MOONS'
moving in better ways

ST

Intelligent Stepper Drives

The ST series integrate motion control capability that support stand-alone programming and various bus control as RS-232/485, Ethernet UDP/TCP, CANopen and EtherNet/IP.

Anti-Resonance
Microstep Emulation
Torque Ripple Smoothing
Advanced Current Control
Stall Detection and Stall Prevention

CE RoHS Compliant

www.moonsindustries.com

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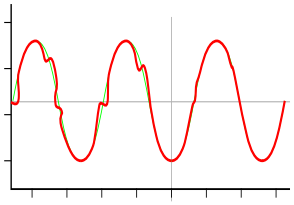
Features

Anti-Resonance

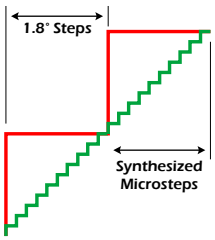
Step motor systems have a natural tendency to resonate at certain speeds. The MSST drives automatically calculate the system's natural frequency and apply damping to the control algorithm. This greatly improves midrange stability, allows higher speeds and greater torque utilization, and also improves settling times.



Provides better motor performance and higher speeds

Microstep Emulation

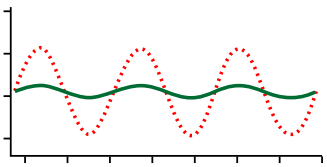
With Microstep Emulation, low resolution systems can still provide smooth motion. The drive can take low resolution step pulses and create fine resolution motion.



Delivers smoother motion in any application

Torque Ripple Smoothing

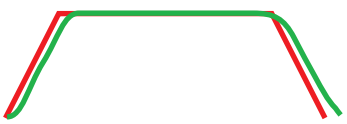
All step motors have an inherent low speed torque ripple that can affect the motion profile of the motor. By analyzing this torque ripple the system can apply a negative harmonic to counter this effect. This gives the motor much smoother motion at low speed.



Produces smoother motion at low 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.



Improves overall system performance

Stall detection & Stall prevention (only available on drives with encoder option)

The optional encoder detects the rotor's position to provide Stall Detection and Stall Prevention functions.

Auto Setup & Self Test

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.

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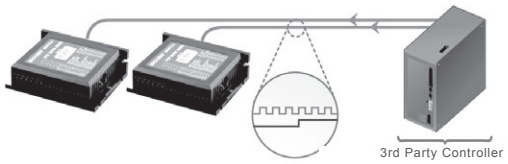
Step & Direction



S

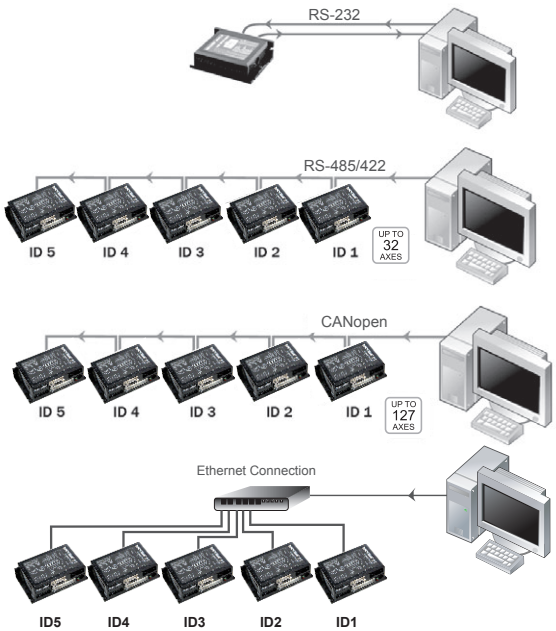
- Step & Direction
- CW & CCW pulse
- Master Encoder

Oscillator / Run-stop

S

- Software configuration
- Two speeds
- Vary speed with analog input
- Joystick compatible

Host Control



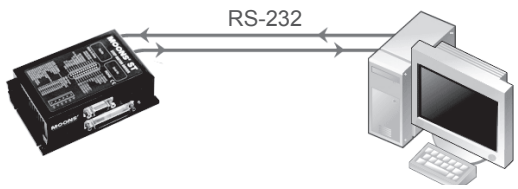
S Q

C IP

Accepts commands from host PC or PLC

- Multi-axis capable
- Real time control

Stand-Alone Programmable



Q

- Accepts commands from host PC or PLC
- Multi-axis capable
- Real time control

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Option Boards

The following option boards are available with the MSST drives (depending on control option)

Encoder Feedback

(Q, C and IP control options)

Example: MSST5-Q-AE

The Encoder Feedback option board provides Stall Detection and Stall Prevention functionality to the drives. Stall Detection detects the moment the motor has stalled and triggers a drive fault. Stall Prevention automatically senses rotor lag (just before stalling) and reduces motor speed to avoid stalling. Stall Prevention includes Position Maintenance, which maintains shaft position when the motor is stopped.

