

# SureStep® Stepping System Motors

## SureStep® Stepping Motors

SureStep Series Part Numbers – Connectorized Bipolar Stepping Motors*				
Bipolar Stepping Motors	Price	Shaft Type	Torque Level	Encoder Mounting
STP-MTRL-14026	\$22.50	single	low	not available
STP-MTRL-14026D	\$27.00	dual		optional
STP-MTRL-14026E**	\$97.00	dual		pre-installed
STP-MTRL-14034	\$28.50	single		not available
STP-MTRL-14034D	\$32.50	dual		optional
STP-MTRL-14034E**	\$101.00	dual		pre-installed
STP-MTR-17040	\$19.00	single	high	not available
STP-MTR-17040D	\$23.00	dual		optional
STP-MTR-17040E**	\$92.00	dual		pre-installed
STP-MTR-17040W***	\$132.00	single		not available
STP-MTR-17048	\$23.00	single		not available
STP-MTR-17048D	\$27.50	dual		optional
STP-MTR-17048E**	\$97.00	dual		pre-installed
STP-MTR-17048W***	\$135.00	single		not available
STP-MTR-17060	\$37.50	single		not available
STP-MTR-17060D	\$42.00	dual		optional
STP-MTR-17060E**	\$111.00	dual		pre-installed
STP-MTR-17060W***	\$175.00	single		not available
STP-MTR-23055	\$37.50	single		not available
STP-MTR-23055D	\$42.50	dual		optional
STP-MTR-23055E**	\$112.00	dual		pre-installed
STP-MTR-23055W***	\$163.00	single		not available
STP-MTR-23079	\$49.00	single		not available
STP-MTR-23079D	\$54.00	dual		optional
STP-MTR-23079E**	\$123.00	dual		pre-installed
STP-MTR-23079W***	\$177.00	single		not available
STP-MTR-34066	\$116.00	single	higher	not available
STP-MTR-34066D	\$132.00	dual		not available
STP-MTR-34066W***	\$211.00	single		not available
STP-MTRH-23079	\$55.00	single		not available
STP-MTRH-23079D	\$59.00	dual		optional
STP-MTRH-23079E**	\$129.00	dual		pre-installed
STP-MTRH-23079W***	\$263.00	single		not available
STP-MTRH-34066	\$130.00	single		not available
STP-MTRH-34066D	\$145.00	dual		not available
STP-MTRH-34066W***	\$299.00	single		not available
STP-MTRH-34097	\$147.00	single		not available
STP-MTRH-34097D	\$162.00	dual		not available
STP-MTRH-34097W***	\$335.00	single		not available
STP-MTRH-34127	\$174.00	single		not available
STP-MTRH-34127D	\$191.00	dual		not available
STP-MTRH-34127W***	\$366.00	single		not available

Motors listing continued on next page

\* For integrated motor/drives part numbers and pricing, see the integrated motor/drives section.

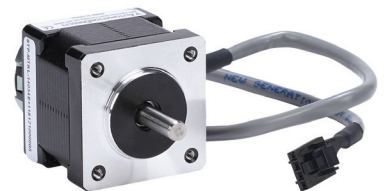
\*\* E model motors come with a STP-MTRA-ENC9 encoder pre-installed. Requires STP-CBL-EBxx for encoder wiring. To change from the default 400ppr, use STP-USBENC-CBL-1. See the SureStep Stepping System Encoders section for more details.

\*\*\* W models are IP65 washdown rated. All others are IP40.

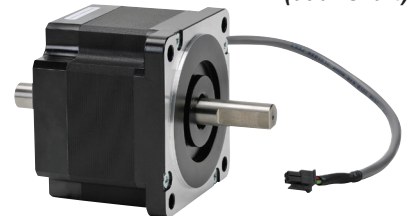
**STP-MTR-xxxxx  
(single-shaft)**



**STP-MTR-xxxxxE  
(encoder mount)**



**STP-MTR-xxxxxD  
(dual-shaft)**



**STP-MTR-xxxxxW  
(IP65)**



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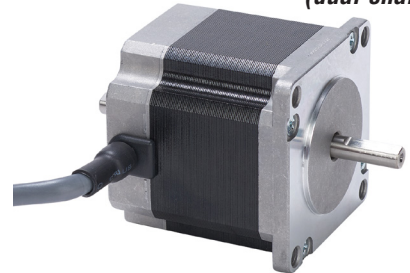
SureStep Series Part Numbers – Non-connectorized Bipolar Stepping Motors				
Bipolar Stepping Motors	Price	Shaft Type	Torque Level	Encoder Mounting
<i>Motors listing continued from previous page</i>				
<b>STP-MTRAC-23044</b>	\$57.00	single	High voltage High torque	not available
<b>STP-MTRAC-23044D</b>	\$58.00	dual		optional
<b>STP-MTRAC-23055</b>	\$63.00	single		not available
<b>STP-MTRAC-23055D</b>	\$64.00	dual		optional
<b>STP-MTRAC-23078</b>	\$88.00	single		not available
<b>STP-MTRAC-23078D</b>	\$89.00	dual		optional
<b>STP-MTRAC-34075</b>	\$235.00	single		not available
<b>STP-MTRAC-34075D</b>	\$236.00	dual		optional
<b>STP-MTRAC-34115</b>	\$245.00	single		not available
<b>STP-MTRAC-34115D</b>	\$246.00	dual		optional
<b>STP-MTRAC-34156</b>	\$265.00	single		not available
<b>STP-MTRAC-34156D</b>	\$265.00	dual		optional

NOTE: STP-MTRAC-34156(x) motors have a 5/8" front shaft

**STP-MTRAC-xxxxx**  
(single-shaft)



**STP-MTRAC-xxxxxD**  
(dual-shaft)



## SureStep® Stepping Motors Mounting Accessory

Mounting Accessory – for NEMA 17 SureStep Series Bipolar Stepping Motors		
Part Number	Price	Description
<b>STP-MTRA-RB-85</b>	\$8.50	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<sup>®</sup> Stepping System Motors

## SureStep<sup>®</sup> Stepping Motors

SureStep Series Specifications – Connectorized Bipolar Stepping Motors													
Bipolar Stepping Motors		Low Voltage Low Torque		Low Voltage High Torque						Low Voltage Higher Torque			
		STP-MTRL-14026(x)	STP-MTRL-14034(x)	STP-MTR-17040(x)	STP-MTR-17048(x)	STP-MTR-17060(x)	STP-MTR-23055(x)	STP-MTR-23079(x)	STP-MTR-34066(x)	STP-MTRH-23079(x)	STP-MTRH-34066(x)	STP-MTRH-34097(x)	STP-MTRH-34127(x)
NEMA Frame Size		14	14	17	17	17	23	23	34	23	34	34	34
Maximum Holding Torque*	(lb-in)	0.5	1.25	3.81	5.19	7.19	10.37	17.25	27.12	17.87	27.12	50.00	80.50
	(oz-in)	8	20	61	83	115	166	276	434	286	434	800	1288
	(N-m)	0.06	0.14	0.43	0.59	0.81	1.17	1.95	3.06	2.02	3.06	5.65	9.10
Rotor Inertia	(oz-in <sup>2</sup> )	0.06	0.08	0.28	0.37	0.56	1.46	2.60	7.66	2.60	7.66	14.80	21.90
	(kg-cm <sup>2</sup> )	0.0003	0.00035	0.05	0.07	0.10	0.27	0.48	1.40	0.48	1.40	2.71	4.01
Rated Current (A/phase)		0.35	0.8	1.7	2.0	2.0	2.8	2.8	2.8	5.6	6.3	6.3	6.3
Resistance (Ω/phase)		8.5	7.66	1.6	1.4	2.0	0.75	1.1	1.11	0.4	0.25	0.3	0.49
Inductance (mH/phase)		5.77	6.92	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		0.003 in [0.076 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 80°C [176°F])											
Operating Humidity Range		55% to 85% non-condensing											
Product Material		steel motor case; stainless steel shaft(s)											
Environmental Rating		IP40 (IP65 for "W" motors)											
Weight (lb [kg]) (E models)		0.25 [0.11] (0.3 [0.1])	0.35 [0.15] (0.4 [0.2])	0.6 [0.3] (0.7 [0.3])	0.7 [0.3] (0.8 [0.4])	0.9 [0.4] (0.9 [0.4])	1.5 [0.7] (1.5 [0.7])	2.2 [1.0] (2.4 [1.1])	3.9 [1.7]	2.4 [1.1] (2.4 [1.1])	3.9 [1.7]	5.9 [2.7]	8.4 [3.8]
Agency Approvals		CE											
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-EXTL-0xx		STP-EXT-0xx STP-EXTW-0xx ( for "W" motors)						STP-EXTH-0xx STP-EXTHW-0xx (for "W" motors)			
* For dual-shaft motors (STP-MTR-xxxxD): 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<sup>®</sup> Stepping System Motors

