Sure*step*® Stepping Systems

*Sure*Step® System Overview

+ + +

Single-shaft or Dual-shaft

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)
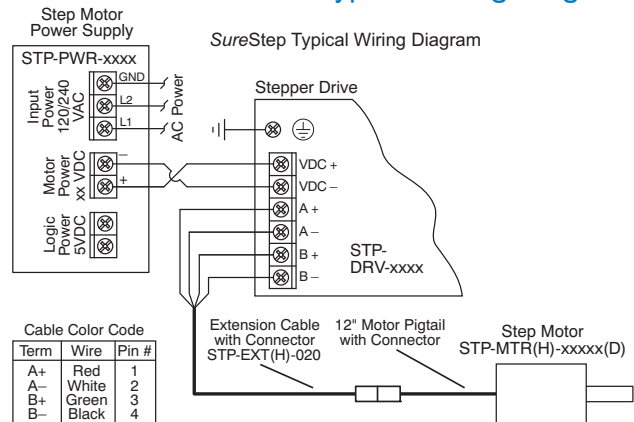
Standard stepper drive features
(STP-DRV-4035 & STP-DRV-6575)
- Low cost, digital step motor driver in compact package
- Operates from Step & Direction signals, or Step CW & Step CCW (jumper selectable)
- Fault output (-6575 only) & Enable input
- Optically isolated I/O
- Digital filters prevent position 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: 200 (full-step); 400 (half-step); 2,000; 5,000; 12,800; or 20,000 steps per revolution (-6575 only)
- 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

Cable Color Code

Term	Wire	Pin #
A+	Red	1
A–	White	2
B+	Green	3
B–	Black	4

*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.

Sure step ® Stepping Systems

SureStep® Microstepping Drives Overview

SureStep Series – Microstepping Drives Features Comparison				
Drive Model	**Standard Microstepping Drives**		**Advanced Microstepping Drives**	
	STP-DRV-6575	**STP-DRV-4035**	**STP-DRV-4850**	**STP-DRV-80100**
Price	<--->	<--->	<--->	<--->
Drive Type	Microstepping drive with pulse input		Advanced microstepping drive with pulse or analog input, serial communication; includes programming/communication cable STP-232RJ11-CBL	
	enclosed	open-frame	enclosed	
Output Current	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: 24–65 VDC range: 20–75 VDC	nominal: 12–32 VDC range: 12–42 VDC	nominal: 24–48 VDC range: 18– 53 VDC	nominal: 24–80 VDC range: 18–88 VDC
Configuration Method	rotary dial, dip switches, jumpers	dip switches	SureStep Pro software (included)	
Amplifier Type	MOSFET, dual H-bridge, 4-quadrant	MOSFET, dual H-bridge, bipolar chopper	MOSFET, dual H-bridge, 4-quadrant	
Current Control	4-state PWM @ 20 kHz	4-state PWM 20 kHz	4-state PWM @ 20 kHz	4-state PWM @ 20 kHz
Microstep Resolution	dipswitch selectable	dipswitch selectable	software selectable	software selectable
	200 to 20,000 steps/rev	400 to 10,000 steps/rev	200 to 51200 steps/rev	
Modes of Operation — **Step & Dir**	YES	YES	YES	YES
CW/CCW	YES	n/a	YES	YES
A/B Quad	n/a	n/a	YES	YES
Oscillator	n/a	n/a	YES	YES
Serial Indexing	n/a	n/a	YES	YES
Digital Input Signals — **Step/Pulse**	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 disable	motor enable, alarm reset, speed select (oscillator mode)	
Analog Input	n/a	n/a	speed control	
Output Signal	fault	n/a	fault, motion, tach	
Communication Interface	n/a	n/a	YES (programming/communication cable included)	
Non-volatile Memory Storage	n/a	n/a	YES	
Idle Current Reduction	YES	YES	YES	
Self Test	YES	YES	YES	
Additional Features	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

