

## ST10-Q-EE

DC Advanced Microstep Drive w/ Ethernet & Encoder Input

1pc. - 726.00  
50pc. - 544.50



### 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
- Wide current range 0.1 to 10.0 A/phase (peak of sine) with idle current reduction
- Advanced anti-resonance algorithm
- Torque ripple smoothing
- Microstepping and Microstep Emulation
- 8 digital inputs, 4 digital outputs, optically isolated
- 2 analog inputs, +/-10 volt range
- Encoder feedback connector for Stall Prevention & Stall Detection
- Fast 10/100 Ethernet for programming and communications
- UDP & TCP support



## Description

The ST10-Q-EE 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-EE can operate in pulse & direction, velocity, and streaming command modes, 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 Ethernet port for configuration and programming. The Ethernet port is fast 10/100 Mbit, and the drive supports both TCP and UDP communication protocols.

The ST10-Q-EE comes with an encoder feedback connector for applications that demand a higher level of position control than ordinary open-loop step motor systems can provide. Use our double-shaft step motors with incremental encoders and activate either Stall Detection or Stall Prevention in the drive. Stall Detection notifies the system as soon as the required torque is too great for the motor, which results in a loss of synchronization between the rotor and stator, also known as stalling. Stall Prevention automatically adjusts motor speed to maintain synchronization of the rotor to the stator under all conditions. This unique feature allows step motors to operate in a much broader range of applications than previously possible, such as torque-control. The Stall Prevention feature also performs static position maintenance, which maintains the position of the motor shaft when at rest. Additionally, the inclusion of the optional encoder allows the motor to be precisely homed to the index (marker) pulse.

All ST drives are CE approved and RoHS compliant.

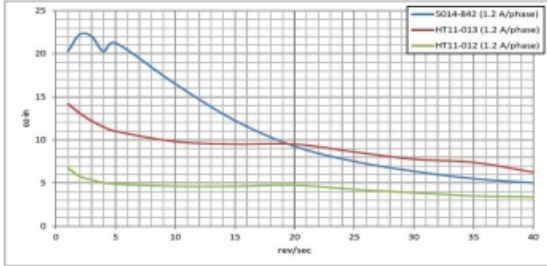
## Specifications

<b>Model Number:</b>	ST10-Q-EE
<b>Part Number:</b>	5000-180
<b>Supply Voltage:</b>	24-80 VDC
<b>Supply Voltage Type:</b>	DC
<b>Control Modes:</b>	Step & Direction Velocity (Oscillator) Streaming Commands Analog Positioning Encoder Following Q Programming
<b>Output Current:</b>	0.1-10.0 A/phase
<b>Communication Ports:</b>	Ethernet
<b>Encoder Feedback:</b>	Yes
<b>Step Resolution:</b>	Full Half Microstepping Microstep Emulation
<b>Idle Current Reduction:</b>	0-90%
<b>Setup Method:</b>	Software setup
<b>Digital Inputs:</b>	8
<b>Digital Outputs:</b>	4
<b>Analog Inputs:</b>	1 differential or 2 single-ended
<b>Dimensions:</b>	5.0 x 3.0 x 1.75 inches
<b>Weight:</b>	10.4 oz
<b>Operating Temperature Range:</b>	0-70 °C
<b>Ambient Temperature Range:</b>	0-55 °C
<b>Ambient Humidity:</b>	90% max, non-condensing
<b>Status LEDs:</b>	1 red, 1 green
<b>Circuit Protection:</b>	Short circuit Over-voltage Under-voltage Over-temp

