

## STM23S-3RN

NEMA 23 Integrated Drive+Motor



### Product Features

- *Sophisticated current control*
- *Anti-resonance*
- *Torque ripple smoothing*
- *Microstep emulation*
- *Step & direction, CW/CCW pulse, and A/B quadrature control modes*
- *Oscillator (velocity) control mode*
- *Streaming serial commands*
- *SiNet™ Hub compatible*
- *RS-485 port for programming and communications*

### Description

The STM23S-3RN integrated stepper is a drive+motor unit, fusing a NEMA 23 step motor and a sophisticated 5.0 A/phase (peak-of-sine) stepper drive into a single device. Power to the drive, located at the rear of the motor, must be supplied by an external DC supply. See Related and Recommended Products below for compatible 24 and 48 volt DC [power supplies](#).

The STM23S-3RN integrated stepper can operate in the following control modes: step (pulse) & direction, velocity (oscillator), streaming serial commands (SCL), and operation with an Applied Motion 4-axis or 8-axis SiNet Hub. All STM23 units are setup and configured using Applied Motion's [ST Configurator™](#) software.












Each STM23 integrated stepper comes with 3 digital inputs, 1 digital output, and 1 analog input. The digital inputs accept signals of 5-24 VDC and can be used for connecting pulse & direction signals, end-of-travel limit switches, jog switches, quadrature encoder signals, PLC outputs, sensors, or many other signal types. The digital output can be connected to PLC inputs, counters, lights, relays, or other devices. The analog input accepts 0-5 VDC signals and can be used for velocity and position control.

The STM23S-3RN comes with an RS-485 port for programming and serial communications.

## Specifications

|                                     |   |
|-------------------------------------|---|
| <b>Part Number:</b>                 | STM23S-3RN  |
| <b>Supply Voltage:</b>              | 12-70 VDC   |
| <b>Supply Voltage Type:</b>         | DC  |
| <b>Control Modes:</b>               | Step & Direction<br>Velocity (Oscillator)<br>Streaming Commands |
| <b>Communication Ports:</b>         | RS-485  |
| <b>Encoder Feedback:</b>            | No  |
| <b>Step Resolution:</b>             | Full<br>Half<br>Microstepping<br>Microstep Emulation            |
| <b>Idle Current Reduction:</b>      | 0-90%   |
| <b>Setup Method:</b>                | Software setup  |
| <b>Digital Inputs:</b>              | 3   |
| <b>Digital Outputs:</b>             | 1   |
| <b>Analog Inputs:</b>               | 1 single-ended  |
| <b>Circuit Protection:</b>          | Short circuit<br>Over-voltage<br>Under-voltage<br>Over-temp     |
| <b>Status LEDs:</b>                 | 1 red, 1 green  |
| <b>Frame Size:</b>                  | NEMA 23   |
| <b>Holding Torque:</b>              | 210 oz-in   |
| <b>Step Angle:</b>                  | 1.8 deg   |
| <b>Rotor Inertia:</b>               | 6.51E-03 oz-in-sec <sup>2</sup>                                 |
| <b>Length:</b>                      | 4.50 inches   |
| <b>Weight:</b>                      | 42 oz   |
| <b>Operating Temperature Range:</b> | 0 to 85 °C  |
| <b>Ambient Temperature Range:</b>   | 0 to 40 °C  |
| <b>Ambient Humidity:</b>            | 90% max, non-condensing   |
| <b>Insulation Class:</b>            | Class B (130 °C)  |

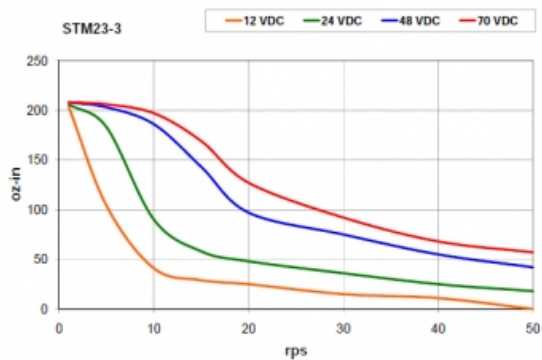
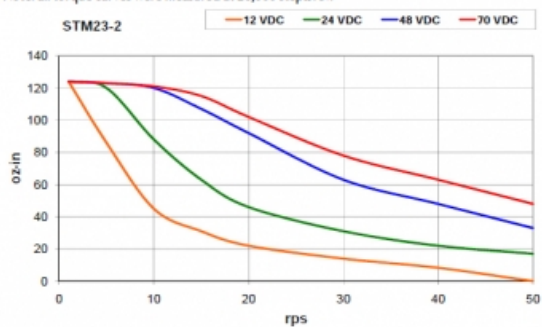
## Downloads

