SureStep® Stepping System Motors

SureStep® Stepping Motors

SureStep Series Part Numbers – Connectorized Bipolar Stepping Motors																				
Bipolar Stepping Motors	High Torque Motors												Higher Torque Motors							
	STP-MTR-17040	STP-MTR-17040D	STP-MTR-17048	STP-MTR-17048D	STP-MTR-17060	STP-MTR-17060D	STP-MTR-23055	STP-MTR-23055D	STP-MTR-23079	STP-MTR-23079D	STP-MTR-34066	STP-MTR-34066D	STP-MTRH-23079	STP-MTRH-23079D	STP-MTRH-34066	STP-MTRH-34066D	STP-MTRH-34097	STP-MTRH-34097D	STP-MTRH-34127	STP-MTRH-34127D
Price	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->
Shaft Type	single	dual	single	dual	single	dual	single	dual	single	dual	single	dual	single	dual	single	dual	single	dual	single	dual

SureStep Series Specifications – Connectorized Bipolar Stepping Motors											
Bipolar Stepping Motors		High Torque Motors						Higher Torque Motors			
		STP-MTR-17040(D)	STP-MTR-17048(D)	STP-MTR-17060(D)	STP-MTR-23055(D)	STP-MTR-23079(D)	STP-MTR-34066(D)	STP-MTRH-23079(D)	STP-MTRH-34066(D)	STP-MTRH-34097(D)	STP-MTRH-34127(D)
NEMA Frame Size		17	17	17	23	23	34	23	34	34	34
* Maximum Holding Torque	(lb·in)	3.81	5.19	7.19	10.37	17.25	27.12	17.87	27.12	50.00	80.50
	(oz·in)	61	83	115	166	276	434	286	434	800	1288
	(N·m)	0.43	0.59	0.81	1.17	1.95	3.06	2.02	3.06	5.65	9.12
Rotor Inertia	($oz·in^2$)	0.28	0.37	0.56	1.46	2.60	7.66	2.60	7.66	14.80	21.90
	($kg·cm^2$)	0.05	0.07	0.10	0.27	0.48	1.40	0.48	1.40	2.71	4.01
Rated Current (A/phase)		1.7	2.0	2.0	2.8	2.8	2.8	5.6	6.3	6.3	6.3
Resistance (Ω/phase)		1.6	1.4	2.0	0.8	1.1	1.1	0.4	0.3	0.3	0.5
Inductance (mH/phase)		3.0	2.7	3.3	2.4	3.8	6.6	1.2	1.5	2.1	4.1
Insulation Class		130°C [266°F] Class B; 300V rms									
Basic Step Angle		1.8°									
Shaft Runout (in)		0.002 in [0.051 mm]									
Max Shaft Radial Play @ 1lb load		0.001 in [0.025 mm]									
Perpendicularity		0.003 in [0.076 mm]									
Concentricity		0.002 in [0.051 mm]									
* Maximum Radial Load (lb [kg])		6.0 [2.7]			15.0 [6.8]		39.0 [17.7]	15.0 [6.8]	39.0 [17.7]		
* Maximum Thrust Load (lb [kg])		6.0 [2.7]			13.0 [5.9]		25.0 [11.3]	13.0 [5.9]	25.0 [11.3]		
Storage Temperature Range		-20°C to 100°C [-4°F to 212°F]									
Operating Temperature Range		-20°C to 50°C [-4°F to 122°F] (motor case temperature should be kept below 100°C [212 °F])									
Operating Humidity Range		55% to 85% non-condensing									
Product Material		steel motor case; stainless steel shaft(s)									
Environmental Rating		IP40									
Weight (lb [kg])		0.6 [0.3]	0.7 [0.3]	0.9 [0.4]	1.5 [0.7]	2.2 [1.0]	3.9 [1.7]	2.4 [1.1]	3.9 [1.7]	5.9 [2.7]	8.4 [3.8]
Agency Approvals		CE (complies with EN55014-1 (1993) and EN60034-1.5.11)									
Design Tips		Allow sufficient time to accelerate the load and size the step motor with a 100% torque safety factor. DO NOT disassemble step motors because motor performance will be reduced and the warranty will be voided. DO NOT connect or disconnect the step motor during operation. Mount the motor to a surface with good thermal conductivity, such as steel or aluminum, to allow heat dissipation. Use a flexible coupling with "clamp-on" connections to both the motor shaft and the load shaft to prevent radial and thrust loading on bearings from minor misalignment.									
Accessory Extension Cable		STP-EXT-020						STP-EXTH-020			

** For dual-shaft motors (STP-MTR-xxxxxD):*
The sum of the front and rear Torque Loads, Radial Loads, and Thrust Loads must not exceed the applicable Torque, Radial, and Thrust load ratings of the motor.

