The STM is an integrated Drive+Motor, fusing step motor and drive technologies into a single device, offering savings on space, wiring and cost over conventional motor and drive solutions.

### Models

<table>
<thead>
<tr>
<th>Drive Options</th>
<th>Motor Options</th>
<th>Control Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Pulse &amp; direction, CW/CCW pulse</td>
<td>- Pulse &amp; direction, CW/CCW pulse, A/B quadrature</td>
<td>- Executes stored Q programs</td>
</tr>
<tr>
<td>- Pulse &amp; direction, CW/CCW pulse, A/B quadrature</td>
<td>- Velocity (oscillator) mode</td>
<td>- Networking with RS-485 or Ethernet options</td>
</tr>
<tr>
<td>- Velocity (oscillator) mode</td>
<td>- Streaming commands (SCL compatible)</td>
<td>- Conditional processing &amp; multi-tasking</td>
</tr>
<tr>
<td>- Streaming commands (SCL compatible)</td>
<td>- ST Configurator™ software for setup</td>
<td>- Math functions, register manipulation</td>
</tr>
<tr>
<td>- ST Configurator™ software for setup</td>
<td>- Encoder following</td>
<td>- Third-party HMI compatibility</td>
</tr>
</tbody>
</table>

### Drive Features
- Dynamic Current Control
- Anti-Resonance
- Torque Ripple Smoothing
- Microstep Emulation
- Stall Prevention/Detection

### Motor Features
- Integrated Steppers
- Integrated Motor Length (inch)
- Available Part Numbers:
  - STM23IP-3EN X X X X
  - STM23IP-2EN X X X X
  - STM23IP-3EE X X X X X
  - STM23IP-2EE X X X X X
  - STM23Q-3RN X X X X
  - STM23Q-2RN X X X X
  - STM17R-3NN X
  - STM23Q-3AN X X X X
  - STM23Q-2AN X X X X
  - STM17Q-3RN X X X X
  - STM23Q-2RE X X X X X
  - STM23Q-3EN X X X X
  - STM23Q-2EN X X X X
  - STM17C-3CN X X
  - STM23Q-3AE X X X X X
  - STM17R-3NE X X X
  - STM23Q-2AE X X X X X
  - STM17Q-3RE X X X X X
  - STM23S-3RN X X X
  - STM23S-2RN X X X X
  - STM23S-3AE X X X X
  - STM23S-2AE X X X X
  - STM23Q-2RE X X X X
  - STM17C-3CE  STM23Q-2RN
  - STM17C-3CN  STM23Q-2AE
  - STM17Q-3RE  STM23Q-2AN
  - STM17Q-3RN  STM23S-2RE  STM24C-3CE
  - STM17Q-3AN  STM23S-2AE  STM24QF-3RE
  - STM17S-3RE  STM23S-2AN  STM24QF-3RN
  - STM17S-3RN  STM23R-3NE  STM24QF-3AN
  - STM17S-3AE  STM23R-3ND  STM24SF-3RN
  - STM17R-3NE  STM23R-2NE  STM24SF-3AE
  - STM17R-3ND  STM23R-2ND  STM24SF-3AN
  - STM17R-3NN  STM23R-2NN  STM24SF-3AN

For more information visit: www.applied-motion.com/STM
STM17 Dimensions

STM17
Integrated Stepper

- NEMA 17 frame size
- Torque: up to 68 oz-in
- Input voltage: 12-48 VDC

STM17 Dimensions

STM17R

STM17S/Q/C

Dimensions in mm, not to scale

*rear shaft is only present on -ND and -NE versions
Q Programmer™ is used to create stored programs for Q, C and IP models. It is a robust and powerful programming environment with functionality for multi-tasking, math, conditional processing, register manipulation, encoder following, analog positioning and more.

Stored Q programs can run stand-alone in Q and IP models, allowing the drive+motor to power up and begin operation on its own. They can be called from the host in C models using Applied Motion-specific CANopen objects.

ST Configurator™ is used for setup and configuration of the STM drive+motor (all but R models). For more information about ST Configurator™ visit the Applied Motion Products website.

All software applications run on Windows 7 (32 & 64 bit), Vista, XP, 2000, NT, ME, 98.

