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**

- **Pulse & direction, CW/CCW pulse**
- **Pulse & direction, CW/CCW pulse, A/B quadrature**
- **Velocity (oscillator) mode**
- **Streaming commands (SCL compatible)**
- **ST Configurator™ software for setup**
- **Executes stored Q programs**
- **Networking with RS-485 or Ethernet options**
- **Conditional processing & multi-tasking**
- **Math functions, register manipulation**
- **Encoder following**
- **Third-party HMI compatibility**
- **CANopen protocols DS301 and DSP402**
- **Profile Position, Profile Velocity, and Homing modes**
- **Up to 127 axes per channel**
- **Executed stored Q programs**
- **EtherNet/IP industrial networking**
- **Same control modes as Q model**

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

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

STM17 Dimensions

<table>
<thead>
<tr>
<th>STM17R</th>
<th>STM17S/Q/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>42.3 MAX</td>
<td>6.5 MAX 4.5</td>
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<tr>
<td>43.5</td>
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<td>19.05</td>
<td>22</td>
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<tr>
<td>4.50Flats</td>
<td>4.50Flats</td>
</tr>
</tbody>
</table>

*rear shaft is only present on –ND and –NE versions

Accessories

3004-189 Serial Programming Cable
- Included with all STM23 and STM24 products (all but R models) with the “A” communication option
- Used for setup and programming
- 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
- Included with all STM17 products (all but R models) with the “A” communication option
- Used for setup and programming
- 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
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™ 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

12V 24V 48V

0 10 20 30 40 50 60 70 80

0 10 20 30 40 50

oz-in

rps

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
1 analog input

3 digital inputs
1 digital output

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### 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/wire shorts (phase-to-phase, phase-to-ground)
  - Idle current reduction
  - Software selectable 50% or 99% of running current.

**Controller:**
- **MICROSTEP RESOLUTION**
  - STM17Q/C: Software selectable from 200 to 51,200 steps/rev in increments of 2 steps/rev.
  - STM17R: Dip-switch selectable 200, 400, 800, 1000, 1800, 2000, 3200, 4000, 5000, 6400, 8000, 10000, 12800, 20000, 25000 or 25600 steps/rev.
- **MICROSTEP EMULATION**
- **COMMAND SIGNAL SMOOTHING**
  - Performs high resolution stepping by synthesizing fine microsteps from coarse steps (step & direction mode only).
- **ANTI-RESONANCE**
  - Software configurable filtering reduces jerk and excitation of extraneous system resonances (step & direction mode).
- **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**
  - STM17R: Step & direction or CW/CCW pulse (switch selectable)
  - STM17S/Q/C: Step & direction, CW/CCW pulse, A/B quadrature pulse, velocity (oscillator, joystick), streaming commands (SCL).
- **AUTO SETUP**
  - STM17R: Configurations are saved in flash memory on-board the DSP.
  - STM17S/Q/C: Automatic Damping (Electronic Damping)
  - STM17Q: Anti-resonance (Software configurable filtering reduces jerk and excitation of extraneous system resonances (step & direction mode).

**Digital Inputs:**
- **STEP+/− (IN3+/−):** Optically isolated, 5-24 volt. Minimum pulse width = 250 ns. Maximum pulse frequency = 3 MHz.
- **DIR+/− (IN2+/−):** Optically isolated, 5-24 volt. Minimum pulse width = 250 ns. Maximum pulse frequency = 3 MHz.
- **ENC+/− (IN1+/−):** Optically isolated, 5-24 volt. Minimum pulse width = 250 ns. Maximum pulse frequency = 3 MHz.

**Digital Outputs:**
- **OUT+/−:**
  - STM17Q/C: Optically isolated, 30V/30mA max. Function: STM17R: Fault. All others: Enable, alarm/fault reset, speed 1/speed 2 (oscillator mode).

**Analog Inputs:**
- **AIN:**
  - STM17Q/C: AIN referenced to GND. Range = 0 to 5 VDC. Resolution = 12 bits.
- **STM17R:**
  - No analog input.

**Communication Interface:**
- **STM17x-3Ax:**
  - STM17Q/C: CANopen slave node plus stored Q program execution
  - STM17S/Q/C: CANopen slave mode plus stored Q program execution
- **STM17R:**
  - Option programmable.

