Specifications

High performance AC Input stepper drives with advanced features & control options.

- Advanced Current Control
- Anti-Resonance
- Torque Ripple Smoothing
- Microstep Emulation

Other Products

Stepper Drives & Motors
Stepper drives are offered in both open frame (DC input) and packaged versions (AC input), in full/half step and microstepping versions.

- Stepper Motors: http://www.applied-motion.com/products/stepper-motors

Servo Drives & Motors
Servo motors and drives from 50W to 1000W offered in AC and DC powered versions with options for host communication or Stand-alone control.

- Servo Motors: http://www.applied-motion.com/products/servo-motors

Gearheads
Applied Motion offers a full range of planetary gearheads to complement the offering of servo motors and step motors.

- Gearheads: http://www.applied-motion.com/products/gearheads/

Models

- Pulse & Direction
- CW/CCW Pulse
- A/B Quadrature
- Analog Velocity (Oscillator) mode
- Host commands (SCL compatible)
- SiNet Hub compatible
- ST Configurator software for setup

- Stand-alone Operation
- Q Programmer™ for programming
- Conditional Processing
- Math Functions
- Multi-tasking
- Register Manipulation
- Encoder Following
- Third HMI compatibility

- Si Programmer™ with built-in Configurator
- Point-and-click indexing software
- Friendly GUI
- I/O and motion programming
- MMI-01 compatibility

- CANopen protocols DS301 and DSP402
- Profile Position, Profile Velocity, and Homing modes
- Up to 327 axial per channel
- Execute stored Q programs

Specifications

POWER SUPPLY:
- STAC6: 94-135 VAC
- STAC6-220: 94-265 VAC

OUTPUT CURRENT:
- STAC6: 0.5 - 6.0A Peak
- STAC6-220: 0.5 - 3.2A Peak

PROTECTION:
- Over-Voltage
- Under voltage
- Over-Temp
- External Output Shorts
- Regeneration

Dimensions

- 4.65" (118mm)
- 2.31" (60mm)
- 7.63" (197mm)

404 Westridge Dr.
Watsonville, CA 95076
Tel: 800-525-1609
Fax: 831-761-6544
www.applied-motion.com

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- Profile Position, Profile Velocity, and Homing modes
- Up to 327 axial per channel
- Execute stored Q programs
**STAC6 technical specs.**

### POWER AMPLIFIER SECTION
- **AMPLIFIER TYPE:** MOSFET, Dual H Bridge, 4 Quadrant
- **CURRENT CONTROL:** 4 state PWM at 20 kHz
- **OUTPUT CURRENT:**
  - STAC6: 0.5 - 6.0 in 0.01 amp increments (6A peak of sine)
  - STAC6-220: 0.5 - 3.2 in 0.01 amp increments (3.2A peak of sine)
- **POWER SUPPLY:**
  - STAC6: Line operated nominal 120 VAC, 50/60 Hz
  - STAC6-220: Line operated nominal 220 VAC, 50/60 Hz
- **AC INPUT VOLTAGE:**
  - STAC6: 94 – 265VAC, 50/60Hz
  - STAC6-220: 94 – 265VAC, 50/60Hz
- **PROTECTION:**
  - Over-voltage, under-voltage, over-temperature, external output shorts
- **IDLE CURRENT REDUCTION:** Reduction to any integer percent of full-current after delay selectable in milliseconds.
- **MOTOR REGENERAITION:** Built in regeneration circuit - 25 watts max.