### STM17 Torque Curves

**STM17-3**

Current Setting: 2A

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Torque (oz-in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td></td>
</tr>
<tr>
<td>24V</td>
<td></td>
</tr>
<tr>
<td>48V</td>
<td></td>
</tr>
</tbody>
</table>

### I/O Connections

- **C**
  - 3 digital inputs
  - 1 digital output
  - 1 analog input

- **S**
  - 3 digital inputs
  - 1 digital output
  - 1 analog input

- **R**
  - 3 digital inputs
  - 1 digital output
### STM17 Technical Specifications

**POWER AMPLIFIER:**
- **AMPLIFIER TYPE:** Dual H-bridge, 4 quadrant
- **CURRENT CONTROL:** 4 state PWM at 16 kHz
- **OUTPUT TORQUE:** Up to 68 oz-in with suitable power supply
- **POWER SUPPLY:**
  - External 12 - 48 VDC power supply required
  - Under-voltage alarm: 11 VDC
  - Over-voltage shutdown: 52 VDC
- **PROTECTION:** Over-voltage, under-voltage, overtemp, motor/wiring shorts (phase-to-phase, phase-to-ground)
- **IDLE CURRENT REDUCTION:**
  - STM17R: Switch selectable 50% or 90% of running current.
  - STM17Q/C: Reduction range of 0 - 90% of running current after delay selectable in milliseconds.

**CONTROLLER:**
- **MICROSTEP RESOLUTION:**
  - STM17R: Dip-switch selectable 200, 400, 800, 1000, 1800, 2000, 3200, 4000, 5000, 6400, 8000, 10000, 12800, 20000, 25000 or 25600 steps/rev.
  - STM17Q/C: Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev.
- **MICROSTEP EMULATION:** Performs high resolution stepping by synthesizing fine microsteps from coarse steps (step & direction mode only).
- **COMMAND SIGNAL SMOOTHING:** Software configurable filtering reduces jerk and excitation of extraneous system resonances (step & direction mode).
- **ANTI-RESONANCE (Electronic Damping):**
  - STM17S/Q/C: Raises the system damping ratio to eliminate midrange instability and allow stable operation throughout the speed range and improves settling time.
  - STM17R: Software configurable filtering reduces jerk and excitation of extraneous system resonances (step & direction mode).
- **SELF TEST:**
  - STM17R: Checks internal & external power supply voltages, diagnoses open motor phases.
  - STM17Q/C: Checks internal & external power supply voltages, diagnoses open motor phases.
  - STM17Q: Self test, performs postion maintenance, which maintains the position of the motor shaft when at rest. See figure 2.
- **NON-VOLATILE STORAGE:** Configurations are saved in flash memory on-board the DSP.
- **MODES OF OPERATION:**
  - STM17R: Step & direction or CW/CCW pulse (switch selectable)
  - STM17S: Step & direction, CW/CCW pulse, A/B quadrature pulse, velocity (oscillator, joystick), streaming commands (SCL)
  - STM17Q/C: All STM17S modes of operation plus stored Q program execution
  - STM17Q: CANopen slave mode plus stored Q program execution
- **DIGITAL INPUTS:**
  - Programmable bandwidth digital noise rejection filter on all inputs.
  - Function: STM17R: Step; CW pulse; All others: Step; CW pulse, A/B quadrature (encoder following), CW limit, CW jog, start/stop (oscillator mode), or general purpose input.
  - Function: STM17R: Direction; CCW pulse; All others: Direction, CCW pulse, B quadrature (encoder following), CCW limit, CCW jog, direction (oscillator mode), or general purpose input.
  - Function: STM17R: Enable; All others: Enable, alarm/fault reset, speed 1/speed 2 (oscillator mode).
- **DIGITAL OUTPUT:**
  - OUT+/−: Optically isolated, 30V/40mA max. Function: STM17R: Fault; All others: Fault, motion, tach, or general purpose programmable.
- **ANALOG INPUT:**
  - STM17Q/C: Analog referenced to GND. Range = 0 to 5 VDC. Resolution = 12 bits.
  - STM17S: No analog input.
- **COMMUNICATION INTERFACE:**
  - STM17A-3Ax: RS-232
  - STM17A-3Rx: CANopen and RS-232
  - STM17G-3Ax: Canopen and RS-232
  - STM17G-3Rx: No communication port
- **APPROVALS:**
  - **Agency Approvals:** RoHS, CE EN61800-3:2004
- **PHYSICAL:**
  - **OPERATING TEMPERATURE:** 0 to 100°C (32 to 212°F)
  - **AMBIENT TEMPERATURE:** 0 to 105°C (32 to 221°F) when mounted to a suitable heatsink
  - **HUMIDITY:** 95% max, non-condensing
  - **MASS:**
    - STM17R: 14.7 oz (416 g)
    - STM17Q/C: 15.6 oz (441 g)
  - **ROTOR INERTIA:**
    - STM17R: 1.16 x 10⁻³ oz-in-sec² (82 g-cm²)
    - STM17Q/C: 1.1 x 10⁻³ oz-in-sec² (75 g-cm²)
    - STM17S: 0.76 x 10⁻³ oz-in-sec² (49 g-cm²)
    - STM17Q: 0.97 x 10⁻³ oz-in-sec² (56 g-cm²)
STM23 Integrated Stepper