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

**Approvers:**
- **AGENCY APPROVALS**
  - RoHS, CE EN61800-3:2004

**Physical:**
- **OPERATING TEMPERATURE**
  - 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
- **AMBIENT TEMPERATURE**
  - 0 to 40°C (32 to 104°F) when mounted to a suitable heatsink
- **HUMIDITY**
  - 90% max. non-condensing
- **MASS**
  - STM17R: 14.7 oz (416 g) STM17S/Q/C: 15.6 oz (441 g)
- **ROTOR INERTIA**
  - 1.16 x 10⁻³ oz-in-sec² (82 g·cm²)
STM23
Integrated Stepper

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

STM23 Dimensions

STM23R

STM23S/Q/C/IP
**STM23-2 Torque Curves**

![Torque Curves Diagram]

**I/O Connections**

- **STM23-2AN**
  - 3 digital inputs
  - 1 digital output
  - 1 analog input

- **STM23-2CN**
  - 3 digital inputs
  - 1 digital output
  - 1 analog input

- **STM23-3**
  - 3 digital inputs
  - 1 digital output
  - 1 analog input

---

**Dynamic Current Control**

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

**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.

**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.

**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.

**Anti-Resonance/Electronic Damping**

Delivers better motor performance and higher speeds.

**Self Test & Auto Setup**

System runs cooler

- Running Current - the current the drive will deliver for continuous motion.
- Accel Current - the current the drive will deliver when accelerating or decelerating.
- Idle Current - reduces current draw when motor is stationary.

---

**I/O Connections**

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

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

- **R**
  - 3 digital inputs
  - 1 digital output

---

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sales@electromate.com
STM24x-3Ax:
COMMUNICATION INTERFACE
ANALOG INPUT AIN referenced to GND. Range = 0 to 5 VDC. Resolution = 12 bits. (Not present on STM24C).

C models
DIGITAL I/O

Rotor INERTIA 1.27 x 10^{-2} oz-in-sec^2 (900 g-cm^2)
Mass 56 oz (1580 g)

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

AGENCY APPROVALS RoHS

SF and QF models
DIGITAL FLEX I/O

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
Measures motor parameters and configures motor current control and anti-resonance gain settings

Auto Setup

Self test
Checks internal & external power supply voltages, diagnoses open motor phases

ModeS of operation

Stm24sR:
Modes of operation plus stored Q program execution

Auto Setup

Measures motor parameters and configures motor current control and anti-resonance gain settings

Power Supply
External 12 - 70 VDC power supply required. Under-voltage alarm: 11 VDC. Over-voltage shutdown: 74 VDC

Current Control
4 state PWM at 20 kHz

Over-voltage shutdown: 74 VDC
Under-voltage alarm: 11 VDC

Power Supply
External 12 - 70 VDC power supply required.

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

Idle Current Reduction
STM24S/Q/C/IP: Reduction range of 0 - 90% of running current after delay selectable in milliseconds.
STM24R: Switch selectable 50% or 90% of running current.

Controller:
MICROSTEP RESOLUTION
STM24R: Switch selectable 200, 400, 800, 1000, 1500, 2000, 3000, 4000, 5000, 6400, 8000, 10000, 12800, 20000, 25000 or 25600 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
Raises the system damping ratio to eliminate midrange instability and allows 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

Software Selectable

MICROSTEP RESOLUTION
STM24R: Switch selectable 200, 400, 800, 1000, 1500, 2000, 3000, 4000, 5000, 6400, 8000, 10000, 12800, 20000, 25000 or 25600 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
(Rotational damping) Raises the system damping ratio to eliminate midrange instability and allows 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

Software Selectable

DIGITAL INPUTS
Adjustable bandwidth digital/trigger/rejection filter on all inputs

STEP+/STEP-: (IN1+/-): Optically isolated, 5-24 volt. Minimum pulse width = 250 ns. Maximum pulse frequency = 3 MHz.
Function: STM24S: Step, CW pulse, All others: Step, CW pulse, A quadrature (encoder following), CW limit, CW jog, start/stop (oscillator mode), or general purpose input.