|                               |   |
|-------------------------------|---|
| <b>Speed-Torque Curves:</b>   |  <a href="#">STM23-speed-torque.pdf</a>  |
| <b>Manuals:</b>               |  <a href="#">STM23 Hardware Manual_920-0021F-opt-.pdf</a><br> <a href="#">STM23_24_S_Q_QuickSetup_920-0020E-opt.pdf</a><br> <a href="#">Host-Command-Reference_920-0002R.pdf</a> |
| <b>Product PDF - S3 Link:</b> | <a href="http://s3.amazonaws.com/applied-motion-pdf/STM23S-3RN.pdf">http://s3.amazonaws.com/applied-motion-pdf/STM23S-3RN.pdf</a>   |
| <b>Datasheet:</b>             |  <a href="#">STM-Datasheet-925-0009.pdf</a>  |
| <b>2D Drawing:</b>            |  <a href="#">STM23S-3XX_RevC.pdf</a><br> <a href="#">STM23X-3RX_3D.pdf</a>  |
| <b>3D Drawing:</b>            |  <a href="#">STM23S-3_5-14_.igs</a>  |
| <b>Agency Approvals:</b>      |  <a href="#">STM17_23_24_CE_DOC.pdf</a>  |
| <b>Application Notes:</b>     |  <a href="#">APPN0026B-LabVIEW-communication-using-streaming-commands.zip</a><br> <a href="#">APPN0018_EZ-Series-Touchpanel-HMI.zip</a>   |

## Torque Curves

### Torque-Speed Curves

Note: all torque curves were measured at 20,000 steps/rev.



# Software

|              |   |
|--------------|---|
| Software:    | <a href="#">SCL Utility</a><br><a href="#">ST Configurator™</a>   |
| Sample Code: |  <a href="#">scldemo.zip</a> |

## Products in the Series *STM23 Integrated Steppers*

| Part Number                 | Frame Size | Supply Voltage | Control Modes  | Holding Torque | Communication Ports   | Encoder Feedback | 1pc.     |
|-----------------------------|------------|----------------|--|----------------|-----------------------|------------------|----------|
| <a href="#">STM23C-3CE</a>  | NEMA 23    | 12-70 VDC      | CANopen  | 210            | RS-232, CANopen       | Yes              | \$642.00 |
| <a href="#">STM23C-3CN</a>  | NEMA 23    | 12-70 VDC      | CANopen  | 210            | RS-232, CANopen       | No               | \$552.00 |
| <a href="#">STM23IP-2EE</a> | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP, Modbus TCP          | 125            | Ethernet, EtherNet/IP | Yes              | \$630.00 |
| <a href="#">STM23IP-2EN</a> | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP, Modbus TCP          | 125            | Ethernet, EtherNet/IP | No               | \$540.00 |
| <a href="#">STM23IP-3EE</a> | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP, Modbus TCP          | 210            | Ethernet, EtherNet/IP | Yes              | \$642.00 |
| <a href="#">STM23IP-3EN</a> | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP, Modbus TCP          | 210            | Ethernet, EtherNet/IP | No               | \$552.00 |
| <a href="#">STM23Q-2AE</a>  | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus RTU | 125            | RS-232                | Yes              | \$528.00 |
| <a href="#">STM23Q-2AN</a>  | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus RTU | 125            | RS-232                | No               | \$438.00 |
| <a href="#">STM23Q-2EE</a>  | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus TCP                       | 125            | Ethernet              | Yes              | \$542.00 |
| <a href="#">STM23Q-2EN</a>  | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus TCP                       | 125            | Ethernet              | No               | \$452.00 |
| <a href="#">STM23Q-2RE</a>  | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus RTU                       | 125            | RS-485                | Yes              | \$536.00 |
| <a href="#">STM23Q-2RN</a>  | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus RTU                       | 125            | RS-485                | No               | \$446.00 |
| <a href="#">STM23Q-3AE</a>  | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus RTU | 210            | RS-232                | Yes              | \$547.00 |
| <a href="#">STM23Q-3AN</a>  | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, SiNet Hub Compatible, Modbus RTU | 210            | RS-232                | No               | \$457.00 |
| <a href="#">STM23Q-3EE</a>  | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus TCP                       | 210            | Ethernet              | Yes              | \$562.00 |
| <a href="#">STM23Q-3EN</a>  | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus TCP                       | 210            | Ethernet              | No               | \$472.00 |
| <a href="#">STM23Q-3RE</a>  | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus RTU                       | 210            | RS-485                | Yes              | \$556.00 |
| <a href="#">STM23Q-3RN</a>  | NEMA 23    | 12-70 VDC      | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus RTU                       | 210            | RS-485                | No               | \$466.00 |
| <a href="#">STM23R-2ND</a>  | NEMA 23    | 12-70 VDC      | Step & Direction   | 125            | NA                    | No               | \$179.00 |
| <a href="#">STM23R-2NE</a>  | NEMA 23    | 12-70 VDC      | Step & Direction   | 125            | NA                    | Yes              | \$268.00 |
| <a href="#">STM23R-2NN</a>  | NEMA 23    | 12-70 VDC      | Step & Direction   | 125            | NA                    | No               | \$179.00 |
| <a href="#">STM23R-3ND</a>  | NEMA 23    | 12-70 VDC      | Step & Direction   | 210            | NA                    | No               | \$190.00 |

