



**Applied
Motion
Products**

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Product Datasheet

www.Applied-Motion.com

ST10-Q-NN

DC Advanced Microstep Drive w/ Q Programming

1pc. - 515.00
50pc. - 386.25



Product Features

- Programmable microstepping drive with advanced current control
- Q Programmer™ for robust motion control programming
- 744 lines of stored program capability
- Math calculations using analog and digital parameters
- Supports all "S" drive control modes as well
- Compatible with many 3rd party HMI's
- Modbus/RTU for easy PLC and HMI communication
- Wide current range 0.1 to 10.0 A/phase (peak of sine) with idle current reduction
- Advanced anti-resonance algorithm
- Torque ripple smoothing
- 8 digital inputs, 4 digital outputs, optically isolated
- 2 analog inputs, +/-10 volt range
- RS-232 cable and mating connectors included



Description

The ST10-Q-NN stepper drive is a DC-powered microstepping drive for controlling two-phase, bipolar step motors. It offers advanced current control and a sophisticated 3rd generation anti-resonance algorithm that electronically dampens motor and system resonances to improve motor smoothness and usable torque over a wide speed range. The drive also employs electronic torque ripple smoothing and microstep emulation to greatly reduce motor noise and vibration. The drive must be powered from 24-80 VDC and can output up to 10.0 A/phase (peak-of-sine) to the step motor. Over-voltage, over-temperature and over-current protection features prevent damage while running in adverse conditions. The drive is complemented by a specifically matched set of NEMA 23 and NEMA 34 frame stepper motors (see Related and Recommended products below).

The ST10-Q-NN can operate in all of the same control modes as the S model (pulse & direction, velocity, streaming commands, SiNet Hub operation), plus it has the ability to run stand-alone Q programs stored in non-volatile memory. Q programs are created using the [Q Programmer™](#) software, which provides multi-tasking, math functions, conditional processing, data register manipulation, and more features in a robust yet simple text-based programming language. The drive is setup and configured using Applied Motion's [ST Configurator™](#) software. Preconfigured motor setup files included with *ST Configurator™* make it easy to set up the drive for optimum results.

For connecting to external devices such as control signals, incremental encoders, limit switches, proximity or photoelectric sensors, PLC I/O, lamps, and other devices, the drive comes with 8 digital inputs, 4 digital outputs, and 2 single-ended analog inputs (analog inputs can be wired together as 1 differential analog input). Adjustable digital filters are present on the digital inputs for enhanced reliability in noisy environments.

The drive comes with an RS-232 port for configuration, serial communications and programming.

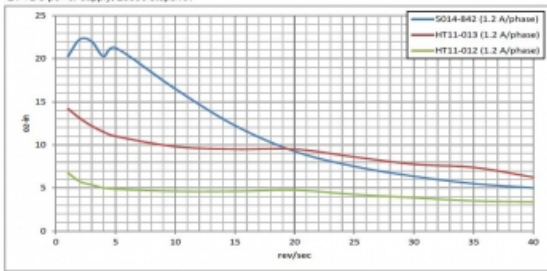
All ST drives are CE approved and RoHS compliant.

Specifications

Model Number:	ST10-Q-NN
Part Number:	5000-138
Supply Voltage:	24-80 VDC
Supply Voltage Type:	DC
Control Modes:	Step & Direction Velocity (Oscillator) Streaming Commands Analog Positioning Encoder Following Q Programming SiNet Hub Compatible Modbus
Output Current:	0.1-10.0 A/phase
Communication Ports:	RS-232
Encoder Feedback:	No
Step Resolution:	Full Half Microstepping Microstep Emulation
Idle Current Reduction:	0-90%
Setup Method:	Software setup
Digital Inputs:	8
Digital Outputs:	4
Analog Inputs:	1 differential or 2 single-ended
Dimensions:	5.0 x 3.0 x 1.75 inches
Weight:	10.4 oz
Operating Temperature Range:	0-70 °C
Ambient Temperature Range:	0-55 °C
Ambient Humidity:	90% max, non-condensing
Status LEDs:	1 red, 1 green
Circuit Protection:	Short circuit Over-voltage Under-voltage Over-temp