SureStep® Stepping Motors Mounting Accessory

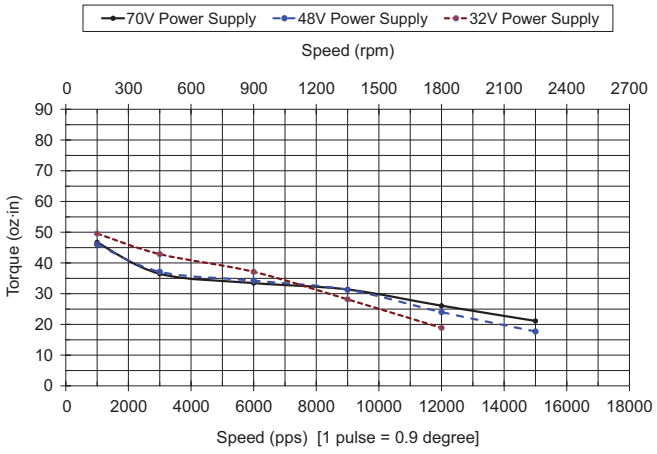
Mounting Accessory – for NEMA 17 SureStep Series Bipolar Stepping Motors		
Part Number	Price	Description
STP-MTRA-RB-85	<--->	Reducer bushing, 8mm OD to 5mm ID, 16mm length, aluminum alloy. Connects NEMA size 17 stepper motors to Koyo TRD-NH and TRD-SH hollow shaft encoders.

SureStep® Stepping System Motors

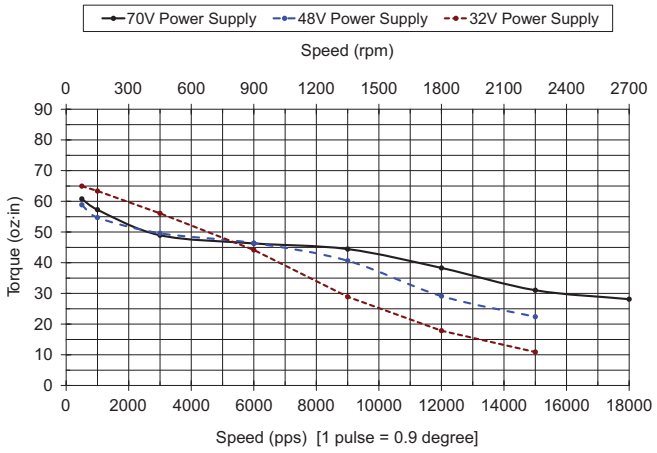
*Sure*Step® Motor Torque vs. Speed Charts

STP-MTR-17xxx(D) NEMA 17 Step Motors

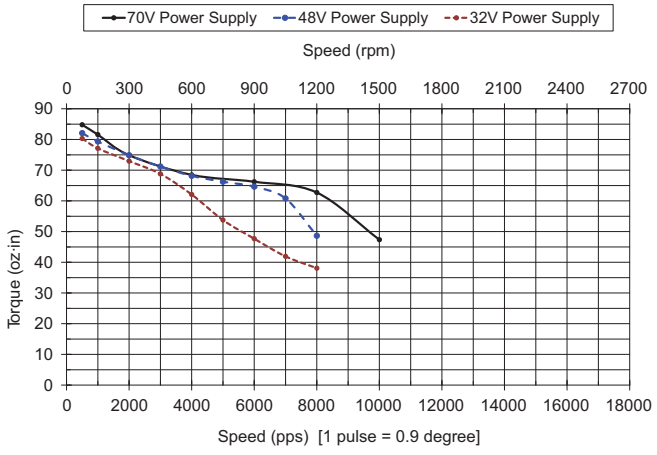
STP-MTR-17040(D) Torque vs Speed (1.8° step motor; 1/2 stepping)



STP-MTR-17048(D) Torque vs Speed (1.8° step motor; 1/2 stepping)