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SureStep® Standard Microstepping Drives

SureStep Series Specifications – Standard Microstepping Drives		
Microstepping Drive	STP-DRV-6575	STP-DRV-4035
Drive Type	Microstepping drive with pulse input	Microstepping drive with pulse input
Output Current	Selectable from 0.5–7.5 A/phase (peak of sine)	Selectable from 0.4 to 3.5 A/phase (maximum output power is 140W)
Input Voltage (external p/s required)	Nominal: 24–65 VDC Range: 20–75 VDC	Nominal: 12–32 VDC Range: 12–42 VDC (including ripple voltage)
Configuration Method	Rotary dial, DIP switches, jumpers	DIP switches
Amplifier Type	MOSFET, dual H-bridge, 4-quadrant	MOSFET, dual H-bridge, bipolar chopper
Current Control	4-state PWM @ 20 kHz	4-state PWM @ 20 kHz
Protection	n/a	n/a
Recommended Input Fusing	Fuse: 7A fast-acting; ADC #ACG7; Holder: ADC # DN-F6L110	Fuse: 4A fast-acting; ADC # ACG4; Holder: ADC # DN-F6L110
Input Signals	**Input Circuit**	5–24 VDC nominal (range: 4–30 VDC); optically isolated, differential.	Opto-coupler input with 440 resistance (5 to 15 mA input current); Logic Low is input 0.8 VDC or less; Logic High is input 4VDC or higher.
	Step/Pulse	Minimum pulse width = 0.25 µs. Maximum pulse frequency = 150 kHz or 2MHz (user selectable).	Motor steps on falling edge of pulse and minimum pulse width is 0.5 µs (1MHz)
	Direction	FUNCTIONS: step & direction, CW/CCW step	Needs to change at least 2 microseconds before a step pulse is sent
	Enable	FUNCTION: disable motor when closed	Logic 1 will disable current to the motor (current is enabled with no hook-up or logic 0)
	Analog	n/a	n/a
Output Signal		30 VDC / 80 mA max, optically isolated photodarlington, sinking or sourcing. Function = closes on drive fault.	n/a
Features	**Current Reduction**	Reduce power consumption and heat generation by limiting motor running current to 100%, 90%, or 80% of maximum. Current should be increased to 120% if microstepping. (Torque is reduced/increased by the same %.)	n/a
	Idle Current Reduction	90% or 50% of running current. (Holding torque is reduced by the same %.)	0% or 50% reduction (idle current setting is active if motor is at rest for 1 second or more)
	Microstep Resolution	20000, 12800, 5000, 2000, 400 smooth, 400, 200 smooth, or 200 steps/rev.	400 (200x2), 1,000 (200x5), 2,000 (200x10), or 10,000 (200x50) steps/rev
	Phase Current Setting	(1.3–6.3) x 80%–120% DIP switch selectable	0.4 to 3.5 A/phase with 32 selectable levels
	Self Test	Automatically rotates the motor back and forth two turns in each direction in order to confirm that the motor is operational	Uses half-step to rotate 1/2 revolution in each direction at 100 steps/second
	Step Pulse Noise Filter	Select 150 kHz or 2MHz	n/a
	Load Inertia	Set motor and load inertia range to 0–4x or 5–10x.	n/a
Connectors		Removable screw terminal blocks. Motor & Power Supply: 30–12 AWG; Signals: 30–14 AWG	Screw terminal blocks with AWG 18 maximum wire size
Maximum Humidity		90% non-condensing	90% non-condensing
Storage/Ambient Temperature		0 to 50 °C [32 to 122 °F] (mount to suitable heat sink)	-20 to 80 °C [-4 to 176 °F]
Operating Temperature		0 to 85 °C [32 to 185 °F] (interior of electronics section)	0 to 55 °C [32 to 131 °F] recommended; 70 °C [158 °F] maximum
Drive Cooling Method		Natural convection (mount drive to metal surface)	Natural convection (mount drive to metal surface to dissipate heat)
Mounting		(2) #6 screws to mount wide or narrow side to metal surface	(4) #4 screws to mount on wide side; (2) #4 screws to mount on narrow side
Weight		10.8 oz [306g] – (including mating connectors)	9.3 oz. [264 g]
Agency Approvals		CE (EMC & LVD); RoHS	CE (complies with EN55011A & EN50082-1 (1992)), RoHS

