

# STEPPER DRIVES

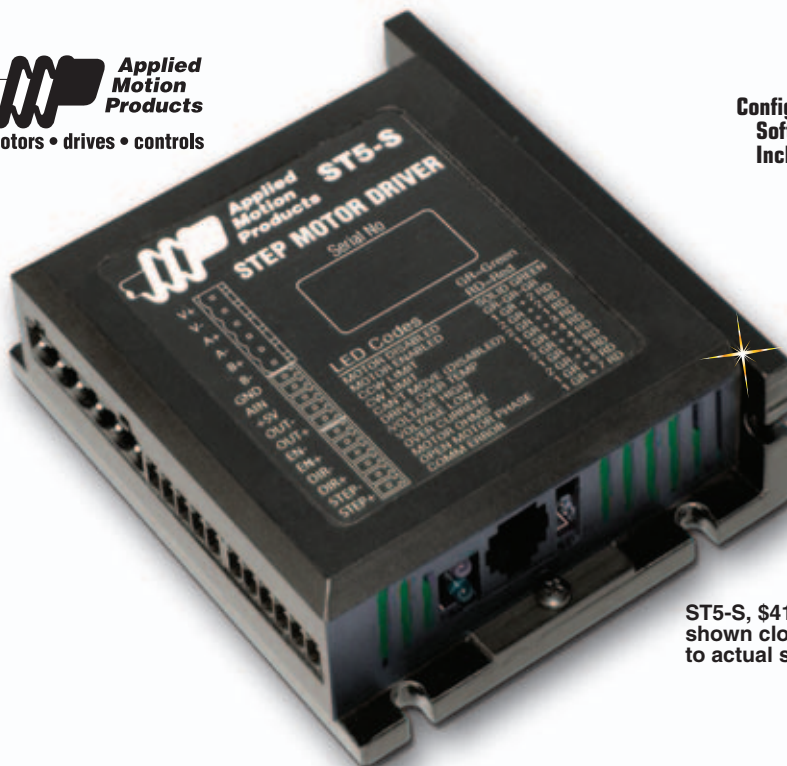
## PERFORMANCE STEPPER DRIVES WITH ADVANCED FEATURES AND CONTROL OPTIONS



ST Series  
Starts at  
**\$413**



**Configuration  
Software  
Included!**



ST5-S, \$413,  
shown close  
to actual size.

- Current Output 0.5 to 10.0 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)
- Multi-Axis System with SiNet™ Hub
- Stand-Alone Programming on Si Model
- Microstepping Emulation (Up to 51200 steps/revolution)

### Advanced Features

- Auto Setup: Measures Motor Parameters and Configures Tuning Parameters
- Self-Test: Detects Encoder and Determines Resolution; Diagnoses Miswires and Open Phases
- Torque Ripple Smoothing: Smoother Motion at Lower Speeds
- Command Signal Smoothing: Assures Smooth Acceleration/Deceleration Ramps
- Anti-Resonance: Eliminates Mid-Range Instability; Allows Stable Operation to 50 rps or Greater

### SPECIFICATIONS

#### ST5-S, ST5-Si POWER AMPLIFIER SECTION

**Amplifier Type:** MOSFET, Dual H-Bridge, 4 Quadrant

**Current Control:** 4 state PWM at 20 KHz  
**Output Current:** 0.5 to 5.0 A/phase in 0.01 A increments

**Power Supply:** External 24 to 48 Vdc power supply required

**Input Voltage Range:** 18 to 53 Vdc  
**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

#### ST10-S, ST10-Si POWER AMPLIFIER SECTION

**Amplifier Type:** MOSFET, Dual H-Bridge, 4 Quadrant

**Current Control:** 4 state PWM at 20 KHz  
**Output Current:** 0.5 to 10.0 A/phase in 0.01 A increments

**Power Supply:** External 24 to 80 Vdc power supply required

**Input Voltage Range:** 18 to 88 Vdc  
**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

#### -S AND -Si (COMMON FEATURES) CONTROLLER SECTION

**Mode of Operation:** Step and direction, CW/CCW, encoder following, oscillator, joystick, SCL, Si (Si programming is only available on the -Si models)

