Superior Electric SS2000MD4-M

Motor Driver

$525.00

In Stock

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DANA

WARNER ELECTRIC®

SL0-SYN® PACKAGED STEP MOTOR CONTROLLER AND DRIVE

WARPDRIVE™ SERIES

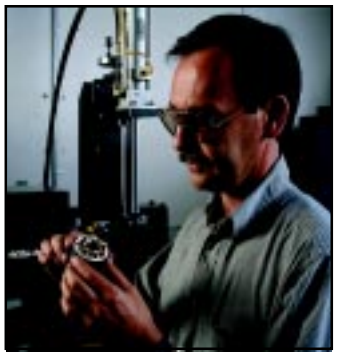
SERVO CONTROLS STEPPER CONTROLS VOLTAGE CONDITIONING ENGINEERED SYSTEMS AC/DC DRIVES

People Finding A Better Way®

SLO-SYN® PACKAGED STEP MOTOR CONTROLLER AND DRIVE WARPDRIVE™ SERIES

Leader In Technology

Warner Electric Motors and Controls puts you ahead of the game by developing products and systems to help the performance of your machinery. Our AC synchronous and DC motors, controllers, adjustable speed drives, voltage control and conditioning product lines, and engineered systems are designed to provide next generation solutions to today's applications.

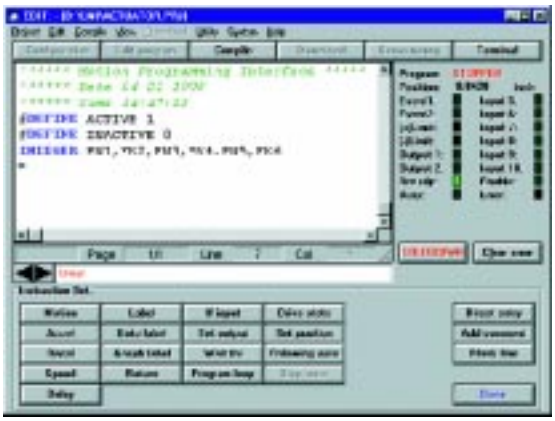


Formerly known as The Superior Electric Company, the Warner Electric Motors and Controls Division of Dana Corporation boasts a reputation for quality and service. Coupled with unparalleled engineering capabilities, we can help you develop product lines for both new and existing high-technology markets.

Our SLO-SYN® Packaged Step Motor Controllers and Drives are designed to offer optimum performance in a full range of step motor positioning applications. The WARPDRIVE Series is another addition to the SLO-SYN family of components and systems that offers features that will help you invest wisely.

Basic-Like Language for Easy Programming

Programmers have the competitive advantage of mixing powerful English-like text with time-saving, graphical "point and click" tools in familiar MS Windows® environments. For motion control developers familiar with Warner Electric's programming language used in the SLO-SYN family of MX2000 motion controls and TDC servo controllers, or familiar with BASIC, the WARPDRIVE requires no new programming skills. New users will find the language easy to learn since it uses intuitive commands.



Convenient, Compact Packaged System

The SLO-SYN WARPDRIVE Series step motor position system provides a controller and microstepping drive in one convenient, compact package. The microstepping indexer/drive package requires less panel volume and is priced at a savings compared to previous generations of controllers and drives sold separately.

Technology for Smoother Performance

The integral programmable controller uses a patent pending digital microstepping current control technique to provide smooth motor performance.

Compatible with SLO-SYN® Standard and High Torque Motors

SLO-SYN M & KM Series motors complete this step motor positioning system. The WARPDRIVE Series is compatible with standard SLO-SYN motors in sizes ranging from NEMA 23 to NEMA 42 and SLO-SYN high torque motors in sizes NEMA 23 and 34.

More I/O for Greater Versatility

- 8 Inputs, 4 Outputs Optically Isolated
- 8 Inputs, 4 Outputs Non-Isolated
- One 0-10V Analog Input (10 Bits)
- Encoder Input for Closed Loop Operation (differential or single-ended)
- 12V DC I/O Power Supply

WARPDRIVE™ SERIES FEATURES
MODEL SS2000D6i

Greater Flexibility in One Package

The SLO-SYN WARPDRIVE Series offers features normally found on the most expensive drives. These features enable the WARPDRIVE to be used in a broad range of applications. Features include:

- 100-120V +/-10% AC Input
- Motor Phase Current from 1-6 Amps Selectable
- Robust SS2000D6 Drive Design
- Short Circuit Protection (phase-to-phase and phase-to-ground)
- 16-Bit Micro-Processor
- Built-In BCD Interface with Separate Connector
- 2 Serial Ports, RS232/485 up to 38K Baud
- RS485 Daisy Chaining, up to 32 Units
- An RS232 Communication Cable Used to Program the WARPDRIVE™
- Built-In AC Line Filter and MOVs
- IEC 1000-4-4 Standards for Electrical Noise Compliant
- Graphical User Interface Software Available
- UL Recognized and CE Pending
- Optional Terminal Board for Easy Wiring
- All Mounting Hardware Included

Reduce Current capability allows setting standstill current from 0% to 100% in 10% increments. (Allows the motor to cool down at standstill, prolonging the life of the motor.)

Boost Current capability allows setting current during acceleration and deceleration from 100% to 200% in 10% increments up to a maximum level of 6 amperes. (Provides additional torque during acceleration and deceleration.)

Microstepping Resolution

The resolution of this drive is internally set to 1/64 of a step or 12,800 microsteps/rev. This resolution will give you a very smooth motion at slow speeds. An adjustable smoothing factor also improves low speed smoothness.

All program distances and speeds are programmed in engineering units. Achieving different increments can be done by setting USER UNITS to the appropriate increment needed for a particular application.