## SureStep<sup>®</sup> Stepping Motors

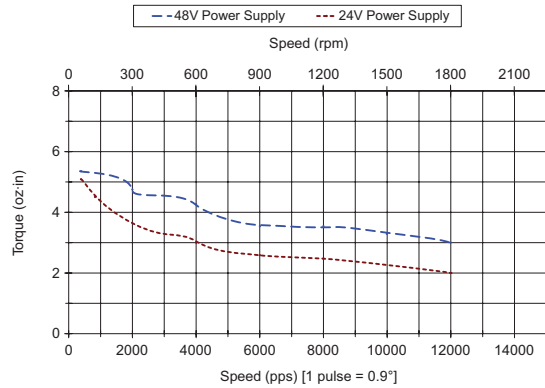
SureStep Series Specifications – High Voltage Bipolar Stepping Motors							
Bipolar Stepping Motors		High Voltage High Torque					
		STP-MTRAC-23044(x)	STP-MTRAC-23055(x)	STP-MTRAC-23078(x)	STP-MTRAC-34075(x)	STP-MTRAC-34115(x)	STP-MTRAC-34156(x)**
NEMA Frame Size		23	23	23	34	34	34**
Maximum Holding Torque*	(lb-in)	4.69	9.31	14.19	51.31	69.48	115.06
	(oz-in)	75	149	227	821	1110	1841
	(N-m)	0.53	1.05	1.6	5.8	7.84	13
Rotor Inertia	(oz-in <sup>2</sup> )	0.66	1.64	2.62	7.38	14.74	24.06
	(kg-cm <sup>2</sup> )	120	300	480	1350	2700	4400
Rated Current (A/phase)	Series	0.71	0.71	0.71	2.15	2.05	2.55
	Parallel	1.41	1.41	1.41	4.3	4.1	5.1
Resistance (Ω/phase)	Series	12.4	14.4	18	4	4.8	4.8
	Parallel	3.1	3.6	4.5	1.0	1.2	1.375
Inductance (mH/phase)	Series	30.4	51.2	60.8	32	43.2	44.8
	Parallel	7.6	12.8	15.2	8.0	10.8	11.2
Insulation Class		B					
Steps per Revolution		200					
Basic Step Angle		1.8°					
Shaft Runout (in)		0.002 in 0.05 mm]					
Max Shaft Radial Play @ 1lb load		0.02 in [0.51 mm]			0.025 in [0.635 mm]		0.02 in [0.51 mm]
Max End Play @ 2.2-lb Axial load		0.08 in [2.03 mm]			0.075 in [1.91 mm]		0.08 in [2.03 mm]
Connectors		8 leads, 24AWG			8 leads, 22AWG		
Temperature Rise		80°C [176°F] max					
Storage Temperature Range		-40°C to 70°C [-40°F to 158°F]					
Operating Temperature Range		-20°C to 50°C [-4°F to 122°F]					
Operating Humidity Range		5% to 95% non-condensing					
Product Material		Steel motor case; stainless steel shaft(s)					
Environmental Rating		IP40					
Weight (lb [kg])		1.03 [0.47]	1.54 [0.7]	2.2 [1.0]	4.2 [1.9]	8.4 [3.8]	11.46 [5.2]
Agency Approvals		None			cUR <sub>US</sub>		
* For dual-shaft motors (STP-MTRAC-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.							
** STP-MTRAC-24156(x) motors have a 5/8" front shaft							

# SureStep® Stepping System Motors

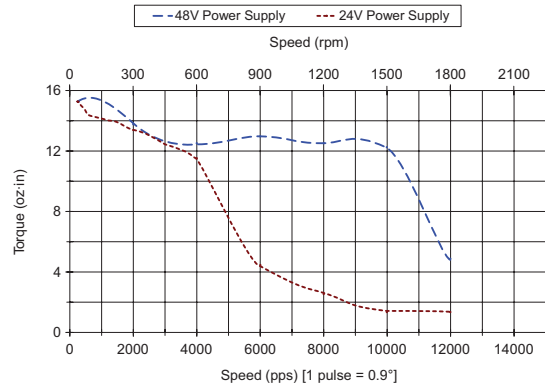
## SureStep® Motor Running Torque vs. Speed Charts

### STP-MTRL-14xxx(x) NEMA 14 Step Motors

STP-MTRL-14026(x) Torque vs Speed (1.8° step motor; 1/2 stepping, RMS phase current)



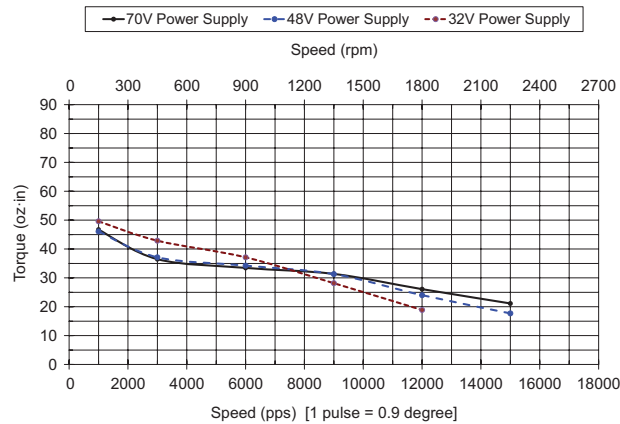
STP-MTRL-14034(x) Torque vs Speed (1.8° step motor; 1/2 stepping, RMS phase current)



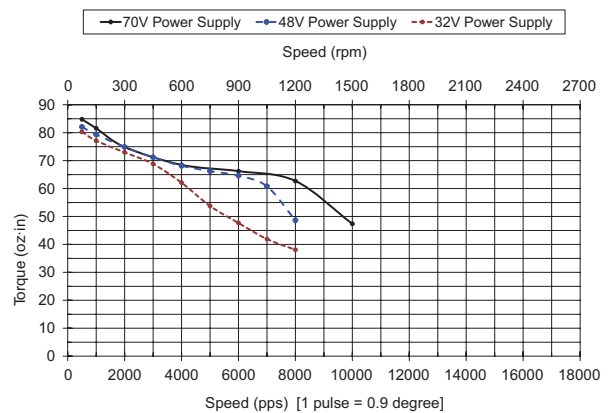
### STP-MTR-17xxx(x) NEMA 17 Step Motors

Note: "W" series motors have 5% less running torque than other models

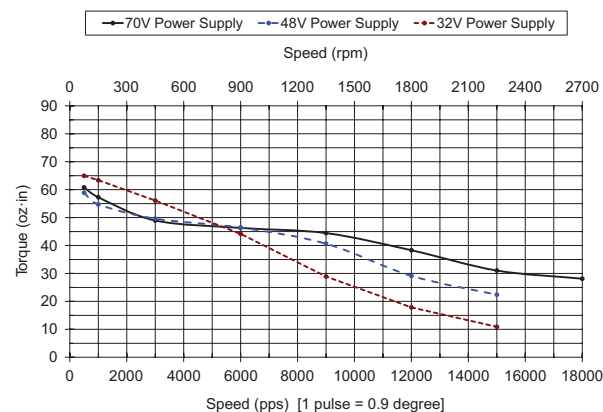
STP-MTR-17040(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



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



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



Note: Motor torque vs speed charts for STP-MTRD series integrated motor/drives can be found in the integrated motor/drives section of the full catalog

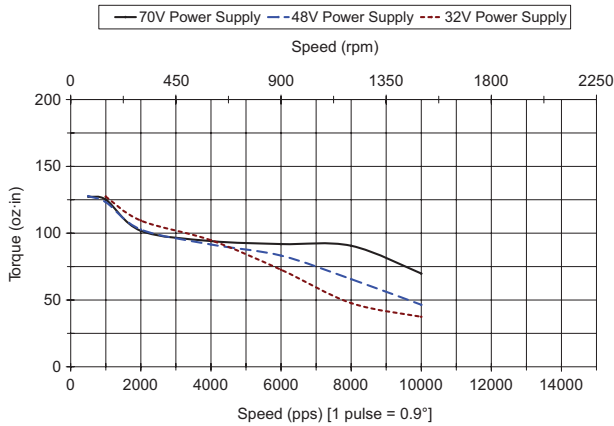
# SureStep<sup>®</sup> Stepping System Motors

## SureStep<sup>®</sup> Motor Torque vs. Speed Charts (continued)

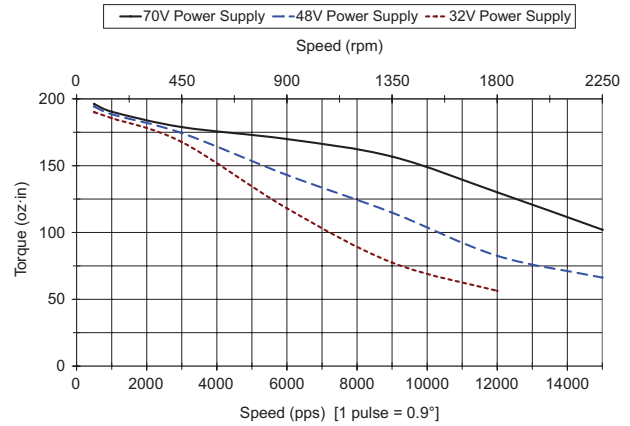
### STP-MTR(H)-23xxx(x) NEMA 23 Step Motors

Note: "W" series motors have 5% less running torque than other models

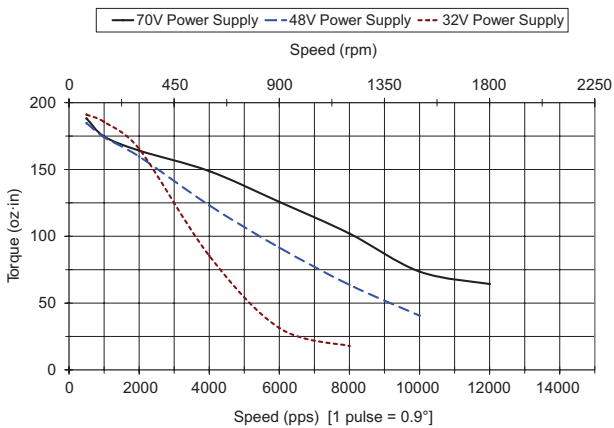
STP-MTR-23055(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