- NEMA 23 frame size
- Torque: up to 210 oz-in
- Input voltage: 12-70 VDC

STM23 Dimensions

Dimensions in mm, not to scale
*rear shaft is only present on -ND and -NE versions
STM23-2 Torque Curves

STM23-2

STM23-3

I/O Connections

3 digital inputs
1 digital output
1 analog input

3 digital inputs
1 digital output
1 analog input

3 digital inputs
1 digital output

3 digital inputs
1 digital output
<table>
<thead>
<tr>
<th><strong>POWER AMPLIFIER:</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AMPLIFIER TYPE</strong></td>
<td>Dual H-bridge, 4 quadrant</td>
</tr>
<tr>
<td><strong>CURRENT CONTROL</strong></td>
<td>4 state PWM at 20 kHz</td>
</tr>
<tr>
<td><strong>OUTPUT TORQUE</strong></td>
<td>STM23-2: Up to 125 oz-in with suitable power supply</td>
</tr>
<tr>
<td></td>
<td>STM23-3: Up to 210 oz-in with suitable power supply</td>
</tr>
<tr>
<td><strong>POWER SUPPLY</strong></td>
<td>External 12 - 70 VDC power supply required. Under-voltage alarm: 11 VDC. Over-voltage shutdown: 74 VDC</td>
</tr>
<tr>
<td><strong>PROTECTION</strong></td>
<td>Over-voltage, under-voltage, over-temp, motor/wiring shorts (phase-to-phase, phase-to-ground)</td>
</tr>
<tr>
<td><strong>IDLE CURRENT REDUCTION</strong></td>
<td>STM23S/Q/C/IP: Reduction range of 0 - 90% of running current after delay selectable in milliseconds. STM23R: Select switch selectable 50% or 90% of running current.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CONTROLLER:</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MICROSTEP RESOLUTION</strong></td>
<td>STM23S/Q/C/IP: Software selectable from 200 to 512000 steps/rev in increments of 2 steps/rev. STM23R: Dip-switch selectable 200, 400, 800, 1000, 1500, 2000, 3200, 4000, 5000, 6400, 8000, 10000, 12800, 20000, 25000 or 25600 steps/rev.</td>
</tr>
<tr>
<td><strong>MODES OF OPERATION</strong></td>
<td>STM23S: Step &amp; direction or CW/CCW pulse, A/B quadrature pulse, velocity (oscillator, joystick), streaming commands (SLC), SiN Hub compatible STM23Q: All STM23S modes of operation plus stored Q program execution STM23QC: CANopen slave node plus stored Q program execution STM23QIP: All STM23Q modes of operation plus EtherNet/IP industrial network communications</td>
</tr>
<tr>
<td><strong>SELF TEST</strong></td>
<td>Checks internal &amp; external power supply voltages, diagnoses open motor phases</td>
</tr>
<tr>
<td><strong>NON-VOLATILE STORAGE</strong></td>
<td>Configurations are saved in flash memory on-board the DSP</td>
</tr>
<tr>
<td><strong>DIGITAL OUTPUT</strong></td>
<td>STM23R: Step &amp; direction or CW/CCW pulse (switch selectable) STM23S: Step &amp; direction, CW/CCW pulse, A/B quadrature pulse, velocity (oscillator, joystick), streaming commands (SLC), SiN Hub compatible STM23Q: All STM23S modes of operation plus stored Q program execution STM23QC: CANopen slave node plus stored Q program execution STM23QIP: All STM23Q modes of operation plus EtherNet/IP industrial network communications</td>
</tr>
<tr>
<td><strong>ANALOG INPUT</strong></td>
<td></td>
</tr>
<tr>
<td><strong>DIGITAL INPUTS</strong></td>
<td>STM23R: Fault; All others: Fault, motion, tach or general purpose programmable.</td>
</tr>
<tr>
<td><strong>DIGITAL OUTPUT</strong></td>
<td>STM23Q/C/Q/IP: AVIN referenced to GND. Range: +5 to 0 VDC. Resolution = 12 bits. STM23R/Q/C/Q/IP: No analog input</td>
</tr>
<tr>
<td><strong>APPROVALS:</strong></td>
<td>UL508, CE EN61800-3:2004</td>
</tr>
<tr>
<td><strong>PHYSICAL:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>OPERATING TEMPERATURE</strong></td>
<td>0 to 85°C (32 to 185°F) Internal temperature of the electronics section and encoder 0 to 100°C (32 to 212°F) Temperature of motor body</td>
</tr>
<tr>
<td><strong>AMBIENT TEMPERATURE</strong></td>
<td>0 to 40°C (32 to 104°F) When mounted to a suitable heatsink</td>
</tr>
<tr>
<td><strong>HUMIDITY</strong></td>
<td>90% max, non-condensing</td>
</tr>
<tr>
<td><strong>MASS</strong></td>
<td>STM23-2: 30 oz (850 g), STM23-3: 42 oz (1191 g)</td>
</tr>
<tr>
<td><strong>ROTHER INERTIA</strong></td>
<td>STM23-2: 3.68 x 10^-3 oz-in-sec² (290 g-cm²), STM23-3: 6.52 x 10^-3 oz-in-sec² (480 g-cm²)</td>
</tr>
</tbody>
</table>
STM24
Integrated Stepper