SureStep Stepping Systems

SureStep® Advanced Microstepping Drives

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SureStep Series Specifications – Advanced Microstepping Drives		
Microstepping Drive	**STP-DRV-4850**	**STP-DRV-80100**
Drive Type	Advanced microstepping drive with pulse or analog input, serial communication (serial communication allows indexing capability)	
Output Current	0.1-5.0 A/phase (in 0.01A increments)	0.1-10.0 A/phase (in 0.01A increments)
Input Voltage (external p/s required)	24-48 VDC (nominal) (range: 18-53 VDC)	24-80 VDC (nominal) (range: 18-88 VDC)
Configuration Method	SureStep Pro software (included)	
Amplifier Type	MOSFET, dual H-bridge, 4-quadrant	
Current Control	4-state PWM @ 20 kHz	
Protection	over-voltage, under-voltage, over-temperature, external output faults (phase-to-phase & phase-to-ground), inter-amplifier shorts	
Recommended Input Fusing	Fuse: 4A 3AG delay (ADC #MDL4) Fuse Holder: ADC #DN-F6L110	Fuse: 6.25A 3AG delay (ADC #MDL6-25) Fuse Holder: ADC #DN-F6L110
Input Signals / **Input Circuit**	Opto-coupler input with 5 to 15 mA input current; Logic Low is input 0.8 VDC or less; Logic High is input 4 VDC or higher.	
Step/Pulse	optically isolated, differential, 5V, 330Ω; min pulse width = 250 ns max pulse frequency = 2MHz adjustable bandwidth digital noise rejection feature	
Direction	FUNCTIONS: step & direction, CW/CCW step, A/B quadrature, run/stop & direction, jog CW/CCW, CW/CCW limits	
Enable	Optically isolated, 5-12V, 680Ω; FUNCTIONS: motor enable, alarm reset, speed select (oscillator mode)	
Analog	Range: 0–5 VDC; Resolution: 12 bit; FUNCTION: speed control	
Output Signal	Optically isolated, 24V, 10mA max; FUNCTIONS: fault, motion, tach	
Communication Interface	RS-232; RJ11 (6P4C) receptacle	
Non-volatile Memory Storage	Configurations are saved in FLASH memory on-board the DSP.	
Features / **Idle Current Reduction**	Reduction range of 0-90% of running current after delay selectable in ms	
Microstep Resolution	Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev	
Modes of Operation	Step & direction, CW/CCW, A/B quadrature, oscillator, joystick, serial commands	
Phase Current Setting	0.1-5.0 A/phase (in 0.01A increments)	0.1-10.0 A/phase (in 0.01A increments)
Self Test	Checks internal & external power supply voltages, diagnoses open motor phases	
Additional Features	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	
Connectors	Communication: RJ11 (6P4C); programming/communication cable STP-232RJ11-CBL included Other: removable screw terminal blocks; Motor & Power Supply: 26–12 AWG; Signals: 28–16 AWG	
Maximum Humidity	90% non-condensing	
Storage Temperature	-20 to 80 °C [-4 to 176 °F]	
Operating Temperature	0 to 55 °C [32 to 131 °F]; (mount to suitable heat sink)	
Drive Cooling Method	Natural convection (mount to suitable heat sink)	
Mounting	#6 mounting screws (mount to suitable heat sink)	
Weight	8 oz [227g] (approximate)	
Agency Approvals	CE, RoHS	

Sure‑step® Stepping System Drives

SureStep® Microstepping Drives Accessories

Braking Accessories

If you plan to use a regulated or switching power supply, you might encounter problems from regeneration. 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.