### CONTROLLER SECTION
- **NON-VOLATILE STORAGE:** Configurations are saved in FLASH memory on board the DSP.
- **STEPS AND DIRECTION INPUTS:**
  - X5: Optically isolated, 12 - 24V. Function: general Purpose Input.
  - X3: Optically isolated, 12 - 24V, sourcing or sinking. Function: Motor Enable, Sensor, Home or Branch Select
  - X6, X7: Optically isolated, 12 - 24V. Function: CW & CCW Limits, Sensor, Home or Branch Select
- **INPUTS AND OUTPUTS**
  - IN / OUT 1 connector - All Drives: S, SE, Q, QE, Si, C
  - IN / OUT 1 connector - Option - Encoder
  - 7 Inputs: X1, X2: Optically isolated, Differential, 5 Volt. Minimum pulse width = 250ns, Maximum pulse frequency = 2 MHz
  - X3: Optically isolated, 12 - 24V, sourcing or sinking. Function: Motor Enable, Sensor, Home or Branch Select
  - X4: Optically isolated, 12 - 24V, sourcing or sinking. Function: Alarm Reset, Sensor, Home or Branch Select
  - X5: Optically isolated, 12 - 24V. Function: general Purpose Input
  - X6, X7: Optically isolated, 12 - 24V. Function: CW & CDW Limits, Sensor, Home or Branch Select
  - 4 Outputs: Y1: Optical darlington, 30V, 100mA max, NPN/sinking, shared common with Y2 & Y3. Function: Brake or general purpose programmable
  - Y2: Optical darlington, 30V, 100mA max, NPN/sinking, shared common with Y1 & Y3. Function: Motion, tach or general purpose programmable
  - Y3: Optical darlington, 30V, 100mA max, NPN/sinking, shared common with Y1 & Y2. Function: Fault or general purpose programmable

### OPTION - ENCODER
With the addition of an encoder on the motor the STAC6 can provide additional functions:

- **Stall Detection:** If an external force or increased load is placed on the system, the motor will reach a point at which it can no longer produce sufficient torque. At this point the motor will stall and stop rotating – a basic step motor system will not know this has happened and will assume the move has been completed. With the addition of an encoder on the motor the STAC6 can detect this stall and generate a fault signal which can be sent to an output, or used within the Q or Si program to branch to a fault handling routine.

- **Stall Prevention:** If at some point during a motor’s pre-programmed move the load on the system increases, the drive will detect that the lead angle of the motor is lagging. This may otherwise cause the motor to stall due to the lack of available torque. The Stall Prevention feature of the drive reduces the motor’s velocity (step motors have more torque at lower speeds) so that it can continue with the move. In this way the correct move distance is achieved, though the move has taken longer than programmed.

- **Position Maintenance:** When a motor is at zero speed holding position, it is possible for external forces to move the load out of position. With an encoder and position maintenance, this position error will be detected and the motor moved back to its correct position once the external force is removed.

### Torque Curves
- STAC6-552/553/554, STAC6-552/553/554 (120)
- STAC6-554 (200)
- STAC5-554 (1600)
- STAC6-495/496/497, STAC6-495 (120)
- STAC5-495/496/497 (2000)
- STAC6-498, STAC6-498 (120)
- STAC5-498 (2000)
- STAC6-491, STAC6-491 (120)
- STAC5-491 (2000)
- STAC6-492, STAC6-492 (120)
- STAC5-492 (2000)
- STAC6-493, STAC6-493 (120)
- STAC5-493 (2000)
- STAC6-494, STAC6-494 (120)
- STAC5-494 (2000)
- STAC6-496, STAC6-496 (120)
- STAC5-496 (2000)
- STAC6-497, STAC6-497 (120)
- STAC5-497 (2000)
STAC6 technical specs (cont)

Software

Runs on IBM-compatible PC's running Windows 7, XP, Vista, 2000, NT, ME, 98.

Q Programmer™

Q Programmer™ is used to create and edit stand-alone programs for Q-compatible drives. The functions of these drives include multi-tasking, math, register manipulation, encoder following, and more.

Si Programmer™

Intended for use in stand-alone applications. Si Programmer™ provides a friendly, point-and-click, graphical interface that doesn’t require any previous programming experience.

Help Manuals - “Printable Pages”

ST Configurator™ incorporates new help menus. All the technical data, application information and advice on setting up the drive is now just a mouse click away.

Notes -
1) Drawing shown with optional rear shaft.
2) Encoder holes only on dual shaft version.
3) The “Drive Current Setting” shown here differs from the rated current of each motor because the rated current is RMS and the drive current setting is peak sine.
4) These motors include a 10ft cable.
Anti Resonance
Step motor systems have a natural tendency to resonate at certain speeds. The STAC6 drives automatically calculate the system’s natural frequency and apply damping to the control algorithm. This greatly improves midrange stability, allows higher speeds and greater torque utilization, and also improves settling times.

Delivers better motor performance and higher speeds

Micro Step 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.

Allows the use of PLC type pulse trains

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.

Smooth, even motion from a stepper system

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.