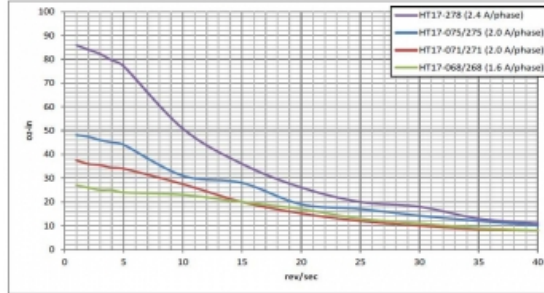
Torque Curves

HT11-012, HT11-013, 5014-842
24 VDC power supply, 20000 steps/rev



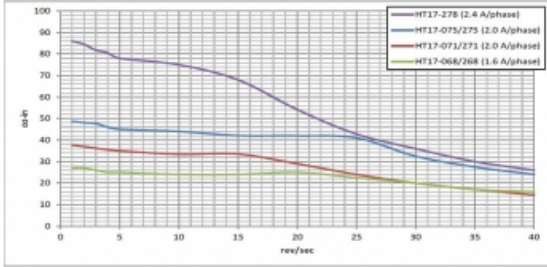
HT17

24 VDC power supply, 20000 steps/rev, all motors connected in parallel



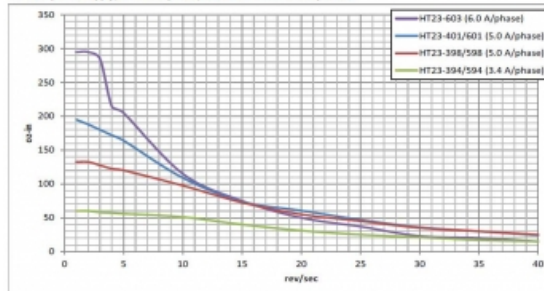
HT17

48 VDC power supply, 20000 steps/rev, all motors connected in parallel



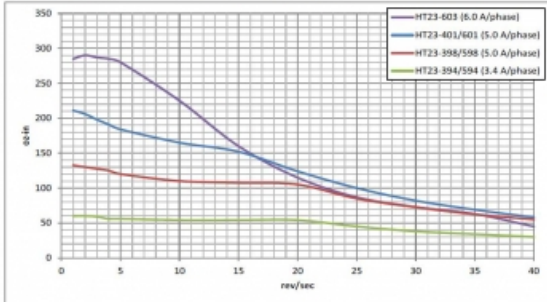
HT23

24 VDC power supply, 20000 steps/rev, all motors connected in parallel



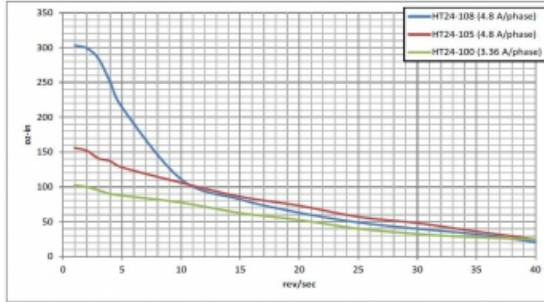
HT23

48 VDC power supply, 20000 steps/rev, all motors connected in parallel



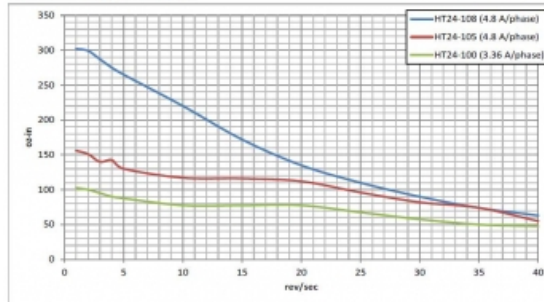
HT24

24 VDC power supply, 20000 steps/rev



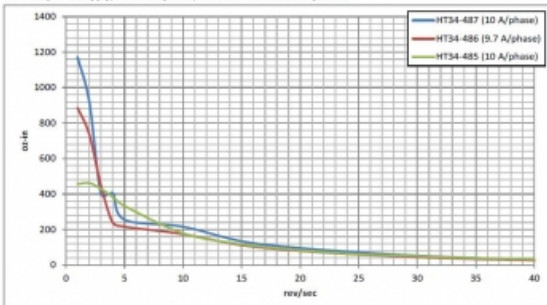