This can trip the overvoltage protection of a switching power supply or a 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.

Regeneration Clamp Description

As with most stepper systems, a clamp circuit is often required to limit increased power supply bus voltage when the motor is decelerating under load. This is commonly referred to as "regeneration," which is what happens when DC motors are driven by their load. During regeneration, the DC motor can produce enough voltage to actually exceed the input power supply voltage.

With a Regen Clamp, one or more stepper drives can be protected from "Over Voltage" conditions by placing the clamp module between the power supply and the drive. The clamp tracks the input power supply, and will operate from 24 to 80 volts. No adjustments are needed.

The Regen Clamp is designed to handle a wide range of conditions. The voltage input matches the needs of the SureStep stepper drives by providing 24 to 80 VDC capabilities, and external power resistors can be added for even greater continuous power requirements. The clamp modules are small and compact to minimize impact on the system design. More than one stepper drive can be connected to the clamp module with the potential to handle an entire multi-axis sytem.

Regeneration Clamp

Braking Resistor

Regeneration Clamp Features

- Built-in 50W power resistor for more continuous current handling (optional 100W resistor is also available)
- Mounted on a heat sink
- Voltage range: 24–80 VDC; no user adjustments required
- Power: 50W continuous; 800W peak
- Wire connection: 6-pin screw terminal block; 12–18 AWG wire.
- 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.
- RoHS

*Sure*Step Series Specifications – Microstepping Drives Optional Accessories		
Part Number	**Price**	**Description**
**STP-DRVA-RC-050 ** *	<--->	Regen Clamp: use with DC-powered stepper & servo drives; 50W, 24–80 VDC
STP-DRVA-BR-100	<--->	Braking Resistor: use with STP-DRV-RC-050 regen clamp; 100W, 10 ohms
*** Do not use the regeneration clamp in an atmosphere containing corrosive gases.**		

# Sure Step® Stepping System Drives

SureStep® Microstepping Drives Accessories

SureStep Pro Drive Configuration Software - for Advanced Stepper Drives

Free Download

SureStep Pro configuration software is available as a free download from our website for SureStep advanced drives (STP-DRV-4850 & -80100).

