

SureStep® Microstepping Drives Overview

SureStep Series – Microstepping Drives Features Comparison											
Drive Model	Standard Microstepping Drives						Advanced Microstepping Drives				
	STP-DRVAC-24025	STP-DRV-4830	STP-DRV-4845	STP-DRV-6575	STP-MTRD-x	STP-DRV-4035	STP-DRV-4850	STP-DRV-80100	STP-MTRD-xR		
Price					See Integrated Motor/Drives section				See Integrated Motor/Drives section		
Drive Type	Microstepping drive with pulse input				Integrated stepper motor/drive	Micro-stepping drive with pulse input	Advanced microstepping drive with pulse or analog input, serial communication; includes programming/communication cable STP-232RJ11-CBL			Advanced integrated stepper motor/drive with internal encoder	
	enclosed				enclosed	open-frame	enclosed			enclosed	
Output Current	0.6–2.5 A/phase	0.35–3.0 A/phase	0.8–4.5 A/phase	0.5–7.5 A/phase	–	0.4–3.5 A/phase	0.1–5 A/phase	0.1–10 A/phase	–		
Input Voltage	nominal: 120/240 VAC range: 90–240 VAC	nominal: 12–48 VDC range: 10–53 VDC	nominal: 24–48 VDC range: 20–60 VDC	nominal: 24–75 VDC range: 20–85 VDC	nominal: 12–48 VDC (NEMA 17) 12–70 VDC (NEMA 23) range: 10–55 VDC (NEMA 17) 11–74 VDC (NEMA 23)	nominal: 12–32 VDC range: 12–42 VDC	nominal: 24–48 VDC range: 18–53 VDC	nominal: 24–80 VDC range: 18–88 VDC	nominal: 12–48 VDC (NEMA 17) 12–70 VDC (NEMA 23, 24) range: 10–55 VDC (NEMA 17) 11–74 VDC (NEMA 23) 10–75 VDC (NEMA 24)		
Configuration Method	rotary dial, dip switches, jumpers				dip switches		SureMotion Pro software (SM-PRO: free download)				
Amplifier Type	MOSFET, dual H-bridge, 4-quadrant				Dual H-bridge, 4 quadrant	MOSFET, dual H-bridge, bipolar chopper	MOSFET, dual H-bridge, 4-quadrant		Dual H-bridge, 4 quadrant		
Current Control	4-state PWM @ 20 kHz	4-state PWM @ 16 kHz	4-state PWM @ 20 kHz		4-state PWM @ 16 kHz	4-state PWM @ 20 kHz					
Microstep Resolution	dipswitch selectable						software selectable				
	200 to 25,600 steps/rev		200 to 20,000 steps/rev		200 to 25,600 steps/rev	400 to 10,000 steps/rev	200 to 51200 steps/rev				
Modes of Operation	Step & Dir	YES	YES	YES	YES	YES	YES	YES	YES	YES	
	CW/CCW	YES	YES	YES	YES	YES	n/a	YES	YES	YES	
	A/B Quad	n/a	n/a	n/a	n/a	n/a	n/a	YES	YES	YES	
	Oscillator	n/a	n/a	n/a	n/a	n/a	n/a	YES	YES	YES	
	Serial Indexing	n/a	n/a	n/a	n/a	n/a	n/a	YES	YES	YES	
Digital Input Signals	Step/Pulse	step & direction, CW/CCW step				step & direction, CW/CCW step	step & direction	step & direction, CW/CCW step, A/B quadrature, run/stop & direction, jog CW/CCW, CW/CCW limits			
	Direction										
	Enable	motor disable				motor enable	motor disable	motor enable, alarm reset, speed select (oscillator mode)			
Analog Input	n/a	n/a	n/a	n/a	n/a	n/a	speed control		signal range, offset, dead band, and filtering		
Output Signal	fault	n/a	fault	fault	fault	n/a	fault, motion, tach		brake, fault, motion, tach		
Communication Interface	n/a	n/a	n/a	n/a	n/a	n/a	YES (programming/communication cable included)				
Non-volatile Memory Storage	n/a	n/a	n/a	n/a	n/a	n/a	YES				
Idle Current Reduction	YES										
Self Test	YES										
Additional Features	Step pulse noise filter, accepts AC power input	Step pulse noise filter	Load inertia (anti-resonance & damping feature to improve motor performance) Step pulse noise filter			n/a	Anti-resonance (Electronic Damping) Auto setup Microstep emulation Torque ripple smoothing (allows for fine adjustment of phase in the range 0.25 to 1.5 rps) Waveform (command signal) smoothing				

Refer to Specifications Tables for detailed specifications.