HT24

48 VDC power supply, 20000 steps/rev



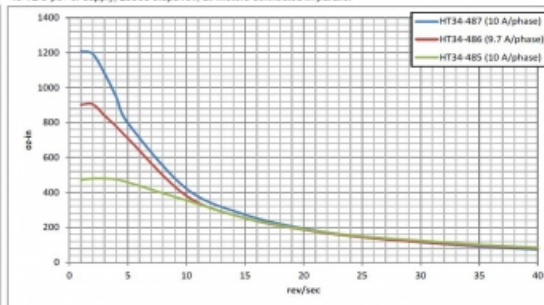
HT34-485/486/487 with ST10

24 VDC power supply, 20000 steps/rev, all motors connected in parallel



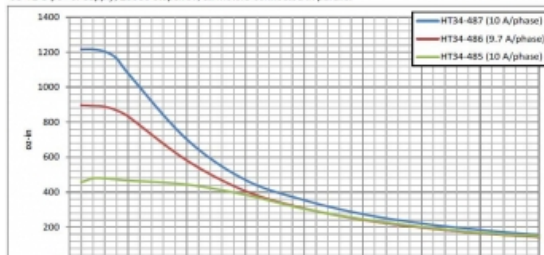
HT34-485/486/487 with ST10

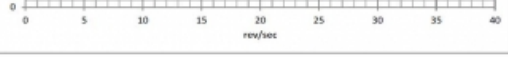
48 VDC power supply, 20000 steps/rev, all motors connected in parallel



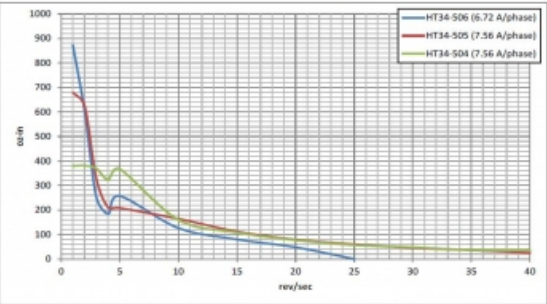
HT34-485/486/487 with ST10

80 VDC power supply, 20000 steps/rev, all motors connected in parallel

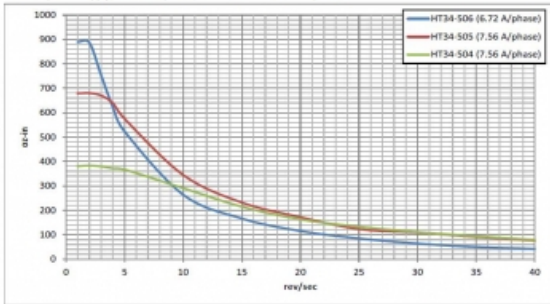




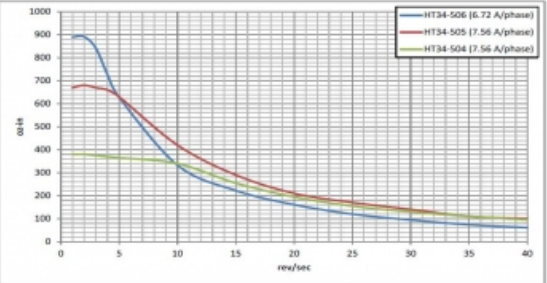
HT34-504/505/506 with ST10
24 VDC power supply, 20000 steps/rev, all motors connected in parallel



