

ST5-IP-EE

DC EtherNet/IP Advanced Microstep Drive w/ Encoder Input

1pc. - 655.00
50pc. - 491.25



Product Features

- Programmable microstepping drive with advanced current control and built-in EtherNet/IP networking
- Full Q programming functionality with Q Programmer™ software
- 744 lines of stored program capability
- Math calculations using analog and digital parameters
- Access all commands and data registers from EtherNet/IP network
- Wide current range 0.1 to 5.0 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
- Also supports Ethernet UDP & TCP communication protocols



Description

The ST5-IP-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 24-48 VDC and can output up to 5.0 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 11 through NEMA 23 frame stepper motors (see Related and Recommended products below).

The ST5-IP-EE incorporates EtherNet/IP network communications, the widely used industrial protocol for manufacturing automation applications. With EtherNet/IP users can control, configure and query the drive using an open, standards-based, industrial Ethernet connection at speeds up to 100 MBits/sec. The ST-IP drives run all of the same control modes as ST-Q drives, with the addition that all drive features can be accessed over EtherNet/IP, including more than 100 commands and 130 registers for controlling motion, I/O, configuration, polling, math, register manipulation, and Q programming.

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.

In addition to EtherNet/IP the drive supports Ethernet TCP and UDP protocols for sending commands from Applied Motion's proprietary Serial Command Language (SCL). The same 10/100 Mbit Ethernet port on the drive is also used for configuring and programming the drive using the [ST Configurator™](#) and [Q Programmer™](#) software applications, respectively.

The ST5-IP-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.

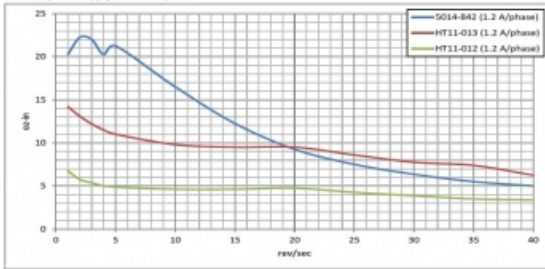
All ST drives are CE approved and RoHS compliant.

Specifications

| | |
|-------------------------------------|---|
| Model Number: | ST5-IP-EE |
| Part Number: | 5000-184 |
| Supply Voltage: | 24-48 VDC |
| Supply Voltage Type: | DC |
| Control Modes: | Streaming Commands Analog Positioning Encoder Following Q Programming EtherNet/IP |
| Output Current: | 0.1-5.0 A/phase |
| Communication Ports: | Ethernet EtherNet/IP |
| Encoder Feedback: | Yes |
| 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 |