**Microstep Resolution:** Software selectable from 200 to 51,200 steps/rev in increments of 200 steps/rev

**Speed Range:** Depends upon selected resolution; amplifier is suitable for speeds up to 50 rps

**Anti-Resonance:** Raises the system damping ratio to eliminate mid-range instability and allows stable operation to 50 rps

**Waveform:** 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

**Dynamic Smoothing:** Software configurable filtering (4th order, elliptic) for use in removing spectral components from the command sequence; reduces jerk and excitation of extraneous system resonances

**Encoder Option:** Employs encoder (high or low resolution) to provide stall detection, stall prevention and perform position verification and maintenance



**Communication Interface:** RS232; RS485 option available for Si models

**Ambient Temperature:** 0 to 55°C (32 to 158°F)

**Humidity:** 90% non-condensing

#### -Si CONTROLLER SECTION

**Non-Volatile Storage:** Program and drive configuration are saved in EEPROM memory

#### INPUTS

**X1, X2:** Optically isolated, differential, 5V; minimum pulse width = 250 ns; maximum pulse frequency = 2 MHz

**Function:** Step and direction, encoder following, sensor, home or branch select

**X3:** Optically isolated, 12 to 24V, sourcing or sinking, shares common with X3-X6

**Function:** Motor enable, sensor, home or branch select

**X4:** Optically isolated, 12 to 24V, sourcing or sinking, shares common with X3-X6

**Function:** Alarm reset, sensor, home or branch select

**X5, X6:** Optically isolated, 12 to 24V, sourcing or sinking, shares common with X3-X6

**Function:** Jogging, sensor, home or branch select

**X7, X8:** Optically isolated, differential, 12 to 24V

**Function:** CW and CCW limits, sensor, home or branch select

#### OUTPUTS

**Y1:** Optical darlington, 30V, 100 mA max, NPN/sinking, shared common with Y2 and Y3

**Function:** Brake or general purpose programmable

**Y2:** Optical darlington, 30V, 100 mA max, NPN/sinking, shared common with Y1 and Y3

**Function:** Motion, tach or general purpose programmable

**Y3:** Optical darlington, 30V, 100 mA max, NPN/sinking, shared common with Y1 and Y2

**Function:** Fault or general purpose programmable

**Y4:** Optical darlington, 30V, 100 mA max, configurable as sinking or sourcing

**Function:** General purpose programmable

#### Analog Inputs (2):

**Range:** Software selectable: 0 to 5V, ±5V, 0 to 10V, ±10V

#### Resolution:

12 bits (±10V signal range)

11 bits (0 to 10V or ±5V signal range)

10 bits (0 to 5V signal range)

**Encoder:** Differential line receivers suitable for 200 KHz or greater

#### -S CONTROLLER SECTION

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

**Step and Direction Inputs:** Optically isolated, differential, 5V; minimum pulse width = 250 ns; maximum pulse frequency = 2 MHz