SureStep® High Bus Voltage Microstepping Drives

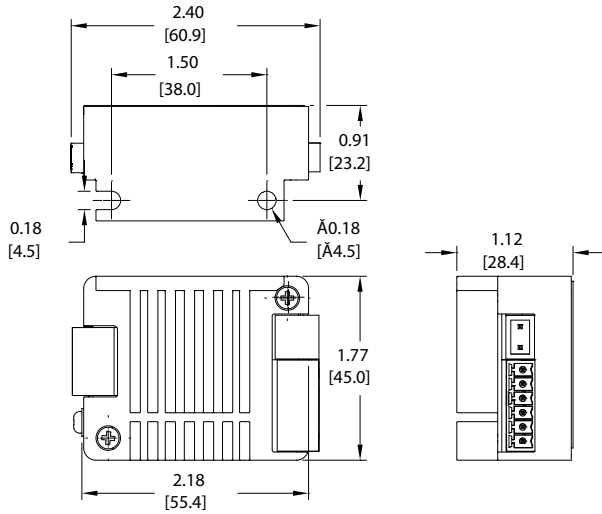


SureStep Series Specifications – Standard Microstepping Drives		
Microstepping Drive	STP-DRVAC-24025	
Price		
Drawing	PDF	
Drive Type	Microstepping drive with pulse input	
Output Current	Selectable from 0.6–2.5 A/phase (peak of sine)	
Input Voltage	90–240 VAC	
Configuration Method	Rotary dial, DIP switches, jumpers	
Amplifier Type	MOSFET, dual H-bridge, 4-quadrant	
Current Control	4-state PWM @ 20 kHz	
Protection	Over temp, over voltage, under voltage, over current, excess regen, open circuit	
Recommended Input Fusing	Fuse: 4A fast-acting; ADC #AGC4; Holder: ADC # DN-F6L110	
Input Signals	Input Circuit	5–24 VDC nominal (range: 4–28 VDC); optically isolated, differential.
	Step/Pulse	Minimum pulse width = 1µs. Maximum pulse frequency = 150kHz or 2MHz (user selectable). FUNCTIONS: step & direction, CW/CCW step
	Direction	
	Enable	FUNCTION: disable motor when closed
	Analog	n/a
Output Signal	30 VDC / 100 mA max, optically isolated photodarlington, sinking or sourcing. Function = closes on drive fault.	
Features	Current Reduction	n/a
	Idle Current Reduction	90% or 50% of running current. (Holding torque is reduced by the same %.)
	Microstep Resolution	200, 400, 800, 1000, 1600, 2000, 3200, 4000, 5000, 6000, 6400, 8000, 10000, 12800, 20000, 25600
	Phase Current Setting	0.6–2.5 Amps RMS
	Self Test	Automatically rotates the motor back and forth two turns in each direction in order to confirm that the motor is operational.
	Step Pulse Noise Filter	Select 150kHz or 2MHz
	Load Inertia	Set motor and load inertia range to 0–4x or 5–10x.
Connectors	DEGSON 2EDGK-7.62-02P-14-00A(H) 2-pin power connector DEGSON 2EDGK-5.08-04P-14-00A(H) 4-pin motor connector DEGSON 15EDGK-3.81-08P-14-00A(H) 8-pin I/O connector ADC part STP-CON-6 contains replacement connectors	
Maximum Humidity	90% non-condensing	
Storage/Ambient Temperature	0 to 40 °C [32 to 104 °F]	
Operating Temperature	0 to 85 °C [32 to 185 °F] (interior of electronics section)	
Drive Cooling Method	Natural convection (mount drive to metal surface)	
Mounting	(2) M4 screws to mount to metal surface	
Weight	1 lb 15 oz [0.88 kg]	
Agency Approvals	CE, cUR _{US}	