Accessories for SLO-SYN WARPDRIVE Series

ACCESSORY	DESCRIPTION	ORDERING PART NUMBER
Man-Machine Interface	Provides the ability to print statements on the terminal and receive input from a terminal.	**IWS30SE** **IWS120SE**
External Wiring Card	A screw terminal breakout board provides easy access to wire I/O and RS232/485 communications. It easily plugs into the connectors on front of the unit.	**XWC-D6i**
BCD Switch	A BCD switch can be connected to a WARPDRIVE controller for entry of BCD data. Applications for this function include moving to a set position, selecting move distance, or a speed.	**221157-002** (This kit includes a seven-digit plus sign BCD switch and an 18-inch long ribbon cable.
Encoder Cable	For closed loop operation, the following encoder cables can be used with an encoder motor and a WARPDRIVE.	For a 9-pin "D" male connector on both ends, use part numbers: **215851-002** 10-ft. encoder cable **215851-003** 25-ft. encoder cable For a 9-pin "D" male connector on one end, unterminated leads on the other, use part numbers: **220170-001** 10-ft. encoder cable **220170-002** 25-ft. encoder cable
Motor Cable	A 10-ft. motor cable is shipped with every WARPDRIVE SS2000D6i. For other lengths, use the following part numbers:	**216022-031** 10-ft. motor cable **216022-032** 25-ft. motor cable **216022-033** 50-ft. motor cable **216022-034** 75-ft. motor cable **216022-035** 100-ft. motor cable

PROGRAMMING COMMANDS GROUPED BY FUNCTION

Motion

BOOST	Enables or disables the boost current feature of a stepper or returns the boost status.
BUSY	Returns the motion status of the axis.
EVENT1	Sets enable/disable and trigger state of event1.
EVENT2	Sets enable/disable and trigger state of event2.
JOG	Runs continuously in the specified direction.
MOVEA	Initiates an absolute indexed move.
MOVEHOME	Runs until the home input is activated.
MOVEI	Initiates an incremental indexed move.
MOVEREG	Runs until the registration input is activated, then moves the specified distance.
REDUCE	Enables or disables the reduce current feature of a stepper or returns the reduce status.
STOP	Brings any motion to a controlled stop.
STOPERR	Sets or returns the maximum position error allowed when motion is stopped.
WAITDONE	Waits for motion to be done.
WNDGS	Enables/disables drive.

Trajectory Parameters

ABSPOS	Sets or returns the absolute position.
ACCEL	Sets or returns the acceleration rate in units/sec/sec.
DECEL	Sets or returns the deceleration rate in units/sec/sec.
DIST	Returns the distance moved from the start of the last commanded motion or changes the move distance during indexed (MOVEA, MOVEI) motion.
ENCPOS	Returns the encoder absolute position.
ENCSPD	Returns the current speed.
FOLERR	Sets or returns the position error limit for a closed-loop stepper.
LOWSPD	Sets or returns the starting speed value of a stepping motor.
SPEED	Sets or returns the commanded target speed.

I/O

ANALOG	Returns the analog input voltage.
BCD	Returns the BCD switch value.
IN	Returns the discrete input state of the defined input.
OUT	Sets or returns the discrete output state of the defined output.

String Manipulation

ASC	Returns the ASCII code of character.
CHR$	Returns a one-character string for the given ASCII code.
GETCHAR	Waits for a character to be received via the serial port.
HEX$	Returns the hex string of an integer.
HVAL	Returns the hex value of a string.
INCHAR	Returns a character from the serial port.
INPUT	Reads a line of data from the serial port.
INSTR	Returns the first occurrence of a character in a string.
LCASE$	Converts a string to lower case letters.
LEFT$	Returns the leftmost characters of a string.
LEN	Returns the number of characters in a string.
MID$	Returns the designated middle number of characters in a string.
PRINT	Transmits data via the serial port.
PRINT USING	Prints string characters or formatted numbers.
RIGHT$	Returns the rightmost characters of a string.
STR$	Returns a string representation of a numeric expression.
STRING$	Returns a string of characters.
UCASE$	Converts a string to upper case letters.
VAL	Returns the value of a string.

Relational Operators

=	equal to
<	less than
<= or =<	less than or equal to
<>	not equal to
>	greater than
=> or >=	greater than or equal to

Arithmetic Operators

+	addition
-	subtraction or unary minus
*	multiplication
/	division

Variable Definitions

INTEGER	var, ... , var
REAL	var, ... , var
INTEGER	var(x), ... , var(x,y)
REAL	var(x), ... , var(x,y)

Over Travel Limit

HARDLIMOFF	Disables hard limits.
HARDLIMON	Enables hard limits.
REGLIMIT	Sets or returns the move registration limit distance.
SOFTLIMNEG	Sets or returns the absolute negative travel limit position.
SOFTLIMOFF	Disables soft limits.
SOFTLIMON	Enables soft limits.
SOFTLIMPOS	Sets or returns the absolute positive travel limit position.

Time Functions

TIMER	Sets or returns timer value.
WAIT	Waits (dwells) for the period of time to expire.

Program Flow Control

DO...EXIT DO...LOOP... LOOP...UNTIL...WHILE	Begins a repeatable block of statements.
END	Ends program.
FOR...TO...EXIT FOR...NEXT	Begins a repeatable block of statements.
GOSUB...RETURN	Branches to a subroutine and returns.
GOTO	Branches unconditionally to the specified label.
IF...THEN...ELSE...END IF	Begins a conditional block of statements.

Interrupt

INTROFFn	Disables interrupt n, where n is 1-4.
INTRONn	Enables interrupt n, where n is 1-4.
ON...INTRn	On condition, goes to interrupt n, where n is 1-4.

Miscellaneous

DEFINE	Defines a symbolic name to be a particular string of characters.
ERR	Returns error code number.
INCLUDE	Includes a file name with defined statements in a user task.