# Torque Curves

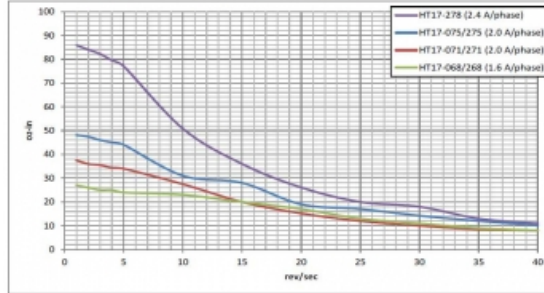
**HT11-012, HT11-013, 5014-842**

24 VDC power supply, 20000 steps/rev



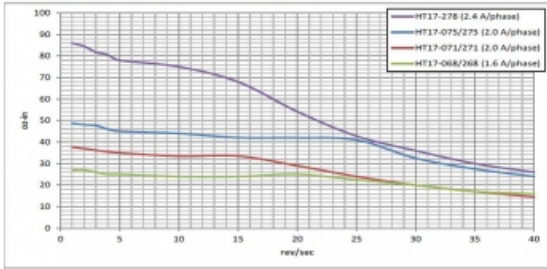
**HT17**

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



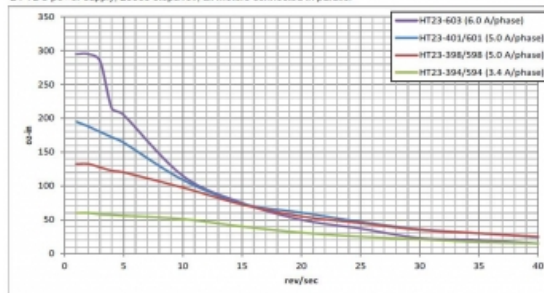
**HT17**

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



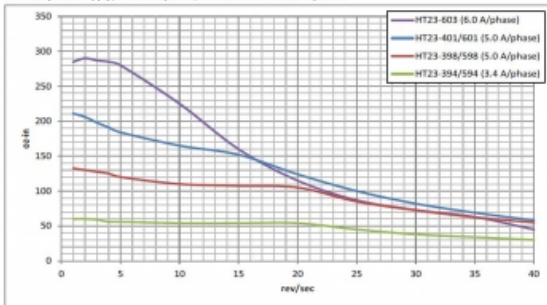
**HT23**

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



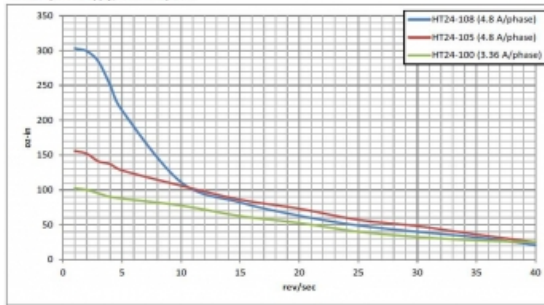
**HT23**

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



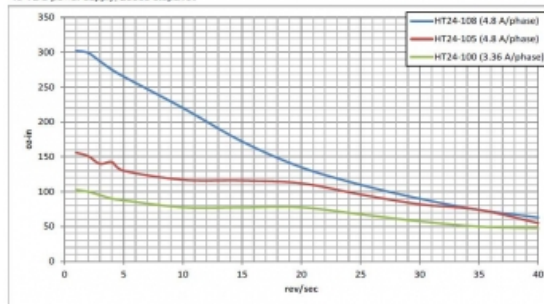
**HT24**

24 VDC power supply, 20000 steps/rev



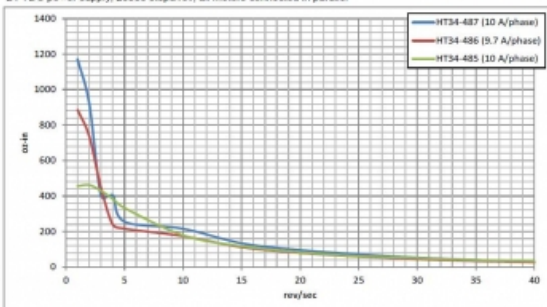
**HT24**

48 VDC power supply, 20000 steps/rev



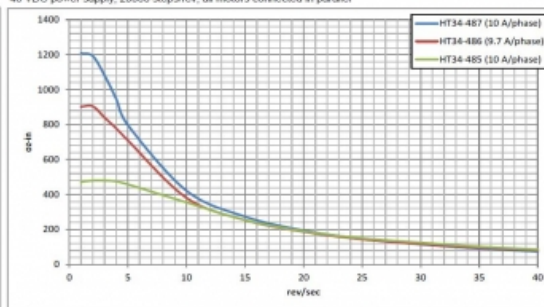
**HT34-485/486/487 with ST10**

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



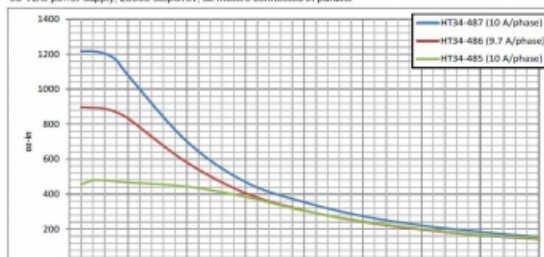
**HT34-485/486/487 with ST10**

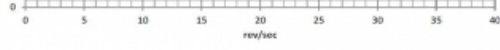
48 VDC power supply, 20000 steps/rev, all motors connected in parallel