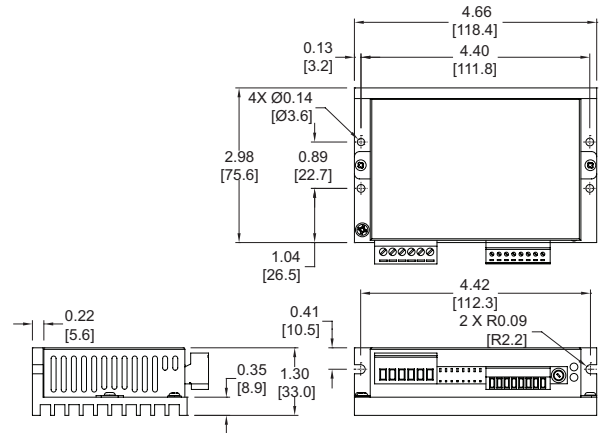
SureStep® Microstepping Drives Dimensions

Dimensions = in [mm]

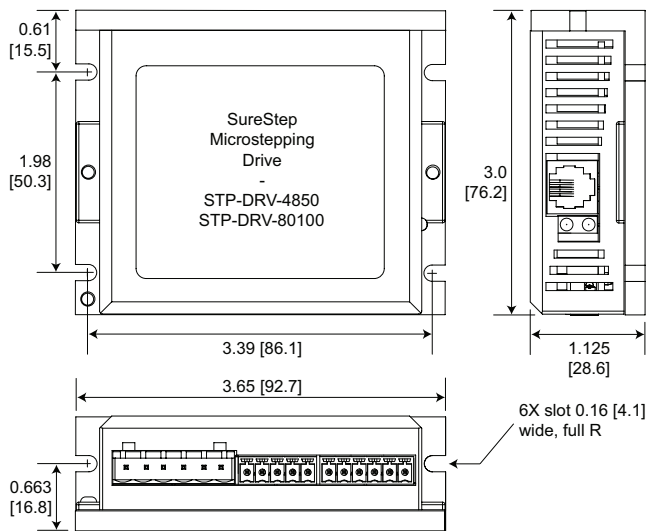
STP-DRV-4830



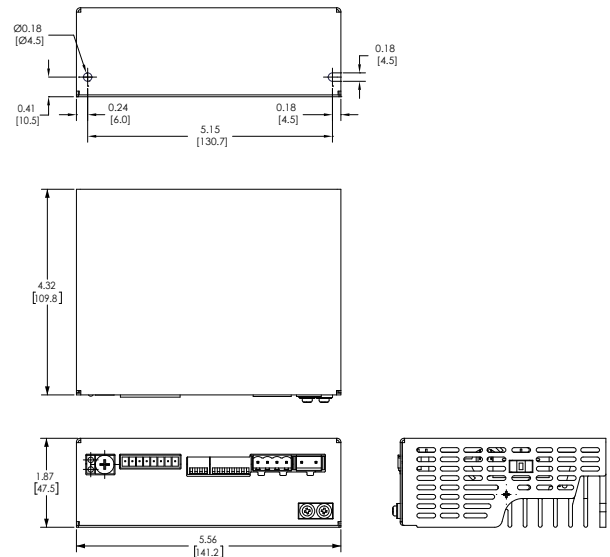
STP-DRV-4845 & -6575



STP-DRV-4850 & -80100



STP-DRVAC-24025



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 as an optional accessory. The regen clamp has a built-in 50W braking resistor. The STP-DRVA-RC-050A does not have the ability to use an external resistor.



Regeneration Clamp STP-DRVA-RC-050A

Regeneration Clamp Features

STP-DRVA-RC-050A

- 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.
- 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.



Damper

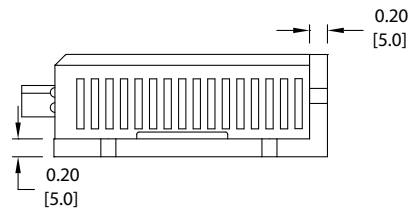
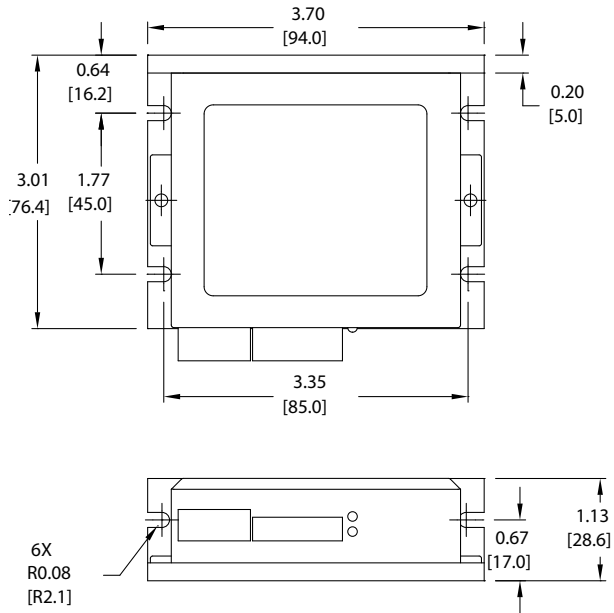
Sure Step Series Specifications – Microstepping Drives Optional Accessories			
Part Number	Price	Description	Drawing
STP-DRVA-RC-050A*		Regen Clamp: 50W, for DC input stepper and servo drives, enclosed	PDF
STP-MTRA-17DMP		SureStep damper, metal body. For use with NEMA 17 stepper motors with 5mm shafts. Mounting set screw included.	PDF
STP-MTRA-23DMP		SureStep damper, metal body. For use with NEMA 23 stepper motors with 1/4 inch shafts. Mounting set screw included.	PDF