Assures smooth acceleration/deceleration ramps

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. The drive can also detect open and short circuits.

Inputs & Outputs
- 2 analog inputs
- 3 digital outputs
- 2 analog inputs
- 7 digital outputs
- 15 digital inputs
- 3 digital outputs
- 7 digital outputs
- 7 digital inputs
- 3 digital outputs
- 2 analog inputs

For more information go to www.applied-motion.com/STAC6

Power Ratings

<table>
<thead>
<tr>
<th></th>
<th>STAC6</th>
<th>STAC6-220</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>94-135 VAC</td>
<td>94-265 VAC</td>
</tr>
<tr>
<td>Output Current</td>
<td>6.0A Peak</td>
<td>3.2A Peak</td>
</tr>
</tbody>
</table>

Q over CANopen
The STAC6 drive with the CANopen option board has the unique ability to access, modify and trigger a program stored on the drive. The user develops and downloads a program using the Q programmer™ software. The program sequences can then be triggered via the CANopen network, creating a powerful distributed motion control system.
Software

STAC6 technical specs (cont)

Software selectable: 0.5V, ±5V, 0-10V, ±10V
12 bits (with ±10V signal range)
10 bits (with 0-5V signal range)

8 digital Inputs
IN1-IN8: Optically isolated, 12 - 24V. Function: general Purpose Input.

8 digital Outputs
OUT 1-4: Optical darlington, 30V, 300mA max, sinking or sourcing. Function: general purpose programmable
1 Analog Input
0-5VDC analog input - for use with Q or SCL software only

ST Configurator™
Used for setup, configuration, uploading and downloading programs to the STAC6. For more information about the ST Configurator™ visit the STAC6 webpage: applied-motion.com/STAC6

Q Programmer™
Q Programmer™ is used to create and edit stand-alone programs for Q-compatible drives. The functions of these drives include multi-tasking, math, register manipulation, encoder following, and more.

Si Programmer™
Intended for use in stand-alone applications, Si Programmer™ provides a friendly, point-and-click, graphical interface that doesn’t require any previous programming experience.

Help Manuals - “Printable Pages”
ST Configurator™ incorporates new help menus. All the technical data, application information and advice on setting up the drive is now just a mouse click away.

Software

STAC6 NEMA 34 Motors

Software selectable: 0.5V, ±5V, 0-10V, ±10V
12 bits (with ±10V signal range)
10 bits (with 0-5V signal range)

IN / OUT 2 connector - SE, QE and Si

8 digital Inputs
IN1-IN8: Optically isolated, 12 - 24V. Function: general Purpose Input.

4 Digital Outputs
OUT 1-4: Optical darlington, 30V, 300mA max, sinking or sourcing. Function: general purpose programmable
1 Analog Input
0-5VDC analog input - for use with Q or SCL software only

STAC6 NEMA 22 Motors

Software selectable: 0.5V, ±5V, 0-10V, ±10V
12 bits (with ±10V signal range)
10 bits (with 0-5V signal range)

IN / OUT 2 connector - SE, QE and Si

8 digital Inputs
IN1-IN8: Optically isolated, 12 - 24V. Function: general Purpose Input.

4 Digital Outputs
OUT 1-4: Optical darlington, 30V, 300mA max, sinking or sourcing. Function: general purpose programmable
1 Analog Input
0-5VDC analog input - for use with Q or SCL software only

Software

STAC6 NEMA 34 Motors

Software selectable: 0.5V, ±5V, 0-10V, ±10V
12 bits (with ±10V signal range)
10 bits (with 0-5V signal range)

IN / OUT 2 connector - SE, QE and Si

8 digital Inputs
IN1-IN8: Optically isolated, 12 - 24V. Function: general Purpose Input.

4 Digital Outputs
OUT 1-4: Optical darlington, 30V, 300mA max, sinking or sourcing. Function: general purpose programmable
1 Analog Input
0-5VDC analog input - for use with Q or SCL software only

Software

STAC6 NEMA 22 Motors

Software selectable: 0.5V, ±5V, 0-10V, ±10V
12 bits (with ±10V signal range)
10 bits (with 0-5V signal range)

IN / OUT 2 connector - SE, QE and Si

8 digital Inputs
IN1-IN8: Optically isolated, 12 - 24V. Function: general Purpose Input.