Boolean Expression Operators

AND	Logical conjunction operator.
NOT	Logical complement operator.
OR	Logical inclusive operator.

Mechanical and Environmental Specifications

Size ..... 3.67W x 9.5H x 5.98D
Operating Temperature ..... +32°F to +122°F (0°C to +50°C)
Storage Temperature ..... -40°F to +167°F (-40°C to +75°C)
Humidity ..... 95% maximum, non-condensing
Altitude ..... 10,000 feet (3,048 meters) max.
Weight ..... 7.75 lbs. (3.52 kg)

Electrical Specifications

AC Input Range ..... 90 to 132 VAC, 50/60 Hz
AC Current ..... 7 amperes
Fuse Rating ..... 250 volts, 8 amperes
Drive Power Dissipation (Worst Case) ..... 50 watts

Isolated Digital I/O

12V DC Internal I/O Power: .... 11.5 to 14V DC @ 100mA
or User Supplied I/O Power ..... 5-24V DC

Inputs (IN1 - IN8):

Sink Mode: (+Vopto = 12V DC)
On State Voltage Range (V_{IN}) ..... 0V to +6V DC
Input Current (V_{IN} = 0V) ..... -6mA

Source mode:
On State Voltage Range (V_{IN}) ..... 4.5V to 24V
Input Current (V_{IN} = 12V DC) 6mA

Response Time (sink or source):
Opto Turn On Delay ..... 10uS typical
Opto Turn Off Delay ..... 75uS typical

Programmable Outputs (OUT1-OUT4):

Sink Mode:
Continuous Current Rating per Output ..... 250mA max.
Maximum Collector Voltage ..... 25V max.
On State Voltage @ 250mA ..... 1.5V max.

Non-Isolated I/O (or BCD Interface):

IN9 - IN 16: These inputs may be used with open collector outputs without an external supply by connecting the output device common (ground) to signal ground on the unit, and the open collector to the input pin. An internal pullup resistor to +5V DC is provided.

Logic High Input Level ..... 25V > Vsource > 4.5V, or open circuit
Logic Low Input Level ..... 1.2V max.
Logic Low Current with Input @ GND ..... -1mA max.

OUT5 - OUT8: These are open-collector, sink only TTL outputs, and are NOT isolated from the unit's +5V logic supply. Proper care must be taken to ensure noise is not injected onto these signals. The user's I/O supply must be referenced to GND on the controller.

Active Output Voltage ..... 0.6V max. @ 20mA
Permissible Output Current 20mA
Permissible Output Voltage ..... 24V DC

Serial Communications:

Port 1: Configurable for RS-232C or RS-485 four wire communications via a switch. Port 1 is designated as the HOST communications port and can be used to daisy chain up to 32 units in RS485 mode.

Port 2: Serial port 2 is used for differential RS485 four wire USER communications.

Encoder Connections:

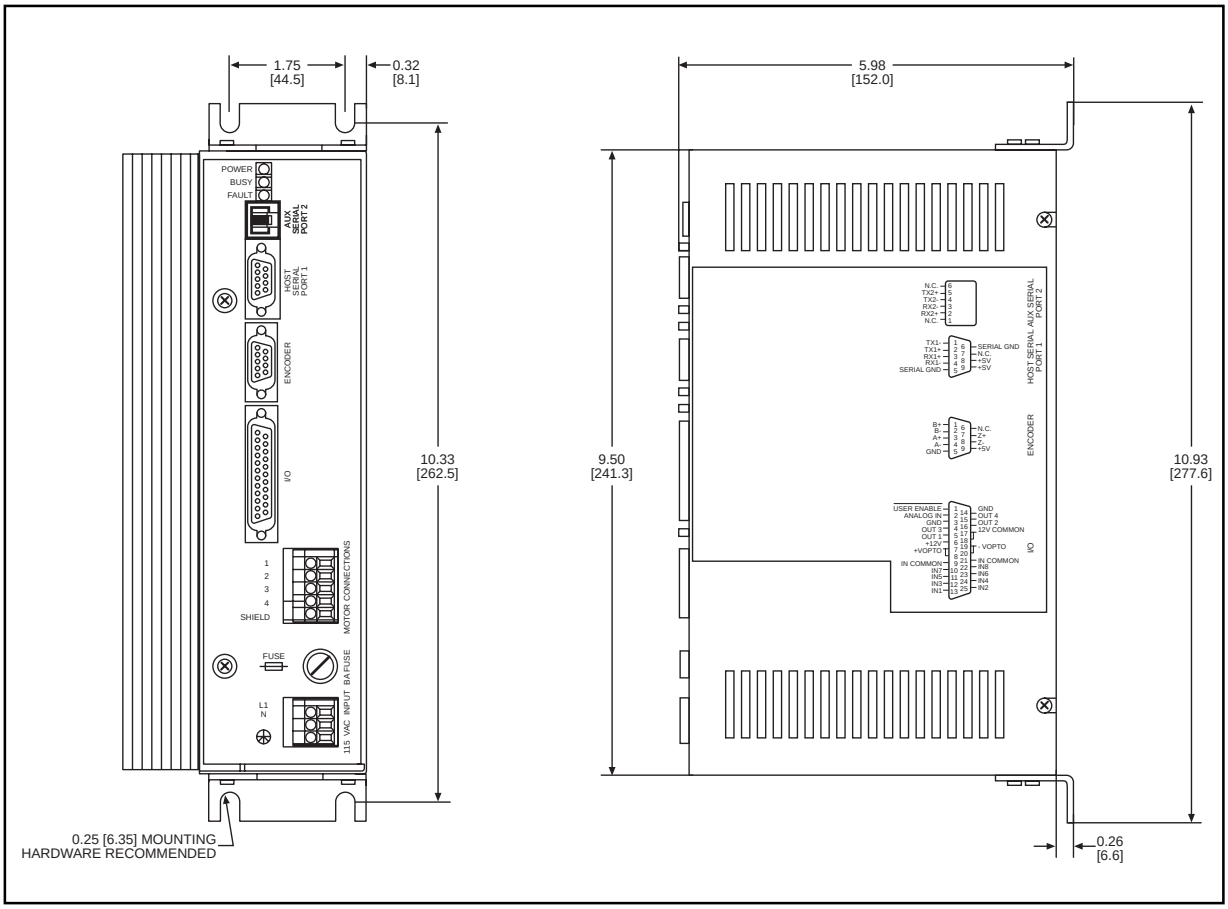
Encoder connections provide power and inputs for a digital encoder interface to indicate motor position to the controller.