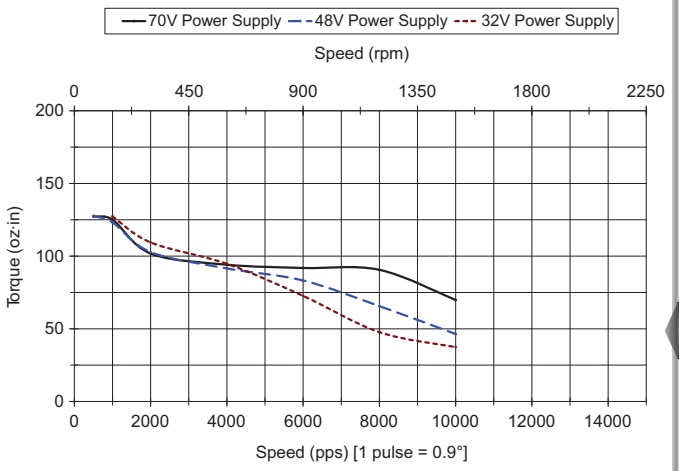


STP-MTR-17060(D) Torque vs Speed (1.8° step motor; 1/2 stepping)

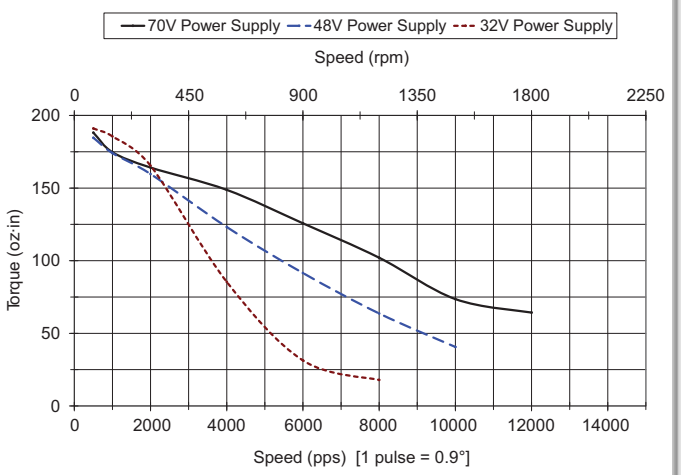


STP-MTR(H)-23xxx(D) NEMA 23 Step Motors

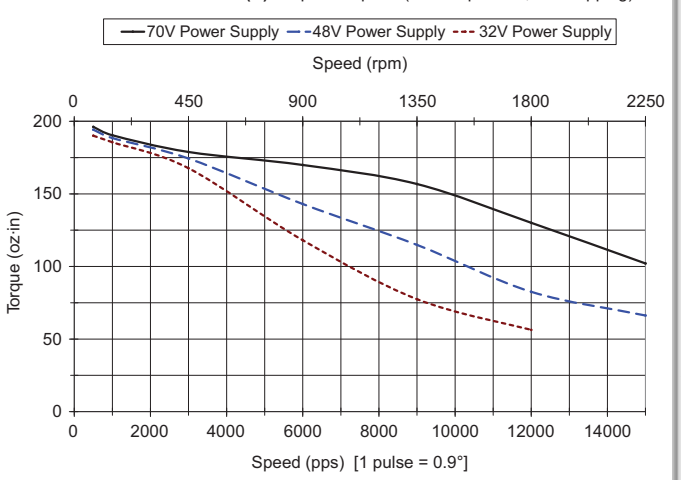
STP-MTR-23055(D) Torque vs Speed (1.8° step motor; 1/2 stepping)



STP-MTR-23079(D) Torque vs Speed (1.8° step motor; 1/2 stepping)



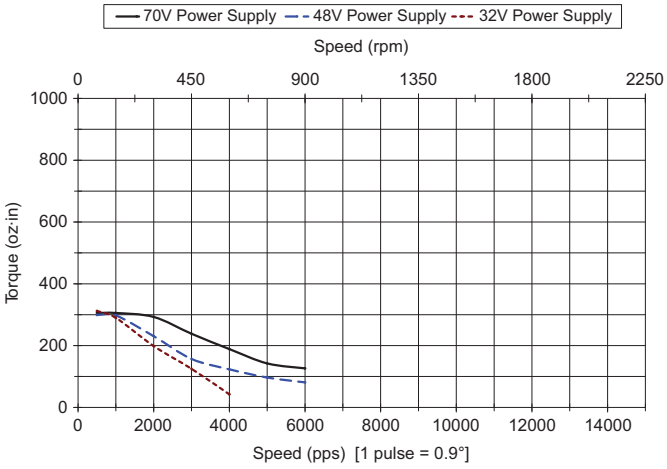
STP-MTR*H*-23079(D) Torque vs Speed (1.8° step motor; 1/2 stepping)