DIR+/DIR-: (IN2+/-): Optically isolated, 5-24 volt. Minimum pulse width = 250 ns. Maximum pulse frequency = 3 MHz.
Function: STM24S: Direction, CW pulse, All others: Direction, CW pulse, B quadrature (encoder following), CW limit, CW jog, direction (oscillator mode), or general purpose input.

EN+/EN-: (IN3+/-): Optically isolated, 5-24 volt. Minimum pulse width = 250 ns. Maximum pulse frequency = 3 MHz.
Function: STM24S: Enable; All others: Enable, alarm/fault reset, speed 1/speed 2 (oscillator mode)

DIGITAL OUTPUTS
OUT+/OUT-: Optically isolated, 30V/40 mA max.
Function: STM24S: Fault; All others: Fault, motion, tach or general purpose programmable

ANALOG INPUTS
STM24S/Q/C/IP: AN referenced to GND. Range: 0 to 5 VDC. Resolution: 12 bits.
STM24R: No analog input

Analog Input
STM24S/Q/C/IP: AN referenced to GND. Range: 0 to 5 VDC. Resolution: 12 bits.
STM24R: No analog input

Communication Interface
STM23x-xEx: RS-232, STM24x-xEx: Ethernet, STM23x-xRx: RS-485, STM243C-3Ex: CANopen, RS-232, STM2343x-xEx: Ethernet, EtherNet/IP, STM234r-xEx: No communication port

ApprovalS:
Agency Approvals
RoHS, CE EN61800-3:2004

Physical:
Operating temperature 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

Ambient Temperature
0 to 40°C (32 to 104°F) When mounted to a suitable heatsink

Humidity
90% max, non-condensing

Mass
STM23-2: 30 oz (850 g), STM23-3: 42 oz (1191 g)

Motor Inertia
STM23-2: 3.68 x 10^{-3} oz-in-sec^2 (260 g-cm^2), STM23-3: 6.52 x 10^{-3} oz-in-sec^2 (480 g-cm^2)
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

- 4 digital flex I/O
- 1 analog input

- 3 digital inputs
- 1 digital output
STM24 Torque Curves

STM24-3
Current Setting: 6A

- 12V
- 24V
- 48V
- 70V

Torque (oz-in) vs. rps

Dimensions in mm

- Ø 38.1
- 60
- 47.14
- Ø 8
- 7.5 Flat
- 4-Ø 4.5
- 125.5±1
- 84
- 77
- 20.6 60
- 47.14 15
- 1.5 51
- 7 55
- 89

I/O Connections

- 4 digital flex I/O
- 1 analog input
- 3 digital inputs
- 1 digital output

Integrated Stepper

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

STM24-2AN

I/O1+
I/O1−
I/O2+
I/O2−
I/O3+
I/O3−
I/O4+
I/O4−
+5V
AIN
GND

STM24-2CN

- 8 F
- 7 E
- 6 D
- 5 C
- 4 B
- 3 A
- 2 91

IN1+
IN1−
IN2+
IN2−
IN3+
IN3−
OUT+
OUT−

STM24 Dimensions

- Ø 38.1
- 60
- 47.14
- Ø 8
- 7.5 Flat
- 4-Ø 4.5
- 125.5±1
- 84
- 77
- 20.6 60
- 47.14 15
- 1.5 51
- 7 55
- 89

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sales@electromate.com

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**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 uA with suitable power supply</td>
</tr>
</tbody>
</table>

**POWER SUPPLY**

- External 12 - 70 VDC power supply required
- Under-voltage alarm: 11 VDC

**PROTECTION**

- Over-voltage, under-voltage, overtemp, motor/wiring shorts (phase-to-phase, phase-to-ground)
- Over-voltage shutdown: 94 VDC

**IDLE CURRENT REDUCTION**

Reduction range of 0 - 90% of running current after delay selectable in milliseconds