Encoder +5V DC
- Power Supply Output ..... +5V DC (±5%) @ 100mA current.
- Encoder Signal Inputs ..... TTL level Single-ended or differential; channels A and B in phase quadrature.
- Input Current A+, A-, B+, B-, Z+, Z- ..... ±5mA min.

Analog Input:

Voltage Range ..... 0-10V referenced to GND
Resolution ..... 10 bits or 9.77mV
Absolute Accuracy ..... ±0.3V worst case
Sample Rate ..... 500 Hz min.
Bandwidth ..... 100 Hz max.

WARPDRIVE™ SERIES DIMENSIONS
MODEL SS2000D6i



MOTOR COMPATIBILITY

Motor Types	Warner Electric M and KM Series
Frame Sizes	M061 through M112*, KML060 through KML093

Other Motor Capability Specifications

Number of Connections	4, 6, 8
Minimum Inductance	8 millihenrys
Maximum Inductance	64 millihenrys
Maximum Resistance	2 ohms at 6 ampere setting

Note: Maximum resistance is the total of the motor and the cable.

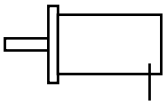
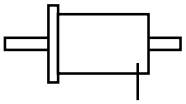
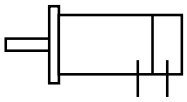
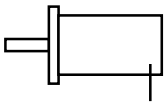
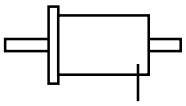
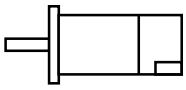
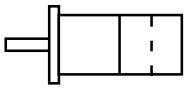
CAUTION: Do not use larger frame size motors than those listed, or the drive may be damaged.

Motors for use with the SS2000D6i Controller:

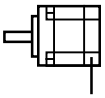
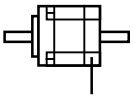
M Series Motors		KM Series Motors	
PN	Amperes	Current PN	Current Amperes
M061-FF-206	1	KML060F02	1.5
M062-FF-206	1.5	KML061F03	1.5
M063-FF-206	1.5	KML062F03	1.5
M091-FF-206	3	KML063F04	2
M092-FF-206	4	KML091F05	3
M093-FF-206	4	KML091F07	3
M111-FF-206	5	KML092F07	4
M112-FF-206	6	KML093F08	4
MH112-FF-206	6	KML093F10	6

MOTOR CONFIGURATIONS

M Series Motor Configurations

Sizes	Leaded	Double End with Leads		Single End with Leads and Encoder
60 NEMA 23	 M061-FF-206 M062-FF-206 M063-FF-206	 M061-FF-206E M062-FF-206E M063-FF-206E		 M061-FF-206Cn M062-FF-206Cn M063-FF-206Cn
Sizes	**Leaded**	**Double End with Leads**	**Single End with Terminal Box**	**Single End with Terminal Box and Encoder**
90, 110 NEMA 34 and 42	 M091-FF-206 M092-FF-206 M093-FF-206	 M091-FF-206E M092-FF-206E M093-FF-206E	 M091-FF-206T M092-FF-206T M093-FF-206T M111-FF-206T M112-FF-206T MH112-FF-206T	 M091-FF-206Cn M092-FF-206Cn M093-FF-206Cn M111-FF-206Cn M112-FF-206Cn MH112-FF-206Cn

KML Motor Configurations

Sizes	Leaded	Double End with Leads	
60, 90 NEMA 23 and 34			

KM_0

L - Lead
T - Terminal Box

Frame Size
6 = 60mm (NEMA Size 23)
9 = 90mm (NEMA Size 34)

0 = .5 stack
1 = 1 stack
2 = 2 stack
3 = 3 stack

Current rating with 2 phases on

F = four lead - bipolar
S = six lead - unipolar

KML060F02
KML061F03
KML062F03
KML063F04

KML091F05
KML091F07
KML092F07
KML093F08
KML093F10

Note: All M090 series motors with encoders and all M111, M112, and M112H motors have terminal boxes.

Options – Use appropriate suffix as listed. Standard encoder is 500-line (C5). Other encoder counts:

C2 = 200-line ..... (800 quadrature counts)
C4 = 400-line ..... (1,600 quadrature counts)
C5 = 500-line ..... (2,000 quadrature counts)
C12 = 1,250-line ..... (5,000 quadrature counts)

Connectors*

D = 9 pin "D" connector on encoder leads (Size 60 only)
K = Flat on shaft (Size 60, 90)

Example: M061-FF-206C12D
M061-FF-206 motor with 1250-line encoder and connector on encoder leads

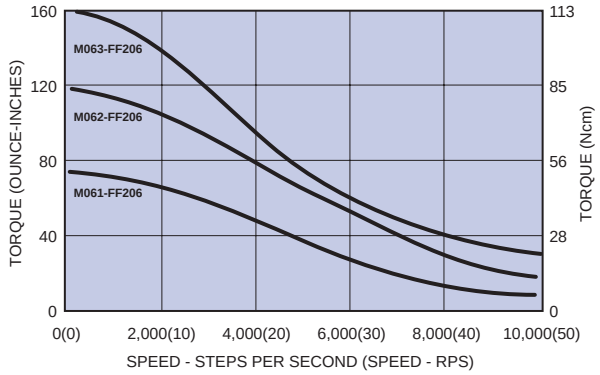
Example: M061-FF-206EK
M061 motor with flat on motor shaft