**Function:** Step and direction, run/stop and direction or CW and CCW Limits

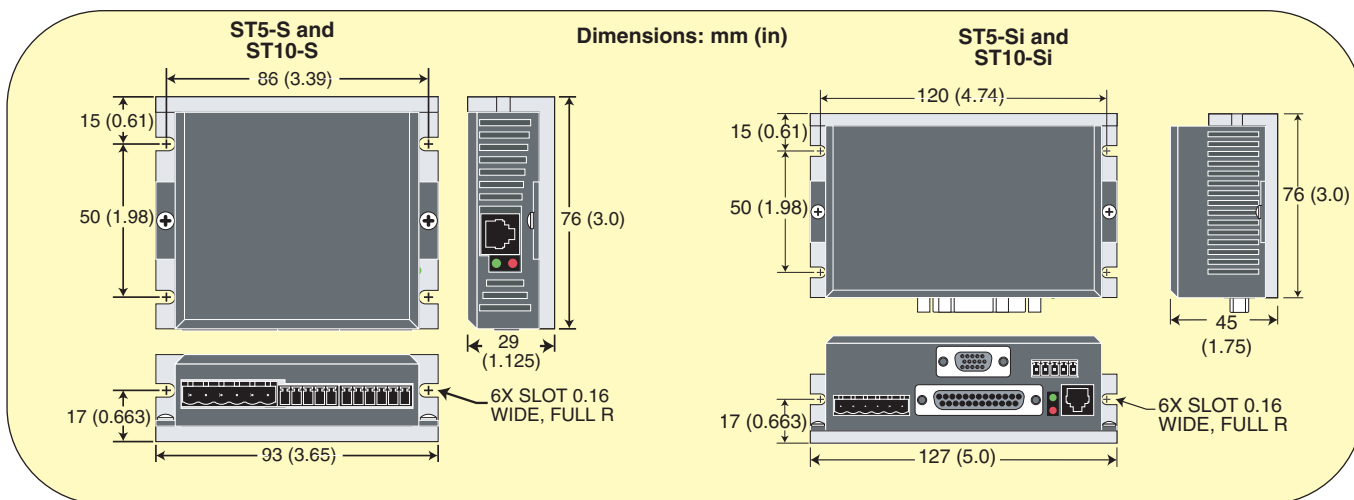
**Enable Input:** Optically isolated, 5 to 12V

**Function:** Motor enable, speed select or alarm reset

**Output:** Optically Isolated, 24V, 10 mA max

**Function:** Fault, motion, tach, or brake

**Analog Input:** 0 to 5V, 12 bits resolution



## SOFTWARE ST CONFIGURATOR™



**Software Included Free with Purchase of ST Drives!**

- Simple Drive Setup
- Store and Download Configurations

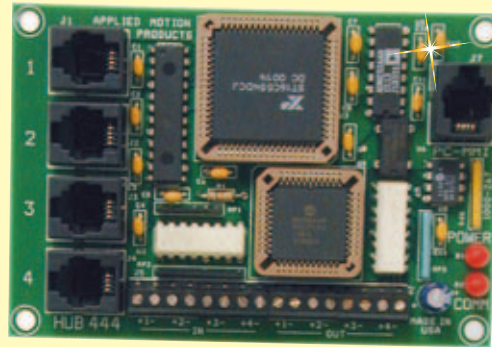
# ACCESSORIES



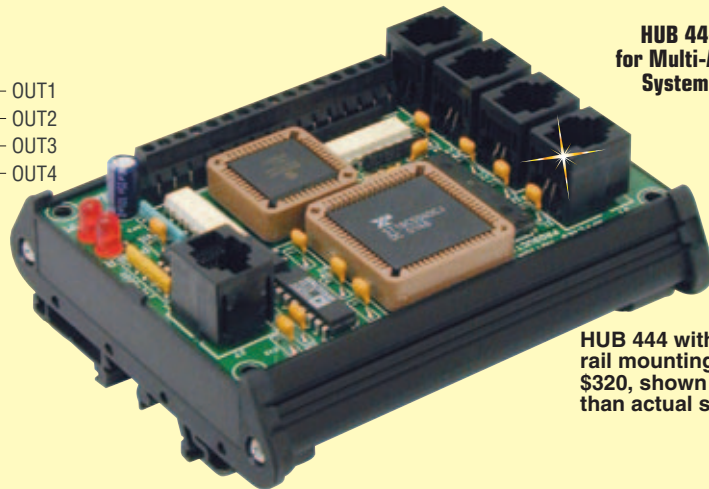
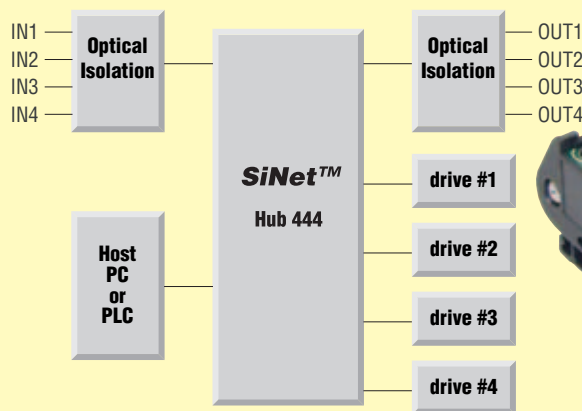
## Multi-Axis Systems

