# STEPPER DRIVES
## INTEGRATED STEPPER DRIVES/MOTORS WITH ADVANCED FEATURES AND CONTROL OPTIONS

NEW

*STM Series*

CE RoHS

- **Current Output 0.5 to 5.0 A**
- **Configurator™ Configuration Software**
- **Configurable Idle Current Reduction**
- **External Control Options**
- **Pulse and Direction**
- **Analog Command Signal**
- **Host Command via RS232/485**
- **Fault Protection:**
  - **Over-Voltage, Under-Voltage**
  - **Over-Temp**
  - **External Output Shorts**
  - **Internal Amplifier Shorts**
  - **Open Motor Phases**
- **Multi-Axis System with SINet™ Hub**
- **Microstepping Up to 51200 Steps/Revolution**

The STM is a drive + motor + control unit, fusing step motor, drive, and controller technologies into a single device, offering savings on space, wiring and cost over conventional motor and drive solutions. The "S" models offer control options such as step and direction, analog input, joystick control, and host commands using the Si Command Language (SCL). The "Q" models add the capability of stand-alone programmable operation using the "Q" text-based programming language. This language offers high-level features such as multi-tasking, conditional programming, math functions, register access, and much more. Both of the STM models offer RS232 and RS485 versions, as well as the option of a 1000-line encoder that is integrated into the motor housing. The encoder option provides stall detection and prevention; the controller senses rotor lag and reduces speed to avoid stalling. In addition, all models offer two different motor sizes: a 2-stack version that provides 125 oz-in of holding torque, and a 3-stack version with 210 oz-in of torque.

**Configuration Software Included!**

STM23S-3RN shown smaller than actual size.

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## ADVANCED FEATURES

### Auto Set-Up:

At start-up the drive measures motor parameters, including the resistance and inductance, then uses this information to optimize the system performance.

### Self-Test:

At power-up the drive diagnoses mis-wires and detects any open or shorted motor phases.

### Torque Ripple Smoothing:

The drive smoothes the low-speed torque ripple which is inherent in all step motor systems.

### Command Signal Smoothing:

Command Signal Smoothing can soften the effect of immediate changes in velocity and direction, making the motion of the motor less jerky.

### Anti-Resonance/ Electronic Damping:

Step motor systems resonate at certain speeds. The STM drive + motor automatically calculates the system's natural frequency and applies damping to the control algorithm.

## SPECIFICATIONS

### POWER AMPLIFIER (ALL MODELS)

**Amplifier Type:** Dual H-Bridge, 4 Quadrant
**Current Control:** 4 state PWM at 20 Khz
**Output Torque:**
**STM23x-2 Series:** To 125 oz-in with suitable power supply
**STM23x-3 Series:** To 210 oz-in with suitable power supply
**Power Supply:** External 12 to 70 Vdc power supply required
**Input Voltage Range:** 12 to 70 Vdc
**Protection:** Over-voltage, under-voltage, over-temp, motor/wiring shorts (phase-to-phase, phase-to-ground)
**Idle Current Reduction:** Reduction range of 0 to 90% of running current after delay selectable in milliseconds
**Ambient Temperature:** 0 to 40°C (32 to 104°F) (mounted to suitable heatsink)
**Humidity:** 90% non-condensing

### CONTROLLER (ALL MODELS)

**Microstep Resolution:** Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev
**Anti-Resonance (Electronic Damping):** Raises the system damping ratio to eliminate midrange instability and allow stable operation throughout the speed range and improves settling time
**Torque Ripple Smoothing:** Allows for fine adjustment of phase current waveform harmonic content to reduce low-speed torque ripple in the range 0.25 to 1.5 rps
**Auto Set-Up:** Measures motor parameters and configures motor current control and anti-resonance gain settings
**Self Test:** Checks internal and external power supply voltages; diagnoses open motor phases and motor resistance changes >40%; detects encoder wiring and signal faults (differential encoder only)
**Microstep Emulation:** Performs high resolution stepping by synthesizing fine microsteps from coarse steps (step and direction mode only)