**Since the SS2000D6i Drive features lugless terminals, a connector on the motor is not usually required.*

MOTOR OPTIONS – TORQUE VS. SPEED

Available Options (add appropriate suffix to motor model number)

E = Double End Shaft
Cn = Encoder Options
K = Flat On Shaft
D = Plug On Encoder

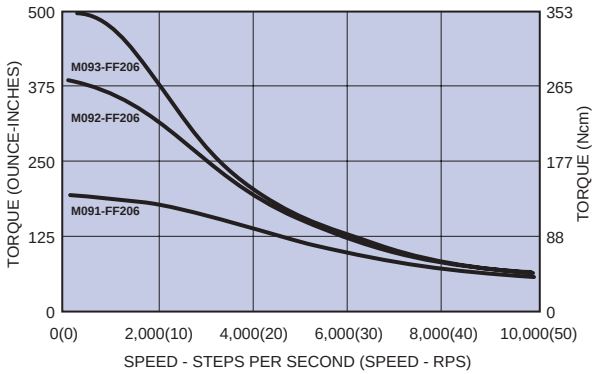


M061-FF-206, M062-FF-206, and M063-FF-206 Motors

Available Options (add appropriate suffix to motor model number)

E = Double End Shaft
T = Terminal Box
ET = Double End Shaft and Terminal Box
Cn = Encoder Option*
K = Flat On Shaft

** A terminal box is always used with the encoder option. The "T" suffix is not needed.*

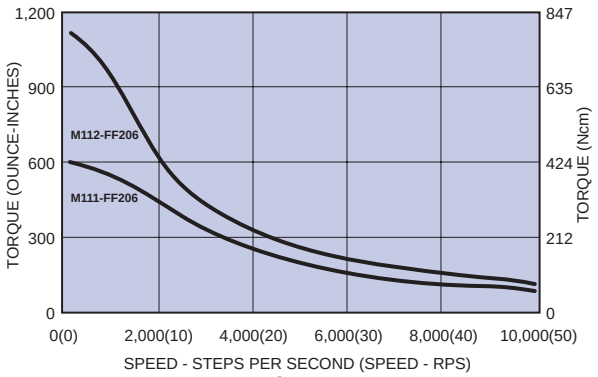


M091-FF-206, M092-FF-206, and M093-FF-206 Motors

Available Options (add appropriate suffix to motor model number)

E = Double End Shaft
Cn = Encoder Option

Note: Shaft keyway and cast terminal box are standard on these motors.

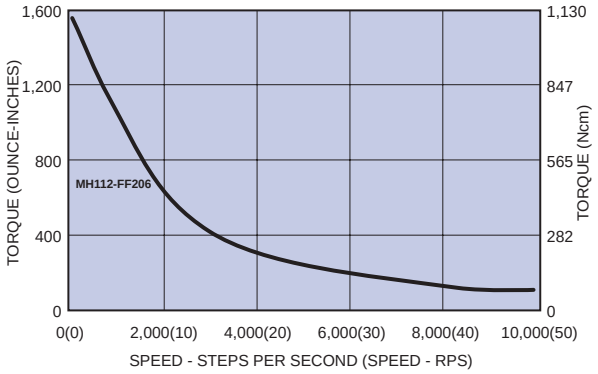


M111-FF-206 and M112-FF-206 Motors

Available Options (add appropriate suffix to motor model number)

E = Double End Shaft
Cn = Encoder Option

Note: Shaft keyway and cast terminal box are standard on these motors.



MH112-FF-206 Motor

MOTOR OPTIONS – TORQUE VS. SPEED

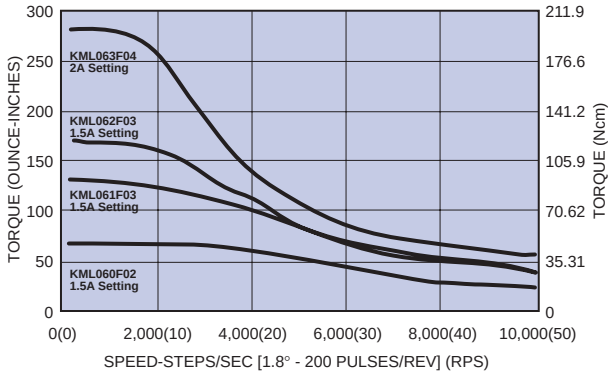
Available Options (add appropriate suffix to motor model number)

E = Double End Shaft

Cn = Encoder Options

K = Flat On Shaft

Note: Flat on shaft is standard on KML063 motors.



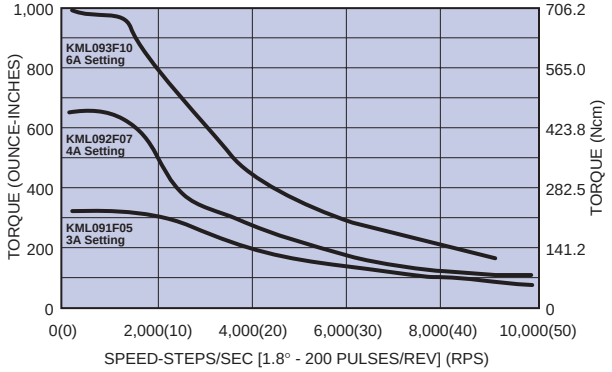
KML060, KML061, KML062, and KML063 Motors

Available Options (add appropriate suffix to motor model number)