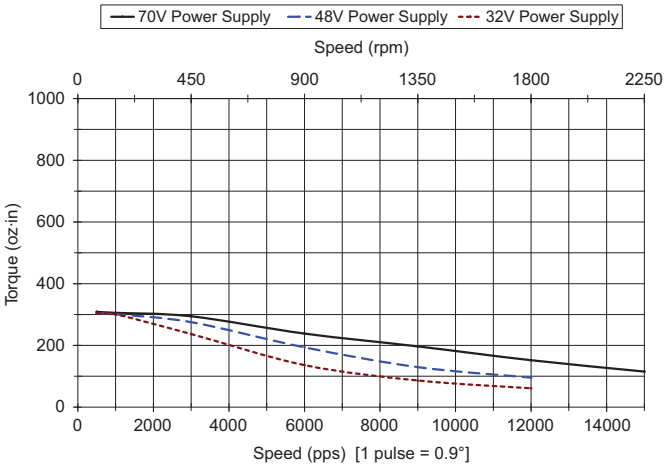
*Sure*Step® Motor Torque vs. Speed Charts (continued)

STP-MTR(H)-34xxx(D) NEMA 34 Step Motors

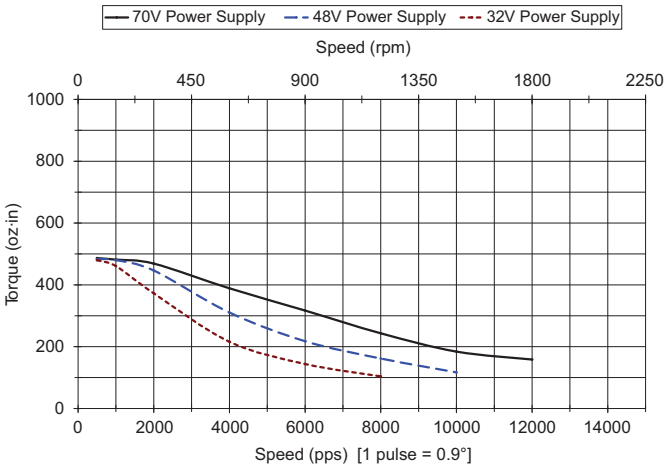
STP-MTR-34066(D) Torque vs Speed (1.8° step motor; 1/2 stepping)



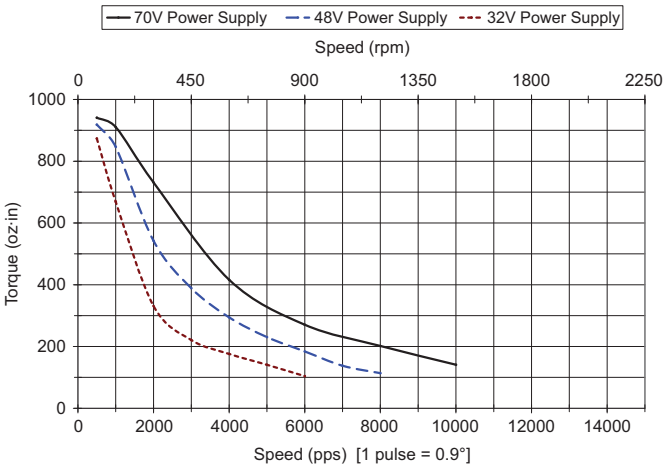
STP-MTR*H*-34066(D) Torque vs Speed (1.8° motor; 1/2 stepping)



STP-MTR*H*-34097(D) Torque vs Speed (1.8° step motor; 1/2 stepping)