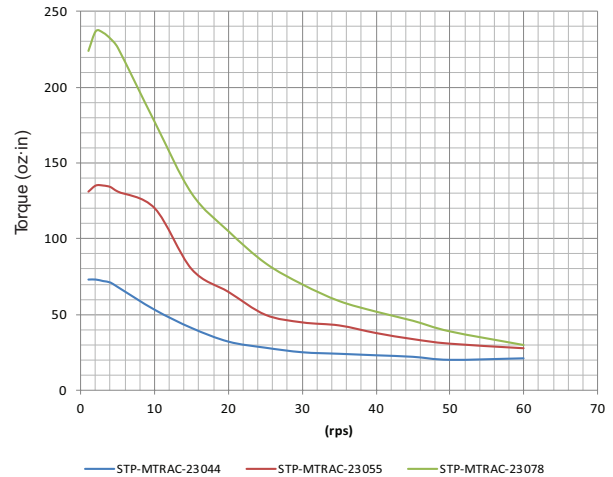
STP-MTRH-23079(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



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



STP-MTRAC-23xxxx Torque vs Speed @ 340VDC bus  
(1.8° step motor; 1/2 stepping)



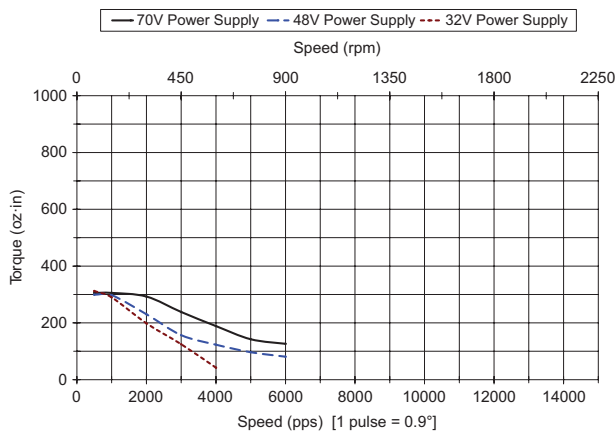
# SureStep® Stepping System Motors

## SureStep® Motor Torque vs. Speed Charts (continued)

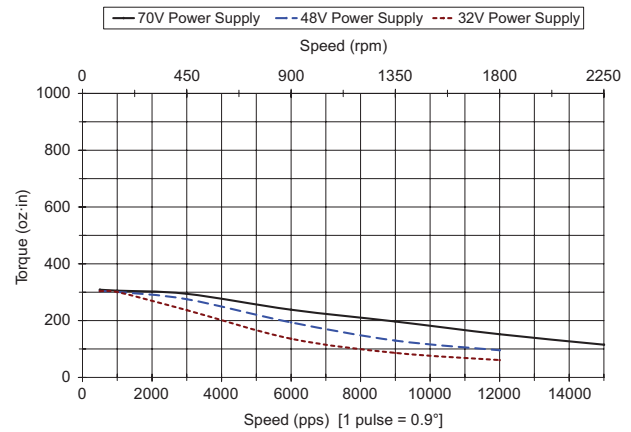
### STP-MTR(H)-34xxx(x) NEMA 34 Step Motors

Note: "W" series motors have 5% less running torque than other models

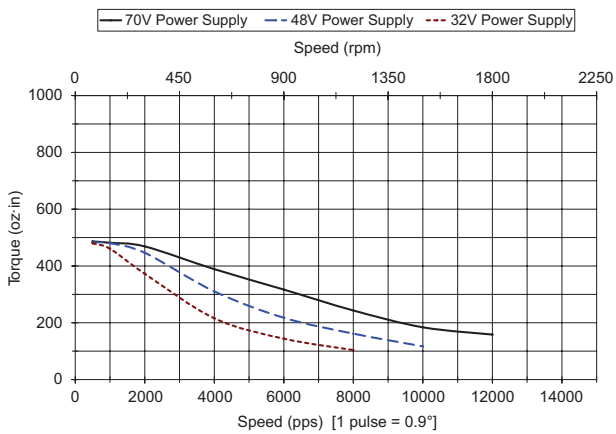
STP-MTR-34066(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



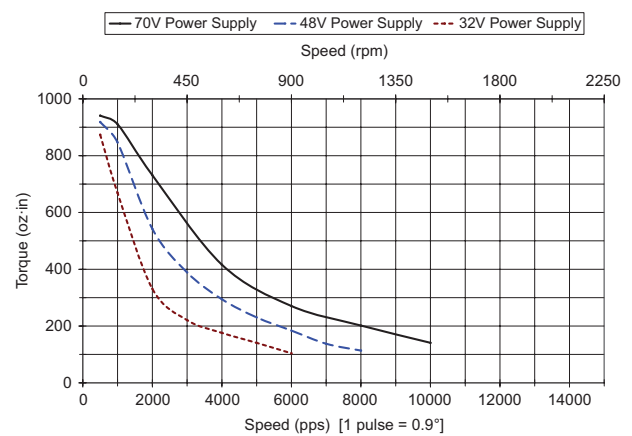
STP-MTRH-34066(x) Torque vs Speed (1.8° motor; 1/2 stepping)



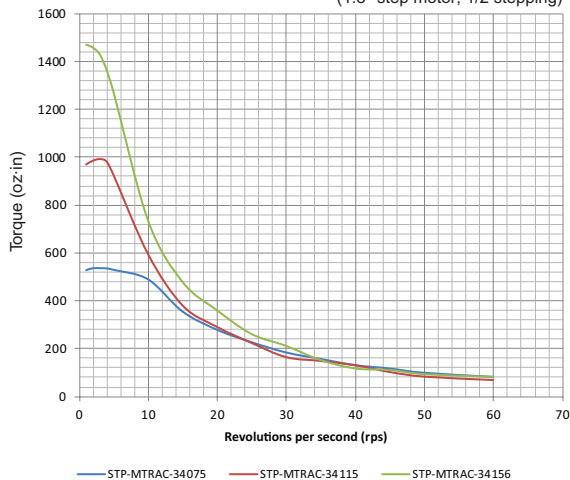
STP-MTRH-34097(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



STP-MTRH-34127(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



STP-MTRAC-34xxxx Torque vs Speed @ 340VDC bus  
(1.8° step motor; 1/2 stepping)

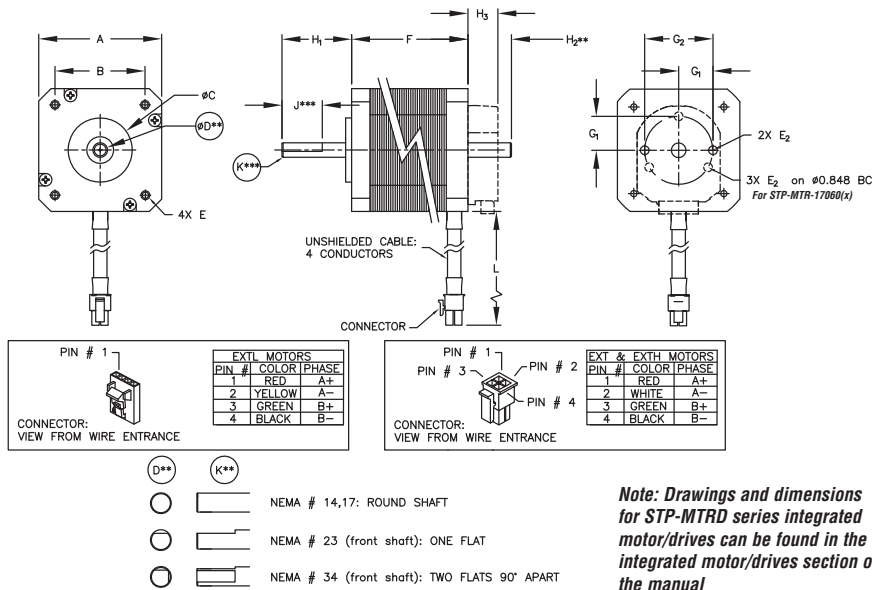




# SureStep® Stepping System Motors

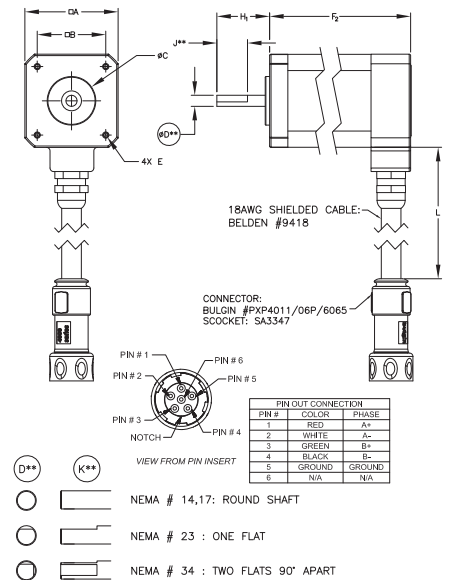
## SureStep® Motor Dimensions and Cabling

### STP-MTR(x)-xxxx(x) Motors



**Note: Drawings and dimensions for STP-MTRD series integrated motor/drives can be found in the integrated motor/drives section of the manual**

