

# SURESTEP™ STEPPING SYSTEMS USER MANUAL TABLE OF CONTENTS

---



Warnings . . . . .	w-1
Chapter 1: Getting Started . . . . .	1-1
Manual Overview . . . . .	1-2
Overview of this Publication. . . . .	1-2
Who Should Read this Manual. . . . .	1-2
Technical Support . . . . .	1-2
Special Symbols . . . . .	1-2
SureStep™ System Introduction . . . . .	1-3
SureStep™ Part Number Explanation. . . . .	1-3
SureStep™ System Recommended Component Compatibility. . . . .	1-5
Drive and Motor Compatibility . . . . .	1-6
Microstepping Drives Introduction . . . . .	1-9
Standard Microstepping Drives . . . . .	1-9
High Bus Voltage Microstepping Drives . . . . .	1-11
Advanced Microstepping Drive . . . . .	1-12
Standard Integrated Motors/Drives . . . . .	1-13
Advanced Integrated Motors/Drives. . . . .	1-14
Step Motor Introduction . . . . .	1-15
Stepping System Power Supply Introduction. . . . .	1-16
Selecting the Stepping System . . . . .	1-17
Use with AutomationDirect PLCs. . . . .	1-17
High-Speed Pulse Output Control (Standard Drives) . . . . .	1-17
Serial Communication Control (Advanced Drives) . . . . .	1-17
Chapter 2: SureStep STP-DRV-4830,-4845,-6575 Standard DC Microstepping Drive. . . . .	2-1
Features. . . . .	2-2
Specifications. . . . .	2-3

Typical Wiring Diagram . . . . .	2–5
Wiring Connections and Configuration Switches . . . . .	2–5
STP-DRV-4830 . . . . .	2–5
STP-DRV-4845 and STP-DRV-6575 . . . . .	2–6
Connecting the Motor . . . . .	2–7
Connecting the Power Supply . . . . .	2–8
SureStep™ Drive Digital Inputs and Outputs . . . . .	2–9
Connecting the Input Signals: STEP and DIR . . . . .	2–9
Connecting the Input Signals – EN Input . . . . .	2–10
Connecting the Fault Output . . . . .	2–11
Drive Configuration . . . . .	2–12
Drive Configurations Settings . . . . .	2–12
DIP Switch Settings . . . . .	2–13
Alarm Codes . . . . .	2–16
Mounting the Drive . . . . .	2–19
Drive Heating . . . . .	2–19
Dimensions and Mounting Slot Locations . . . . .	2–19
STP-DRV-4830 . . . . .	2–19
STP-DRV-4845 and STP-DRV-6575 . . . . .	2–20
<b>Chapter 3: SureStep STP-DRV-4035 Microstepping Drive</b>	<b>3–1</b>
Features . . . . .	3–2
Specifications . . . . .	3–3
Typical Wiring Diagram . . . . .	3–4
Connection and Adjustment Locations . . . . .	3–4
Connecting the Motor . . . . .	3–5
Connecting the Power Supply . . . . .	3–6
Connecting the Logic . . . . .	3–7
Using Logic That is Not 5 volt TTL Level . . . . .	3–9
The Enable Input . . . . .	3–9
Setting Phase Current . . . . .	3–10
Current Setting Formula . . . . .	3–10
Current Setting Table . . . . .	3–11
Microstepping . . . . .	3–12
Idle Current Reduction . . . . .	3–13

Self Test . . . . .	3–13
Dimensions . . . . .	3–15
<b>Chapter 4: SureStep Advanced Microstepping Drives . . .</b>	<b>4–1</b>
Features . . . . .	4–2
Specifications . . . . .	4–3
Typical Wiring Diagram . . . . .	4–4
Connection Locations & Pin-out . . . . .	4–4
Connecting the Power Supply . . . . .	4–6
Connecting the I/O . . . . .	4–7
SureStep™ Drive Digital Inputs . . . . .	4–7
Connecting STEP and DIR to 5V TTL Logic . . . . .	4–7
Connecting STEP and DIR to Logic Other Than 5V TTL Level . . . . .	4–8
Connections to the EN Input . . . . .	4–9
Connecting the Analog Input . . . . .	4–10
Connecting the Digital Output . . . . .	4–10
LED Display Codes . . . . .	4–12
Drive Configuration . . . . .	4–15
Mounting the Drive . . . . .	4–17
Drive Heating . . . . .	4–17
Dimensions and Mounting Slot Locations . . . . .	4–17
<b>Chapter 5: SureStep STP-DRVAC-24025 Microstepping Drive</b>	<b>5–1</b>
Features . . . . .	5–2
Specifications . . . . .	5–3
Mounting the Drive . . . . .	5–4
Dimensions . . . . .	5–4
Wiring Connections and Configuration Switches . . . . .	5–5
STP-DRVAC-24025 . . . . .	5–5
Connecting the Power Supply . . . . .	5–6
Connecting the Motor . . . . .	5–7
Selecting the Motor . . . . .	5–8
Connecting the I/O . . . . .	5–9
Step/Direction Mode and CW/CCW Mode Jumper . . . . .	5–9
Connecting the Input Signals - Step and Direction . . . . .	5–9

