Stepper Systems

Complete SureStep system in 4 components: Power Supply, Stepper Drive, Motor Extension Cable, Motor. Standard Drives (pulse and direction input; DIP-switch configuration) and Advanced Drives (communication/analog control and setup) are available.

Complete SureStep system in 2 components: Power Supply and Integrated Stepper Motor/Drive. Standard Motor/Drives (pulse and direction input; DIP-switch configuration) and Advanced Motor/Drives (communication/analog control and setup) are available.
SureStep stepping systems provide simple and accurate control of position and speed. Pulses (or “step” and “direction” signals) from an AutomationDirect PLC or other indexer and motion controller are “translated” by the microstepping drive into precise movement of the stepping motor shaft. The SureStep stepping motors use 2-phase technology with 200 full steps per revolution or 1.8° per full step. Older type stepping motor drives, which operate stepping motors in full step mode, can result in stalling or lost motion due to potential problems with low speed mechanical vibration (usually between 100 to 200 RPM). To minimize this vibration problem, the SureStep microstepping drives use advanced microstepping technology to smooth the motor motion and stepping response. The SureStep family has options for open loop control (no encoder), position monitoring (external encoder feedback), and inclusive position verification (integrated motor/drives with internal encoder). Inclusive position verification provides for stall prevention and detection along with position completion after a temporary stall.

FREE configuration software!
SureMotion Pro software is available that makes setting parameters a snap for the advanced drives and advanced integrated motor/drives! SureMotion Pro replaces SureStep Pro configuration software. Download free from our website:
http://support.automationdirect.com/products/suremotion.html

Stepping Motor RPM = (A ÷ B) x (60 seconds/minute)
Where:  
A = PLC output frequency (pulses per second)  
B = microstepping resolution selection (steps/revolution)

SureStep stepper drives support a wide range of selectable microstep resolutions, from 200 steps per revolution (full step) to 51,200 (full step ÷ 256) steps per revolution, depending on model.

The advanced drives can operate with traditional high-speed inputs, but can also be commanded via 0–5V analog input. They have an internal indexer that can accomplish point-to-point moves controlled via ASCII communication.
Stepping System Overview

Two or Four components to make a complete system

Choose an integrated motor/drive and power supply

**Integrated Motor/Drives**

Integrated Motor/Drives

**Step Motor Power Supplies**

**OR . . .**

Choose a separate drive, motor, motor extension cable and power supply

**Microstepping Drives**

**NEMA Step Motors**

**Step Motor Extension Cables**

**Step Motor Power Supplies**

---

**SureStep™ NEMA 23 System**

Ours includes:

- Two Microstepping Drives
  (STP-DRV-6575)
- Two Stepper Motors
  (STP-MTR-23079)
- One Power Supply
  (STP-PWR-3204)
- Two Extension Cables
  (STP-EXT-020)

**Hey - I can do the math! - AutomationDirect**

A complete 2-axis SureStep™ Stepping System for less than just the competition’s stepping drives.

**Parker E-DC $798 for 2 drives**


For the latest prices, please check AutomationDirect.com.

1-800-633-0405
Stepping System Overview

The SureStep stepping family has a wide variety of high-torque motors to handle a wide range of automation applications such as woodworking, assembly, and test machines. The motors are available in both single-shaft and dual-shaft configurations, with or without an encoder. Our square frame or “high-torque” style stepping motors are the latest in bipolar technology, resulting in very high torque to volume ratios. We have NEMA 14, 17, 23, and 34 size motors with holding torque ranging from 8 to 1841 oz\cdot in. Wash down “W” motors (IP65) are also available. Optional 6, 10, or 20-foot extension cables with locking connectors are available to interface any of the stepping motors to the microstepping drive, except STP-MTRAC-x motors. The MTRAC motors have an integrated 10-foot pigtail cable. The extension cables can be easily cut to length, if desired. Integrated motor/drives and separate motors with an “E” in their part number include an encoder for position feedback. The MTRAC motors are designed to work with 115 or 230 VAC powered drives and can withstand high voltages. This allows higher torque, especially at higher speeds.