HT34-504/505/506 with ST10
48 VDC power supply, 20000 steps/rev, all motors connected in parallel



HT34-504/505/506 with ST10
60 VDC power supply, 20000 steps/rev, all motors connected in parallel



Software

Software: [SCL Utility](#)
[ST Configurator™](#)

Sample Code:  [scldemo.zip](#)

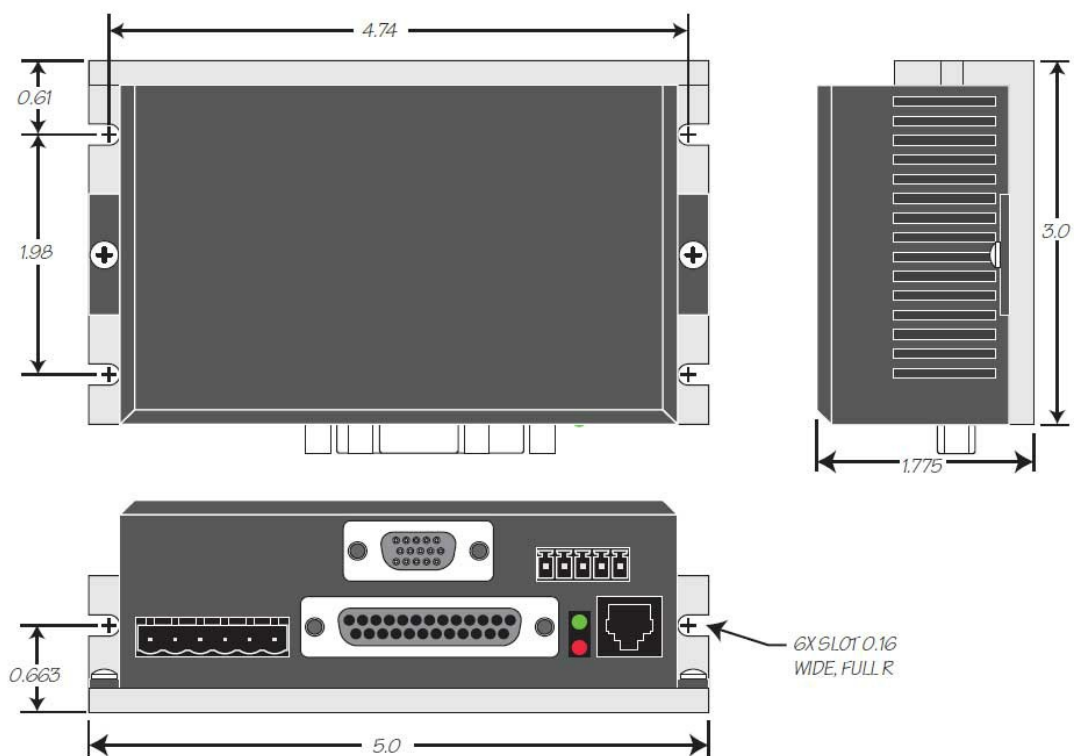
Downloads

Manuals:	 Host Command Reference Rev I.pdf  ST5_10-Q_QuickSetup_920-0007E.pdf  ST5-10-QSi_Hardware Manual_920-0004F.pdf  ModbusManual_920-0072E.pdf
Datasheet:	http://s3.amazonaws.com/applied-motion-pdf/ST10-Q-NN.pdf
Family Datasheet:	 ST_Datasheet_925-0007.pdf
2D Drawing:	 ST5_10_Dimensions.pdf  ST_T_simple_3D.pdf
3D Drawing:	 ST5_10-Q_Si_C_SIMPLE.igs
Speed-Torque Curves:	 ST_speed-torque.pdf
Agency Approvals:	 ST-Q-Si-C-IP_CE_DOC.pdf
Application Notes:	 APPN0021_5V-Keepalive-Circuit.pdf  APPN0019_Analog-positioning-using-Q-program.zip  APPN0018_EZ-Series-Touchpanel-HMI.zip  APPN0016_Simple-25-pin-mating-connections.pdf  APPN0015_Make-a-serial-programming-cable.pdf