**Command Signal Smoothing:** Software configurable filtering reduces jerk and excitation of extraneous system resonances (step and direction mode only)

**CONTROLLER ("S" MODELS)**

**Non-Volatile Storage:** Configurations are saved in FLASH memory on-board the DSP

**Mode of Operation:** Step and direction, CW/CCW, A/B quadrature, oscillator, joystick, SCL, hub

**Step and Direction Inputs:**

**STEP ±:** Optically Isolated, 5 to 24V; minimum pulse width = 250 ns; maximum pulse frequency = 3 MHz; function: Step, CW Step, A quadrature, encoder following, CW limit, CW jog, start/stop (oscillator mode)

**DIR ±:** Optically isolated, 5 to 24V; minimum pulse width = 250 ns; maximum pulse frequency = 3 MHz; function: DIR, CCW step, B quadrature, encoder following, CCW limit, CCW jog, sensor, DIR (oscillator mode), adjustable bandwidth digital noise rejection filter on all inputs

**Enable Input:**

**EN±:** Optically isolated, 5 to 24V; minimum pulse width = 250 ns; maximum pulse frequency = 3 MHz; function: enable, reset, speed 1/ speed 2 (oscillator mode)

**Output:** Optically isolated, 24V, 40 mA max NPN/sinking; function: fault, motion, tach or general purpose programmable

**Analog Input Range:** 0 to 5 Vdc

**Analog Input Resolution:** 12 bits

**Communication Interface:** RS232 or RS485

**CONTROLLER ("Q" MODELS)**

**Non-Volatile Storage:** Programs, data and drive configuration are saved in FLASH and EEPROM memory

**Inputs:**

**STEP ±:** Optically isolated, 5 to 24V; minimum pulse width = 250 ns; maximum pulse frequency = 3 MHz; function: step, CW step, A quadrature, encoder following, CW limit, CW jog, start/stop (oscillator mode), general purpose input

**DIR ±:** Optically isolated, 5 to 24V; minimum pulse width = 250 ns; maximum pulse frequency = 3 MHz; function: DIR, CCW step, B quadrature, encoder following, CCW limit, CCW jog, sensor, DIR (oscillator mode), general purpose input

**EN ±:** Optically isolated, 5 to 24V; minimum pulse width = 250 ns; maximum pulse frequency = 3 MHz; function: enable, reset, speed 1/ speed 2 (oscillator mode), general purpose input

Adjustable bandwidth digital noise rejection filter on all inputs

**Output:** Optically isolated, 24V, 40 mA max NPN/sinking

**Function:** Fault, motion, tach or general purpose programmable

**Analog Input Range:** 0 to 5 Vdc

**Analog Input Resolution:** 12 bits

**Communication Interface:** RS232 or RS485

**PHYSICAL (ALL MODELS)**

**Mass:**

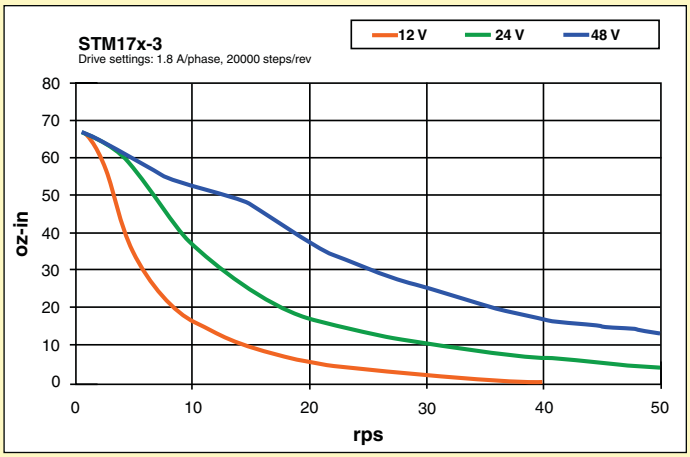
STM23X-2XX = 1 lb 14 oz
STM23X-3XX = 2 lb 10 oz