Note that the integrated/motor drive systems have a lower maximum torque due to heat constraints with the drive connected to the motor. For solutions requiring the highest torque, use the systems with our NEMA MTRH (low voltage, higher torque) or MTRAC (high voltage, high torque) motors.

For the latest prices, please check AutomationDirect.com.
1-800-633-0405
SureStep microstepping drives  
(Stp-Drv-4035, -4830, -4845, -6575, & Stp-Mtrd-x)  
- Standard high-speed pulse input (pulse and direction)  
- On-board or removable screw terminals for easy hook-up  
- Optically-isolated inputs ready for +5VDC logic from AutomationDirect PLCs, or 5–24 VDC (depending on model)  
- No software or add-on resistors required for drive configuration; dipswitch and/or rotary-dial setup  
- Dipswitch used for built-in self-test, microstep resolution selection, current level selection, and optional idle current reduction.  
- Optional external encoder feedback for integrated models

SureStep high bus voltage microstepping drives  
(Stp-Drvac-24025)  
- Auto-setup measures motor parameters and configures motor current control and anti-resonance gain settings  
- Uses universal AC input 90 to 240 VAC, AC input voltage must be selected by switch  
- Switch selectable microstep resolution, 16 settings from 200 to 25600 steps/rev  
- Switch configurable running current, anti-resonance, input signal filter, step smoothing filter, and self test  
- Motor selection via 16-bit rotary switch

SureStep advanced microstepping drives  
(Stp-Drv-4850, Stp-Drv-80100, & Stp-Mtrd-xR)  
All the features of the standard high-performance drive, plus:  
- Software configurable  
- 200 - 51,200 microsteps (software selectable)  
- High-speed pulse input (Quadrature, cw/ccw, pulse/direction)  
- Analog velocity mode (0-5v or potentiometer)  
- Internal indexer (point-to-point moves via ASCII command)  
- A8 quadrature/encoder following for all advanced models  
- Advanced “E” integrated models contain a built-in encoder (encoder is not accessible and not available for signaling outside the drive)

Power supplies  
- SureStep linear power supplies, 32V @ 4A, 48V @ 5A, 48V @ 10A, 70V @ 5A  
- Input and output fuses included on power supplies  
- Includes 5 VDC Logic supply for all low voltage signals  
- Switching power supplies also available (12V, 24V, 48V)
Choose your SureStep System

1. Choose a motor

Determine the torque and speed required by your application. Then look at the motor speed-torque curves in the Motors and Standard Integrated and Advanced Integrated sections of this catalog chapter. Choose a standalone or integrated motor that can run your application with plenty of speed and torque reserve (most stepper systems should have a 100% safety margin for torque). If encoder feedback is desired, be sure to choose an “E” model motor. If an IP65 rating is desired, choose a “W” motor. If you chose an Integrated motor/drive, you can skip to “Choose a Power Supply”. If you chose an STP-MTRAC motor, you are done. The MTRAC motors use the STP-DRVAC-24025 drive, have no motor extension cable (10’ leads on the motor), and require no power supply (the drive uses AC input power).

2. Choose a motor extension cable

Our 6-, 10-, and 20-ft motor extension cables have a locking connector that mates up to the motor cable. The extension cables allow you to quickly connect the motor to the drive without having to splice wires or cut any cables. All STP-MTRAC-x motors have integrated 10-foot cables and don’t need an extension cable.

If you chose an STP-MTR-xxxx motor, select an STP-EXT-0xx cable.
If you chose an STP-MTRL-xxxx motor, select an STP-EXTL-0xx cable.
If you chose an STP-MTRH-xxxx motor, select an STP-EXTHW-0xx cable (The “H” motors and cable can handle higher motor current).
If you chose an STP-MTR-xxxxW motor, select an STP-EXTW-0xx cable.
If you chose an STP-MTRH-xxxxW motor, select an STP-EXTHW-0xx cable.
If you chose an STP-MTRAC-xxxx motor, no cable is required.