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

SureStep® Microstepping Drives Accessories

Dimensions = in [mm]

STP-DRVA-RC-050A



SureStep® Microstepping Drives Accessories

USB to RS-485 Adapter

The STP-USB485-4W is a USB to RS-232/RS-485 converter that can be used in 2-wire or 4-wire serial networks. Serial communication can be wired up via the 9-pin D-sub connector or through the 6-screw terminals.

The STP-USB485-4W can be set for several different configurations. These modes are set up by the 4 DIP switches on the outside of the case (RS-232/RS-485, full/half duplex) and by the 7 jumpers located inside the case (termination/bias resistors).

SureStep Advanced Drives communicate via RS-232 (for control and for configuration via SureMotion Pro).

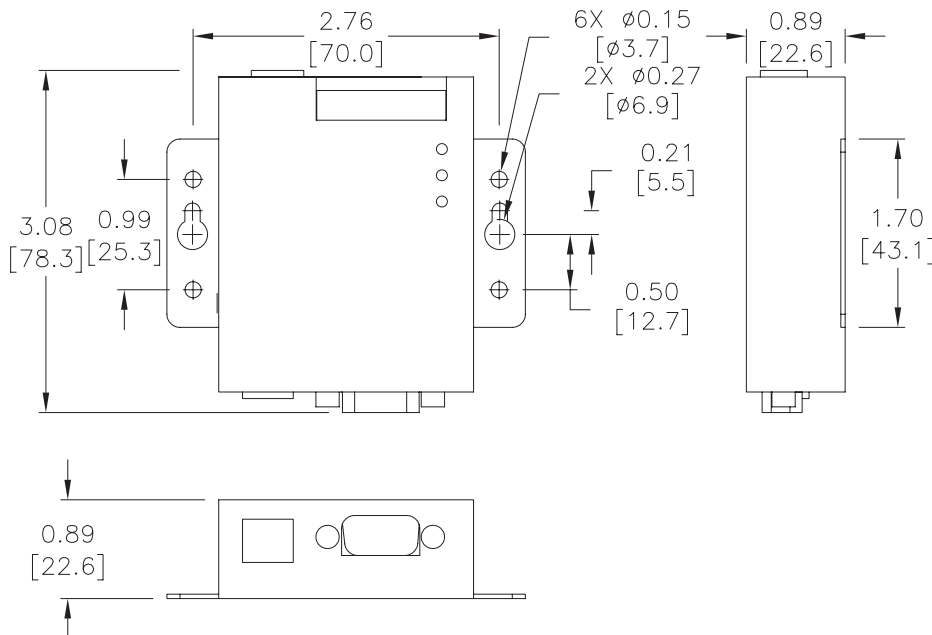
The Advanced Integrated motor/drives use RS-485. While the Advanced Integrated motor/drives can be wired for either 2- or 4-wire networks, 4-wire is require for use with SureMotion Pro due to the Firmware Download utility and the Status Monitor Screen.

Depending on the host controller's RS-485 implementation, either 2- or 4-wire RS-485 can be used for control. All RS-485 PLCs that have 2-wire capability (Productivity, BRX, Click, DirectLogic, etc.) can control the Advanced Integrated steppers.