- Used for easy configuration and setup of the drive, including drive, motion control mode, I/O, motor.
- Serial command language for motor drive control via serial port; eliminates the need for separate motion controllers or indexers; provides easy interface to other industrial devices such as PCs, PLCs and HMIs.
- Easily use the ASCII output commands from most of our PLCs to enable indexing capability.
- Help files include technical data, application information, advanced setup, serial command instructions.
- Runs on 32-bit/64-bit Windows 7 and XP operating systems.
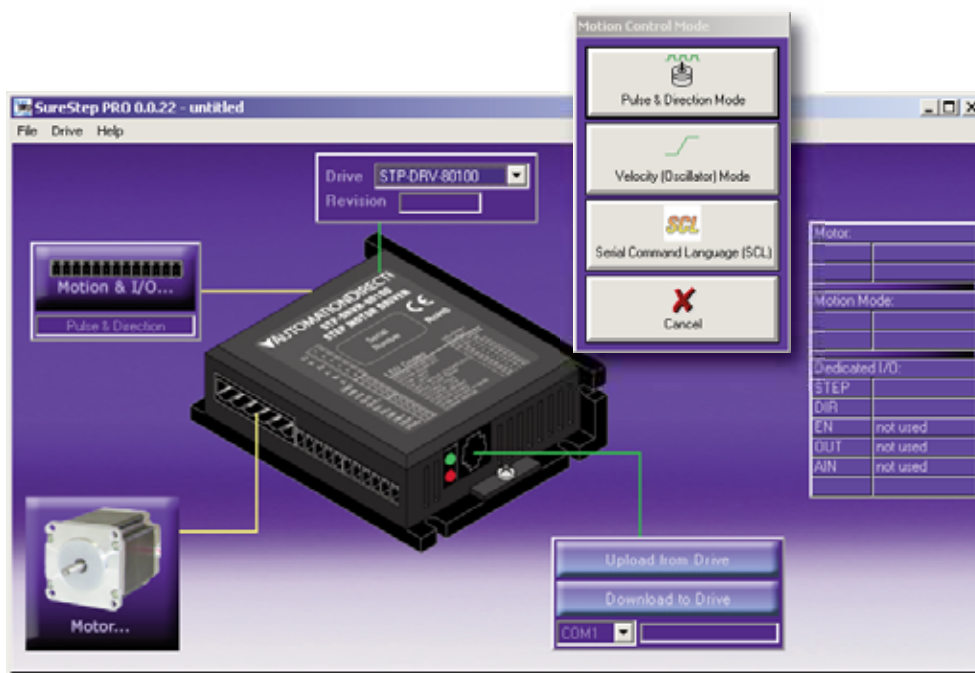
| SureStep Drive Configuration Software - for Advanced Stepper Drives		
Part Number	**Price**	**Description**
STP-PRO ∗	<--->	Windows-based configuration software for use with SureStep STP-DRV-4850 and STP-DRV-80100 advanced stepper drives. Requires Windows XP or Windows 7 (32 or 64-bit) operating system, minimum 12MB hard drive space, and RS-232 port (software also compatible with USB-RS232 adapter).
∗ Available for purchase on CD or can be <u>downloaded for free</u> from AutomationDirect Web site (www.AutomationDirect.com).		

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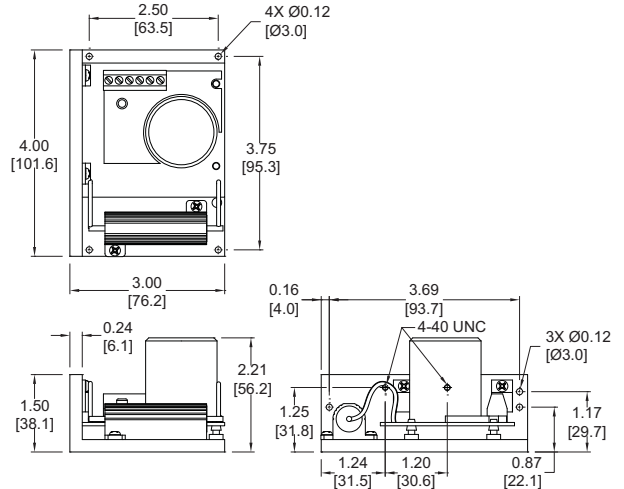# Sure‑step® **Stepping System Drives**

*Sure*Step® Microstepping Drives Dimensions

Dimensions = in [mm]