E = Double End Shaft

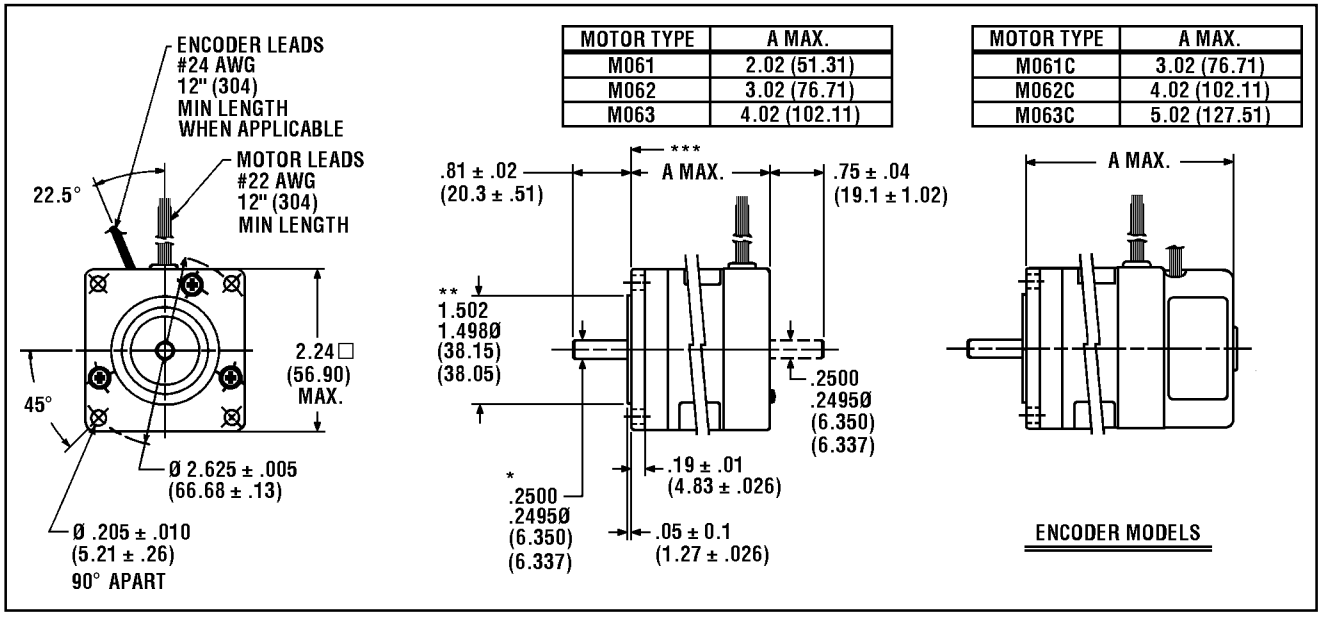
Cn = Encoder Option

Note: Flat on shaft is standard on KML091, KML092, and KML093 motors.