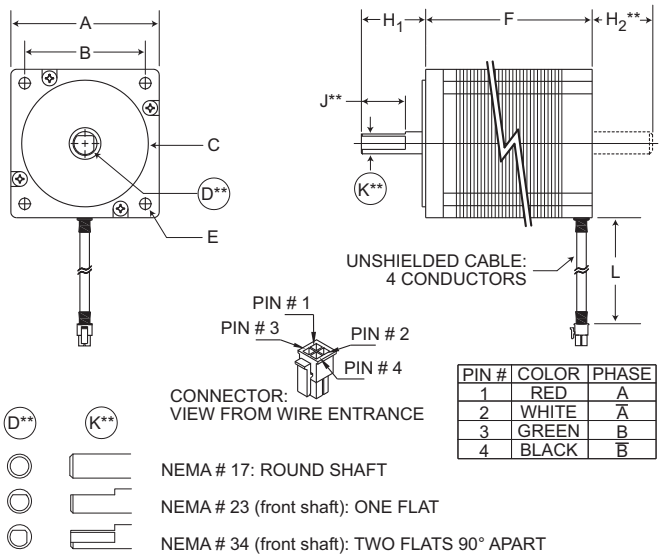
STP-MTR*H*-34127(D) Torque vs Speed (1.8° step motor; 1/2 stepping)



Sure-step® Stepping System Motors

*Sure*Step® Motor Dimensions and Cabling

STP-MTR(H)-xxxx(D) Motors



PIN #	COLOR	PHASE
1	RED	A
2	WHITE	$\overline{A}$
3	GREEN	B
4	BLACK	$\overline{B}$

** Dimension H_2 applies only to dual-shaft STP-xxxxxD motors.
** Dimension D is the same for both front and rear shafts of dual-shaft motors.
** Dimensions J & K do NOT apply to rear shafts of dual-shaft motors (all rear shafts are round style).

SureStep Series Dimensions & Cabling – Connectorized Bipolar Stepping Motors

Dimen-sions* (in [mm]*)	High Torque Motors						Higher Torque Motors			
	STP-MTR-17040(D)	STP-MTR-17048(D)	STP-MTR-17060(D)	STP-MTR-23055(D)	STP-MTR-23079(D)	STP-MTR-34066(D)	STP-MTRH-23079(D)	STP-MTRH-34066(D)	STP-MTRH-34097(D)	STP-MTRH-34127(D)
A	1.67 [42.3]			2.25 [57.2]		3.39 [86.1]	2.25 [57.2]	3.39 [86.1]		
B	1.22 [31.0]			1.86 [47.2]		2.74 [69.6]	1.86 [47.2]	2.74 [69.6]		
C	Ø 0.87 [22.1]			Ø 1.50 [38.1]		Ø 2.88 [73.0]	Ø 1.50 [38.1]	Ø 2.88 [73.0]		
D**	Ø 0.20 [5.0]			Ø 0.25 [6.4]		Ø 0.50 [12.7]	Ø 0.25 [6.4]	Ø 0.50 [12.7]		
E	M3 x 0.5 thread 0.15 [3.8] min depth			Ø 0.20 [5.1] through		Ø 0.26 [6.6] through	Ø 0.20 [5.1] through	Ø 0.26 [6.6] through		
F	1.58 [40.1]	1.89 [48.0]	2.34 [59.5]	2.22 [56.4]	3.10 [78.7]	2.64 [67.1]	3.10 [78.7]	2.64 [67.1]	3.82 [97.0]	5.00 [127.0]
H_1	0.94 [24.0]			0.81 [20.6]		1.46 [37.1]	0.81 [20.6]	1.46 [37.1]		
H_2**	0.39 [9.9]			0.63 [16.0]		1.13 [28.7]	0.63 [16.0]	1.13 [28.7]		
J**	n/a			0.59 [15.0]		0.98 [25.0]	0.59 [15.0]	0.98 [25.0]		
K**	n/a			0.23 [5.8]		0.45 [11.4]	0.23 [5.8]	0.45 [11.4]		
L	12.0 [305]						12 [305]			
Conductor	(4) #20 AWG						(4) #18 AWG			
Connector	Molex # 43025-0400						Molex # 39-01-3042			
Pin	Molex # 43030-0007						Molex # 39-00-0039			

** mm dimensions are for reference purposes only.*

*** Dimension H_2 applies only to dual-shaft STP-xxxxxD motors.*
Dimension D (shaft diameter) is the same for both front and rear shafts of dual-shaft motors.
Dimensions J & K do NOT apply to rear shafts of dual-shaft motors (all rear shafts are round style).