**HT34-485/486/487 with ST10**

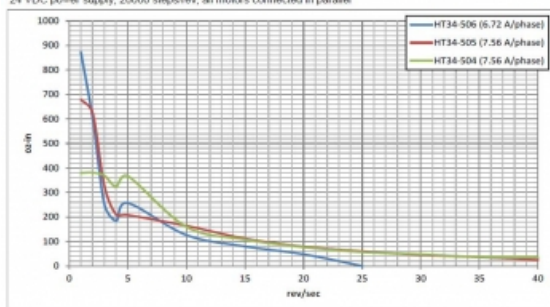
80 VDC power supply, 20000 steps/rev, all motors connected in parallel





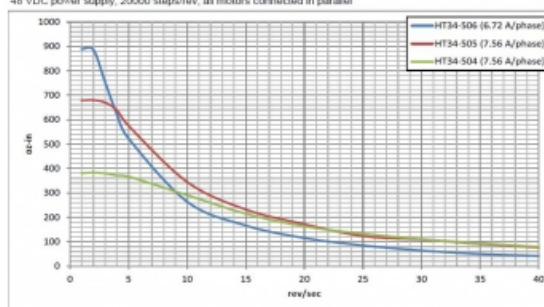
#### HT34-504/505/506 with ST10

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



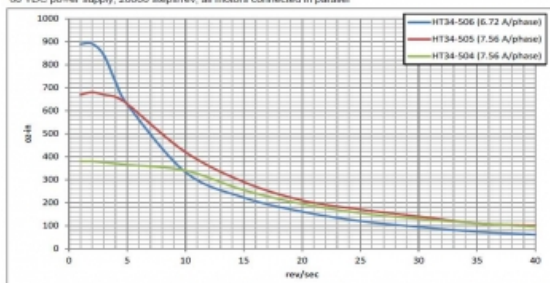
#### HT34-504/505/506 with ST10

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:

[C\\_sharp\\_UDP\\_example.zip](#)  
[VB6\\_UDP\\_example.zip](#)  
[VB6\\_TCP\\_example.zip](#)