STP-DRV-6575
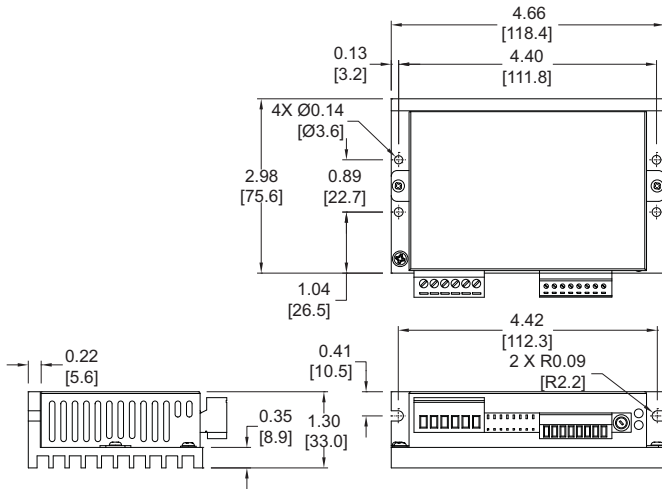
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STP-DRVA-BR-100
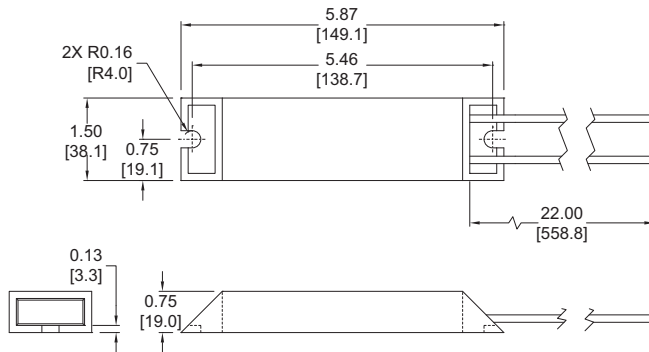
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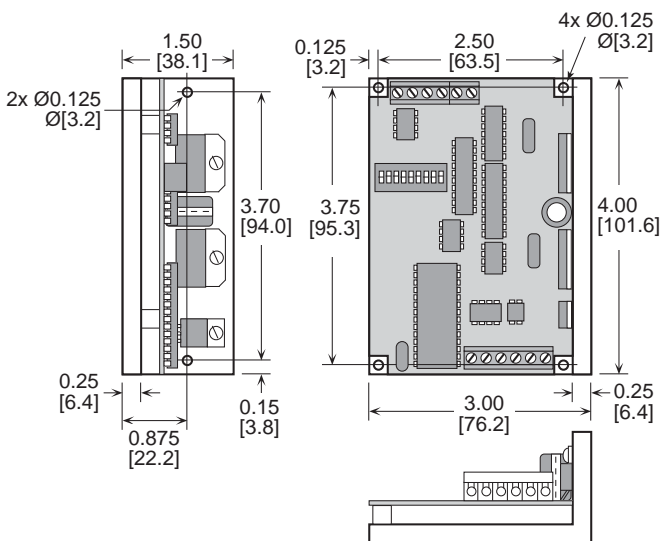
STP-DRV-4850 & -80100
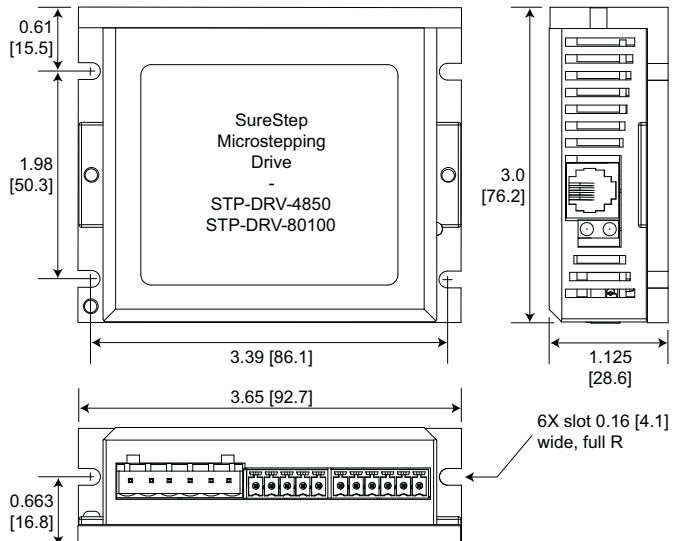
Wiring Solutions

Wiring Solutions using the *ZIP*Link Wiring System

*ZIP*Links eliminate the normally tedious process of wiring between devices by utilizing prewired cables and DIN rail mount connector modules. It's as simple as plugging in a cable connector at either end or terminating wires at only one end. Prewired cables keep installation clean and efficient, using half the space at a fraction of the cost of standard terminal blocks. There are several wiring solutions available when using the *ZIP*Link System ranging from

PLC I/O-to-*ZIP*Link Connector Modules that are ready for field termination, options for connecting to third party devices, GS, DuraPulse and SureServo Drives, and specialty relay, transorb and communications modules. Pre-printed I/O-specific adhesive label strips for quick marking of *ZIP*Link modules are provided with *ZIP*Link cables. See the following solutions to help determine the best *ZIP*Link system for your application.