The Enable Input . . . . .	5–10
Connecting the Fault Output Setting . . . . .	5–11
Drive Configuration . . . . .	5–12
Microstepping . . . . .	5–13
Setting Running Current . . . . .	5–13
Idle Current Reduction . . . . .	5–14
Step Noise Filter . . . . .	5–14
Load Inertia . . . . .	5–14
Smoothing Filter . . . . .	5–14
Self Test . . . . .	5–15
Alarm Codes . . . . .	5–16
Chapter 6: SureStep Integrated Motors/Drives . . . . .	6–1
Features . . . . .	6–3
General Features: . . . . .	6–3
Standard Drive Features . . . . .	6–3
Advanced Drive Features . . . . .	6–3
Features Comparison . . . . .	6–4
Specifications . . . . .	6–5
Getting Started . . . . .	6–11
Installing Software . . . . .	6–11
Mounting . . . . .	6–11
Additional Reading . . . . .	6–12
Mating Connectors and Accessories . . . . .	6–12
Using a Regulated Power Supply . . . . .	6–17
LED Error Codes . . . . .	6–18
STP-MTRD Inputs and Outputs . . . . .	6–22
Input/Output Functions . . . . .	6–25
The Step (STEP) and Direction (DIR) Inputs . . . . .	6–26
The Enable (EN/IN3) Digital Input . . . . .	6–28
The Analog (AIN) Input . . . . .	6–29
The Digital Output . . . . .	6–30
Using the Optional Encoder . . . . .	6–31
Configuring the Standard STP-MTRD . . . . .	6–32
Drive/Motor Heating . . . . .	6–37

Torque Speed Graphs . . . . .	6–40
Dimensions and Mounting Slot Locations . . . . .	6–43
<b>Chapter 7: SureStep Stepping Motors . . . . .</b>	<b>7–1</b>
Features . . . . .	7–2
Design and Installation Tips . . . . .	7–3
Specifications . . . . .	7–4
Power Supply and Step Motor Drive . . . . .	7–8
Mounting the Motor . . . . .	7–8
Connecting the Motor . . . . .	7–8
Extension Cable Wiring Diagrams . . . . .	7–9
Connecting a STP-MTRAC-23x or STP-MTRAC-34x Motor . . . . .	7–10
Connecting a STP-MTRAC(H)-42 Motor . . . . .	7–11
Motor Dimensions and Cabling . . . . .	7–12
Typical Dimension & Cable Diagrams . . . . .	7–12
Typical Dimension & Cable Diagram for STP-MTRH . . . . .	7–15
Typical Dimension & Cable Diagram for STP-MTRAC . . . . .	7–18
Typical Dimension & Cable Diagram for STP-MTRAC(H)-42x . . . . .	7–20
Torque vs. Speed Charts . . . . .	7–21
<b>Chapter 8: SureStep Linear Actuators . . . . .</b>	<b>8–1</b>
Features . . . . .	8–2
Design and Installation Tips . . . . .	8–3
Model Number Explanation . . . . .	8–3
Specifications . . . . .	8–4
Power Supply and Step Motor Drive . . . . .	8–8
Mounting the Motor . . . . .	8–8
Journal Mounting . . . . .	8–8
Connecting the Motor . . . . .	8–10
Extension Cable Wiring Diagrams . . . . .	8–10
Motor Dimensions and Cabling . . . . .	8–12
Thrust vs. Speed Charts . . . . .	8–16
<b>Chapter 9: SureStep System Power Supplies . . . . .</b>	<b>9–1</b>
Features . . . . .	9–2
Specifications . . . . .	9–3
Drive Heating . . . . .	9–4