Connect up to 4 drives on a multi-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.

**Order  
HUB 444  
Separately.  
See Page D-34  
for Details.**



**HUB 444  
for Multi-Axis  
Systems**



**HUB 444 with DIN  
rail mounting kit,  
\$320, shown smaller  
than actual size.**

## RECOMMENDED POWER SUPPLIES (ORDER SEPARATELY)

**ST5-S and -Si:** OMPS150A24, 24 Vdc at 6.3 A. See page D-37 for details.  
**ST10-S and -Si:** OMPS300A48, 48 Vdc at 6.7 A. See page D-37 for details.

## FUSING

**Internal Fuse:** ST5 and ST10 contain internal 10 A fast acting fuses

## OMRC-050 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")

**Order  
OMRC-050  
Separately.  
See Page D-39  
for Details.**

**OMRC-050, \$210,  
shown smaller  
than actual size.**



## SPECIFICATIONS

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

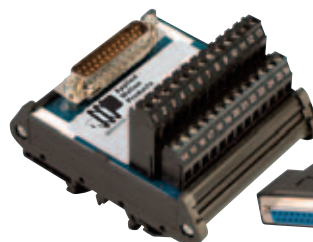
## Recommended When Using:

NEMA 17 motors @ speeds > 30 rps  
NEMA 23 motors @ speeds > 10 rps  
NEMA 34 motors @ speeds > 4 rps

## OMBOB-1 Breakout Box for I/O Connector

- Break out DB-25 I/O Connector to Screw Terminals
- Includes 1 m (3') Cable
- Compatible with ST5-Si and ST10-Si

**OMBOB-1,  
\$175, shown  
smaller than  
actual size.**



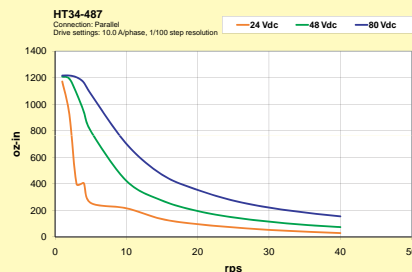
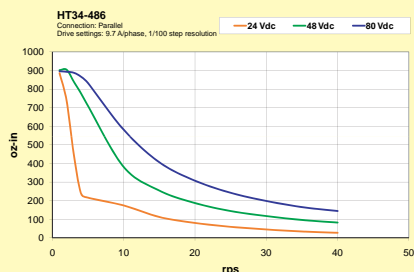
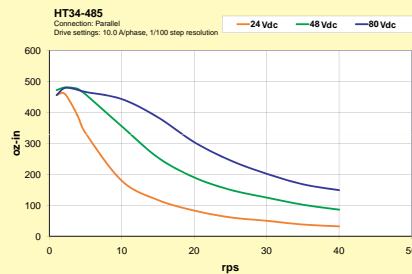
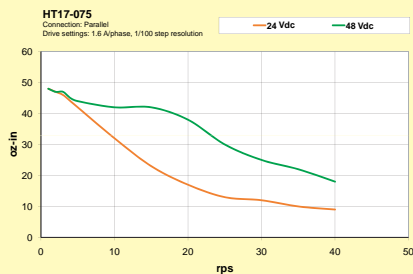
**Great for  
prototyping  
systems!**