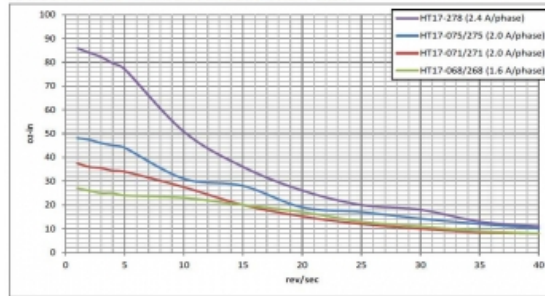
Torque Curves

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



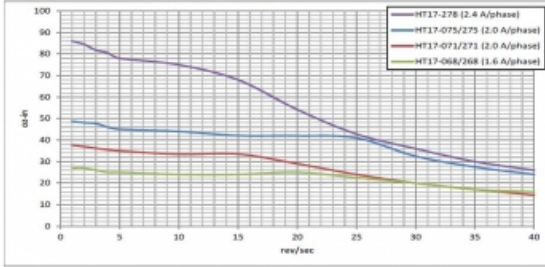
HT17

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



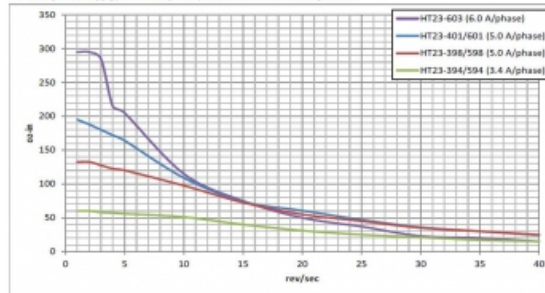
HT17

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



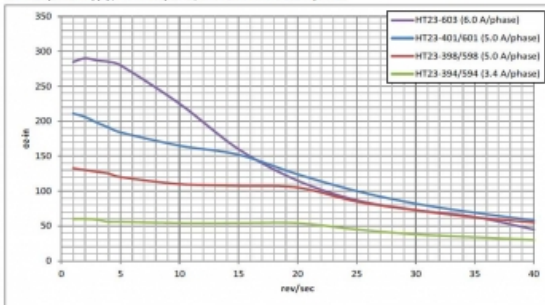
HT23

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



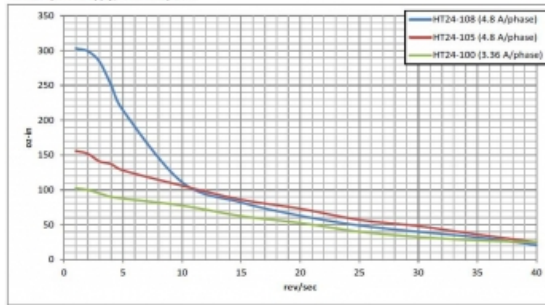
HT23

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



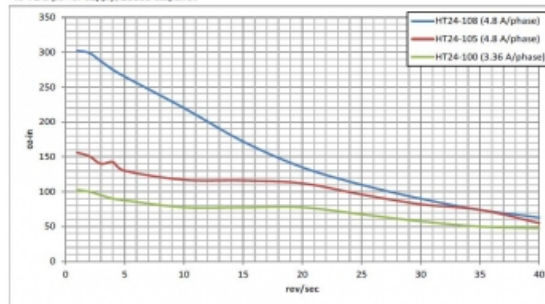
HT24

24 VDC power supply, 20000 steps/rev



HT24
















48 VDC power supply, 20000 steps/rev



Software

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

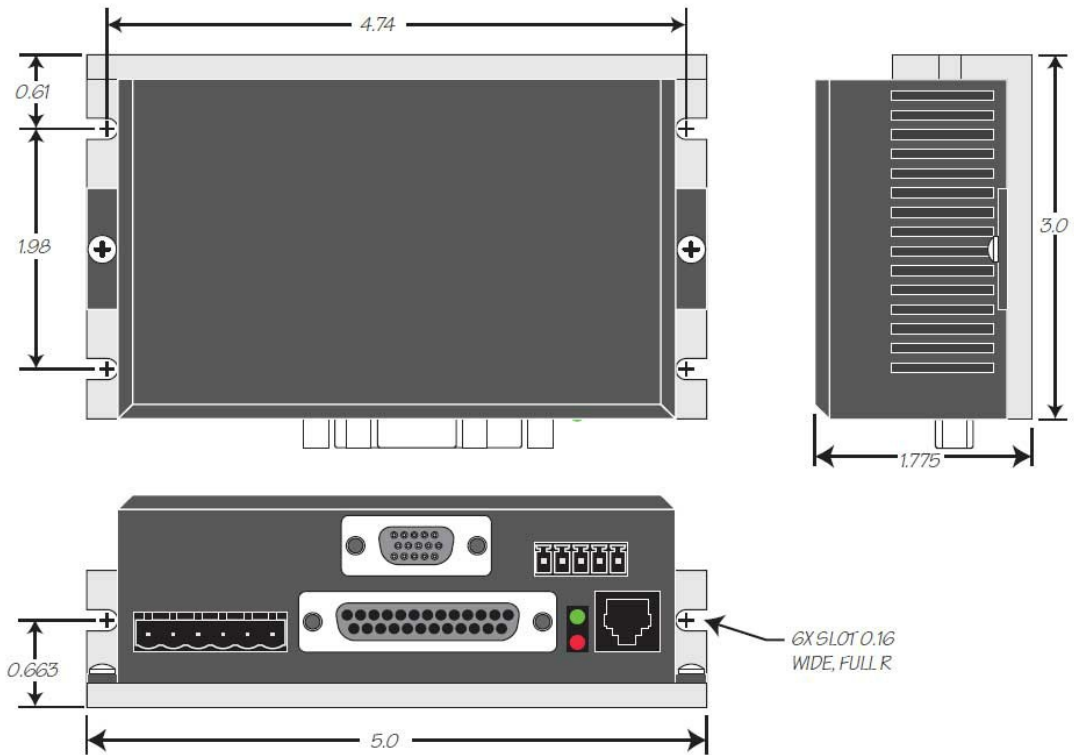
Downloads

| | |
|-----------------------------|--|
| Manuals: |  ST_IP_QuickSetup_920-0048C.pdf  Host Command Reference Rev I.pdf  ST5-10-QSi_Hardware Manual_920-0004F.pdf |
| Datasheet: | http://s3.amazonaws.com/applied-motion-pdf/ST5-IP-EE.pdf |
| Family Datasheet: |  ST_Datasheet_925-0007.pdf  EtherNet-IP-White-Paper_920-0050.pdf  EIP_EDS_FILES.zip |
| 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: |  APPN0024_AOIs-for-RSLogix5000.zip  APPN0023_MicroLogix-to-EtherNet-IP-drive.zip  APPN0022_CompactLogix-to-EtherNet-IP-drive.zip  APPN0021_5V-Keepalive-Circuit.pdf  APPN0016_Simple-25-pin-mating-connections.pdf |

Pricing

| ST5-IP-EE Part No. 5000-184 | |
|--------------------------------|--|
| 1pc. | \$655.00 |
| 25pc. | \$563.30 |
| 50pc. | \$491.25 |
| 100pc. | Contact us for 100+ piece pricing. |

Mechanical Outline



Products in the Series *EtherNet/IP Products*

| Model Number | Supply Voltage | Control Modes | Output Current | Communication Ports | Encoder Feedback | 1pc./50pc. |
|-------------------------------|----------------|---|------------------|-----------------------|------------------|---------------------|
| | 12-70 VDC | Step & Direction, Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP, Velocity Control | NA | Ethernet, EtherNet/IP | Yes | \$575.00 / \$431.25 |
| | 12-70 VDC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP | NA | Ethernet, EtherNet/IP | No | \$551.00 / \$413.25 |
| | 12-70 VDC | Step & Direction, Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP, Velocity Control | NA | Ethernet, EtherNet/IP | Yes | \$585.00 / \$438.75 |