- NEMA 24 frame size
- Torque: up to 340 oz-in
- Input voltage: 12-70 VDC

STM24 Dimensions

Dimensions in mm
Not to scale

I/O Connections

4 digital flex I/O
1 analog input

3 digital inputs
1 digital output

4 digital flex I/O
1 analog input
STM24 Torque Curves

STM24-3
Current Setting: 6A

- Orange: 12V
- Green: 24V
- Blue: 48V
- Red: 70V

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Torque (oz-in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>350</td>
</tr>
<tr>
<td>24V</td>
<td>300</td>
</tr>
<tr>
<td>48V</td>
<td>250</td>
</tr>
<tr>
<td>70V</td>
<td>200</td>
</tr>
</tbody>
</table>

Dimensions in mm
Not to scale

Current Setting: 6A
### STM24 Technical Specifications

#### POWER AMPLIFIER:

<table>
<thead>
<tr>
<th>AMPLIFIER TYPE</th>
<th>Dual H-bridge, 4 quadrant</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENT CONTROL</td>
<td>4 state PWM at 20 kHz</td>
</tr>
<tr>
<td>OUTPUT TORQUE</td>
<td>Up to 340 oz-in with suitable power supply</td>
</tr>
<tr>
<td>POWER SUPPLY</td>
<td>External 12 - 70 VDC power supply required</td>
</tr>
<tr>
<td>PROTECTION</td>
<td>Over-voltage, under-voltage, overtemp, motor/wiring shorts (phase-to-phase, phase-to-ground)</td>
</tr>
<tr>
<td>IDLE CURRENT REDUCTION</td>
<td>Reduction range of 0 - 90% of running current after delay selectable in milliseconds</td>
</tr>
</tbody>
</table>

#### CONTROLLER:

| MICROSTEP RESOLUTION | Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev |
| MICROSTEP EMULATION | Performs high resolution stepping by synthesizing fine microsteps from coarse steps (step & direction mode only) |
| COMMAND SIGNAL SMOOTHING | Software configurable filtering reduces jerk and excitation of extraneous system resonances (step & direction mode only) |
| 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 |
| AUTO SETUP | Measures motor parameters and configures motor current control and anti-resonance gain settings |
| SELF TEST | Checks internal & external power supply voltages, diagnoses open motor phases |
| NON-VOLATILE STORAGE | Configurations are saved in flash memory on-board the DSP |

#### MODES OF OPERATION

| STM24AIF: | Step & direction, CW/CCW pulse, A/B quadrature pulse, velocity (oscillator, joystick), streaming commands (SCU) |
| STM24AF/M: | All STM24B modes of operation plus stored Q program execution |
| STM24QF: | CANopen slave node plus stored Q program execution |