4 Digital Outputs
OUT 1-4: Optical darlington, 30V, 300mA max, sinking or sourcing. Function: general purpose programmable
1 Analog Input
0-5VDC analog input - for use with Q or SCL software only

Software

STAC6 technical specs (cont)

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Software

STAC6 technical specs (cont)

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8 digital Inputs
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**STAC6 technical specs.**

**POWER AMPLIFIER SECTION**
- **AMPLIFIER TYPE:** MOSFET, Dual H Bridge, 4 Quadrant
- **CURRENT CONTROL:** 4 state PPM at 20 kHz
- **OUTPUT CURRENT:** STAC6 0.5—6.0 in 0.01 amp increments (6A peak of sine)
- **POWER SUPPLY:** STAC6 Line operated nominal 120 VAC, 50/60 Hz
- **AC INPUT VOLTAGE:** STAC6 94—135VAC, 50/60Hz
- **PROTECTION:** Over-voltage, under-voltage, over-temp, external output shorts (phase-to-phase, phase-to-ground), internal amplifier shorts
- **IDLE CURRENT REDUCTION:** Reduction to any integer percent of full-current after delay selectable in milliseconds.
- **MOTOR REGENERATION:** Built in regeneration circuit - 25 watts max.

**CONTROLLER SECTION**
- **NON-VOLATILE STORAGE:** Configurations are saved in FLASH memory on board the DSP
- **STEP AND DIRECTION INPUTS:** Optically isolated: 5 Volt. Minimum pulse width = 200 ns. Maximum pulse frequency = 2 MHz
- **RESOLUTION:** Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev
- **ANTI-RESONANCE:** Raises the system damping ratio to eliminate minigrange instability and allow stable operation throughout the speed range and improves settling time.
- **TORQUE SMOOTHING:** Allows for fine adjustment of phase current waveform harmonic content to reduce low-speed torque ripple in the range 0.25—1.5 rps.
- **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.
- **MICROSTEP EMULATION:** Performs low resolution stepping by synthesizing fine microsteps from coarse steps.
- **COMMAND SIGNAL SMOOTHING:** Software configurable filtering reduces jerk and excitation of extraneous system resonances (step & direction mode only).
- **ENCODER OPTION:** Empties encoder (h or low resolution) to provide false stall detect and perform stall prevention and position maintenance. Differential line receivers suitable for 500 kHz or greater. Minimum encoder resolution is 1000 lines.
- **INTERFACE:** RS-232 and RS-485, CANopen standard on STAC6-C models.

**INPUTS AND OUTPUTS**
- **IN / OUT 1 connector - All Drives:** 5, SE, Q, OE, SI, C

7 Inputs
- X1, X2: Optically isolated, Differential, 5 Volt, Minimum pulse width = 250ns. Maximum pulse frequency = 2 MHz
- X3: Optically isolated, 12—24V, sourcing or sinking. Function: Motor Enable, Sensor, Home or Branch Select
- X4: Optically isolated, 12—24V, sourcing or sinking. Function: Alarm Reset, Sensor, Home or Branch Select
- X5: Optically isolated, 12—24V. Function: General Purpose Input
- X6, X7: Optically isolated, 12—24V. Function: CW & CDW Limits, Sensor, Home or Branch Select

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- Y1: Optical darlington, 30V, 100mA max, NPN/sinking, shared common with Y2 & Y3. Function: Brake or general purpose programmable
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**ANALOG INPUTS**

**STAC6 analog specs.**

**OUTPUT CURRENT**
- STAC6 0.5—6.0 in 0.01 amp increments (6A peak of sine)

**CURRENT CONTROL**
- 4 state PWM at 20 Khz

**Analog Inputs**
- Y3: Optical darlington, 30V, 100mA max, NPN/sinking, shared common with Y1 & Y2. Function: Brake or general purpose programmable
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**STAC6 torque curves**

**Option - Encoder**

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- Up to 127 axes per channel
- Execute stored Q programs

**Power Supply:**

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- **STAC6-220:** 94-265 VAC

**Output Current:**

- **STAC6:** 0.5 - 6.0A Peak
- **STAC6-220:** 0.5 - 3.2A Peak

**Protection:**

- Over-Voltage
- Under voltage
- Over-Temp
- External Output Shorts
- Regeneration

**Dimensions:**

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