**CONTROLLER:**

<table>
<thead>
<tr>
<th>MICROSTEP RESOLUTION</th>
<th>Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMAND SIGNAL SMOOTHING</td>
<td>Software configurable filtering reduces jerk and excitation of extraneous system resonances (step &amp; direction mode only)</td>
</tr>
<tr>
<td>ANTI-RESONANCE (Electronic Damping)</td>
<td>Raises the system damping ratio to eliminate midrange instability and allow stable operation throughout the speed range and improves settling time</td>
</tr>
<tr>
<td>AUTO SETUP</td>
<td>Measures motor parameters and configures motor current control and anti-resonance gain settings</td>
</tr>
<tr>
<td>SELF TEST</td>
<td>Checks internal &amp; external power supply voltages, diagnoses open motor phases</td>
</tr>
</tbody>
</table>

**NON-VOLATILE STORAGE**

Configurations are saved in flash memory on-board the DSP

**MODES OF OPERATION**

- STM24SF: Step & direction, CW/CCW pulse, velocity (oscillator, joystick), streaming commands (SCL)
- STM24QF: All STM24S modes of operation plus stored Q program execution
- STM24SF: Configuration is saved in flash memory on-board the DSP

**DIGITAL FLEX I/O**

- STM24S-3Ax:
  - IN1 - IN3: Optically isolated, 30V/80 mA max. Function: see STM24 hardware manual.
  - IN2+/-, IN3+/-: Optically isolated, 5-24 VDC, 8-12 mA. Minimum pulse width = 250 ns. Maximum pulse frequency = 3 MHz. Functions: see STM24 hardware manual.
- STM24QF: All STM24S modes of operation plus stored Q program execution
- STM24C: All STM24S modes of operation plus stored Q program execution

**DIGITAL I/O**

- IN1 - IN3: Optically isolated, 30V/80 mA max. Function: see STM24 hardware manual.
- OUT: Optically isolated output, open emitter/collector, 30V/80 mA max. Function: see STM24 hardware manual.

**ANALOG INPUT**

- STM23S/Q/IP:
  - AIN referenced to GND. Range = 0 to 5 VDC. Resolution = 12 bits. Function: see STM24 hardware manual.
- STM23R/C:
  - AIN referenced to GND. Range = 0 to 5 VDC. Resolution = 12 bits. Function: see STM24 hardware manual.
- STM23R/Q/C/IP:
  - AIN referenced to GND. Range = 0 to 5 VDC. Resolution = 12 bits. Function: see STM24 hardware manual.

**COMMUNICATION INTERFACE**

- STM24S-3Ax:
  - RS-232
- STM24QF:
  - RS-485
- STM24SF:
  - CANopen slave node plus stored Q program execution

**APPROVALS:**

- RoHS
- CE EN61800-3:2004

**PHYSICAL:**

- Operating Temperature: 0 to 85°C (32 to 185°F) Internal temperature of the electronics section and encoder
- Ambient Temperature: 0 to 40°C (32 to 104°F) Temperature of motor body
- Humidity: 90% max, non-condensing
- Mass: 56 oz (850 g)
- Rotor Inertia: 1.27 x 10^-7 oz-in-sec^2 (900 g-cm^2)
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 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.
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.

![Diagram showing the position of the encoder inside the STM17](image)

**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.

![Figure 1: Diagram showing the Stall Detection process](image)

![Figure 2: Diagram showing the Stall Prevention process](image)
**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™**

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>CANopen</th>
<th>Ethernet</th>
<th>RS-422/485</th>
<th>Rear Shaft</th>
<th>Encoder</th>
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<tbody>
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### STM Drive Features

- **Integrated Steppers**: Models STM23 and STM24 feature built-in stepper motors, eliminating the need for separate stepper drivers.
- **EtherNet/IP**: Provides high-speed, reliable communication over Ethernet networks.
- **CANopen**: Offers a standard protocol for industrial automation, supporting diagnostics and configuration.
- **Third-party HMI compatibility**: Integrates seamlessly with a variety of third-party human machine interfaces (HMIs).
- **Encoder following**: Ensures precise positioning control.
- **Networking with RS-485 or Ethernet**: Supports various networking options for extended applications.
- **Math functions, register manipulation**: Includes advanced mathematical functions for complex control algorithms.
- **Conditional processing & multi-tasking**: Enables the execution of complex control tasks simultaneously.

For more information, visit [www.applied-motion.com/STM](http://www.applied-motion.com/STM).