KML091, KML092, and KML093 Motors

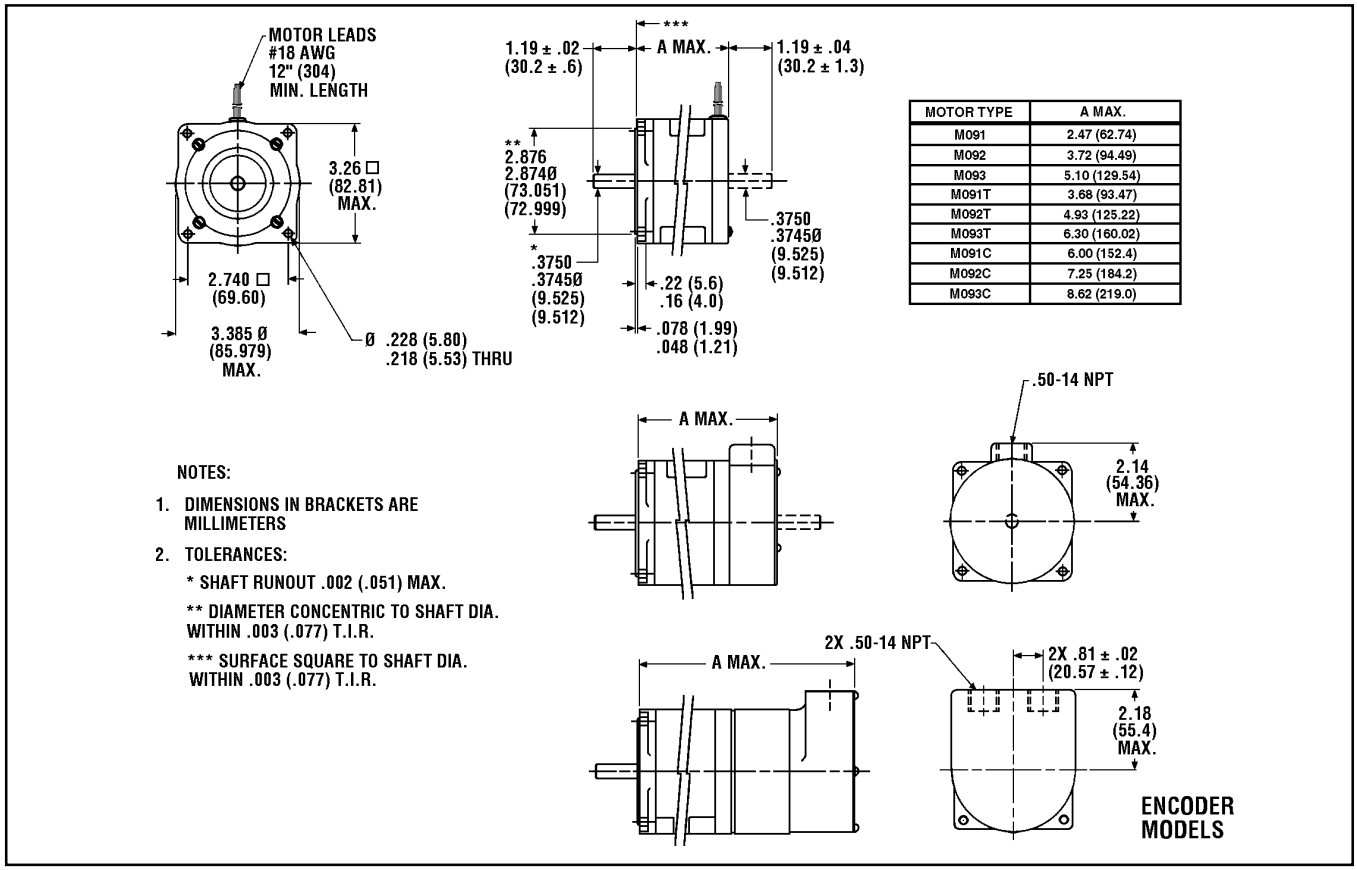
MOTOR DIMENSIONS



M061-FF-206, M062-FF-206, and M063-FF-206 Motors

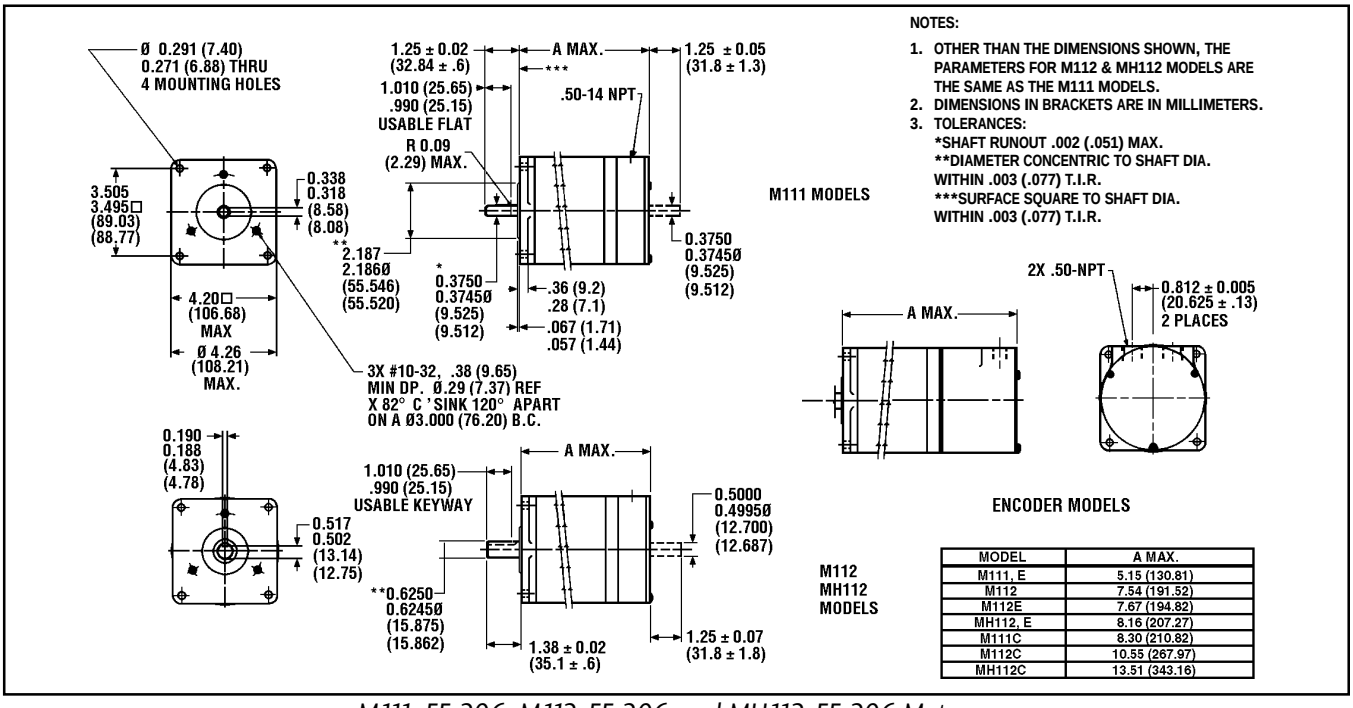
Many configurations available, consult motor catalog.

MOTOR DIMENSIONS



MOTOR TYPE	A MAX.
M091	2.47 (62.74)
M092	3.72 (94.49)
M093	5.10 (129.54)
M091T	3.68 (93.47)
M092T	4.93 (125.22)
M093T	6.30 (160.02)
M091C	6.00 (152.4)
M092C	7.25 (184.2)
M093C	8.62 (219.0)