#### DIGITAL FLEX I/O


#### IDLE CURRENT REDUCTION

| STM24: | Reduction range of 0 - 90% of running current after delay selectable in milliseconds |
| STM23: | Switch selectable 50% or 90% of running current. |

#### PROTECTION

| STM24: | Over-voltage, under-voltage, over-temp, motor/wiring shorts (phase-to-phase, phase-to-ground) |
| STM23: | Over-voltage shutdown: 74 VDC |

#### POWER SUPPLY

| STM24: | External 12 - 70 VDC power supply required. Under-voltage alarm: 11 VDC. Over-voltage shutdown: 74 VDC |
| STM23: | External 12 - 70 VDC power supply required. Under-voltage alarm: 11 VDC. Over-voltage shutdown: 74 VDC |

#### OUTPUT TORQUE

| STM24: | Up to 340 oz-in with suitable power supply |
| STM23: | Up to 125 oz-in with suitable power supply |

#### CURRENT CONTROL

| STM24: | 4 state PWM at 20 kHz |
| STM23: | 4 state PWM at 20 kHz |

#### AMPLIFIER TYPE

| STM24: | Dual H-bridge, 4 quadrant |
| STM23: | Dual H-bridge, 4 quadrant |

#### Analog Input

| STM24: | AIN referenced to GND. Range = 0 to 5 VDC. Resolution = 12 bits. |
| STM23: | No analog input |

#### COMMUNICATION INTERFACE

| STM24AIF: | CANopen, RS-232, CANopen Hub compatible |
| STM24AF/M: | CANopen, RS-232, CANopen Hub compatible |
| STM24QF: | CANopen, RS-232, CANopen Hub compatible |
| STM24S: | CANopen, RS-232, CANopen Hub compatible |
| STM24Q: | CANopen, RS-232, CANopen Hub compatible |
| STM24C: | CANopen, RS-232, CANopen Hub compatible |

#### APPROVALS

| STM24: | RoHS |
| STM23: | RoHS |

#### PHYSICAL

| STM24: | Operating Temperature: 0 to 85°C (32 to 185°F) Duration of the electronics section and encoder |
| STM23: | Operating Temperature: 0 to 85°C (32 to 185°F) Duration of the electronics section and encoder |
| STM24: | Ambient Temperature: 0 to 40°C (32 to 104°F) Temperature of motor body |
| STM23: | Ambient Temperature: 0 to 40°C (32 to 104°F) Temperature of motor body |
| STM24: | Humidity: 90% max, non-condensing |
| STM23: | Humidity: 90% max, non-condensing |
| STM24: | Mass: 56 oz (1580 g) |
| STM23: | Mass: 56 oz (1580 g) |
| STM24: | Rotor Inertia: 1.27 x 10^-2 oz-in-sec^2 (500 g-cm^2) |
| STM23: | Rotor Inertia: 1.27 x 10^-2 oz-in-sec^2 (500 g-cm^2) |
Features

Anti-Resonance/Electronic Damping
Step motor systems have a natural tendency to resonate at certain speeds. The STM drive+motor automatically calculates the system’s natural frequency and applies damping to the control algorithm. This greatly improves midrange stability, allows for higher speeds, greater torque utilization and also improves settling times.

Delivers better motor performance and higher speeds

Microstep Emulation
With Microstep Emulation, low resolution systems can still provide smooth motion. The drive can take low-resolution step pulses and create fine resolution micro-step motion.

Delivers smoother motion in any application

Torque Ripple Smoothing
All step motors have an inherent low speed torque ripple that can affect the motion of the motor. By analyzing this torque ripple the system can apply a negative harmonic to negate this effect, which gives the motor much smoother motion at low speed.

Delivers smoother motion at lower speeds

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. An added advantage is that it can reduce the wear on mechanical components.

Delivers smoother system performance

Dynamic Current Control
Allows for three current settings to help the motor run cooler and reduce power consumption.
- Running Current - the current the drive will deliver for continuous motion.
- Accel/Decel Current - the current the drive will deliver when accelerating or decelerating.
- Idle Current - reduces current draw when motor is stationary.