# TORQUE-SPEED CURVES



## To Order (Specify Model Number)

MODEL NO.	PRICE	DESCRIPTION
ST5-S	\$413	Performance stepper drive with 5 A output
ST5-Si	630	Performance stepper drive with Si Programmer™
ST5-Si-485	735	Performance stepper drive with Si Programmer™ and RS485 option
ST5-Si-ENC	735	Performance stepper drive with Si Programmer™ and encoder option
ST5-Si-ENC-485	840	Performance stepper drive with Si Programmer™ and encoder plus RS485 options
ST10-S	553	Performance stepper drive with 10 A output
ST10-Si	770	Performance stepper drive with Si Programmer™
ST10-Si-485	875	Performance stepper drive with Si Programmer™ and RS485 option
ST10-Si-ENC	875	Performance stepper drive with Si Programmer™ and encoder option
ST10-Si-ENC-485	980	Performance stepper drive with Si Programmer™ and encoder plus RS485 options

Note: Software and download cable included.

Ordering Example: ST5-S, performance stepper drive with 5 A output, \$413.

Order motors separately, see below for details

## RECOMMENDED MOTORS FOR ST5-S AND ST5-Si

MODEL NO.	PRICE	HOLDING TORQUE g-cm (oz-in)	RATED VOLTAGE (V)	RATED CURRENT (A)	RESISTANCE OHMS	INDUCTANCE MH	ROTOR INERTIA g-cm² (oz-in²)
NEMA 17 STEP MOTOR SPECIFICATIONS (RATINGS ARE WITH MOTOR CONNECTED IN PARALLEL)							
OMHT17-075	\$90	4522 (62.8)	2.8	1.7	1.7	3.0	68 (0.37)
OMHT23-397	125	NEMA 23, 177 oz-in holding torque					
OMHT23-400	160	NEMA 23, 264 oz-in holding torque					

Ordering Example: ST5-Si, performance stepper drive with Si Programmer™, and OMHT17-075, NEMA 17 high torque step motor, \$630 + 90 = \$720. See page D-7 for more motor specs. Torque-speed curves for recommended motor shown above.

## RECOMMENDED MOTORS FOR ST10-S AND ST10-Si

MODEL NO.	PRICE	HOLDING TORQUE g-cm (oz-in)	RATED VOLTAGE (V)	RATED CURRENT (A)	RESISTANCE OHMS	INDUCTANCE MH	ROTOR INERTIA g-cm² (oz-in²)
NEMA 34 STEP MOTOR SPECIFICATIONS (RATINGS ARE WITH MOTOR CONNECTED IN PARALLEL)							
OMHT34-485	\$294	46,806 (650)	1.6	8.6	0.19	1.3	1400 (7.8)
OMHT34-486	392	86,412 (1200)	2.2	8.1	0.27	2.2	2680 (14.6)
OMHT34-487	540	132,858 (1845)	2.4	9.0	0.27	2.4	4000 (21.9)

Ordering Example: ST10-Si, performance stepper drive with Si Programmer™, and OMHT34-487, NEMA 34 high torque step motor, \$770 + 540 = \$1310.

## ACCESSORIES

MODEL NO.	PRICE	DESCRIPTION
ENC-ST-CA-10	\$56	Encoder cable for ST drive, 3 m (10')
OMBOB-1	175	Breakout box for I/O connector
OMPS150A24	180	Stepper drive power supply for ST5 series, 24 Vdc, 6.3 A
OMPS300A48	266	Stepper drive power supply for ST10 series, 48 Vdc, 6.7 A
OM-CONV-USB	15	USB to RS232 interface converter

Ordering Example: ST10-Si-ENC-485, 10 A performance stepper drive with Si programmer plus encoder and RS485 options, ENC-ST-CA-10, 3 m (10') encoder cable for ST drive, and OMBOB-1, breakout box for I/O connector, \$980 + 56 + 175 = \$1211.

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