SureStep PC Adapter - STP-USB485-4W	
Price	
Drawing	PDF
Communications	2-wire RS-232 2- or 4-wire RS-485
Configure With	Internal jumpers and external DIP switches
Compatible Cables	STP-232RJ11-CBL STP-485DB9-CBL-2 USB

Dimensions = in [mm]



SureStep Series – Stepping System Cables						
Cable	Price	Purpose	Length	Use With	Cable End Connectors	Drawing
STP-EXT-006		motor to drive extension	6 ft	STP-MTR-xxxx(x)	pigtail / Molex 43020-0401 connector	PDF
STP-EXT-010			10 ft			PDF
STP-EXT-020			20 ft			PDF
STP-EXTH-006			6 ft	STP-MTRH-xxxx(x)	pigtail / Molex 39-01-2041 connector	PDF
STP-EXTH-010			10 ft			PDF
STP-EXTH-020			20 ft			PDF
STP-EXTHW-006			6 ft	STP-MTRHW-xxxx(x)	Bulgin # PXP4011/06P/6065	PDF
STP-EXTHW-010			10 ft			PDF
STP-EXTHW-020			20 ft			PDF
STP-EXTL-006			6 ft	STP-MTRL-xxxx(x)	pigtail / Molex 105308-22004 connector	PDF
STP-EXTL-010			10 ft			PDF
STP-EXTL-020			20 ft			PDF
STP-EXTW-006			6 ft	STP-MTRW-xxxx(x)	Bulgin # PXP4011/06P/6065	PDF
STP-EXTW-010			10 ft			PDF
STP-EXTW-020			20 ft			PDF
STP-EXT42-006		motor to drive extension	6 ft	STP-MTRAC-42xxxx	10-pin / pigtail	PDF
STP-EXT42-010			10 ft			PDF
STP-EXT42-020			20 ft			PDF
STP-EXT42H-006			6 ft	STP-MTRACH-42xxxx		PDF
STP-EXT42H-010			10 ft			PDF
STP-EXT42H-020			20 ft			PDF
STP-232RJ11-CBL*		programming/communication	10 ft	STP-DRV-4850, STP-DRV-80100	DB9 female / RJ11(6P4C)	PDF
STP-232HD15-CBL-2**		communication	6.6 ft	STP-DRV-4850, STP-DRV-80100 DL06, D2-250-1, D2-260	HD 15-pin male / RJ12 6-pin plug	PDF
STP-232RJ12-CBL-2**		communication	6.6 ft	STP-DRV-4850, STP-DRV-80100 DL05, CLICK	RJ12 6-pin plug / RJ12 6-pin plug	PDF
STP-CBL-CA6		control cable	6 ft	STP-MTRD-17038 STP-MTRD-17038E	11-pin / pigtail	PDF
STP-CBL-CA10		control cable	10 ft		11-pin / pigtail	PDF
STP-CBL-CA20		control cable	20 ft		11-pin / pigtail	PDF
STP-CBL-EA6		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	PDF
STP-CBL-EA10		encoder cable	10 ft		10-pin / pigtail	PDF
STP-CBL-EA20		encoder cable	20 ft		10-pin / pigtail	PDF
STP-CBL-EB3		encoder cable	3 ft	STP-MTRA-ENC9 STP-MTRA-ENC10 (for both line driver and push-pull (totem) encoders)	17-pin / pigtail	PDF
STP-CBL-EB6		encoder cable	6 ft		17-pin / pigtail	PDF
STP-CBL-EB10		encoder cable	10 ft		17-pin / pigtail	PDF
STP-CBL-EB20		encoder cable	20 ft		17-pin / pigtail	PDF
STP-CBL-ED6		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	PDF
STP-CBL-ED10		encoder cable	10 ft		5-pin / pigtail	PDF
STP-CBL-ED20		encoder cable	20 ft		5-pin / pigtail	PDF
STP-CON-1		replacement connector kit	n/a	STP-DRV-4845 & -6575	-	PDF
STP-CON-2		replacement connector kit	n/a	STP-DRV-4850 & 80100	-	PDF

* 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.

SureStep® Cables, *continued*

SureStep Series – Stepping System Cables						
Cable	Price	Purpose	Length	Use With	Cable End Connectors	Drawing
STP-CON-3		replacement connector kit	n/a	STP-MTRD-xxxxR	-	PDF
STP-CON-4		replacement connector kit	n/a	STP-DRVA-RC-050A	-	PDF
STP-CON-5		replacement connector kit	n/a	STP-DRV-4830	-	PDF
STP-CON-6		replacement connector kit	n/a	STP-DRVAC-24025	-	PDF
STP-485DB9-CBL-2		4-wire programming cable	6.5 ft	STP-MTRD-xxxxR	DB9 / Phoenix 5-conductor plug	PDF
STP-USBENC-CBL-1		USB programming cable	3 ft	STP-MTRA-ENC9,ENC10	17-pin / USB	PDF