For the latest prices, please check AutomationDirect.com.
1-800-633-0405
Choose your SureStep System

3. Choose a drive

[If you chose an Integrated motor/drive in Step 1, skip to “Choose a Power Supply” . . . you have already chosen your drive. If you chose STP-MTRAC, you are done - the STP-MTRAC motors use the STP-MTRAC-24025 drive and don’t require an extension cable or power supply.]

The chart below is a quick selection guide. For a full list of features, check out the Technical Info later in this chapter. The requirements for what you will need from a drive are determined by your applications. Deciding whether you plan to operate the drive via high speed pulses, analog control, encoder following, or communication commands is an important factor. The voltage supplied to the drive as determined by the speed torque curves is another important factor to consider when choosing a drive. If you need to select a drive based on RMS step motor phase current, please see the next page.

- Standard and Advanced Drives and Integrated Motor/Drives can accept high speed pulse input control.
- Advanced Drives and some Integrated Motor/Drives can also accept serial communication control.
- STP-MTRAC and STP-DRVAC motors and drives are designed for use with high voltages. These components are not designed to work at low voltages (12V, 32V, 48V, 70V).

<table>
<thead>
<tr>
<th>What you need</th>
<th>STP-DRV-4035</th>
<th>STP-DRV-4845</th>
<th>STP-DRV-4850</th>
<th>STP-DRV-6575</th>
<th>STP-DVR-80100</th>
<th>STP-MTRD-17x(E)</th>
<th>STP-MTRD-23x(E)</th>
<th>STP-MTRD-17xR(E)</th>
<th>STP-MTRD-23xR(E)</th>
<th>STP-MTRD-24xRV(E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V Speed-Torque Curve (from Step 1)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>32V Speed-Torque Curve (from Step 1)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>-</td>
<td>-</td>
<td>√</td>
<td>-</td>
<td>√</td>
<td>-</td>
</tr>
<tr>
<td>48V Speed-Torque Curve (from Step 1)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>70V Speed-Torque Curve (from Step 1)</td>
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<tr>
<td>More than 3.5A/motor phase</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>More than 5A/motor phase (“H” motors)</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>12-32</td>
<td>24-48</td>
<td>24-48</td>
<td>24-65</td>
<td>24-80</td>
<td>12-48</td>
<td>12-70</td>
<td>12-48</td>
<td>12-70</td>
<td>12-70</td>
</tr>
<tr>
<td>Internal Indexing (Drive can move from Point A to Point B with a serial communication command)</td>
<td>-</td>
<td>-</td>
<td>√</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>High speed pulse input</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>-</td>
<td>√</td>
<td>√</td>
<td>-</td>
<td>√</td>
<td>-</td>
</tr>
<tr>
<td>Analog Velocity Input</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Position Verification (internal encoder)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>E models only</td>
<td>E models only</td>
<td>E models only</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>External encoder</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>E models only</td>
<td>E models only</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>RS-232 communication (ASCII)</td>
<td>-</td>
<td>-</td>
<td>√</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>RS-485 communication (ASCII)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>√</td>
<td>√</td>
<td>-</td>
</tr>
<tr>
<td>Variable I/O (I/O can be either a digital input or digital output)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>√</td>
</tr>
</tbody>
</table>

* External dropping resistor required for 12V and 24V I/O use. See Product Data Sheet for wiring details and resistor values.
Choose your SureStep System

3a. Using RMS Step Motor Phase Current to Select an Appropriate Stepper Drive Rated in Peak Phase Current

\[(\text{Drive Amps})_{\text{peak}} = 1.2 \times (\text{Motor Amps})_{\text{RMS}}\]

Generic stepper drives usually have output current specified in peak phase current while stepper motors will have their phase current specified in RMS phase current. This can cause sub-optimal drive to motor pairing unless this is understood. There is no need to understand this difference if you are selecting a system that uses the SureStep drives that are tuned for specific SureStep motors. These drives will have a rotary switch setting (STP-DRV-6575 and STP-MTRAC-24025) or a motor selection in the SureMotion Pro software (STP-DRV-4850 and STP-DRV-80100). These drives when properly paired with a SureStep motor will output 1.2 times the motor rated phase current.

