

# GETTING STARTED

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# CHAPTER 1

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## Manual Overview

### Overview of this Publication

Thank you for selecting the *SureStep*™ Stepping System components. This user manual describes the selection, installation, configuration, and methods of operation of the *SureStep*™ Stepping System. We hope our dedication to performance, quality and economy will make your motion control project successful.

### Who Should Read this Manual

This manual contains important information for those who will install, maintain, and/or operate any of the *SureStep*™ Stepping System devices.

### Technical Support

By Telephone: **770-844-4200**  
(Mon.-Fri., 9:00 am – 6:00 pm E.T.)

On the Web: [www.automationdirect.com](http://www.automationdirect.com)

Our technical support group is glad to work with you in answering your questions. If you cannot find the solution to your particular application, or, if for any reason you need additional technical assistance, please call technical support at **770-844-4200**. We are available weekdays from 9:00 am to 6:00 pm Eastern Time.

We also encourage you to visit our web site where you can find technical and non-technical information about our products and our company. Visit us at [www.automationdirect.com](http://www.automationdirect.com).

### Special Symbols



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*When you see the “notepad” icon in the left-hand margin, the paragraph to its immediate right will be a special note which presents information that may make your work quicker or more efficient.*

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**When you see the “exclamation mark” icon in the left-hand margin, the paragraph to its immediate right will be a WARNING. This information could prevent injury, loss of property, or even death (in extreme cases).**

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## SureStep™ System Introduction

SureStep open-loop stepping systems provide simple and accurate control of position and speed where lower power and cost are considerations. The SureStep family of stepping components includes power supplies, drives, motors, and cables. The **Direct**LOGIC family of PLCs or other indexers and motion controllers can be used to provide the signals that are "translated" by the microstepping drives into precise movement of the stepping motor shaft.

### SureStep™ System Recommended Component Compatibility

SureStep™ System Recommended Component Compatibility				
Drives (1)	Power Supplies (1)		Motors & Extension Cables (2,3)	
STP-DRV-4035	-	-	STP-PWR-3204	STP-MTR-xxxxx & STP-EXT-020 STP-MTRH-xxxxx & STP-EXTH-020
STP-DRV-4850	-	STP-PWR-4805		
STP-DRV-80100	STP-PWR-7005	STP-PWR-4810		
<p>1) <b>Caution:</b> Do not use a power supply that exceeds the drive input voltage range. Using a lower voltage power supply with a higher voltage drive is acceptable, but will not provide full system performance.</p> <p>2) MTR motors have connectors compatible with the EXT extension cables.</p> <p>3) MTRH motors have connectors compatible with the EXTH extension cables.</p>				

### SureStep™ Part Number Explanation

STP- MTRH - 23079

#### Component Capacity

For DRV: 2-digit max nominal voltage followed by max current with 1 implied decimal place  
4035: 40V, 3.5A  
4850: 48V, 5.0A  
80100: 80V, 10.0A

For EXT(H): cable length in feet

For MTR(H): 2-digit NEMA frame size followed by approximate length in mm

For PWR: 2-digit output voltage followed by output current

#### Component Type

DRV: stepper drive  
EXT: motor extension cable  
EXTH: high-power motor extension cable  
MTR: stepper motor  
MTRH: high-power stepper motor  
PWR: power supply

#### SureStep Series Designation: STP

# Microstepping Drives Introduction

There are two different basic types of microstepping drives offered in the *SureStep*™ series. One DIP-switch configurable model with a pulse input is available, as well as two software configurable advanced models with multiple operating modes.

## Standard Microstepping Drive

The *SureStep*™ STP-DRV-4035 standard microstepping drive uses pulse input signals, and is configured with DIP switches on the drive. To use this drive in a step motor control system, you will need the following:

- 12-42 volt DC power supply for the motor drive. The *SureStep* STP-PWR-3204 power supply from AutomationDirect is the best choice. If you decide not to use the STP-PWR-3204, please read the section entitled “Choosing a Power Supply” in the STP-DRV-4035 Drive chapter of this user manual.
- A source of step pulses. Signal may be sinking (NPN), sourcing (PNP), or differential.
- The step inputs can be CW/CCW, step and direction, or quadrature.
- A compatible step motor, such as an AutomationDirect *SureStep* STP-MTR(H)-xxxxx. (Motor extension cables STP-EXT(H)-020 are also available.)
- A small flat blade screwdriver for tightening the connectors.