Sure step® Stepping System Cables

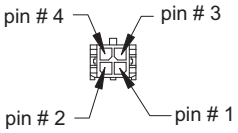
*Sure*Step® Cables

*Sure*Step Series – Stepping System Cables					
Cable	**Price**	**Purpose**	**Length**	**Use With**	**Cable End Connectors**
STP-EXT-020	<--->	motor to drive extension	20 ft	STP-MTR-xxxxx(D)	pigtail / Molex 430450412 connector
STP-EXTH-020	<--->	motor to drive extension	20 ft	STP-MTR**H**-xxxxx(D)	pigtail / Molex 0039012041 connector
STP-232RJ11-CBL *	<--->	programming/communication	10 ft	STP-DRV-4850 STP-DRV-80100	DB9 female / RJ11(6P4C)
STP-232HD15-CBL-2 **	<--->	communication	6.6 ft	STP-DRV-4850 STP-DRV-80100	HD 15-pin male / RJ12 6-pin plug
STP-232RJ12-CBL-2 **	<--->	communication	6.6 ft	STP-DRV-4850 STP-DRV-80100	RJ12 6-pin plug / RJ12 6-pin plug

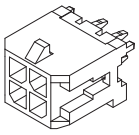
**** Programming/communication cable STP-232RJ11-CBLis available for spare or replacement purposes. (One cable is included with each software programmable drive.)***

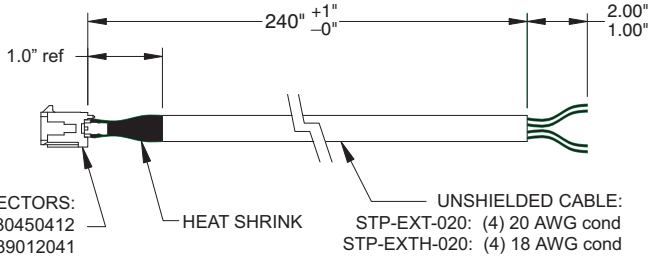
***** Refer to the ZIPLinks Wiring Solutions section for complete information regarding cables STP-232HD15-CBL-2 and STP-232RJ12-CBL-2.***

Extension Cable Wiring Diagram

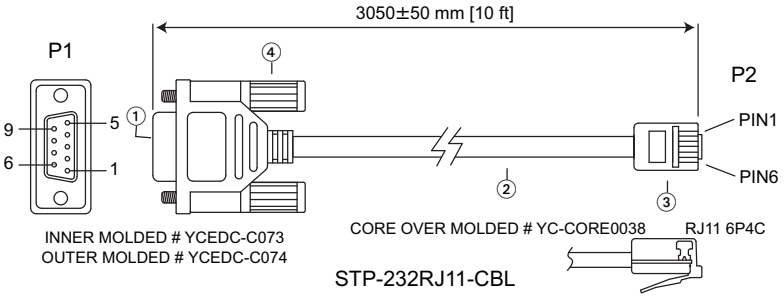


PIN #	COLOR
1	red
2	white
3	green
4	black





Programming Cable Wiring Diagram



WIRE CONNECTION

(DB9) P1			P2 (RJ11 6P4C)
2	RX	TX	3
3	TX	RX	5
4	nc	nc	4
5	GND	GND	2

①	DB 9P FEMALE CONNECTOR SHELL: FRONT NICKEL BACK TIN INSULATOR COLOR: BLACK
②	CABLE: CAT-5 UTP 24AWG (7/0.203BA*2PR) 100MHz COLOR: BLACK OD: 4.5mm
③	RJ11 6P4C PLATED GOLD 3U"
④	SCREW: #4-40UNC PD40*175TNP COLOR: BLACK

Sure-step® Stepping Systems

*Sure*Step® System Overview

***SureStep* Step Motor Power Supply** + ***SureStep* Microstepping Drive** + ***SureStep* Extension Cable** + ***SureStep* Connectorized Step Motor**

SureStep stepping system includes:

- Four step motor power supplies
- Two DIP-switch configurable microstepping drives
- Two software configurable advanced microstepping drives
- Two motor extension cables
- Twenty step motors (NEMA 17, 23, 34 frame sizes; single & dual shaft)

Standard stepper drive features

(STP-DRV-4035 & STP-DRV-6575)