Pricing

ST10-Q-NN Part No. 5000-138	
1pc.	\$515.00
25pc.	\$442.90
50pc.	\$386.25
100pc.	Contact us for 100+ piece pricing.

Mechanical Outline



Products in the Series *Modbus Products*

Model Number	Supply Voltage	Control Modes	Output Current	Communication Ports	Encoder Feedback	1pc./50pc.
	12-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-232	Yes	\$391.00 / \$293.25
	12-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-232	No	\$314.00 / \$235.50
	12-70 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus	NA	RS-232	No	\$447.00 / \$335.25
	12-48 VDC	Step & Direction, Encoder Following	NA	RS-232	Yes	\$353.00 / \$264.75
	12-70 VDC	Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Velocity Control, Modbus	NA	RS-485	Yes	\$554.00 / \$415.50
	12-70 VDC	Step & Direction, Encoder Following	NA	RS-232	Yes	\$378.00 / \$283.50
	12-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-232	No	\$290.00 / \$217.50
	12-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-485	Yes	\$432.00 / \$324.00
	12-70 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-485	Yes	\$610.00 / \$457.50
	12-48 VDC	Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Velocity Control, Modbus	NA	RS-232	Yes	\$385.00 / \$288.75
	12-70 VDC	Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Velocity Control, Modbus	NA	RS-232	Yes	\$546.00 / \$409.50
	12-70 VDC	Step & Direction, Encoder Following	NA	RS-232	Yes	\$420.00 / \$315.00
	12-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-485	Yes	\$403.00 / \$302.25
	12-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-485	No	\$326.00 / \$244.50
	12-70 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-485	No	\$504.00 / \$378.00
	12-48 VDC	Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Velocity Control, Modbus	NA	RS-232	Yes	\$388.00 / \$291.00
	12-70 VDC	Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Velocity Control, Modbus	NA	RS-232	Yes	\$491.00 / \$368.25
	12-70 VDC	Q Programming, CANopen	NA	CANopen	Yes	\$532.00 / \$399.00
	12-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-232	Yes	\$403.00 / \$302.25
	12-70 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus	NA	RS-232	Yes	\$571.00 / \$428.25
	12-70 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-232	Yes	\$623.00 / \$467.25
	12-48 VDC	Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Velocity Control, Modbus	NA	RS-485	Yes	\$388.00 / \$291.00
	12-70 VDC	Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Velocity Control, Modbus	NA	RS-232	Yes	\$477.00 / \$357.75
	12-48 VDC	Q Programming, CANopen	NA	CANopen	Yes	\$517.00 / \$387.75
	12-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-232	No	\$299.00 / \$224.25
	12-70 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus	NA	RS-232	No	\$422.00 / \$316.50
	12-70 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-232	No	\$499.00 / \$374.25