### STP-MTR-xxxxxW Motors



### SureStep Series Dimensions & Cabling – Connectorized Bipolar Stepping Motors

Dimen- sions* (in [mm]*)	Low Torque Motors		High Torque Motors						Higher Torque Motors			
	STP- MTRL -14026(x)	STP- MTRL -14034(x)	STP-MTR -17040(x)	STP-MTR -17048(x)	STP-MTR -17060(x)	STP-MTR -23055(x)	STP-MTR -23079(x)	STP-MTR -34066(x)	STP- MTRH -23079(x)	STP- MTRH -34066(x)	STP- MTRH -34097(x)	STP- MTRH -34127(x)
A	1.39 [35.3]	1.39 [35.3]	1.67 [42.3]			2.25 [57.2]		3.39 [86.1]	2.25 [57.2]	3.39 [86.1]		
B	1.02 [25.9]	1.02 [25.9]	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	0.15 DP	0.15 DP	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		
E <sub>2</sub>	M2.5 x 0.45 thread	M2.5 x 0.45 thread	M2.5 x 0.45 thread		M2 x 0.4 thread	4-40		n/a	4-40	n/a		
F <sub>1</sub> **	1.02 [25.9]	1.34 [34.0]	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]
F <sub>2</sub> **	n/a		1.90 [48.3]	2.24 [56.9]	2.67 [67.8]	2.33 [59.1]	3.19 [81.0]	2.64 [67.1]	3.19 [81.0]	2.64 [67.1]	3.82 [97.0]	5.00 [127.0]
G <sub>1</sub>	0.375	0.375	0.375	0.375	0.411	0.906	0.906	0.906	0.906	0.906	0.906	0.906
G <sub>2</sub>	0.75	0.75	0.75	0.75	n/a	1.812	1.812	1.812	1.812	1.812	1.812	1.812
H <sub>1</sub>	0.60 [15.2]	0.60 [15.2]	0.94 [24.0]			0.81 [20.6]		1.46 [37.1]	0.81 [20.6]	1.46 [37.1]		
H <sub>2</sub> **	0.51 [13.0]	0.51 [13.0]	0.51 [13]			0.51 [13]		1.13 [28.7]	0.51 [13]	1.13 [28.7]		
H <sub>3</sub> ***	0.40							n/a	0.40	n/a		
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 [305]											
Conductor	(4) #26 AWG		(4) #20 AWG (5) #18 AWG (for W motors) Molex # 43025-0400 PXP4010/06S/6065 (for W motors)						(4) #18 AWG (5) #18 AWG (for W motors) Molex # 39-01-3042 PXP4010/06S/6065 (for W motors)			
Connector	TE # 103653-3											
Pin	TE # 1-104505-3 (LOOSE)		Molex # 43030-0007 Socket: SA3347 (for W motors)						Molex # 39-00-0039 Socket: SA3347 (for W motors)			

\* mm dimensions are for reference purposes only.

\*\* Dimension H<sub>2</sub> applies only to dual-shaft (D) and encoder (E) motors.

Dimension D (shaft diameter) is the same for both front and rear shafts of dual-shaft (D) and encoder (E) motors.

Dimensions J & K do NOT apply to rear shafts of dual-shaft (D) and encoder (E) motors (all rear shafts are round style).

Dimension F<sub>2</sub> applies to IP65 (W) motors only.

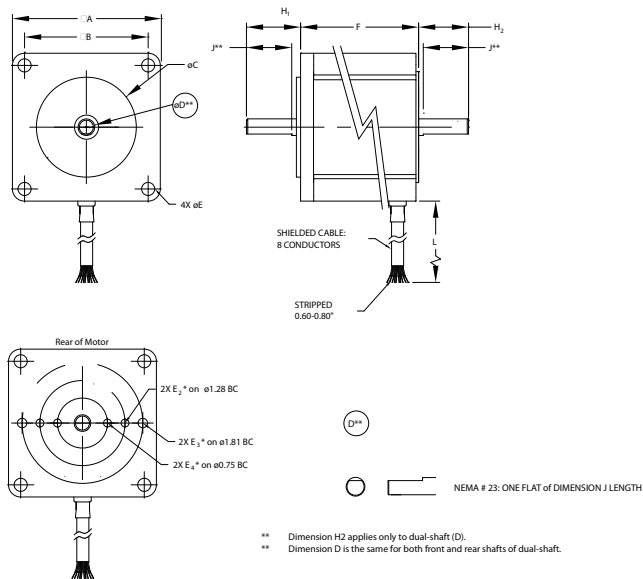
\*\*\* Dimension H<sub>3</sub> applies only to "E" models with the encoder pre-mounted.



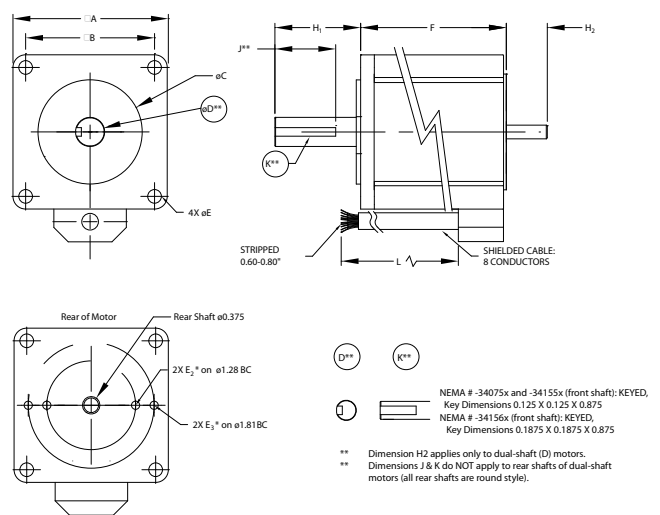
# SureStep® Stepping System Motors

## SureStep® Motor Dimensions and Cabling

### STP-MTRAC-23xxx Motors

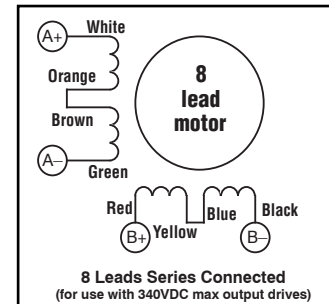


### STP-MTRAC-34xxx Motors

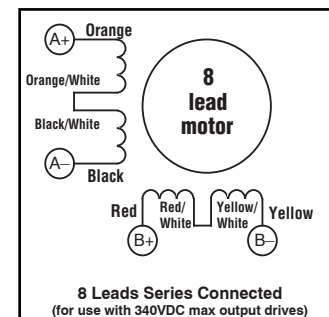


SureStep Series Dimensions & Cabling – High Voltage Bipolar Stepping Motors						
Dimen- sions* (in [mm])*	High Voltage High Torque					
	STP-MTRAC -23044(x)	STP-MTRAC -23055(x)	STP-MTRAC -23078(x)	STP-MTRAC -34075(x)	STP-MTRAC -34115(x)	STP-MTRAC -34156(x)
A	2.25 [57.15]	2.25 [57.15]	2.25 [57.15]	3.39 [86.1]	3.39 [86.1]	3.39 [86.1]
B	1.86 [47.24]	1.86 [47.24]	1.86 [47.24]	2.74 [69.6]	2.74 [69.6]	2.87 [72.9]
C	1.50 [38.1]	1.50 [38.1]	1.50 [38.1]	2.87 [72.9]	2.87 [72.9]	2.87 [72.9]
D**	0.25 [6.35]	0.25 [6.35]	0.25 [6.35]	0.5 [12.7]	0.5 [12.7]	0.625 [15.9]
E	0.2 [5.08]	0.2 [5.08]	0.2 [5.08]	0.25 [6.35]	0.25 [6.35]	0.25 [6.35]
E <sub>2</sub> ***	2-56 thru	2-56 thru	2-56 thru	2-56 UNC Tap 0.2 Deep	2-56 UNC Tap 0.2 Deep	2-56 UNC Tap 0.2 Deep
E <sub>3</sub> ***	4-40 UNC x 0.2 Deep	4-40 UNC x 0.2 Deep	4-40 UNC x 0.2 Deep	4-40 UNC Tap 0.2 Deep	4-40 UNC Tap 0.2 Deep	4-40 UNC Tap 0.2 Deep
E <sub>4</sub> ***	2-56 UNC Tap 0.2 Deep	2-56 UNC Tap 0.2 Deep	2-56 UNC Tap 0.2 Deep	—	—	—
F	1.71 [43.43]	2.16 [54.86]	3.05 [77.47]	2.95 [74.93]	4.52 [114.81]	6.14 [155.96]
H <sub>1</sub>	0.81 [20.57]	0.81 [20.57]	0.81 [20.57]	1.25 [31.75]	1.25 [31.75]	1.25 [31.75]
H <sub>2</sub> ***	0.63 [16.0]	0.63 [16.0]	0.63 [16.0]	1.12 [28.45]	1.12 [28.45]	1.12 [28.45]
J	0.60 [15.24]	0.60 [15.24]	0.60 [15.24]	0.87 [22.1]	0.87 [22.1]	0.87 [22.1]
L	120 [3048]	120 [3048]	120 [3048]	120 [3048]	120 [3048]	120 [3048]

\* mm dimensions are for reference purposes only.  
\*\* Dimension D (shaft diameter) is the same for both front and rear shafts of NEMA 34. See diagrams for NEMA 34.  
\*\*\* Dimension applies only to dual-shaft (D) motors.



**STP-MTRAC-230xx(x),  
34156(x) Motor Wiring**



**STP-MTRAC-34075(x),  
34115(x) Motor Wiring**

# SureStep® Stepping System Accessories

## SureStep® Microstepping Drives Accessories

### Braking Accessories

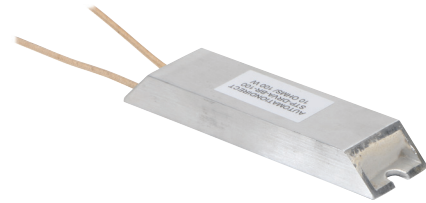
As a load rapidly decelerates from a high speed, much of the kinetic energy of that load is transferred back to the motor. This energy is then pushed back to the drive and power supply, resulting in increased system voltage. If there is enough overhauling load on the motor, the DC voltage will go above the drive and/or power supply limits. In general, the more torque the motor is capable of producing then the more energy it can push back into the drive.

When using a regulated/switching power supply, this can trip the overvoltage protection of the power supply or drive, and cause it to shut down.

To solve this problem, AutomationDirect offers a regeneration clamp and a braking resistor as optional accessories. The regen clamp has a built-in 50W braking resistor. For additional braking power (larger overhauling loads), an optional 100W braking resistor is also available with the STP-DRVA-RC-050. The STP-DRVA-RC-050A does not have the ability to use an external resistor.