Choosing a Power Supply . . . . .	9–5
Power Supply Terminal & Component Layout. . . . .	9–7
Mounting the Power Supply . . . . .	9–8
Dimensions . . . . .	9–9
Dimensions (continued). . . . .	9–10
<b>Chapter 10: SureMotion Pro Configuration Software. . .</b>	<b>10–1</b>
<b>SureMotion™ Pro Software . . . . .</b>	<b>10–2</b>
Communication. . . . .	10–2
Motor Configuration . . . . .	10–2
Motion and I/O . . . . .	10–3
Drive Pull-down Menu. . . . .	10–4
<b>Chapter 11: SureStep Communications. . . . .</b>	<b>11–1</b>
<b>Connecting to a Host Using RS-485 . . . . .</b>	<b>11–2</b>
Four-Wire Configuration . . . . .	11–2
Two-Wire Configuration. . . . .	11–3
Assigning RS-485 Addresses. . . . .	11–3
Connecting to an STP-MTRD-xxxxR using the STP-USB485-4W Adapter . . . . .	11–4
Connecting to a drive using RJ12. . . . .	11–5
<b>Appendix A: Accessories . . . . .</b>	<b>A–1</b>
<b>Braking Accessories . . . . .</b>	<b>A–2</b>
Regeneration Clamp Features . . . . .	A–2
<b>Cables and Accessories . . . . .</b>	<b>A–5</b>
<b>Encoder Options . . . . .</b>	<b>A–10</b>
Encoder Mounting Accessories. . . . .	A–15
Encoder Specifications . . . . .	A–16
Differential Electrical Specifications . . . . .	A–18
<b>Wiring Examples . . . . .</b>	<b>A–19</b>
<b>Line Filters . . . . .</b>	<b>A–24</b>
<b>Appendix B: Using SureStep with AutomationDirect PLCs</b>	<b>B–1</b>
<b>Compatible AutomationDirect PLCs and Modules. . . . .</b>	<b>B–2</b>
<b>Typical Connections to a Productivity PLC. . . . .</b>	<b>B–6</b>
<b>Typical Connections to a DL05 PLC. . . . .</b>	<b>B–7</b>
<b>Typical Connections to an H0-CTRIO . . . . .</b>	<b>B–8</b>

Typical Connections – Multiple Drives/Motors. . . . .	B-9
Typical <b>Direct</b> LOGIC PLC RS-232	
Serial Connections to an Advanced SureStep Drive . . . . .	B-10
Typical CLICK, P-Series, & BRX PLC RS-232	
Serial Connections to an Advanced SureStep Drive . . . . .	B-11
Typical RS-485 Connections to	
Integrated Motor/Drives . . . . .	B-12
<b>Appendix C: Selecting the SureStep Stepping System . . .</b>	<b>C-1</b>
Selecting the SureStep™ Stepping System . . . . .	C-2
The Selection Procedure . . . . .	C-2
How many pulses from the PLC to make the move? . . . . .	C-2
What is the positioning resolution of the load? . . . . .	C-3
What is the indexing speed to accomplish the move time? . . . . .	C-3
Calculating the Required Torque . . . . .	C-4
Leadscrew – Example Calculations. . . . .	C-8
Step 1 – Define the Actuator and Motion Requirements . . . . .	C-8
Step 2 – Determine the Positioning Resolution of the Load . . . . .	C-9
Step 3 – Determine the Motion Profile. . . . .	C-9
Step 4 – Determine the Required Motor Torque . . . . .	C-9
Step 5 – Select & Confirm the Stepping Motor & Driver System. . . . .	C-10
Belt Drive – Example Calculations . . . . .	C-15
Step 1 – Define the Actuator and Motion Requirements . . . . .	C-15
Step 2 – Determine the Positioning Resolution of the Load . . . . .	C-16
Step 3 – Determine the Motion Profile. . . . .	C-16
Step 4 – Determine the Required Motor Torque . . . . .	C-16
Step 5 – Select & Confirm the Stepping Motor & Driver System. . . . .	C-17
Index Table – Example Calculations. . . . .	C-19
Step 1 – Define the Actuator and Motion Requirements . . . . .	C-19
Step 2 – Determine the Positioning Resolution of the Load . . . . .	C-19
Step 3 – Determine the Motion Profile. . . . .	C-20
Step 4 – Determine the Required Motor Torque . . . . .	C-20
Step 5 – Select & Confirm the Stepping Motor & Driver System. . . . .	C-21
Engineering Unit Conversion Tables, Formulae, & Definitions: . . . . .	C-22

BLANK  
PAGE