When choosing a drive that only has current selections instead of motor specific selections you will want to select a peak current that is 1.2 times the motor’s listed RMS current. The true peak drive current value would be 1.4 times the RMS motor value but this amount of current will cause a lot of motor heating and the torque at higher speeds will actually suffer due to higher back electro-magnetic force caused by the inductive field of the coils changing polarity quickly.

Example of a SureStep matched stepper system

To use an STP-MTR-23055 motor with a STP-DRV-6575 drive, the drive’s rotary switch should be positioned to selection 9 (STP-MTR-23055x). The STP-MTR-23055 has a phase current of 2.8 A (RMS), so the drive will actually output 1.2 x 2.8 A (RMS) = 3.36 A (peak). You do not need to calculate peak or RMS current with a pre-configured SureStep motor and drive system.

Example of an adjustable current stepper drive

To use an STP-MTR-23055 motor with a STP-DRV-4845 drive, you should calculate the correct phase current setting for the drive. The motor phase current is 2.8 A (RMS).

- If you do not understand peak vs RMS current, you would select phase current position #8, the 2.8 A selection on the drive (blue box). This setting will work (and the motor will run very cool) but will provide slightly less than the motor’s rated torque.

- If a true peak current value is selected (1.4 x 2.8 A = 3.92 A) then the rotary switch selection would be set to the C position (red box). This will cause excessive motor heating and a lack of performance at higher speeds.

- The optimal phase current selection for stepper motors is 1.2 times the motor RMS phase current (1.2 x 2.8 A (RMS) = 3.36 A (peak)). This will be the rotary switch selection A (green box).
Choose a power supply

Since all low voltage SureStep (non-integrated) motors can operate at 32V, 48V, and 70V, the selection of a power supply is dependent on the selected speed-torque curve of the motor and on the selection of drive. If using an integrated motor/drive, then the power supply is dictated by the specifications of the integrated product. If using an STP-MTRAC drive, then no DC power supply is needed since the drive is powered directly from 115 to 230 VAC.

Choose a power supply that matches the desired speed-torque curve and stays within the voltage limit of the selected drive. Each SureStep linear power supply has incoming AC and outgoing DC fusing. The linear supplies have an electronic overload protected 5V supply for all your logic needs. Stepper applications without large fluctuations in load, without aggressive deceleration, and without regeneration (where the load pushes the motor) can often use a switching power supply instead.

### Permissible Drive/Power Supply Combinations

<table>
<thead>
<tr>
<th>DC Powered Drive</th>
<th>Linear Power Supply</th>
<th>Switching Power Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>STP-DRV-4035</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>12-32 VDC input</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(42V max)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STP-DRV-4830</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>12-48 VDC input</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>(53V max)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STP-DRV-4845</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>24-48 VDC input</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(60V max)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STP-DRV-4850</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>24-48 VDC input</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(53V max)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STP-DRV-6575</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>24-65 VDC input</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(85V max)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STP-DRV-80100</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>24-80 VDC input</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(88V max)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STP-MTRD-17</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>12-48 VDC input</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(55V max)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STP-MTRD-23, -24</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>12-70 VDC input</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(75V max)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Supply current calculation

For systems that use multiple steppers and only one power supply, the power supply current must be at least the sum of 2/3rds of the combined motor currents:

\[
I_{(ps)} \geq \frac{2}{3} \times (I_{motor1} + I_{motor2} + I_{motor3} + \ldots)
\]

For systems that use multiple steppers and only one power supply, the power supply current must be at least the sum of 2/3rds of the combined motor currents:

\[
I_{(ps)} \geq 0.66 \times (I_{motor1} + I_{motor2} + I_{motor3} + \ldots)
\]