**Regeneration Clamp STP-DRVA-RC-050**



**Braking Resistor**

### Regeneration Clamp Features

#### Common Features

- Built-in 50W power resistor for more continuous current handling
- Mounted on a heat sink
- Voltage range: 24–80 VDC; no user adjustments required
- Power: 50W continuous; 800W peak
- Indicators (LED):  
Green = power supply voltage is present  
Red = clamp is operating (usually when stepper is decelerating)
- Protection: The external power supply is internally connected to an “Input Diode” in the regen clamp that protects the power supply from high regeneration voltages. This diode protects the system from connecting the power supply in reverse. If the clamp circuit fails, the diode will continue to protect the power supply from over-voltage.

#### STP-DRVA-RC-050 Features

- External 100W resistor available
- Multiple drives in parallel up to 20A total output current
- Non-removable terminal blocks
- Uses 12-18 AWG wires for connections

#### STP-DRVA-RC-050A Features

- Three drive connections, 7A max per channel, 15A total output current
- Removable terminal blocks (replacement kit STP-CON-4)
- Uses 18-20 AWG wire for connections

### SureStep Damper

A step motor inertia damper can smooth out steps in a typical step motor resulting in a quieter and smoother motion when rotating between steps. Reducing the resonance and possible micro oscillations when moving from step to step is the main purpose of a “hockey puck” style damper, but it can also be used as a hand wheel to directly rotate the position of the rotor when power is removed from the motor. The damper is a properly sized machined piece of aluminum encased in plastic. It is sized and weighted for general damping of the respective frame size motor.



**Regeneration Clamp STP-DRVA-RC-050A**



**Damper**

#### Sure Step Series Specifications – Microstepping Drives Optional Accessories

Part Number	Price	Description
<b>STP-DRVA-RC-050*</b>	\$94.00	Regen Clamp: 50W, for DC input stepper and servo drives, non-enclosed, optional 100W external resistor
<b>STP-DRVA-RC-050A*</b>	\$55.00	Regen Clamp: 50W, for DC input stepper and servo drives, enclosed
<b>STP-DRVA-BR-100</b>	\$68.00	Braking Resistor: use with STP-DRVA-RC-050 regen clamp; 100W, 10 $\Omega$
<b>STP-MTRA-17DMP</b>	\$13.50	SureStep damper, metal body. For use with NEMA 17 stepper motors with 5mm shafts. Mounting set screw included.
<b>STP-MTRA-23DMP</b>	\$31.00	SureStep damper, metal body. For use with NEMA 23 stepper motors with 1/4 inch shafts. Mounting set screw included.

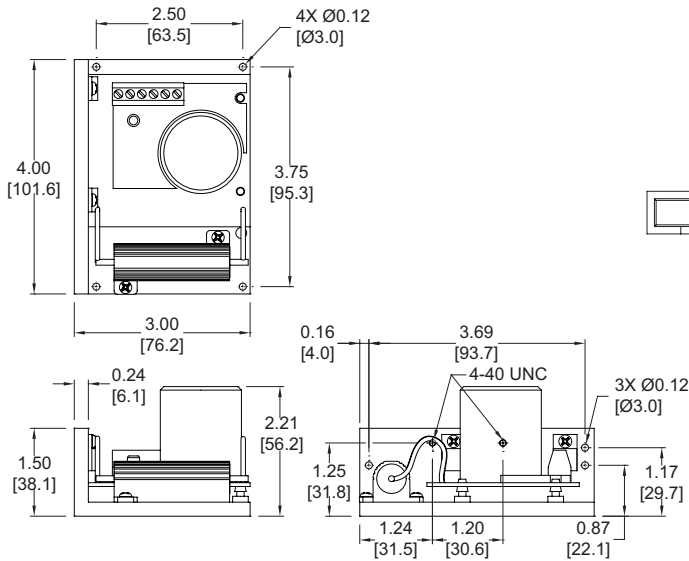
\* Do not use the regeneration clamp in an atmosphere containing corrosive gases.

# SureStep® Stepping System Accessories

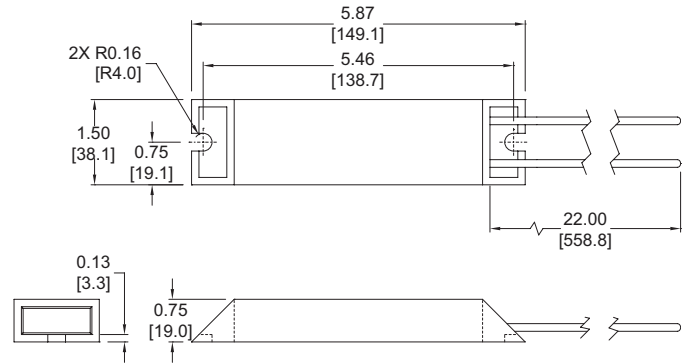
## SureStep® Microstepping Drives Accessories

Dimensions = in [mm]

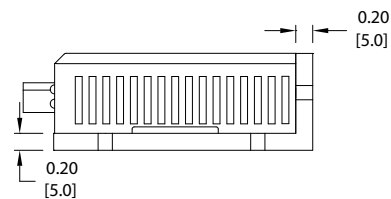
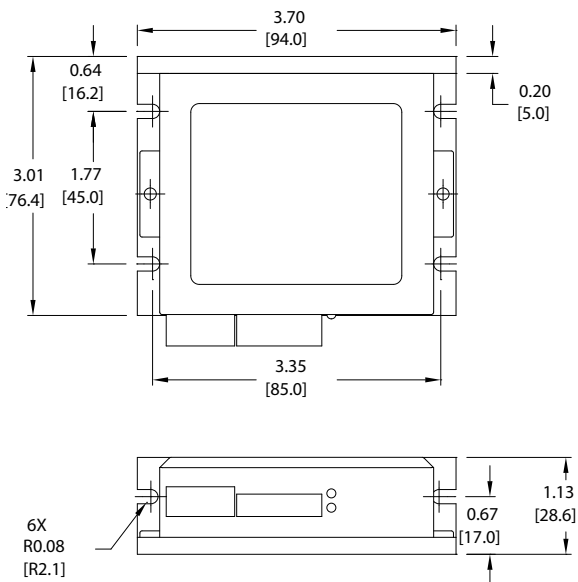
### STP-DRVA-RC-050



### STP-DRVA-BR-100



### STP-DRVA-RC-050A



# SureStep® Stepping System Accessories

## SureStep® Stepping System Encoders

### Replacement Encoders

The STP-MTRA-ENC1 is a replacement for the encoder that comes standard with the STP-MTRD-17038E, STP-MTRD-23042E, and STP-MTRD-23065E integrated motor/drives. Note that the encoder included with (E) model advanced integrated motor/drives is internal and cannot be replaced.

The STP-MTRA-ENC9 is a replacement for the encoder that comes standard with the STP-MTR(x)-xxxxE stand alone step motors.

Installation tool and mounting hardware is included with all replacement encoders. For more information and details on how to wire the replacement encoders, please see the SureStep User Manual.

### Optional Encoders

Optional encoders can be purchased separately for standard integrated motor/drives and standalone dual-shaft motors in all NEMA 14, 17, and 23 sizes, and also for STP-MTRAC-34xxxD motors (currently not available for STP-MTRx-34xxxD motors). All (D) model (dual-shaft) step motors come with pre-drilled holes in the rear end cap for easy encoder mounting. Pre-installed encoders on standalone dual-shaft motors and standard integrated motor/drives can be retrofitted with an appropriate optional encoder if desired. Please see the chart on the following page for encoder compatibility.

### Features:

- Fixed resolutions include 400ppr or 1000ppr
- Configurable models have up to 4096ppr (default = 400ppr)
- Choose line driver or push-pull (totem) output signals



**STP-MTRA-ENC2**



**STP-MTRA-ENC9**



**STP-MTRA-ENC11**

### Sure Step Series Specifications – Encoders

Part Number	Price	Description
<b>STP-MTRA-ENC1</b>	\$68.00	SureStep incremental (quadrature) modular encoder, 5VDC, line driver (differential) output, 1000 ppr. For use with SureStep stepper motors with 5mm rear shaft. Installation tool and mounting hardware included.
<b>STP-MTRA-ENC2</b>	\$58.00	SureStep incremental (quadrature) modular encoder, 5VDC, Push-pull (totem) output, 1000 ppr. For use with SureStep stepper motors with 5mm rear shaft. Installation tool and mounting hardware included.
<b>STP-MTRA-ENC3</b>	\$59.00	SureStep incremental (quadrature) modular encoder, 5VDC, line driver (differential) output, 400 ppr. For use with SureStep stepper motors with 5mm rear shaft. Installation tool and mounting hardware included.
<b>STP-MTRA-ENC4</b>	\$49.50	SureStep incremental (quadrature) modular encoder, 5VDC, Push-pull (totem) output, 400 ppr. For use with SureStep stepper motors with 5mm rear shaft. Installation tool and mounting hardware included.
<b>STP-MTRA-ENC5</b>	\$68.00	SureStep incremental (quadrature) modular encoder, 5VDC, line driver (differential) output, 1000 ppr. For use with SureStep stepper motors with 1/4 inch rear shaft. Installation tool and mounting hardware included.
<b>STP-MTRA-ENC6</b>	\$58.00	SureStep incremental (quadrature) modular encoder, 5VDC, Push-pull (totem) output, 1000 ppr. For use with SureStep stepper motors with 1/4 inch rear shaft. Installation tool and mounting hardware included.
<b>STP-MTRA-ENC7</b>	\$59.00	SureStep incremental (quadrature) modular encoder, 5VDC, line driver (differential) output, 400 ppr. For use with SureStep stepper motors with 1/4 inch rear shaft. Installation tool and mounting hardware included.
<b>STP-MTRA-ENC8</b>	\$49.50	SureStep incremental (quadrature) modular encoder, 5VDC, Push-pull (totem) output, 400 ppr. For use with SureStep stepper motors with 1/4 inch rear shaft. Installation tool and mounting hardware included.
<b>STP-MTRA-ENC9*</b>	\$56.00	SureStep incremental (quadrature) modular encoder, 5VDC, line driver (differential) output, configurable up to 4096 ppr. For use with NEMA 14, 17, and 23 SureStep dual-shaft motors. Installation tool and mounting hardware included.
<b>STP-MTRA-ENC10*</b>	\$42.50	SureStep incremental (quadrature) modular encoder, 5VDC, Push-pull (totem) output, configurable up to 4096 ppr. For use with NEMA 14, 17, and 23 SureStep dual-shaft motors. Installation tool and mounting hardware included.
<b>STP-MTRA-ENC11</b>	\$66.00	SureStep incremental (quadrature) modular encoder, 5 VDC, line driver (differential) output, 1000 ppr. For use with SureStep stepper motors with 3/8in rear shaft. Installation hardware included. Requires STP-CBL-EAxx cable.
<b>STP-MTRA-ENC12</b>	\$56.00	SureStep incremental (quadrature) modular encoder, 5 VDC, push-pull (totem) output, 1000 ppr. For use with SureStep stepper motors with 3/8in rear shaft. Installation hardware included. Requires STP-CBL-EDxx cable.
<b>STP-MTRA-ENC13</b>	\$57.00	SureStep incremental (quadrature) modular encoder, 5 VDC, line driver (differential) output, 400 ppr. For use with SureStep stepper motors with 3/8in rear shaft. Installation hardware included. Requires STP-CBL-EAxx cable.
<b>STP-MTRA-ENC14</b>	\$48.00	SureStep incremental (quadrature) modular encoder, 5 VDC, push-pull (totem) output, 400 ppr. For use with SureStep stepper motors with 3/8in rear shaft. Installation hardware included. Requires STP-CBL-EDxx cable.