Solution 1: DirectLOGIC, CLICK and Productivity3000 I/O Modules to *ZIP*Link Connector Modules

When looking for quick and easy I/O-to-field termination, a *ZIP*Link connector module used in conjunction with a prewired *ZIP*Link cable, consisting of an I/O terminal block at one end and a multi-pin connector at the other end, is the best solution.

Using the PLC I/O Modules to *ZIP*Link Connector Modules selector tables located in this section,
1. Locate your I/O module/PLC.
2. Select a *ZIP*Link Module.
3. Select a corresponding *ZIP*Link Cable.

Solution 2: *Direct*LOGIC, CLICK and Productivity3000 I/O Modules to 3rd Party Devices

When wanting to connect I/O to another device within close proximity of the I/O modules, no extra terminal blocks are necessary when using the *ZIP*Link Pigtail Cables. *ZIP*Link Pigtail Cables are prewired to an I/O terminal block with color-coded pigtail with soldered-tip wires on the other end.

Using the I/O Modules to 3rd Party Devices selector tables located in this section,
1. Locate your PLC I/O module.
2. Select a *ZIP*Link Pigtail Cable that is compatible with your 3rd party device.

Solution 3: GS Series and DuraPulse Drives Communication Cables

Need to communicate via Modbus RTU to a drive or a network of drives?

*ZIP*Link cables are available in a wide range of configurations for connecting to PLCs and *Sure*Servo, *Sure*Step, Stellar Soft Starter and AC drives. Add a *ZIP*Link communications module to quickly and easily set up a multi-device network.

Using the Drives Communication selector tables located in this section,
1. Locate your Drive and type of communications.
2. Select a *ZIP*Link cable and other associated hardware.

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Solution 4: Serial Communications Cables

*ZIP*Link offers communications cables for use with *Direct*LOGIC, CLICK, and Productivity3000 CPUs, that can also be used with other communications devices. Connections include a 6-pin RJ12 or 9-pin, 15-pin and 25-pin D-sub connectors which can be used in conjunction with the RJ12 or D-Sub Feedthrough modules.

Using the **Serial Communications Cables** selector table located in this section,
1. Locate your connector type
2. Select a cable.

Solution 5: Specialty *ZIP*Link Modules

For additional application solutions, *ZIP*Link modules are available in a variety of configurations including stand-alone relays, 24VDC and 120VAC transorb modules, D-sub and RJ12 feedthrough modules, communication port adapter and distribution modules, and *Sure*Servo 50-pin I/O interface connection.

Using the **ZIPLink Specialty Modules** selector table located in this section,
1. Locate the type of application.
2. Select a ZIPLink module.

Solution 6: *ZIP*Link Connector Modules to 3rd Party Devices

If you need a way to connect your device to terminal blocks without all that wiring time, then our pigtail cables with color-coded soldered-tip wires are a good solution. Used in conjunction with any compatible *ZIP*Link Connector Modules, a pigtail cable keeps wiring clean and easy and reduces troubleshooting time.

Using the **Universal Connector Modules and Pigtail Cables** table located in this section,
1. Select module type.
2. Select the number of pins.
3. Select cable.