### Linear Power Supply

- 120 or 240 VAC, 50/60 Hz power input (switch selectable)
- Screw terminal AC input and DC output connections
- 5 VDC ±5% at 500 mA regulated logic power
- 32V, 48V and 70V linear supplies
- Power ON LEDs
- Unregulated linear supplies perfect for stepper systems
- Input and output fusing included

### Switching Power Supply

- 85–264 VAC (DC input range 120–375 VDC)
- Adjustable output voltage
- Output voltage status LED
- DC Output Overload and Short-Circuit Protected
- Rugged plastic or aluminum housings with integral 35mm DIN rail mounting adapters

Note: For detailed information on the switching power supplies, please see:
https://cdn.automationdirect.com/static/specs/rhinopsbc1d2.pdf
SureStep stepping family includes:

- Linear step motor power supplies
- DIP-switch configurable microstepping drives
- Software-configurable advanced microstepping drives
- Motor extension cables
- NEMA 14, 17, 23, and 34 frame size step motors in single-shaft, dual-shaft, IP65, high bus voltage, or encoder mounted configurations
- NEMA 17, 23, and 24 frame size integrated motor/drives
- Variety of step motor accessories including encoders, control cables, and connector kits
- SureStep PC adapter, USB to RS-485
- SureMotion Pro software for advanced drive and integrated motor/drive systems

Motor features:

- Low voltage, high torque, 2-phase, bipolar, 1.8° per step, 4-lead
- High voltage, high torque, 2-phase, bipolar, 1.8° per step, 8-lead
- Available in single-shaft and dual-shaft models
- Connectorized pigtails or integrated 10’ cable (STP-MTRAC only)
- Optional encoder feedback (STP-MTR-xxxxE)
- IP65 versions available (STP-MTR-xxxxW)
- High bus voltage versions available (STP-MTRAC-xxxx)
- Wide variety of NEMA 14, 17, 23, and 34 motors

Power supply features:

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

NOTE: If a switching power supply is desired, we recommend the PSB12-xxxxS, PSB24-xxxxS, or PSB48-xxxxS series.

SureStep® System

SureStep® System Components

Standard stepper drive features

(STP-DRV-4035, -4830, -4845, -6575, STP-MTRD-x, STP-DRVAC-24025)

- Low cost, digital step motor driver in compact package
- Operates from Step and Direction signals, or Step CW and Step CCW (jumper selectable).
- Fault output and Enable input
- Optically isolated I/O
- Digital filters prevent position error from electrical noise on command signals; jumper selectable: 150 kHz or 2MHz
- Rotary or DIP switch easily selects from many popular motors
- Electronic damping and anti-resonance
- Automatic idle current reduction to reduce heat when motor is not moving; switch selectable: 50% or 90% of running current
- Switch-selectable step resolution: 200–25,600 steps per revolution depending on drive
- Switch-selectable step resolution: 200–25,600 steps per revolution depending on drive
- Automatic self test (switch selectable)
- Optional external encoder feedback (integrated models)
- Operates from a 24–65 VDC or 12–40 VDC power supply, depending upon model. STP-DRVAC drive operates off AC voltage.
- Running current from 0.35–7.5A

Advanced stepper drive features

(STP-DRV-4850, STP-DRV-80100, STP-MTRD-xR, & STP-MTRD-xRE)

- 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, and serial communication inputs
- Serial communications allow point-to-point positioning
- AB quadrature/encoder following (integrated models)
- Optional internal encoder feedback (integrated models)
- RS-485 communications (integrated models)
- Four 5 to 24 volt digital “Variable I/O” points (NEMA 24 integrated models)
- Controllable via streaming SCL commands
SureStep Power Supply / DC Input Drive Compatibility