The STP-DRV-4035 standard microstepping drive is an open frame design.



STP-DRV-4035

Refer to the “*SureStep* STP-DRV-4035 Microstepping Drive” chapter of this user manual for complete details on the installation, configuration, and wiring of this drive.

## Advanced Microstepping Drive

The *SureStep*<sup>™</sup> advanced microstepping drives (STP-DRV-4850 & -80100) are capable of accepting several different forms of input signals for control: pulse, analog, serial communication, or internal indexing. These drives are configured by computer with software which is included with the drive. To use one of these drives in a step motor control system, you will need the following:

- A DC power supply for the motor drive. A compatible *SureStep* STP-PWR-xxxx power supply from AutomationDirect is the best choice.
- A source of input control signals, such as a **Direct**Logic PLC from AutomationDirect.
- A compatible step motor, such as an AutomationDirect *SureStep* STP-MTR(H)-xxxxx. (Motor extension cables STP-EXT(H)-020 are also available.)
- A small flat blade screwdriver for tightening the connectors.

The *SureStep* advanced microstepping drives are enclosed with removable wiring terminal blocks.



STP-DRV-80100

Refer to the “*SureStep*<sup>™</sup> Advanced Microstepping Drives” chapter of this user manual for complete details on the installation, configuration, and wiring of this drive.

## Bipolar Step Motor Introduction

AutomationDirect offers nine different models of bipolar step motors with mounting flanges in NEMA frame sizes 17, 23, and 34. There are five High Torque (STP-MTR-xxxxx) motors available, as well as four Higher Torque (STP-MTRH-xxxxx) motors. All of the motors have a 12 inch connectorized pigtail cable, and optional matching 20 ft connectorized extension cables (STP-EXT(H)-020) are also available.

Refer to the “*SureStep™* Stepping Motors” chapter in this user manual for complete details on the specifications, installation, mounting, dimensions, and wiring of the *SureStep* step motors.



**STP-MTR(H)-xxxxx  
NEMA 17, 23, 34  
Frame Sizes**

## Stepping System Power Supply Introduction

The *SureStep* stepping system power supplies are designed to work with *SureStep* microstepping drives and motors. The different power supply models can provide unregulated DC power at the applicable voltage and current levels for various *SureStep* drives and motors. The power supplies also provide a regulated 5VDC, 500 mA logic supply output for indexer and PLC logic outputs to control the *SureStep* drives.



The stepping system power supplies can supply power for multiple *SureStep* STP-DRV-xxxx microstepping motor drives, depending on step motor size and application requirements.

Refer to the Power Supply chapter of this user manual for complete details on the specifications, installation, mounting, dimensions, and wiring of the *SureStep* stepping system power supplies.

## Selecting the Stepping System

Refer to Appendix A: Selecting the *SureStep*™ Stepping System for detailed information on how to calculate requirements for various applications using stepping motors for motion control.

## Use with *Direct*LOGIC PLCs

Refer to Appendix B: Using *SureStep*™ with *Direct*LOGIC PLCs for detailed information on wiring the *SureStep* Stepping System components to *Direct*LOGIC PLCs and high-speed counter modules.

The following is a summary of the *Direct*LOGIC PLCs<sup>(1)</sup> and module part numbers that are suitable to work with the *SureStep* Stepping Systems:

D0-05AD

D0-05DD

D0-05DD-D

D0-06DD1

D0-06DD2

D0-06DD1-D

D0-06DD2-D

H0-CTRIO

F1-130AD

F1-130DD

F1-130DD-D

H2-CTRIO<sup>(2)</sup>

D2-CTRINT

T1H-CTRIO<sup>(2)</sup>

H4-CTRIO

(1) Any *Direct*LOGIC PLC capable of RS-232 ASCII communication can write serial commands to the *SureStep Advanced* Microstepping Drives (STP-DRV-4850 & -80100). These PLCs include DL 05, 06, 250-1, 260, 350, & 450. However, we strongly recommend using DL06 or DL260 PLCs for serial commands due to their more advanced ASCII instruction set which includes PRINTV and VPRINT commands.

(2) The H2-CTRIO and T1H-CTRIO High Speed Counter I/O Interface Modules can also be used to control the *SureStep* Stepping System in PC-Based Control systems with Think & Do/Studio, or with our embedded WinPLC/EBC module plugged into the CPU slot of the DL205 base.