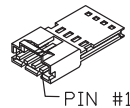
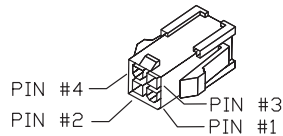
STP-EXT(x)-0xx Extension Cable Wiring Diagram

EXT & EXTH CABLES

PIN#	COLOR
1	RED
2	WHITE
3	GREEN
4	BLACK

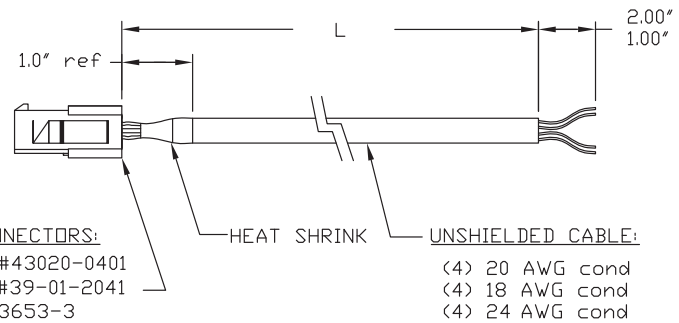
EXTL CABLES

PIN#	COLOR
1	RED
2	WHITE
3	GREEN
4	BLACK

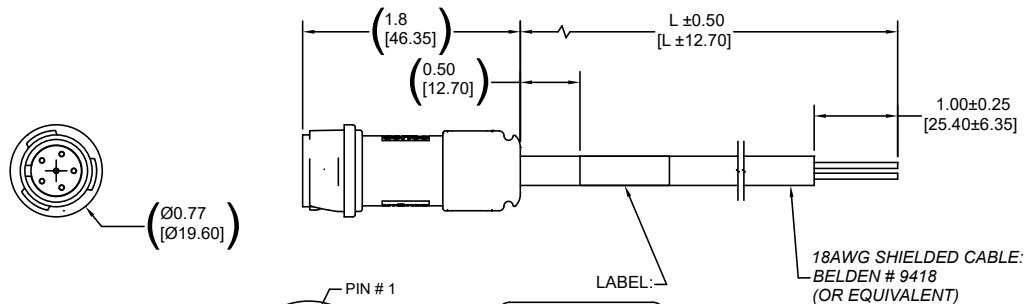


CONNECTORS:

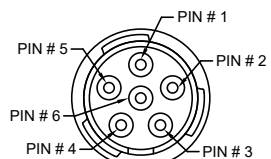
EXT: Molex #43020-0401
 EXTH: Molex #39-01-2041
 EXTL: TE #103653-3



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



PIN OUT CONNECTION		
PIN #	COLOR	PHASE
1	RED	A+
2	WHITE	A-
3	GREEN	B+
4	BLACK	B-
5	GROUND	GROUND
6	N/A	N/A

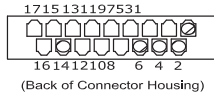
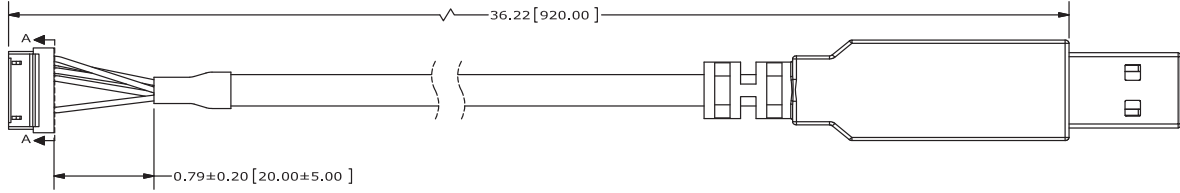