System runs cooler

Self Test & Auto Setup
At start-up the drive measures motor parameters, including the resistance and inductance, then uses this information to optimize the system performance.
### Control Options

#### Oscillator / Run-Stop
- **Run/Stop (Toggle Switch)**
- **Speed/Speed2 (Toggle Switch)**
- **Speed/Position encoder**

#### Host Control
- **RS-232**
  - Accept serial commands from host PC or PLC
  - Accept serial commands from host PC or PLC
- **RS-485**
  - Multi-axis capable, up to 32 axes
- **Ethernet Connection**
  - Accepts streaming commands from host PC or PLC
  - 1000's of axes with Ethernet and EtherNet/IP

#### Stand-Alone Programmable
- **RS-232/485 or Ethernet**
  - Comprehensive text based language
  - Download, store & execute programs
  - High level features: multi-tasking, conditional programming and math functions
  - Host interface while executing stored programs

#### Multi-Axis Systems
- **RS-232**
  - Each drive connects to a port on the hub.
  - Use SiNet Hub Programmer™ software to develop your sequence of events, then download them to a SiNet Hub for a stand-alone system (STM23 only) or stream serial commands to the drives from a PC, PLC, HMI, or other host controller.
**CONTROLLER:**

**PHYSICAL:**

- **ROTOR INERTIA**: 1.16 x 10^{-3} oz-in-sec^2 (82 g-cm^2)
- **HUMIDITY**: 90% max, non-condensing
- **AMBIENT TEMPERATURE**: 0 to 40°C (32 to 104°F) When mounted to a suitable heatsink
- **OPERATING TEMPERATURE**: 0 to 85°C (32 to 185°F) Internal temperature of the electronics section and encoder

---

**STM17x-3Ax:**

- **COMMUNICATION INTERFACE**
- **ANALOG INPUT**
- **DIGITAL OUTPUT**

---

**STM17S/Q/C:**

- **OUT+/-**
- **DIGITAL INPUTS**
- **MODES OF OPERATION**
  - **NON-VOLATILE STORAGE**
    - Configurations are saved in flash memory on-board the DSP
  - **SELF TEST**
    - Checks internal & external power supply voltages, diagnoses open motor phases
  - **AUTO SETUP**
    - Measures motor parameters and configures motor current control and anti-resonance gain settings (Electronic Damping)
  - **ANTI-RESONANCE**
    - COMMAND SIGNAL SMOOTHING
      - Software configurable filtering reduces jerk and excitation of extraneous system resonances (step & direction mode)
  - **MICROSTEP EMULATION**
  - **MICROSTEP RESOLUTION**: Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev.

---

**STM17R:**

- **COMMUNICATION INTERFACE**
- **ANALOG INPUT**
- **DIGITAL OUTPUT**

---

**PROTECTION**

- Over-voltage, under-voltage, over-temp, motor/wiring shorts (phase-to-phase, phase-to-ground)

---

**OUTPUT TORQUE**

- Up to 68 oz-in with suitable power supply

---

**AMPLIFIER TYPE**

- Dual H-bridge, 4 quadrant

---

**STM17 Technical Specifications**

- **0 to 100°C (32 to 212°F)** Temperature of motor body
- **STM17R-3Nx**: No communication port
- **STM17C-3Cx**: All STM17S modes of operation plus stored Q program execution
- **STM17S**: Step & direction, CW/CCW pulse, A/B quadrature pulse, velocity (oscillator, joystick), streaming commands
- **STM17Q**: All STM17S modes of operation plus stored Q program execution
- **STM17C**: Step & direction or CW/CCW pulse (switch selectable)

---

**Encoder Option, STM-S/Q/C/IP**

The STM integrated steppers are offered with an optional 1000-line incremental encoder. On STM-S/Q/C/IP models this encoder is integrated into the housing of the motor, without increasing the overall size of the unit. The addition of this encoder provides the following enhanced functionality:

- **Stall Detection**
  - Notifies the system as soon as the required torque is too great for the motor, resulting in a loss of synchronization between the rotor and stator, also known as stalling. As soon as the motor stalls the drive triggers its fault output. See diagram 1.

- **Stall Prevention**
  - Automatically adjusts the excitation of the motor windings to maintain synchronization of the rotor and stator under all conditions. This means that motor position is maintained and corrected even when the required torque is too great for the motor. The stall prevention feature also performs position maintenance, which maintains the position of the motor shaft when at rest. See figure 2.