Drive / Motor Controller (GS/DuraPulse/SureServo/SureStep/Stellar) ZIPLink Selector							
Drive / Motor Controller		**Communications**			**ZIPLink Cable**		
Controller	**Comm Port Type**	**Network/Protocol**	**Connects to**	**Comm Port Type**	**Cable (2 meter length)**	**Cable Connectors**	**Other Hardware Required**
GS1	RJ12	RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	GS-485HD15-CBL-2	RJ12 to HD15	–
			D2-260 CPU				–
			GS-EDRV100	RJ12	GS-EDRV-CBL-2	RJ12 to RJ12	–
			ZL-CDM-RJ12Xxx*	RJ12	GS-485RJ12-CBL-2		–
			FA-ISOCON	5-pin Connector	GS-ISOCON-CBL-2	RJ12 to 5-pin plug	–
GS2	RJ12	RS-232 Modbus RTU	CLICK PLCs	Port 2 (RJ12)	GS-RJ12-CBL-2	RJ12 to RJ12	–
			DL05 PLCs				–
			DL06 PLCs	Port 2 (HD15)			FA-15HD
			D2-250-1 CPU				
			D2-260 CPU				
			D4-450 CPU	Port 3 (25-pin)			FA-CABKIT
			P3-550 CPU	Port 2 (RJ12)			–
		RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	GS-485HD15-CBL-2	RJ12 to HD15	–
			D2-260 CPU				–
			GS-EDRV100	RJ12	GS-EDRV-CBL-2	RJ12 to RJ12	–
			ZL-CDM-RJ12Xxx*	RJ12	GS-485RJ12-CBL-2		–
			FA-ISOCON	5-pin Connector	GS-ISOCON-CBL-2	RJ12 to 5-pin plug	–
DuraPulse (GS3)	RJ12	RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	GS-485HD15-CBL-2	RJ12 to HD15	–
			D2-260 CPU				–
			GS-EDRV100	RJ12	GS-EDRV-CBL-2	RJ12 to RJ12	–
			ZL-CDM-RJ12Xxx*	RJ12	GS-485RJ12-CBL-2		–
			FA-ISOCON	5-pin Connector	GS-ISOCON-CBL-2	RJ12 to 5-pin plug	–
Stellar (Soft Starter) SR44 Series	RJ45**	RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	SR44-485HD15-CBL-2	RJ45 to HD15	SR44-RS485**
			D2-250-1 CPU				
			D2-260 CPU				
			ZL-CDM-RJ12Xxx*	RJ12	SR44-485RJ45-CBL-2	RJ45 to RJ12	
SureServo	IEEE1394 (CN3)	RS-232 Modbus RTU	CLICK PLCs	Port 2 (RJ12)	SVC-232RJ12-CBL-2	6-pin IEEE to RJ12	–
			DL05 PLCs				–
			DL06 PLCs	Port 2 (HD15)			FA-15HD
			D2-250-1 CPU				
			D2-260 CPU				
			D4-450 CPU	Port 3 (25-pin)			FA-CABKIT
			P3-550 CPU	Port 2 (RJ12)			–
		RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	SVC-485HD15-CBL-2	6-pin IEEE to HD15	–
			D2-260 CPU				–
			ZL-CDM-RJ12Xxx*	RJ12	SVC-485RJ12-CBL-2	6-pin IEEE to RJ12	–
			USB-485M	RJ45	SVC-485CFG-CBL-2	6-pin IEEE to RJ45	–
SureStep	RJ12	RS-232 ASCII	DL06 PLCs	Port 2 (HD15)	STP-232HD15-CBL-2	HD15-pin to RJ12	–
			D2-250-1 CPU				–
			D2-260 CPU (Port2)				–
			DL05 PLCs	RJ12	STP-232RJ12-CBL-2	RJ12 to RJ12	–
			CLICK PLCs				–

* When using the ZL-CDM-RJ12Xxx ZIPLink Communication Distribution Module, replace the lowercase "xx" with the number of RJ12 ports, i.e. "4" for four ports, or "10" for ten ports. (ex: ZL-CDM-RJ12X4 or ZL-CDM-RJ12X10)

** The SR44-RS485 Communications Adapter must be installed for RS-485 communications with the Stellar soft starters.