VIEW FROM PIN CONNECTION
 Connector: Bulgin # PXP4011/06P/6065

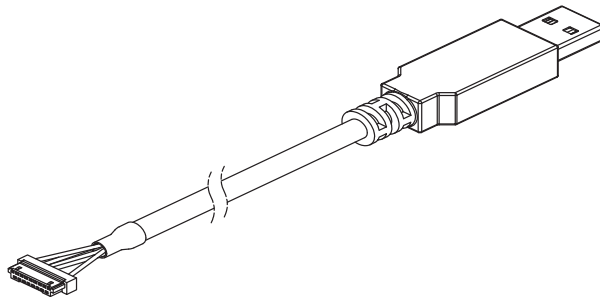
LABEL:
 STP-EXTW-0XX
 or
 STP-EXTHW-0XX

SureStep® Cables, continued

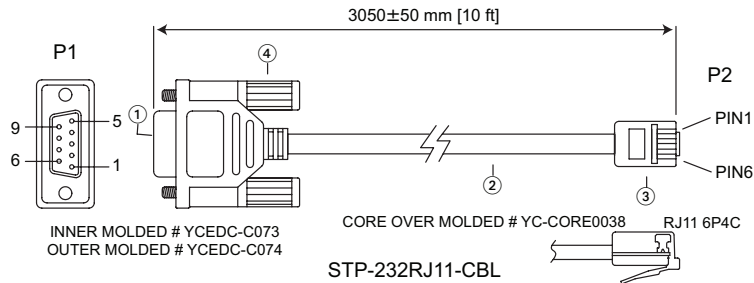
STP-USBENC-CBL-1 Wiring Diagram



Connector Pinout	
#FunctionColor	Pin
TX_ENC+Yellow	1
RX_ENC+Orange	2
GNDBlack	4
+5VRed	6
MCLRGreen	14



STP-232RJ11-CBL Programming Cable Wiring Diagram

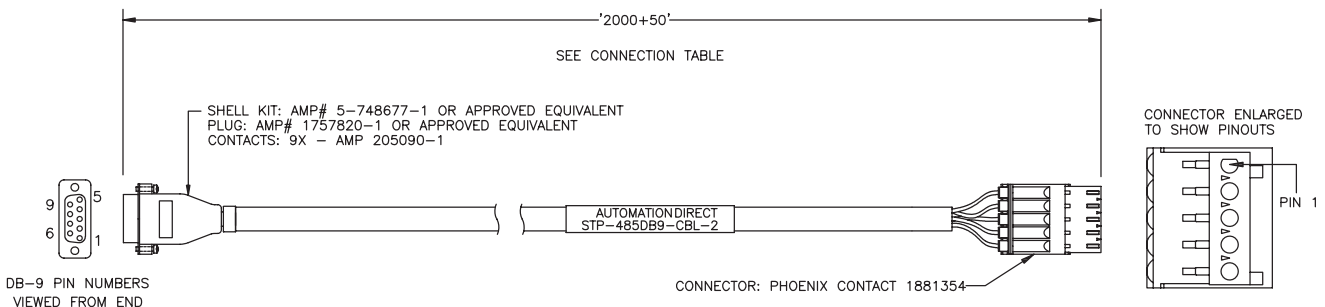


WIRE CONNECTION			
(DB9) P1			P2 (RJ11 6P4C)
2	RX	TX	3
3	TX	RX	5
4	nc	nc	4
5	GND	GND	2

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

STP-485DB9-CBL-2 4-wire Programming Cable Wiring Diagram

CONNECTION CHART				
DB-9 CONN PIN	DB9 SIGNAL	WIRE COLOR	PHOENIX PIN	PHOENIX SIGNAL
2	TX+	RED	5	RX+
1	TX-	ORANGE	4	RX-
3	RX+	BLACK	3	TX+
4	RX-	BROWN	2	TX-
5	GND	YELLOW	1	GND
METAL HOUSING	SHIELD	SHIELD	N/C	N/C