\* ENC9 and ENC10 encoders come with multiple adapter sleeves to accommodate different motor shaft diameters. See the dimensional drawing for details.

# SureStep<sup>®</sup> Stepping System Accessories

## SureStep<sup>®</sup> Stepping System Encoders

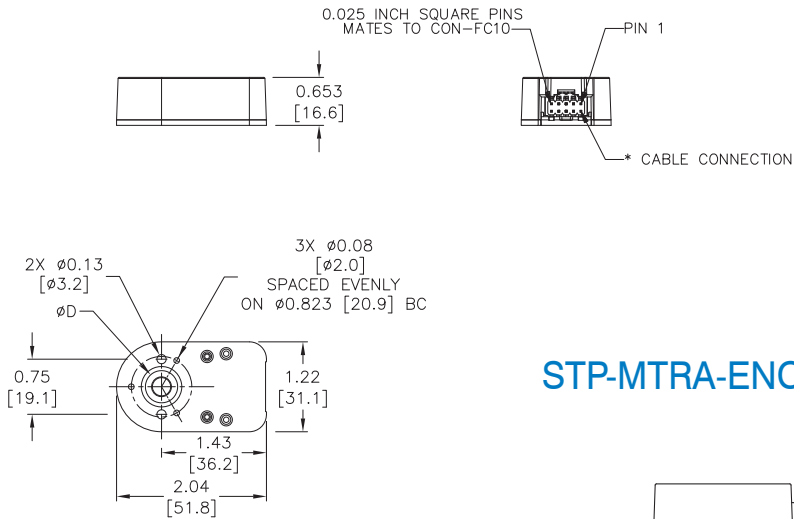
Sure Step Series Encoder Compatibility						
Part Number	PPR	Bore Diameter	Output Type	Encoder Cable	PLC Compatibility	Motor Compatibility
STP-MTRA-ENC1	1000	5mm	Line Driver	STP-CBL-EAxx	P2-HSI, P3-HSI, BRX*, CLICK C0-1xDxE-D*	STP-MTRx-14xxxD STP-MTRx-14xxxE STP-MTRx-17xxxD STP-MTRx-17xxxE Standard STP-MTRD-xxxxxE
STP-MTRA-ENC2			Push-pull (totem)	STP-CBL-EDxx	BRX*, CLICK C0-1xDxE-D*	
STP-MTRA-ENC3	400		Line Driver	STP-CBL-EAxx	P2-HSI, P3-HSI, BRX*, CLICK C0-1xDxE-D*	
STP-MTRA-ENC4			Push-pull (totem)	STP-CBL-EDxx	BRX*, CLICK C0-1xDxE-D*	
STP-MTRA-ENC5	1000	0.25 inch	Line Driver	STP-CBL-EAxx	P2-HSI, P3-HSI, BRX*, CLICK C0-1xDxE-D*	STP-MTRx-23xxxD STP-MTRx-23xxxE STP-MTRAC-23xxxD
STP-MTRA-ENC6			Push-pull (totem)	STP-CBL-EDxx	BRX*, CLICK C0-1xDxE-D*	
STP-MTRA-ENC7	400		Line Driver	STP-CBL-EAxx	P2-HSI, P3-HSI, BRX*, CLICK C0-1xDxE-D*	
STP-MTRA-ENC8			Push-pull (totem)	STP-CBL-EDxx	BRX*, CLICK C0-1xDxE-D*	
STP-MTRA-ENC9	48 to 4096 configurable** (default = 400)	2mm - 8mm	Line Driver	STP-CBL-EBxx (signal)  STP-USBENC-CBL-1 (configuration)	P2-HSI, P3-HSI, BRX*, CLICK C0-1xDxE-D*	STP-MTRx-14xxxD STP-MTRx-14xxxE STP-MTRx-17xxxD STP-MTRx-17xxxE STP-MTRx-23xxxD STP-MTRx-23xxxE STP-MTRAC-23xxxD Standard STP-MTRD-xxxxxE
STP-MTRA-ENC10			Push-pull (totem)		BRX*, CLICK C0-1xDxE-D*	
STP-MTRA-ENC11	1000	0.375 inch	Line Driver	STP-CBL-EAxx	P2-HSI, P3-HSI, BRX*, CLICK C0-1xDxE-D*	STP-MTRAC-34xxxD
STP-MTRA-ENC12			Push-pull (totem)	STP-CBL-EDxx	BRX*, CLICK C0-1xDxE-D*	
STP-MTRA-ENC13	400		Line Driver	STP-CBL-EAxx	P2-HSI, P3-HSI, BRX*, CLICK C0-1xDxE-D*	
STP-MTRA-ENC14			Push-pull (totem)	STP-CBL-EDxx	BRX*, CLICK C0-1xDxE-D*	
* Requires FC-ISO-C						
** Cable STP-USBENC-CBL-1 required for configuration						

# SureStep® Stepping System Accessories

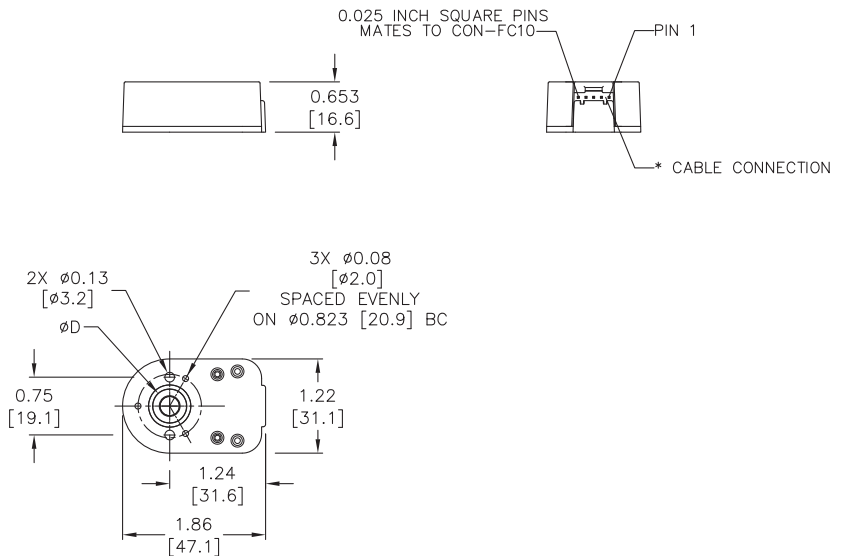
## SureStep® Stepping System Encoders

Dimensions = in [mm]

### STP-MTRA-ENC1, 3, 5, 7

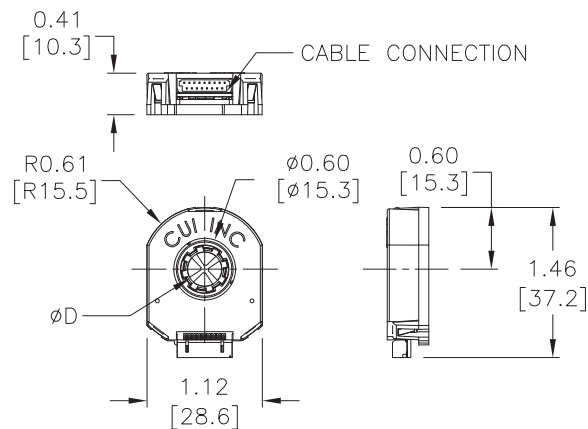


### STP-MTRA-ENC2, 4, 6, 8



Bolt Hole Circles for Mounting	
Encoder	Holes
ENC1, ENC2, ENC3, ENC4, ENC5, ENC6, ENC7, ENC8	2 holes @ 19.05mm (.75") 3 holes @ 20.9mm (.823")
ENC9, ENC10	2 holes @ 16mm, 19.05mm, 32.44mm, 46.02 mm 3 holes @ 20.9mm, 21.55mm, 22mm 4 holes @ 25.4mm