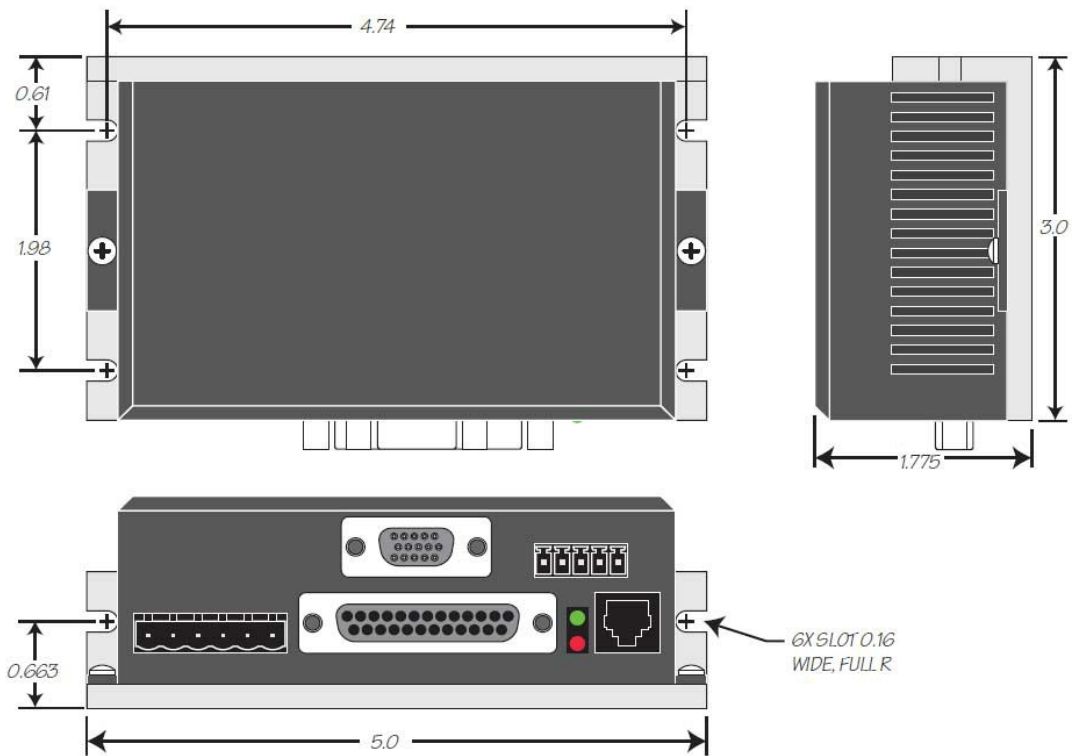
## Downloads

<b>Manuals:</b>	<a href="#"> ST5_10-Q_QuickSetup_920-0007E.pdf</a> <a href="#"> Host Command Reference Rev I.pdf</a> <a href="#"> eSCL_Comm_Reference.pdf</a> <a href="#"> ST5-10-QSi_Hardware Manual_920-0004F.pdf</a>
<b>Datasheet:</b>	<a href="http://s3.amazonaws.com/applied-motion-pdf/ST10-Q-EE.pdf">http://s3.amazonaws.com/applied-motion-pdf/ST10-Q-EE.pdf</a>
<b>Family Datasheet:</b>	<a href="#"> ST_Datasheet_925-0007.pdf</a>
<b>2D Drawing:</b>	<a href="#"> ST5_10_Dimensions.pdf</a> <a href="#"> ST_T_simple_3D.pdf</a>
<b>3D Drawing:</b>	<a href="#"> ST5_10-Q_Si_C_SIMPLE.igs</a>
<b>Speed-Torque Curves:</b>	<a href="#"> ST_speed-torque.pdf</a>
<b>Agency Approvals:</b>	<a href="#"> ST-Q-Si-C-IP_CE_DOC.pdf</a>
<b>Application Notes:</b>	<a href="#"> APPN0021_5V-Keepalive-Circuit.pdf</a> <a href="#"> APPN0020-Maple-Systems-with-Ethernet-Drive.zip</a> <a href="#"> APPN0019_Analog-positioning-using-Q-program.zip</a> <a href="#"> APPN0016_Simple-25-pin-mating-connections.pdf</a>

## Pricing

ST10-Q-EE Part No. 5000-180	
1pc.	\$726.00
25pc.	\$624.36
50pc.	\$544.50
100pc.	<a href="#">Contact us</a> for 100+ piece pricing.

## Mechanical Outline





## Products in the Series *ST Stepper Drives*

Model Number	Supply Voltage	Control Modes	Output Current	Communication Ports	Encoder Feedback	1pc./50pc.
<a href="#">ST10-C-CE</a>	24-80 VDC	CANopen	0.1-10.0 A/Phase	RS-232, CANopen	Yes	\$682.00 / \$511.50
<a href="#">ST10-C-CN</a>	24-80 VDC	CANopen	0.1-10.0 A/Phase	RS-232, CANopen	No	\$631.00 / \$473.25
<a href="#">ST10-IP-EE</a>	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
<a href="#">ST10-IP-EN</a>	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
<a href="#">ST10-Plus</a>	24-80 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming	0.1-10.0 A/Phase	RS-232	No	\$440.00 / \$330.00
<a href="#">ST10-Q-EE</a>	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
<a href="#">ST10-Q-EN</a>	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
<a href="#">ST10-Q-NE</a>	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
<a href="#">ST10-Q-NF</a>	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
<a href="#">ST10-Q-NN</a>	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
<a href="#">ST10-Q-RE</a>	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
<a href="#">ST10-Q-RN</a>	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
<a href="#">ST10-S</a>	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
<a href="#">ST10-Si-NE</a>	24-80 VDC	Si Programming	0.1-10.0 A/Phase	RS-232	Yes	\$630.00 / \$472.50
<a href="#">ST10-Si-NF</a>	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
<a href="#">ST10-Si-NN</a>	24-80 VDC	Si Programming	0.1-10.0 A/Phase	RS-232	No	\$580.00 / \$435.00
<a href="#">ST5-C-CE</a>	24-48 VDC	CANopen	0.1-5.0 A/Phase	RS-232, CANopen	Yes	\$585.00 / \$438.75
<a href="#">ST5-C-CN</a>	24-48 VDC	CANopen	0.1-5.0 A/Phase	RS-232, CANopen	No	\$541.00 / \$405.75
<a href="#">ST5-IP-EE</a>	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
<a href="#">ST5-IP-EN</a>	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
<a href="#">ST5-Plus</a>	24-48 VDC	Streaming Commands, Analog Positioning, Encoder Following, Q Programming	0.1-5.0 A/Phase	RS-232	No	\$346.00 / \$259.50
<a href="#">ST5-Q-EE</a>	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
<a href="#">ST5-Q-EN</a>	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
<a href="#">ST5-Q-NE</a>	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
<a href="#">ST5-Q-NF</a>	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
<a href="#">ST5-Q-NN</a>	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



<a href="#">ST5-Q-RE</a>	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
<a href="#">ST5-Q-RN</a>	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
<a href="#">ST5-S</a>	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
<a href="#">ST5-Si-NE</a>	24-48 VDC	Si Programming	0.1-5.0 A/Phase	RS-232	Yes	\$579.00 / \$434.25
<a href="#">ST5-Si-NF</a>	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
<a href="#">ST5-Si-NN</a>	24-48 VDC	Si Programming	0.1-5.0 A/Phase	RS-232	No	\$490.00 / \$367.50