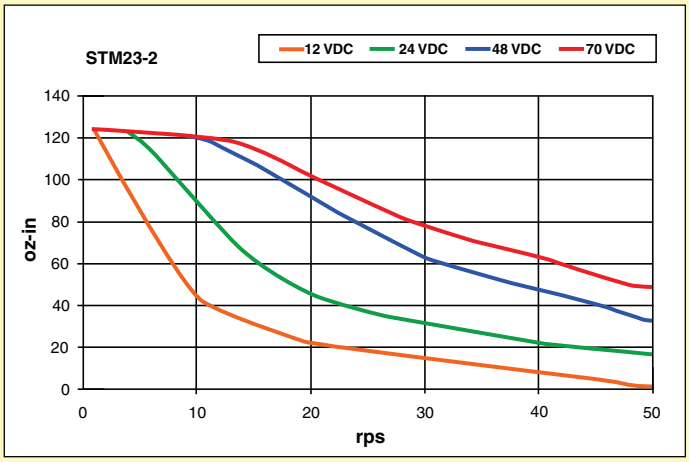
**Rotor Inertia:**

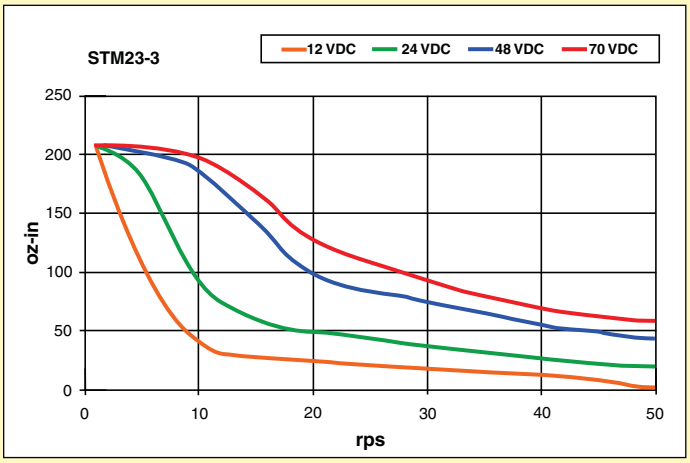
STM23X-2XX = 0.0037 oz-in$^2$
STM23X-2XX = 0.0065 oz-in$^2$

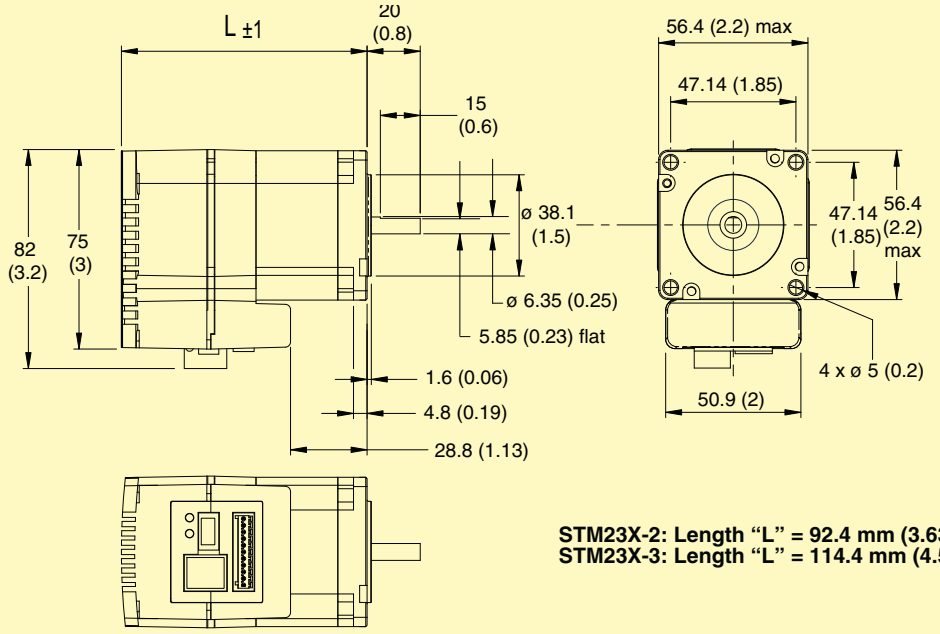
**Operating Temp Range:** -20 to 50°C (-4 to 122°F)