| | 12-70 VDC | Step & Direction, Analog Torque / Velocity, Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP, Velocity Control | NA | Ethernet, EtherNet/IP | Yes | \$595.00 / \$446.25 |
| | 12-70 VDC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP | NA | Ethernet, EtherNet/IP | Yes | \$605.00 / \$453.75 |
| | 12-70 VDC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP | NA | Ethernet, EtherNet/IP | No | \$495.00 / \$371.25 |
| | 12-70 VDC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP | NA | Ethernet, EtherNet/IP | Yes | \$650.00 / \$487.50 |
| | 12-70 VDC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP | NA | Ethernet, EtherNet/IP | No | \$540.00 / \$405.00 |
| | 12-70 VDC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP | NA | Ethernet, EtherNet/IP | Yes | \$706.00 / \$529.50 |
| 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 |
| 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 |
| STAC5-IP-E120 | 94-135 VAC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP | 0.5-5.0 A/Phase | Ethernet, EtherNet/IP | Yes | \$710.00 / \$532.50 |
| STAC5-IP-E220 | 94-265 VAC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP | 0.5-2.55 A/Phase | Ethernet, EtherNet/IP | Yes | \$710.00 / \$532.50 |
| STAC5-IP-N120 | 94-135 VAC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP | 0.5-5.0 A/Phase | Ethernet, EtherNet/IP | No | \$659.00 / \$494.25 |
| STAC5-IP-N220 | 94-265 VAC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP | 0.5-2.55 A/Phase | Ethernet, EtherNet/IP | No | \$659.00 / \$494.25 |
| SV7-IP-EE | 24-80 VDC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP | NA | Ethernet, EtherNet/IP | NA | \$597.00 / \$447.75 |
| SVAC3-IP-E120 | 108-132 VAC | Streaming Commands, Q Programming, EtherNet/IP | NA | Ethernet, EtherNet/IP | NA | \$710.00 / \$532.50 |
| SVAC3-IP-E220 | 108-242 VAC | Streaming Commands, Q Programming, EtherNet/IP | NA | Ethernet, EtherNet/IP | NA | \$710.00 / \$532.50 |

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 |

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|---------------------------|-----------|--|-----------------|----------------|-----|---------------------|
| 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 |