---

**Encoder Option, STM-R**

STM-R models can be ordered with an optional 1000-line incremental encoder mounted to the rear shaft of the unit. This encoder can be connected to the external controller for position verification and enhanced performance, depending on the features of the controller.
**Q Programmer™**

Q Programmer™ is used to create stored programs for Q, C and IP models. Q Programmer™ is a robust and powerful programming environment with functionality for multi-tasking, math, conditional processing, register manipulation, encoder following, analog positioning and more.

Stored Q programs can run stand-alone in Q and IP models, allowing the drive+motor to power up and begin operation on its own. Stored Q programs can be called from the host in C models using Applied Motion-specific CANopen objects.

**ST Configurator™**

ST Configurator™ is used for setup and configuration of the STM drive+motor (all but R models). For more information about ST Configurator™ visit the Applied Motion Products website.

All software applications run on Windows 7 (32 & 64 bit), Vista, XP, 2000, NT, ME, 98.
Power Supplies
Applied Motion offers three matched power supplies for use with the STM drives.
- PS150A24 ... 24 VDC, 150 Watt for use with all STM drives.
- PS320A48 ... 48 VDC, 320 Watt for use with all STM drives.
- PS50A24 ... 24 VDC, 50 Watt for use with STM17 drives.
These power supplies have current overload capability making them ideal for use with stepper drives.

USB to RS-232/485 Adapter
For users without a serial port and/or wishing to take advantage of the benefits of an RS-485 network, Applied Motion offers an adapter (part number 8500-003) that will plug into a USB port and communicate to RS-232 and RS-485 networks.

RC-050 Regeneration Clamp
The RC-050 regeneration clamp is for use where regeneration from the motor may be excessive for the power supply. In these cases the RC-050 is connected between the drive and power supply and absorbs regenerated energy.

3004-189 Serial Programming Cable
The 3004-189 serial programming cable is included with all STM23 and STM24 products (all but R models) with the “A” communication option, and is used for setup and programming. This cable can also be used in streaming serial command (SCL) applications as a permanent connection between the drive and the host device’s RS-232 port.

3004-259 Serial Programming Cable
The 3004-259 serial programming cable is included with all STM17 products (all but R models) with the “A” communication option, and is used for setup and programming. This cable can also be used in streaming serial command (SCL) applications as a permanent connection between the drive and the host device’s RS-232 port.
### STM Drive Model Numbers

<table>
<thead>
<tr>
<th>Part Numbers</th>
<th>Pulse &amp; Direction</th>
<th>Streaming Commands</th>
<th>Q Programming</th>
<th>EtherNet/IP</th>
<th>Rear Shaft</th>
<th>Encoder</th>
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### Available Part Numbers:

- **rs-232**: 24
- **rs-422/485**: C = CANopen
- **QP** = Q Programmer w/ Flex I/O
- **Q** = Q Programmer
- **E** = Ethernet
- **EtherNet/IP**
- **Enc** = Encoder
- **N** = No encoder/No rear shaft
- **R** = Rear shaft w/o encoder
- **E** = 1000 line encoder
- **N** = None
- **C** = CANopen (requires C control option)
- **A** = RS-232
- **IP** = Integrated Steppers

### Feedback/Rear Shaft

- D = Drive shaft encoder
- N = No encoder

### Feedback/Encoder Options

- **N** = None
- **C** = CANopen (requires C control option)
- **A** = RS-232

### Communications

- **A** = EtherNet/IP industrial networking
- **B** = CANopen protocols DS301 and DSP402
- **C** = Third-party HMI compatibility
- **D** = Encoder following
- **E** = Math functions, register manipulation
- **F** = Conditional processing & multi-tasking
- **G** = Networking with RS-485 or Ethernet
- **H** = Executes stored Q programs
- **I** = ST Configurator™
- **J** = Streaming commands (SCL compatible)
- **K** = Velocity (oscillator) mode
- **L** = Pulse & direction, CW/CCW pulse, A/B

### Other Features

- Stall Prevention/Detection
- Microstep Emulation
- Torque Ripple Smoothing
- Anti-Resonance
- Dynamic Current Control
- Step/Direction
- Profile Position, Profile Velocity, and Homing
- CANopen protocols DS301 and DSP402
- Third-party HMI compatibility
- Encoder following
- Mathematical functions, register manipulation
- Conditional processing & multi-tasking
- Networking with RS-485 or Ethernet
- Executes stored Q programs
- ST Configurator™
- Streaming commands (SCL compatible)
- Pulse & direction, CW/CCW pulse

For more information visit: www.applied-motion.com/STM

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