## TORQUE-SPEED CURVES



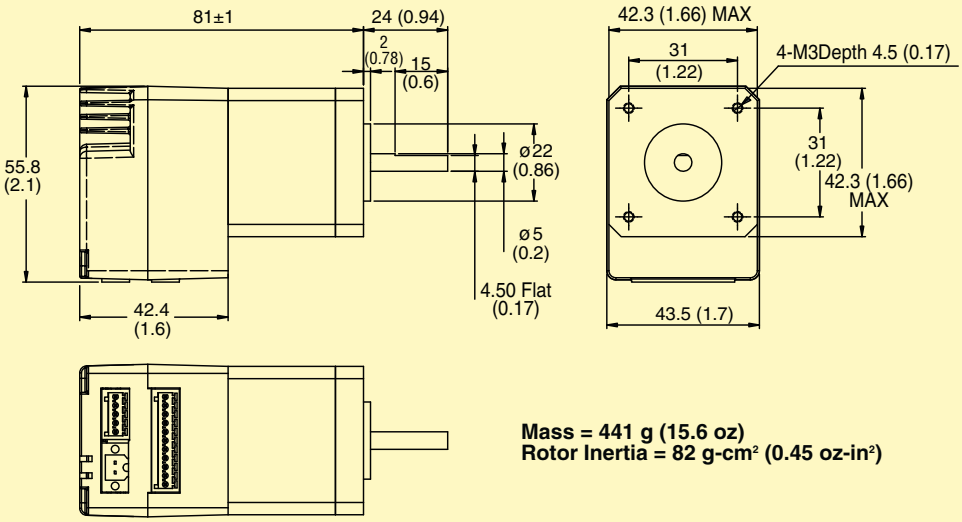






**STM23X-2: Length "L" = 92.4 mm (3.63")**
**STM23X-3: Length "L" = 114.4 mm (4.5")**

**STM17x-3**




**ø = diameter**

**Dimensions: mm (inch)**

**Mass = 441 g (15.6 oz)**
**Rotor Inertia = 82 g-cm² (0.45 oz-in²)**

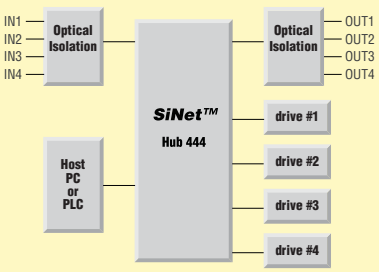
# ACCESSORIES

**Order HUB 444 Separately. See omega.com for details**

**HUB 444 shown smaller than actual size.**

## Multi-Axis Systems

Connect up to 4 drives on a mult-axis system using SiNet™ Hub 444. Use SiNet Hub Programmer™ software to develop your sequence of events, then download to the hub for a stand-alone system or send serial commands to the drives from a PC, PLC, HMI, or other host controller.




**HUB 444 for Multi-Axis Systems**

**HUB 444 DIN RAIL with DIN rail mounting kit shown smaller than actual size.**

OMRC-050 shown smaller than actual size.