### STP-MTRA-ENC9, 10



#### STP-MTRA-ENC9, 10 Additional Dimensions

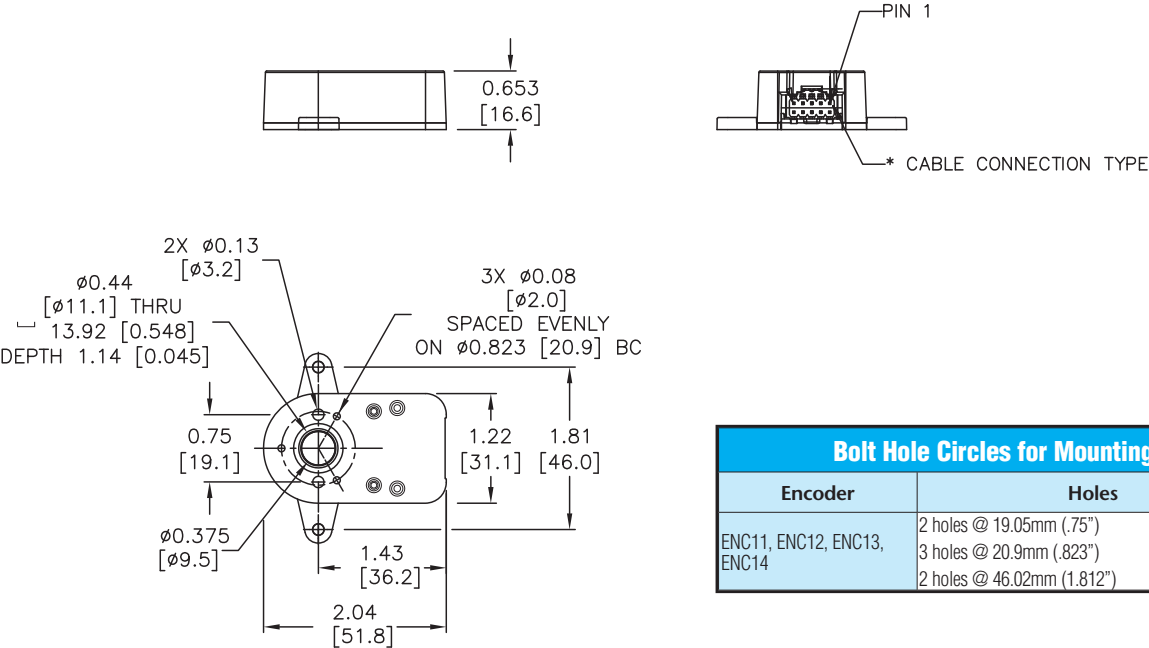
Location	Dimensions
D*	2mm, 3mm, 1/8 inch, 4mm, 3/16 inch, 5mm, 6mm, 1/4 inch, 8mm
* The dimension of D varies based on which sleeve is used. Values listed represent the different sleeves available for this encoder.	

# SureStep® Stepping System Accessories

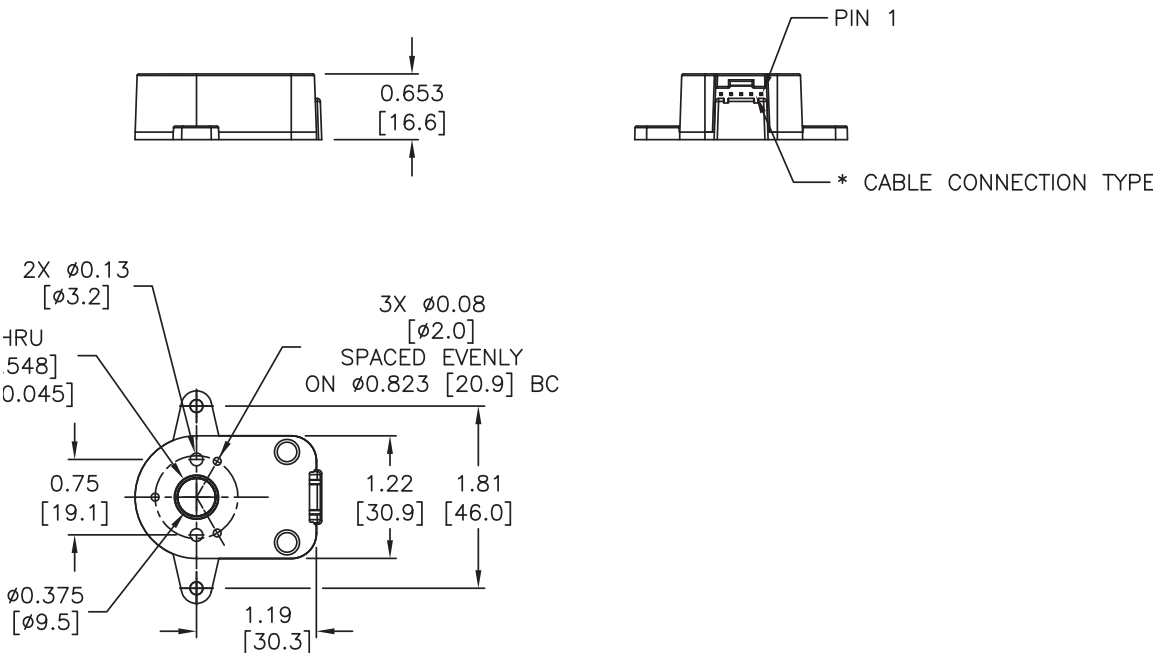
## SureStep® Stepping System Encoders

Dimensions = in [mm]

### STP-MTRA-ENC11, 13



### STP-MTRA-ENC12, 14







# Stepping System Cables

## SureStep® Cables

SureStep Series – Stepping System Cables					
Cable	Price	Purpose	Length	Use With	Cable End Connectors
<b>STP-EXT-006</b>	\$10.50	motor to drive extension	6 ft	STP-MTR-xxxx(x)	pigtail / Molex 43020-0401 connector
<b>STP-EXT-010</b>	\$12.00		10 ft		
<b>STP-EXT-020</b>	\$16.00		20 ft		
<b>STP-EXTH-006</b>	\$22.50		6 ft	STP-MTRH-xxxx(x)	pigtail / Molex 39-01-2041 connector
<b>STP-EXTH-010</b>	\$27.00		10 ft		
<b>STP-EXTH-020</b>	\$31.50		20 ft		
<b>STP-EXTHW-006</b>	\$45.50		6 ft	STP-MTRHW-xxxx(x)	Bulgin # PXP4011/06P/6065
<b>STP-EXTHW-010</b>	\$50.00		10 ft		
<b>STP-EXTHW-020</b>	\$63.00		20 ft		
<b>STP-EXTL-006</b>	\$10.00		6 ft	STP-MTRL-xxxx(x)	pigtail / Molex 105308-22004 connector
<b>STP-EXTL-010</b>	\$12.00		10 ft		
<b>STP-EXTL-020</b>	\$15.50		20 ft		
<b>STP-EXTW-006</b>	\$45.50		6 ft	STP-MTRW-xxxx(x)	Bulgin # PXP4011/06P/6065
<b>STP-EXTW-010</b>	\$50.00		10 ft		
<b>STP-EXTW-020</b>	\$63.00		20 ft		
<b>STP-232RJ11-CBL *</b>	\$9.50	programming/communication	10 ft	STP-DRV-4850, STP-DRV-80100	DB9 female / RJ11(6P4C)
<b>STP-232HD15-CBL-2**</b>	\$11.50	communication	6.6 ft	STP-DRV-4850, STP-DRV-80100 DL06, D2-250-1, D2-260	HD 15-pin male / RJ12 6-pin plug
<b>STP-232RJ12-CBL-2**</b>	\$7.00	communication	6.6 ft	STP-DRV-4850, STP-DRV-80100 DL05, CLICK	RJ12 6-pin plug / RJ12 6-pin plug
<b>STP-CBL-CA6</b>	\$17.00	control cable	6 ft	STP-MTRD-17038 STP-MTRD-17038E	11-pin / pigtail
<b>STP-CBL-CA10</b>	\$20.00	control cable	10 ft		11-pin / pigtail
<b>STP-CBL-CA20</b>	\$29.50	control cable	20 ft		11-pin / pigtail
<b>STP-CBL-EA6</b>	\$17.00	encoder cable	6 ft	STP-MTRD-xxxxE STP-MTRA-ENC1, STP-MTRA-ENC3 STP-MTRA-ENC5, STP-MTRA-ENC7 STP-MTRA-ENC11, STP-MTRA-ENC13 (for line driver encoders)	10-pin / pigtail
<b>STP-CBL-EA10</b>	\$20.00	encoder cable	10 ft		10-pin / pigtail
<b>STP-CBL-EA20</b>	\$29.50	encoder cable	20 ft		10-pin / pigtail
<b>STP-CBL-EB3</b>	\$24.50	encoder cable	3 ft	STP-MTRA-ENC9 STP-MTRA-ENC10 (for both line driver and push-pull (totem) encoders)	17-pin / pigtail
<b>STP-CBL-EB6</b>	\$40.50	encoder cable	6 ft		17-pin / pigtail
<b>STP-CBL-EB10</b>	\$61.00	encoder cable	10 ft		17-pin / pigtail
<b>STP-CBL-EB20</b>	\$112.00	encoder cable	20 ft		17-pin / pigtail
<b>STP-CBL-ED6</b>	\$16.50	encoder cable	6 ft	STP-MTRA-ENC2, STP-MTRA-ENC4 STP-MTRA-ENC6, STP-MTRA-ENC8 STP-MTRA-ENC12, STP-MTRA-ENC14 (for push-pull (totem) encoders)	5-pin / pigtail
<b>STP-CBL-ED10</b>	\$19.50	encoder cable	10 ft		5-pin / pigtail
<b>STP-CBL-ED20</b>	\$29.00	encoder cable	20 ft		5-pin / pigtail
<b>STP-CON-1</b>	\$16.00	replacement connector kit	n/a	STP-DRV-4845 & -6575	-
<b>STP-CON-2</b>	\$16.00	replacement connector kit	n/a	STP-DRV-4850 & 80100	-
<b>STP-CON-3</b>	\$31.50	replacement connector kit	n/a	STP-MTRD-xxxxR	-
<b>STP-CON-4</b>	\$15.00	replacement connector kit	n/a	STP-DRVA-RC-050A	-
<b>STP-CON-5</b>	\$15.00	replacement connector kit	n/a	STP-DRV-4830	-
<b>STP-CON-6</b>	\$21.00	replacement connector kit	n/a	STP-DRVAC-24025	-
<b>STP-485DB9-CBL-2</b>	\$37.00	4-wire programming cable	6.5 ft	STP-MTRD-xxxxR	DB9 / Phoenix 5-conductor plug
<b>STP-USBENC-CBL-1</b>	\$39.50	USB programming cable	3 ft	STP-MTRA-ENC9,ENC10	17-pin / USB

\* Programming/communication cable STP-232RJ11-CBL is 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.