	12-48 VDC	Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Velocity Control, Modbus	NA	RS-485	Yes	\$391.00 / \$293.25
	12-48 VDC	Step & Direction, Encoder Following	NA	RS-232	Yes	\$355.00 / \$266.25
	12-48 VDC	Q Programming, CANopen	NA	CANopen	Yes	\$521.00 / \$390.75
	12-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-485	Yes	\$415.00 / \$311.25
	12-70 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-485	Yes	\$603.00 / \$452.25
	12-70 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-485	Yes	\$682.00 / \$511.50
	12-48 VDC	Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Velocity Control, Modbus	NA	RS-485	Yes	\$394.00 / \$295.50
	12-48 VDC	Step & Direction, Encoder Following	NA	RS-232	Yes	\$358.00 / \$268.50
	12-48 VDC	Q Programming, CANopen	NA	CANopen	Yes	\$524.00 / \$393.00
	12-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-485	No	\$311.00 / \$233.25
	12-70 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-485	No	\$486.00 / \$364.50
	12-70 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-485	No	\$539.00 / \$404.25
	12-70 VDC	Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Velocity Control, Modbus	NA	RS-485	Yes	\$484.00 / \$363.00
	12-48 VDC	Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Velocity Control, Modbus	NA	RS-232	Yes	\$382.00 / \$286.50
	12-70 VDC	Q Programming, CANopen	NA	CANopen	Yes	\$546.00 / \$409.50
	12-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-232	Yes	\$420.00 / \$315.00
	12-70 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus	NA	RS-232	Yes	\$591.00 / \$443.25
	12-70 VDC	Step & Direction, Analog Torque / Velocity, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	NA	RS-232	Yes	\$790.00 / \$592.50
	12-70 VDC	Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Velocity Control, Modbus	NA	RS-485	Yes	\$499.00 / \$374.25
	12-70 VDC	Step & Direction, Encoder Following	NA	RS-232	Yes	\$367.00 / \$275.25
	12-70 VDC	Q Programming, CANopen	NA	CANopen	Yes	\$601.00 / \$450.75
ST10-Q-NE	24-80 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus	0.1-10.0 A/Phase	RS-232	Yes	\$580.00 / \$435.00
ST10-Q-NN	24-80 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus	0.1-10.0 A/Phase	RS-232	No	\$515.00 / \$386.25
ST10-Q-RE	24-80 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	0.1-10.0 A/Phase	RS-232, RS-485	Yes	\$690.00 / \$517.50
ST10-Q-RN	24-80 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	0.1-10.0 A/Phase	RS-232, RS-485	No	\$630.00 / \$472.50
ST5-Q-NE	24-48 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus	0.1-5.0 A/Phase	RS-232	Yes	\$540.00 / \$405.00
ST5-Q-NN	24-48 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus	0.1-5.0 A/Phase	RS-232	No	\$467.00 / \$350.25
ST5-Q-RE	24-48 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	0.1-5.0 A/Phase	RS-232, RS-485	Yes	\$625.00 / \$468.75
ST5-Q-RN	24-48 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	0.1-5.0 A/Phase	RS-232, RS-485	No	\$570.00 / \$427.50