- Low cost, digital step motor driver in compact package
- Operates from Step & Direction signals, or Step CW & Step CCW (jumper selectable)
- Fault output (-6575 only) & Enable input
- Optically isolated I/O
- Digital filters prevent position error from electrical noise on command signals; jumper selectable: 150 kHz or 2MHz (-6575 only)
- Rotary or DIP switch easily selects from many popular motors
- Electronic damping and anti-resonance (-6575 only)
- Automatic idle current reduction to reduce heat when motor is not moving; switch selectable: 50% or 90% of running current
- Switch selectable step resolution: (-DRV-4035) 400–10,000 steps per revolution; (-DRV-6575) 200–20,000 steps per revolution
- Switch selectable microstep emulation provides smoother, more reliable motion in full and half step modes
- Automatic self test (switch selectable)
- Operates from a 24–65 VDC or 12–40 VDC power supply, depending upon model
- Running current from 0.5–7.5A

Advanced stepper drive features

(STP-DRV-4850 & STP-DRV-80100)

- Max 5A, 48V and max 10A, 80V models available
- Software configurable
- Programmable microsteps
- Internal indexer (via ASCII commands)
- Self test feature
- Idle current reduction
- Anti-resonance
- Torque ripple smoothing
- Step, analog, & serial communication inputs
- Serial communications allow point-to-point positioning

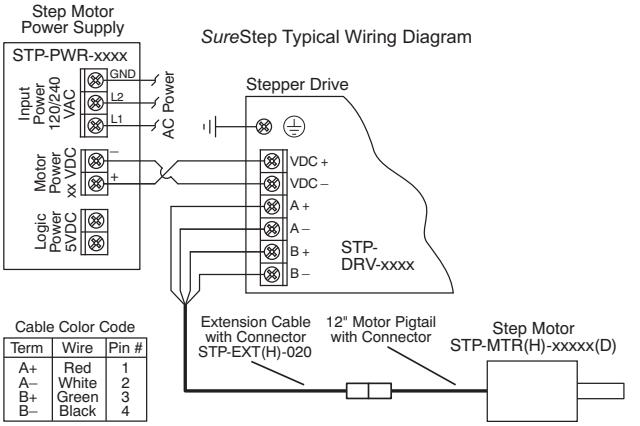
Motor features

- High torque, 2-phase, bipolar, 1.8° per step, 4-lead
- Available in single-shaft and dual-shaft models
- Connectorized
- (6) NEMA 17 motors
- (6) NEMA 23 motors
- (8) NEMA 34 motors

Power supply features

- Linear, unregulated DC power supplies
- 120/240 VAC selectable input
- 32V, 48V, 70V DC output models available
- All models have additional 5VDC, 500 mA regulated logic supply
- Fusing included for both incoming AC and outgoing DC
- 5V supply has electronic overload protection

Typical Wiring Diagram



*Sure*Step Typical Wiring Diagram

*Sure*Step Power Supply / Drive Compatibility

Drive(1)(2)	Recommended Power Supply(1)(2)			
Model #	**STP-PWR -3024**	**STP-PWR -4805**	**STP-PWR -4810**	**STP-PWR -7005**
STP-DRV-4035	√	No	No	No
STP-DRV-4850	√	√	√	No
STP-DRV-6575	√	√	√	No
STP-DRV-80100	√	√	√	√

1) Do NOT use a power supply that exceeds the drive's input voltage range. If using a non-STP linear power supply, ensure that the unloaded voltage does not float above the drive's maximum input range.

2) For best performance, use the lowest voltage power supply that supplies the required speed and torque.

*Sure*Step Drive / Motor Compatibility

Motor(1)(2)			Recommended Drive(1)			
Model # (1)(2)	**Rated Amps**	**Extension Cable(2)**	**STP-DRV -4035(1)**	**STP-DRV -4850(1)**	**STP-DRV -6575(1)**	**STP-DRV -80100(1)**
STP-MTR-17040(D)	1.7	STP-EXT-020	√	√	√	–
STP-MTR-17048(D)	2.0		√	√	√	
STP-MTR-17060(D)	2.0		√	√	√	
STP-MTR-23055(D)	2.8		√	√	√	
STP-MTR-23079(D)	2.8		√	√	√	
STP-MTR-34066(D)	2.8		√	√	√	
STP-MTRH-23079(D)	5.6	STP-EXTH-020	–		√	√
STP-MTRH-34066(D)	6.3				√	√
STP-MTRH-34097(D)	6.3				√	√
STP-MTRH-34127(D)	6.3				√	√

1) The combinations above will perform according to the published speed/torque curves. However, any STP motor can be used with any STP drive. Using a motor with a current rating higher than the drive's output rating will proportionally limit the motor torque.

2) MTR motors have connectors compatible with the EXT extension cables. MTRH motors have connectors compatible with the EXTH extension cables.