|                             |         |           |   |     |                       |     |          |
|-----------------------------|---------|-----------|---|-----|-----------------------|-----|----------|
| <a href="#">STM23R-3NE</a>  | NEMA 23 | 12-70 VDC | Step & Direction  | 210 | NA                    | Yes | \$272.00 |
| <a href="#">STM23R-3NN</a>  | NEMA 23 | 12-70 VDC | Step & Direction  | 210 | NA                    | No  | \$190.00 |
| <a href="#">STM23S-2AE</a>  | NEMA 23 | 12-70 VDC | Step & Direction, Velocity (Oscillator), Streaming Commands, SiNet Hub Compatible                 | 125 | RS-232                | Yes | \$420.00 |
| <a href="#">STM23S-2AN</a>  | NEMA 23 | 12-70 VDC | Step & Direction, Velocity (Oscillator), Streaming Commands, SiNet Hub Compatible                 | 125 | RS-232                | No  | \$330.00 |
| <a href="#">STM23S-2EE</a>  | NEMA 23 | 12-70 VDC | Step & Direction, Velocity (Oscillator), Streaming Commands                                       | 125 | Ethernet              | Yes | \$434.00 |
| <a href="#">STM23S-2EN</a>  | NEMA 23 | 12-70 VDC | Step & Direction, Velocity (Oscillator), Streaming Commands                                       | 125 | Ethernet              | No  | \$344.00 |
| <a href="#">STM23S-2RE</a>  | NEMA 23 | 12-70 VDC | Step & Direction, Velocity (Oscillator), Streaming Commands                                       | 125 | RS-485                | Yes | \$428.00 |
| <a href="#">STM23S-2RN</a>  | NEMA 23 | 12-70 VDC | Step & Direction, Velocity (Oscillator), Streaming Commands                                       | 125 | RS-485                | No  | \$338.00 |
| <a href="#">STM23S-3AE</a>  | NEMA 23 | 12-70 VDC | Step & Direction, Velocity (Oscillator), Streaming Commands, SiNet Hub Compatible                 | 210 | RS-232                | Yes | \$439.00 |
| <a href="#">STM23S-3AN</a>  | NEMA 23 | 12-70 VDC | Step & Direction, Velocity (Oscillator), Streaming Commands, SiNet Hub Compatible                 | 210 | RS-232                | No  | \$349.00 |
| <a href="#">STM23S-3EE</a>  | NEMA 23 | 12-70 VDC | Step & Direction, Velocity (Oscillator), Streaming Commands                                       | 210 | Ethernet              | Yes | \$454.00 |
| <a href="#">STM23S-3EN</a>  | NEMA 23 | 12-70 VDC | Step & Direction, Velocity (Oscillator), Streaming Commands                                       | 210 | Ethernet              | No  | \$364.00 |
| <a href="#">STM23S-3RE</a>  | NEMA 23 | 12-70 VDC | Step & Direction, Velocity (Oscillator), Streaming Commands                                       | 210 | RS-485                | Yes | \$448.00 |
| <a href="#">STM23S-3RN</a>  | NEMA 23 | 12-70 VDC | Step & Direction, Velocity (Oscillator), Streaming Commands                                       | 210 | RS-485                | No  | \$358.00 |
| <a href="#">STM24IP-3EE</a> | NEMA 24 | 12-70 VDC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP, Modbus TCP | 340 | Ethernet, EtherNet/IP | Yes | \$751.00 |
| <a href="#">STM24IP-3EN</a> | NEMA 24 | 12-70 VDC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, EtherNet/IP, Modbus TCP | 340 | Ethernet, EtherNet/IP | No  | \$661.00 |
| <a href="#">STM24Q-3EE</a>  | NEMA 24 | 12-70 VDC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus TCP              | 340 | Ethernet              | Yes | \$691.00 |
| <a href="#">STM24Q-3EN</a>  | NEMA 24 | 12-70 VDC | Streaming Commands, Analog Positioning, Encoder Following, Q Programming, Modbus TCP              | 340 | Ethernet              | No  | \$601.00 |
| <a href="#">STM24S-3EE</a>  | NEMA 24 | 12-70 VDC | Step & Direction, Velocity (Oscillator), Streaming Commands                                       | 340 | Ethernet              | Yes | \$583.00 |
| <a href="#">STM24S-3EN</a>  | NEMA 24 | 12-70 VDC | Step & Direction, Velocity (Oscillator), Streaming Commands                                       | 340 | Ethernet              | No  | \$493.00 |