## RC050 Regen Clamp— For Stepper Drive Power Supply Protection

- Voltage Range 24 to 80 Vdc
- 50 W Power Dissipation
- Regen Present LED
- Power LED
- 76 x 102 x 6.4 mm (3 x 4 x 2.5")

### SPECIFICATIONS

**Input Power Cont:** 50 W
**Input Power Peak:** 800 W
**Voltage Range:** 24 to 80 Vdc

Recommended when using NEMA 23 motors @ speeds >1- rps deceleration rate is > 100 rev/sec²

Order Power Supplies Separately. See omega.com

Order OMRC-050 Separately. See omega.com

OMPS150A24 shown smaller than actual size.

# SOFTWARE ST CONFIGURATOR™

- Simple Drive Set-Up
- Store and Download Configurations

Software Included Free with Purchase of STM Drives!

## To Order *Visit omegamation.com/stm_series for Pricing and Details*

| MODEL NO. | DESCRIPTION |
|---|---|
| **"S" MODELS** | |
| **STM17S-3AN** | Integrated stepper drive/motor, 85 oz-in max torque, RS232 |
| **STM17S-3RN** | Integrated stepper drive/motor, 85 oz-in max torque, RS485 |
| **STM17S-3AE** | Integrated stepper drive/motor, 85 oz-in max torque, RS232, endcoder |
| **STM17S-3RE** | Integrated stepper drive/motor, 85 oz-in max torque, RS485, endcoder |
| **STM23S-2AN** | Integrated stepper drive/motor, 125 oz-in max torque, RS232 |
| **STM23S-2RN** | Integrated stepper drive/motor, 125 oz-in max torque, RS485 |
| **STM23S-2AE** | Integrated stepper drive/motor, 125 oz-in max torque, RS232, encoder |
| **STM23S-2RE** | Integrated stepper drive/motor, 125 oz-in max torque, RS485, encoder |
| **STM23S-3AN** | Integrated stepper drive/motor, 210 oz-in max torque, RS232 |
| **STM23S-3RN** | Integrated stepper drive/motor, 210 oz-in max torque, RS485 |
| **STM23S-3AE** | Integrated stepper drive/motor, 210 oz-in max torque, RS232, encoder |
| **STM23S-3RE** | Integrated stepper drive/motor, 210 oz-in max torque, RS485, encoder |
| **"Q" MODELS** | |
| **STM23Q-2AN** | Integrated stepper drive/motor, 125 oz-in max torque, RS232 |
| **STM23Q-2RN** | Integrated stepper drive/motor, 125 oz-in max torque, RS485 |
| **STM23Q-2AE** | Integrated stepper drive/motor, 125 oz-in max torque, RS232, encoder |
| **STM23Q-2RE** | Integrated stepper drive/motor, 125 oz-in max torque, RS485, encoder |
| **STM23Q-3AN** | Integrated stepper drive/motor, 210 oz-in max torque, RS232 |
| **STM23Q-3RN** | Integrated stepper drive/motor, 210 oz-in max torque, RS485 |
| **STM23Q-3AE** | Integrated stepper drive/motor, 210 oz-in max torque, RS232, encoder |
| **STM23Q-3RE** | Integrated stepper drive/motor, 210 oz-in max torque, RS485, encoder |
| **ACCESSORIES** | |
| **OMPS150A24** | Power supply for STM drive, 24 Vdc, 6.3 A |
| **OMPS300A48** | Power supply for STM drive, 48 Vdc, 6.7 A |
| **HUB 444 DIN RAIL** | Multi-axis motion serial hub with DIN-rail mounting kit |
| **OMRC-050** | Motor regeneration clamp |

*Comes complete with software and download cable.* ***Note:*** *Power supply is required (sold separately).*
***Ordering Examples: STM23S-2AE,*** *integrated stepper drive/motor with 125 oz-in holding torque and RS232 interface plus 1000-line encoder and* ***OMPS150A24,*** *24 Vdc power supply.* ***STM23S-2RN,*** *integrated stepper drive/motor with 125 oz-in holding torque and RS485 interface and* ***OMPS150A24,*** *24 Vdc power supply.*