Products in the Series *ST Stepper Drives*

Model Number	Supply Voltage	Control Modes	Output Current	Communication Ports	Encoder Feedback	1pc./50pc.
ST10-C-CE	24-80 VDC	CANopen	0.1-10.0 A/Phase	RS-232, CANopen	Yes	\$682.00 / \$511.50
ST10-C-CN	24-80 VDC	CANopen	0.1-10.0 A/Phase	RS-232, CANopen	No	\$631.00 / \$473.25
ST10-IP-EE	24-80 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP	0.1-10.0 A/Phase	Ethernet, EtherNet/IP	Yes	\$710.00 / \$532.50
ST10-IP-EN	24-80 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP	0.1-10.0 A/Phase	Ethernet, EtherNet/IP	No	\$659.00 / \$494.25
ST10-Plus	24-80 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming	0.1-10.0 A/Phase	RS-232	No	\$440.00 / \$330.00
ST10-Q-EE	24-80 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming	0.1-10.0 A/Phase	Ethernet	Yes	\$726.00 / \$544.50
ST10-Q-EN	24-80 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming	0.1-10.0 A/Phase	Ethernet	No	\$660.00 / \$495.00
ST10-Q-NE	24-80 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus	0.1-10.0 A/Phase	RS-232	Yes	\$580.00 / \$435.00
ST10-Q-NF	24-80 VDC	Step & Direction, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Velocity Control	0.1-10.0 A/Phase	RS-232	Yes	\$557.00 / \$417.75
ST10-Q-NN	24-80 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus	0.1-10.0 A/Phase	RS-232	No	\$515.00 / \$386.25
ST10-Q-RE	24-80 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	0.1-10.0 A/Phase	RS-232, RS-485	Yes	\$690.00 / \$517.50
ST10-Q-RN	24-80 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	0.1-10.0 A/Phase	RS-232, RS-485	No	\$630.00 / \$472.50
ST10-S	24-80 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, SiNet Hub Compatible	0.1-10.0 A/Phase	RS-232	No	\$405.00 / \$303.75
ST10-Si-NE	24-80 VDC	Si Programming	0.1-10.0 A/Phase	RS-232	Yes	\$630.00 / \$472.50
ST10-Si-NF	24-80 VDC	Step & Direction, Streaming Commands, Analog Positioning, Encoder Following, Si Programming, Q Programming, SiNet Hub Compatible, Velocity Control	0.1-10.0 A/Phase	RS-232	Yes	\$636.00 / \$477.00
ST10-Si-NN	24-80 VDC	Si Programming	0.1-10.0 A/Phase	RS-232	No	\$580.00 / \$435.00
ST5-C-CE	24-48 VDC	CANopen	0.1-5.0 A/Phase	RS-232, CANopen	Yes	\$585.00 / \$438.75
ST5-C-CN	24-48 VDC	CANopen	0.1-5.0 A/Phase	RS-232, CANopen	No	\$541.00 / \$405.75
ST5-IP-EE	24-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP	0.1-5.0 A/Phase	Ethernet, EtherNet/IP	Yes	\$655.00 / \$491.25
ST5-IP-EN	24-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP	0.1-5.0 A/Phase	Ethernet, EtherNet/IP	No	\$607.00 / \$455.25
ST5-Plus	24-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming	0.1-5.0 A/Phase	RS-232	No	\$346.00 / \$259.50
ST5-Q-EE	24-48 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming	0.1-5.0 A/Phase	Ethernet	Yes	\$614.00 / \$460.50
ST5-Q-EN	24-48 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming	0.1-5.0 A/Phase	Ethernet	No	\$564.00 / \$423.00
ST5-Q-NE	24-48 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus	0.1-5.0 A/Phase	RS-232	Yes	\$540.00 / \$405.00
ST5-Q-NF	24-48 VDC	Step & Direction, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Velocity Control	0.1-5.0 A/Phase	RS-232	Yes	\$530.00 / \$397.50
ST5-Q-NN	24-48 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus	0.1-5.0 A/Phase	RS-232	No	\$467.00 / \$350.25

ST5-Q-NN	24-48 VDC	Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus	A/Phase	RS-232	No	\$350.25
ST5-Q-RE	24-48 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	0.1-5.0 A/Phase	RS-232, RS-485	Yes	\$625.00 / \$468.75
ST5-Q-RN	24-48 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus	0.1-5.0 A/Phase	RS-232, RS-485	No	\$570.00 / \$427.50
ST5-S	24-48 VDC	Step & Direction, Velocity (Oscillator), Streaming Commands, SiNet Hub Compatible	0.1-5.0 A/Phase	RS-232	No	\$302.00 / \$226.50
ST5-Si-NE	24-48 VDC	Si Programming	0.1-5.0 A/Phase	RS-232	Yes	\$579.00 / \$434.25
ST5-Si-NF	24-48 VDC	Step & Direction, Streaming Commands, Analog Positioning, Encoder Following, Si Programming, Q Programming, SiNet Hub Compatible, Velocity Control	0.1-5.0 A/Phase	RS-232	Yes	\$606.00 / \$454.50
ST5-Si-NN	24-48 VDC	Si Programming	0.1-5.0 A/Phase	RS-232	No	\$490.00 / \$367.50