# Stepping System Cables

## SureStep® Cables

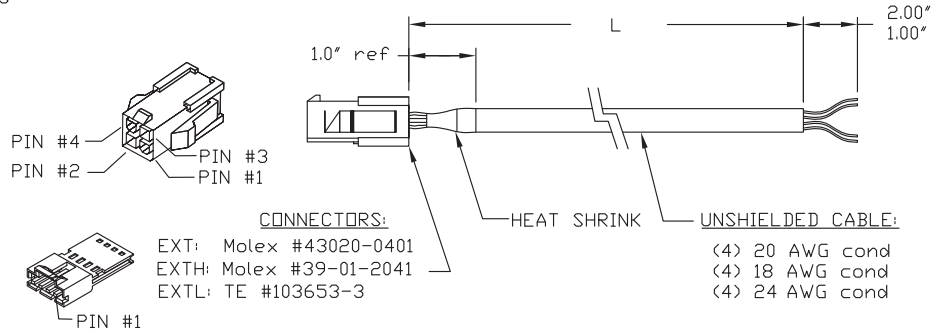
### STP-EXT(x)-0xx Extension Cable Wiring Diagram

EXT &amp; EXTH CABLES

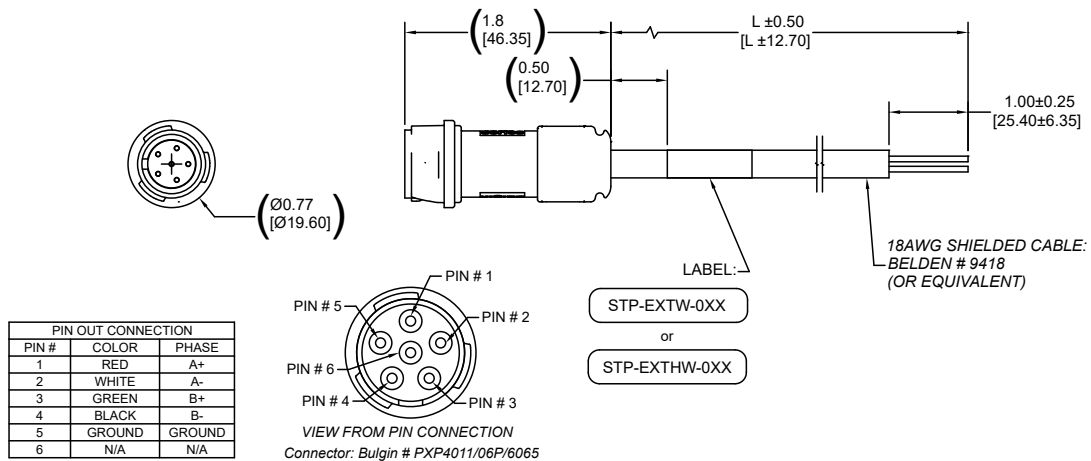
PIN#	COLOR
1	RED
2	WHITE
3	GREEN
4	BLACK

EXTL CABLES

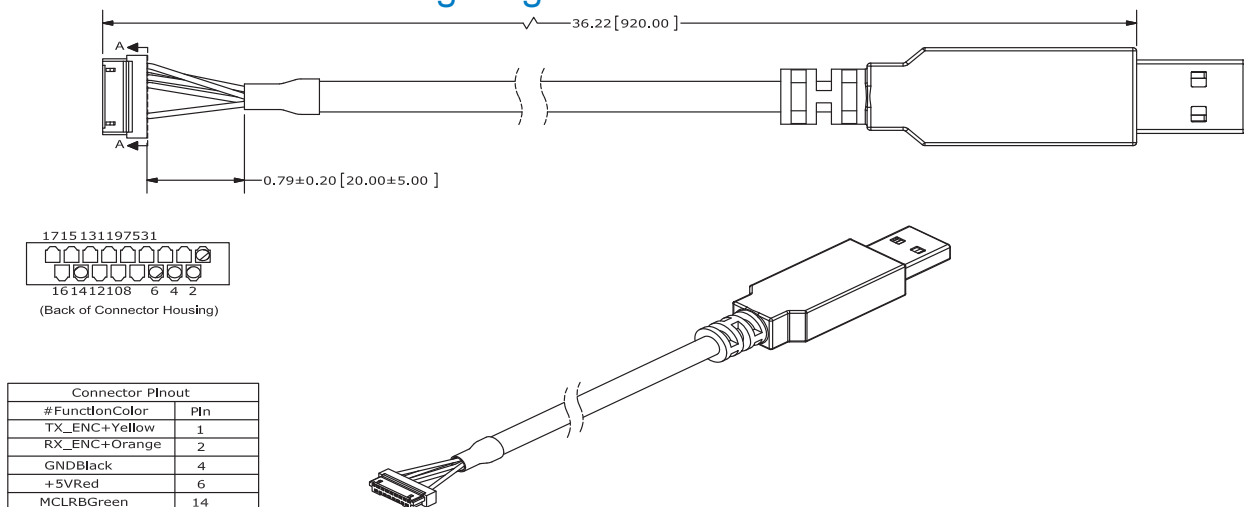
PIN#	COLOR
1	RED
2	WHITE
3	GREEN
4	BLACK



### STP-EXTW-0xx and STP-EXTHW-0xx Extension Cable Wiring Diagram



### STP-USBENC-CBL-1 Wiring Diagram



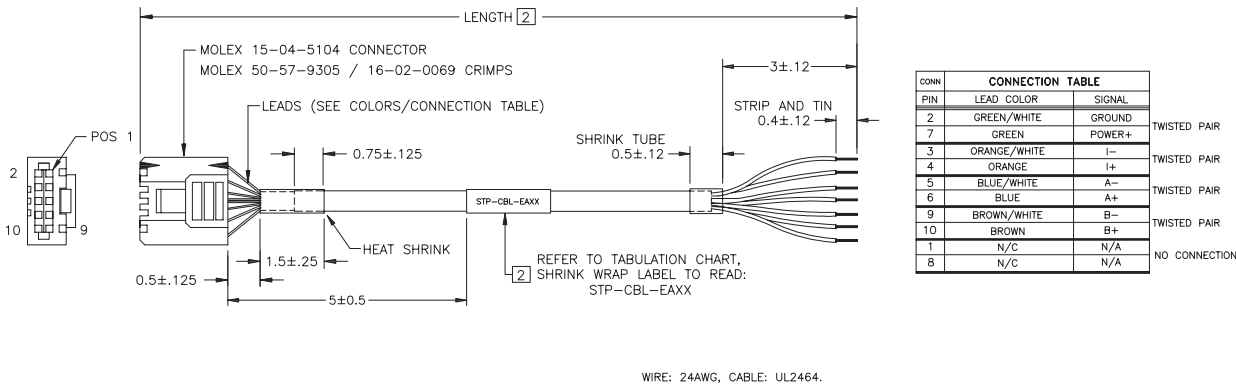




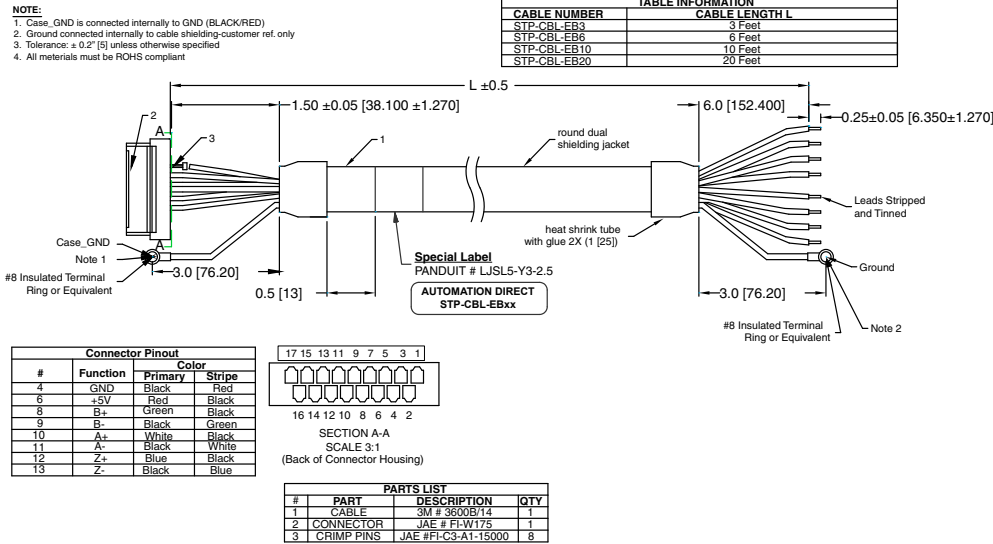
# Stepping System Cables

## SureStep® Cables, continued

### STP-CBL-EAxx Encoder Cable Wiring Diagram



### STP-CBL-EBxx Encoder Cable Wiring Diagram



### STP-CBL-EDxx Encoder Cable Wiring Diagram