<table>
<thead>
<tr>
<th>Drive(1)(2)</th>
<th>STP-PWR-3204</th>
<th>STP-PWR-4805</th>
<th>STP-PWR-4810</th>
<th>STP-PWR-7005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model #</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STP-DVR-4035</td>
<td>√</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>STP-DVR-4830</td>
<td>√</td>
<td>√</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>STP-DVR-4845</td>
<td>√</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>STP-DVR-4850</td>
<td>√</td>
<td>No</td>
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</tr>
<tr>
<td>STP-DVR-6575</td>
<td>√</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>STP-DVR-80100</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>STP-MTRD-17(4)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>STP-MTRD-23(4)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>STP-MTRD-24(4)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

1) Do NOT use a power supply that exceeds the drive’s input voltage range. If using a 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.
3) An unloaded STP-PWR-7005 can float above the allowable input voltages of some drives if it is fed with a high AC input voltage (greater than 120VAC).
4) Integrated motor/drives are included here because they include a drive as well as a motor.
5) STP-DRVAC-x drives are AC powered and cannot be powered by DC power supplies.

SureStep AC Motor/Drive Compatibility

<table>
<thead>
<tr>
<th>Model #</th>
<th>STP-DRVAC-24025</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Series Wired Motor</td>
</tr>
<tr>
<td>STP-MTRAC-23044(x)</td>
<td>√</td>
</tr>
<tr>
<td>STP-MTRAC-23055(x)</td>
<td>√</td>
</tr>
<tr>
<td>STP-MTRAC-23070(x)</td>
<td>√</td>
</tr>
<tr>
<td>STP-MTRAC-34075(x)</td>
<td>√</td>
</tr>
<tr>
<td>STP-MTRAC-34115(x)</td>
<td>√</td>
</tr>
<tr>
<td>STP-MTRAC-34156(x)</td>
<td>√</td>
</tr>
</tbody>
</table>

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

SureStep DC Input Drive / Motor Compatibility

<table>
<thead>
<tr>
<th>Motor(1)(2)</th>
<th>Recommended Drive(1)</th>
<th>Rated Current (Amps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model #</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STP-MTRL-14026(x)</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>STP-MTRL-14034(x)</td>
<td>√</td>
<td></td>
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<tr>
<td>STP-MTR-17040(x)</td>
<td>1.7</td>
<td>STP-DVR-4035(1)</td>
</tr>
<tr>
<td>STP-MTR-17048(x)</td>
<td>2.0</td>
<td>STP-DVR-4845(1)</td>
</tr>
<tr>
<td>STP-MTR-17060(x)</td>
<td>2.0</td>
<td>STP-DVR-6575(1)</td>
</tr>
<tr>
<td>STP-MTR-23055(x)</td>
<td>2.8</td>
<td>STP-DVR-23079(1)</td>
</tr>
<tr>
<td>STP-MTR-23079(x)</td>
<td>2.8</td>
<td>STP-DVR-34066(1)</td>
</tr>
<tr>
<td>STP-MTR-34066(x)</td>
<td>6.3</td>
<td>STP-DVR-6575(1)</td>
</tr>
<tr>
<td>STP-MTR-34079(x)</td>
<td>6.3</td>
<td>STP-DVR-23079(1)</td>
</tr>
<tr>
<td>STP-MTR-34097(x)</td>
<td>6.3</td>
<td>STP-DVR-34066(1)</td>
</tr>
<tr>
<td>STP-MTR-34127(x)</td>
<td>6.3</td>
<td>STP-DVR-6575(1)</td>
</tr>
</tbody>
</table>

1) The combinations above will perform according to the published speed/torque curves. Using a motor with a current rating higher than the drive’s output rating may proportionally limit the motor torque.
2) MTR motors have connectors compatible with the EXT extension cables. MTRL motors have connectors compatible with the EXTL extension cables. MTRH motors have connectors compatible with the EXTH extension cables. W-series motors have connectors compatible with the EXTW and EXTHW extension cables.
3) Not applicable to integrated motor/drives as drives and motors are already paired.

