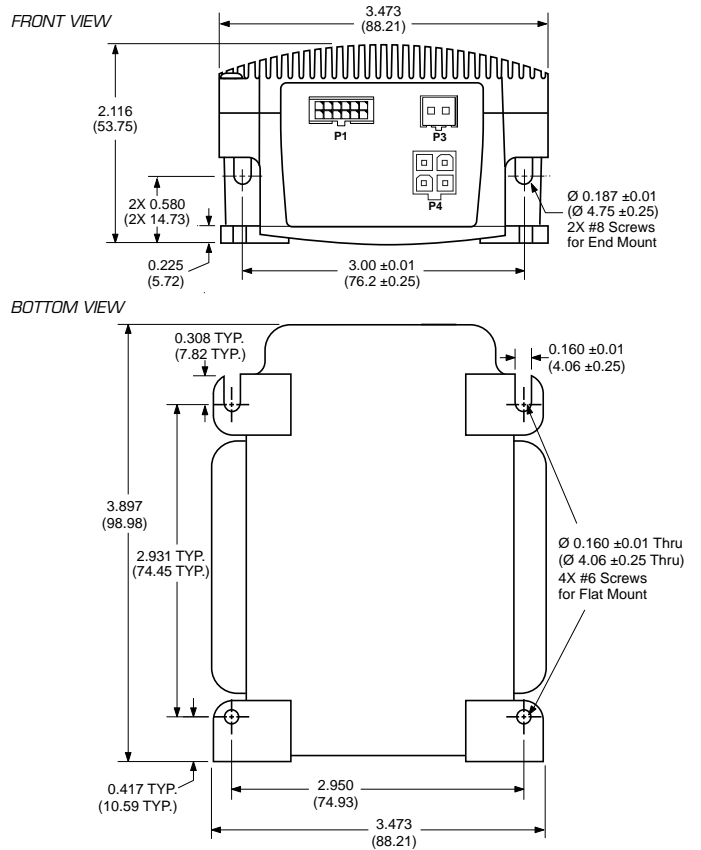
P1: I/O & COMM CONNECTOR	
Locking Wire Crimp	Function
Pin 1	No Connect
Pin 2	No Connect
Pin 3	Optocoupler Reference
Pin 4	Step Clock Input
Pin 5	Enable Input
Pin 6	CW/CCW Direction Input
Pin 7	+5 VDC Output
Pin 8	SPI Clock
Pin 9	Communications Ground
Pin 10	SPI Master Out – Slave In
Pin 11	SPI Chip Select
Pin 12	SPI Master In – Slave Out

P3: POWER CONNECTOR	
Locking Wire Crimp	Function
Pin 1	+V (+12 to +75 VDC)
Pin 2	Power/Aux Ground

P4: MOTOR CONNECTOR	
Locking Wire Crimp	Function
Pin 1	Phase A
Pin 2	Phase /A
Pin 3	Phase B
Pin 4	Phase /B

MECHANICAL SPECIFICATIONS

Dimensions in Inches (mm)



CONNECTIVITY

QuickStart Kit
 For rapid design verification, all-inclusive QuickStart Kits have communication converter, prototype development cables, instructions and CD for MForce initial functional setup and system testing.

Communication Converters
 Electrically isolated, in-line converters pre-wired with mating connectors to conveniently set/program communication parameters for a single MForce via a PC's USB port. Length 12.0" (3.6m).
Mates to connector:
 12-Pin Wire Crimp MD-CC303-001

Prototype Development Cables
 Speed test/development with pre-wired mating connectors that have flying leads other end. Length 10.0" (3.0m).
Mates to connector:
 12-Pin Wire Crimp PD12-1434-FL3
 2-Pin Wire Crimp PDO2-3400-FL3
 4-Pin Wire Crimp PDO4-MF34-FL3

Mating Connector Kits
 Use to build your own cables. Kit contains 5 mating shells with pins. Cable not supplied. Manufacturer's crimp tool recommended.
Mates to connector:
 12-Pin Wire Crimp CK-03
 2-Pin Wire Crimp CK-05
 4-Pin Wire Crimp CK-07

OPTIONS

Motors
 IMS offers a wide range of motors, and their accessories, recommended for interface with the Microstepping MForce PowerDrive. For complete specifications on these products, please visit www.imshome.com.

Power Supplies
 IMS recommends the following power supplies for operating the MForce PowerDrive: IP804, IP806, ISP300-7. Complete power supply specifications at www.imshome.com.

ORDER INFORMATION

MFORCE POWER DRIVE
Plus MICROSTEPPING

K MFM1CSZ34N7
 QuickStart Kit details left

- P1: I/O & Communications 12-Pin Locking Wire Crimp
- P3: Power 2-Pin Locking Wire Crimp
- P4: Motor Interface 4-Pin Locking Wire Crimp

Example: Part Number **MFM1CSZ34N7** is a Microstepping MForce PowerDrive with 12-pin I/O & SPI communications interface, 2-pin power interface and 4-pin motor interface.

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