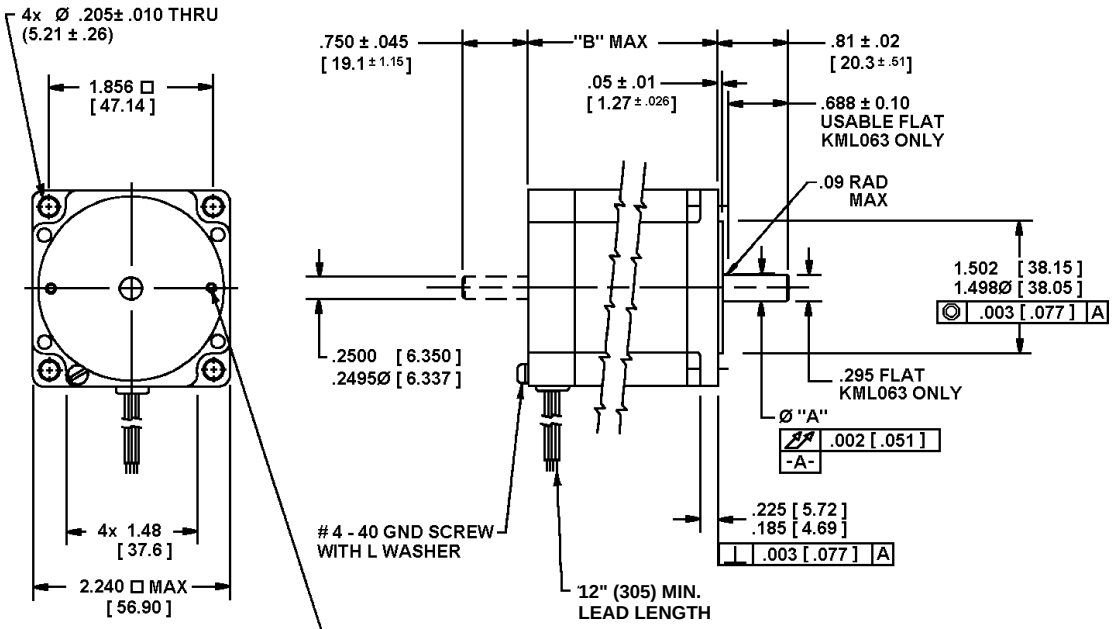
M091-FF-206, M092-FF-206, and M093-FF-206 Motors



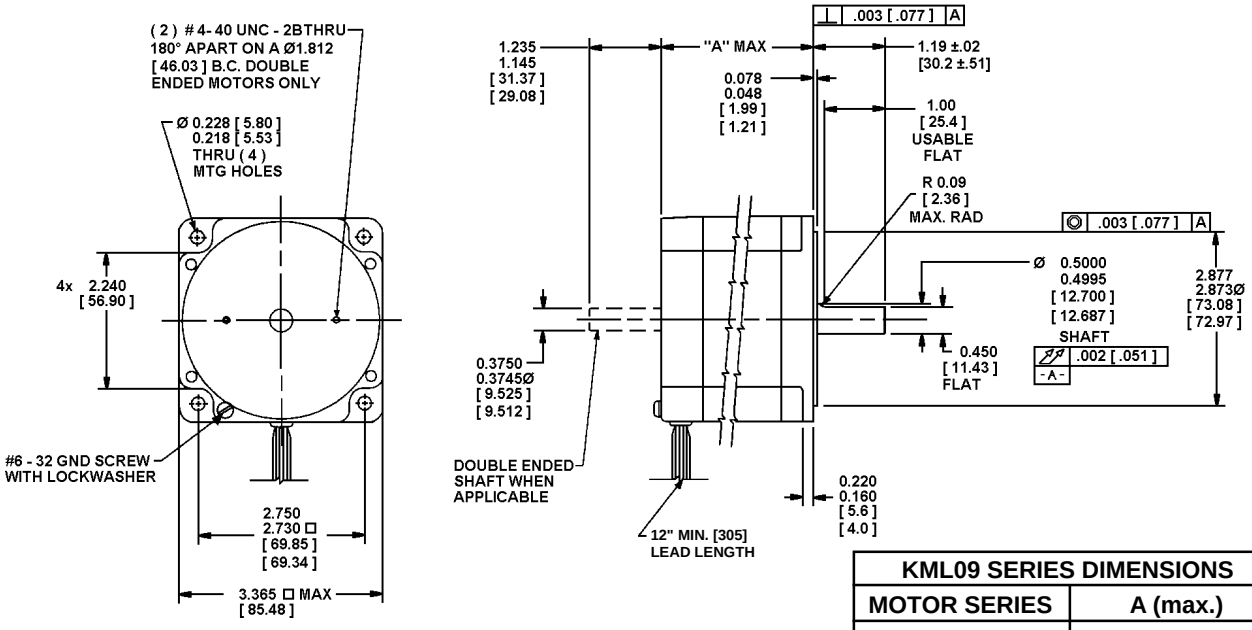
MODEL	A MAX.
M111, E	5.15 (130.81)
M112	7.54 (191.52)
M112E	7.67 (194.82)
MH112, E	8.16 (207.27)
M111C	8.30 (210.82)
M112C	10.55 (267.97)
MH112C	13.51 (343.16)

M111-FF-206, M112-FF-206, and MH112-FF-206 Motors

KML MOTOR DIMENSIONS



KML06 SERIES DIMENSIONS		
MOTOR SERIES	A (max.)	B (max.)
KML060	.2500/.2495 (6.350/6.337)	1.64 (44.7)
KML061	.2500/.2495 (6.350/6.337)	2.21 (56.2)
KML062	.2500/.2495 (6.350/6.337)	3.06 (77.8)
KLM063	.3125/.3120 (7.938/7.924)	4.06 (103.2)



KML09 SERIES DIMENSIONS	
MOTOR SERIES	A (max.)
KML091	2.57 (65.3)
KML092	3.77 (95.8)
KML093	4.97 (126.3)

Dimensions in brackets are in millimeters.

Distributor: ELCTRO SALES CO., INC., 100 FELLSWAY WEST, SOMERVILLE, MA 02145 U.S.

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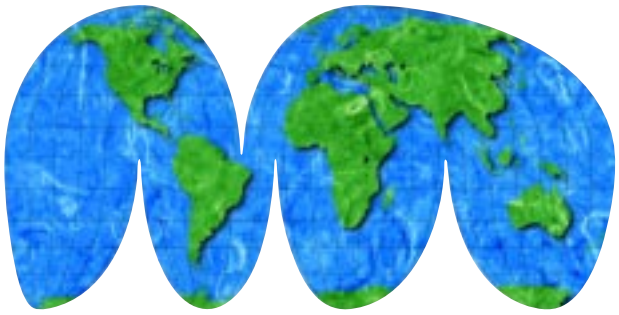

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