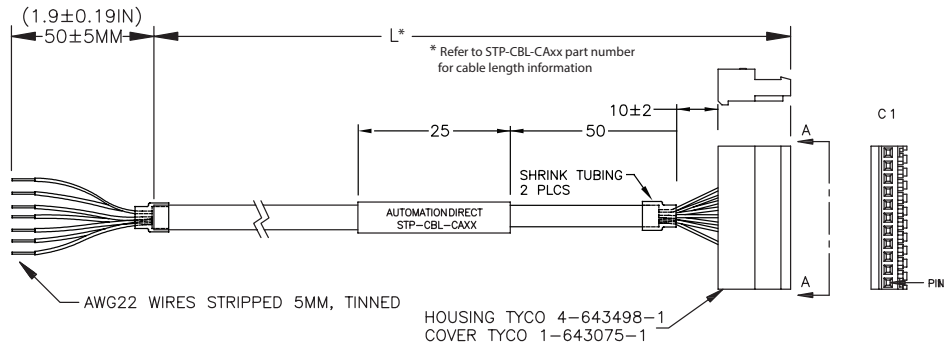


SureStep® Cables, continued

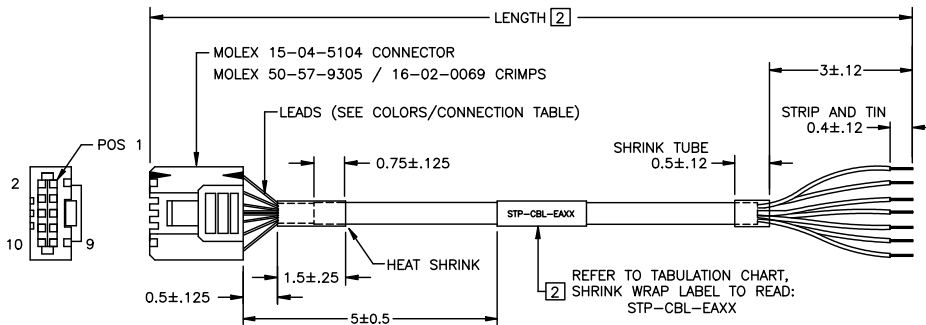
STP-CBL-CAXx Control Cable Wiring Diagram

C 1		
PIN NO.	SIGNAL	WIRE COLOR
1	STEP+	ORANGE
2	STEP-	BROWN
3	DIR+	YELLOW
4	DIR-	GREEN
5	EN+	BLUE
6	EN-	TAN
7	OUT+	GRAY
8	OUT-	WHITE
9	N.C.	PINK
10	V-	BLACK
11	V+	RED
12	N/C	PURPLE - CUT

Note: For Rev A of this cable, STEP+ is Grey/Pink and EN- is Red/Blue



STP-CBL-EAXx Encoder Cable Wiring Diagram



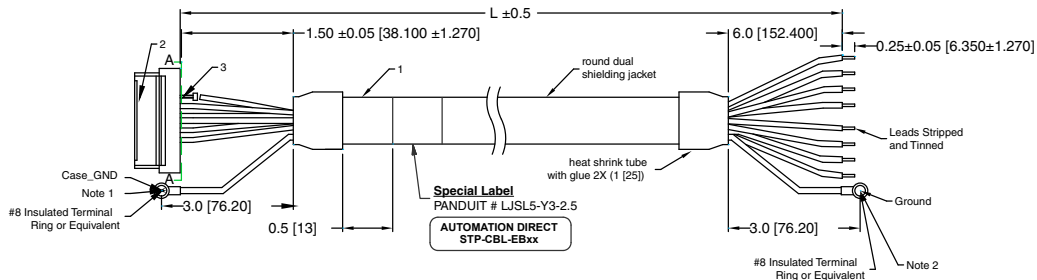
CONNECTION TABLE		
CONN	LEAD COLOR	SIGNAL
2	GREEN/WHITE	GROUND
7	GREEN	POWER+
3	ORANGE/WHITE	Z-
4	ORANGE	Z+
5	BLUE/WHITE	A-
6	BLUE	A+
9	BROWN/WHITE	B-
10	BROWN	B+
1	N/C	N/A
8	N/C	N/A

WIRE: 24AWG, CABLE: UL2464.

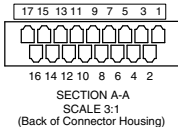
STP-CBL-EBxx Encoder Cable Wiring Diagram

- NOTE:
- Case_GND is connected internally to GND (BLACK/RED)
 - Ground connected internally to cable shielding-customer ref. only
 - Tolerance: ± 0.2" [5] unless otherwise specified
 - All materials must be ROHS compliant

TABLE INFORMATION	
CABLE NUMBER	CABLE LENGTH L
STP-CBL-EB3	3 Feet
STP-CBL-EB6	6 Feet
STP-CBL-EB10	10 Feet
STP-CBL-EB20	20 Feet



Connector Pinout			
#	Function	Primary Color	Stripe
4	GND	Black	Red
6	+5V	Red	Black
8	B+	Green	Black
9	B-	Black	Green
10	A+	White	Black
11	A-	Black	White
12	Z+	Blue	Black
13	Z-	Black	Blue



PARTS LIST			
#	PART	DESCRIPTION	QTY
1	CABLE	3M # 3600B/14	1
2	CONNECTOR	JAE # FI-W175	1
3	CRIMP PINS	JAE # FI-C3-A1-15000	8