Typical Wiring Diagram

- Step Motor Power Supply
- SureStep Typical Wiring Diagram
- Extension Cable with Connector
- 12’ Motor Pigtail with Connector

NOTE: Integrated motor/drives only need power since the drive and motor are one unit. MTRAC motors do not need an extension cable, they have 10’ leads coming from the motor.

NOTE: STP-MTRAC motors and STP-DRVAC drives are designed to work with AC input power to the drive. They are not designed to work with DC input power.

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1-800-633-0405
# SureStep® Microstepping Drives Overview

## SureStep Series – Microstepping Drives Features Comparison

<table>
<thead>
<tr>
<th>Drive Model</th>
<th>Standard Microstepping Drives</th>
<th>Advanced Microstepping Drives</th>
</tr>
</thead>
<tbody>
<tr>
<td>STP-DRVAC-24025</td>
<td><strong>Price</strong> $199.00</td>
<td><strong>Price</strong> $249.00</td>
</tr>
<tr>
<td>STP-DRV-6830</td>
<td><strong>Price</strong> $69.00</td>
<td><strong>Price</strong> $298.00</td>
</tr>
<tr>
<td>STP-DRV-4845</td>
<td><strong>Price</strong> $79.00</td>
<td><strong>Price</strong> $298.00</td>
</tr>
<tr>
<td>STP-MTRD-x</td>
<td><strong>Price</strong> $96.00</td>
<td><strong>Price</strong> $298.00</td>
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<tr>
<td>STP-DRV-4035</td>
<td><strong>Price</strong> $178.00</td>
<td><strong>Price</strong> $298.00</td>
</tr>
<tr>
<td>STP-DRV-4850</td>
<td><strong>Price</strong> $178.00</td>
<td><strong>Price</strong> $298.00</td>
</tr>
<tr>
<td>STP-DRV-80100</td>
<td><strong>Price</strong> $249.00</td>
<td><strong>Price</strong> $298.00</td>
</tr>
<tr>
<td>STP-MTRD-xR</td>
<td><strong>Price</strong> $298.00</td>
<td><strong>Price</strong> $398.00</td>
</tr>
</tbody>
</table>

**Drive Type**
- Microstepping drive with pulse input
- Integrated stepper motor/drive
- Microstepping drive with pulse input
- Advanced microstepping drive with pulse or analog input, serial communication; includes programming/communication cable STP-233RU11-CBL
- Advanced integrated stepper motor/drive with internal encoder

**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: 18–53 VDC
- Nominal: 24–75 VDC
- Range: 20–85 VDC
- Nominal: 12–48 VDC (NEMA 17)
- Range: 10–55 VDC (NEMA 17)
- 12–70 VDC (NEMA 23)
- Range: 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
- Dual H-bridge, 4-quadrant

**Current Control**
- 4-state PWM @ 20 kHz
- 4-state PWM @ 16 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
- Software selectable

**Modes of Operation**
- Step & Dir
- CW/CCW
- A/B Quad
- Oscillator
- Serial Indexing
- Digital Input Signals
- Step/Pulse Direction
- Enable
- Analog Input
- Output Signal
- Communication Interface
- Non-volatile Memory Storage

**Digital Input Signals**
- Step & direction, CW/CCW step
- Step & direction, CW/CCW step
- Step & direction, CW/CCW step
- Step & direction, CW/CCW step
- Step & direction, CW/CCW step

**Enable**
- Motor disable
- Motor enable
- Motor enable
- Motor enable

**Analog Input**
- n/a
- n/a
- n/a
- n/a
- n/a

**Output Signal**
- Fault
- Fault
- Fault
- Fault
- Fault

**Communication Interface**
- 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
- Yes

**Idle Current Reduction**
- Yes

**Self Test**
- Yes

**Additional Features**
- Step pulse noise filter
- Load inertia (anti-resonance & damping feature to improve motor performance)
- Step pulse noise filter
- Anti-resonance (Electronic Damping)
- Auto setup
- Microstep emulation
- Torque ripple smoothing
- Waveshape (command signal) smoothing

Refer to Specifications Tables for detailed specifications.

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