RS-485

(Q control option)

Example: MSST10-Q-RN

The RS-485 option board enhances the ability to stream serial commands (SCL) by allowing you to connect to up to 32 drives in a serial communications network.

Ethernet & EtherNet/IP

(Q control option for Ethernet TCP/UDP)(IP control option for EtherNet/IP)

Example: MSST5-Q-EN, MSST5-IP-EN

MSST-Q drives with the Ethernet option can accept streaming serial commands (SCL) and Q serial commands over a high throughput, high-reliability 100Mbit network. The drives can also execute Q programs stored in built-in, non-volatile memory. IP models communicate with PLCs and other industrial devices supporting the EtherNet/IP standard. They can also be commanded to execute stored Q programs.

CANopen

(C control option)

Example: MSST5-C-CN

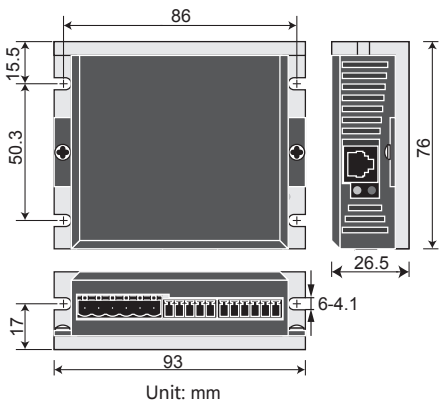
The CANopen option board used with MSST-C drives allows the drive to be connected to a CANopen network along with other CANopen devices. Drives can be controlled and interrogated over the network.

Specifications

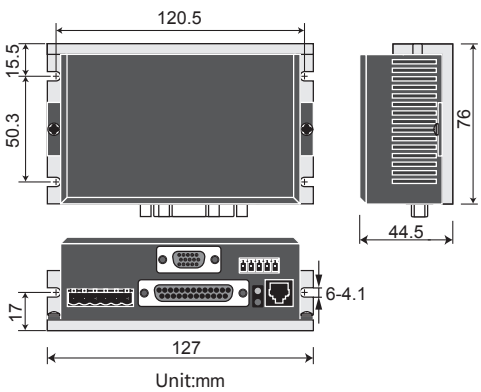
Amplifier Type	Dual H-Bridge, 4 Quadrant
Current Control	4 state PWM at 20 KHz
Protection	Over-voltage, under-voltage, over-temp, internal motor shorts (phase-to-phase, phase-to-ground)
Idle Current	Automatic idle current reduction to reduce heat after motor stops moving, software selectable current and idle delay
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. Reduces jerk and extraneous system resonances.
Anti-Resonance	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 of 0.25 to 1.5 rps
Encoder Feedback	Optional encoder feedback for stall detection and stall prevention
Non-Volatile Storage	Configurations are saved in FLASH memory on-board the DSP
Humidity	90% non-condensing
Ambient Temperature	0 - 40°C when mounted to a suitable heat sink
Mass	-S: Approx. 0.2Kg, -Q/C/IP: Approx. 0.3Kg
I/O Specifications-S	STEP, DIR inputs: Optically isolated, differential, 5 VDC, minimum pulse width = 250 ns, maximum pulse frequency = 2 MHz EN input: Optically isolated, 5-12 VDC OUT output: Optically isolated, 24 VDC max, 10 mA max AIN analog input: Range = 0-5 VDC, resolution = 12 bits
I/O Specifications-Q/C/IP	X1, X2 inputs: Optically isolated, differential, 5 VDC, minimum pulse width = 250 ns, maximum pulse frequency = 2 MHz X3-X6 inputs: Optically isolated, single-ended, shared common, sinking or sourcing, 12-24 VDC X7, X8 inputs: Optically isolated, differential, 12-24 VDC Y1-Y3 outputs: Optical darlington, single-ended, shared common, sinking, 30 VDC max, 100 mA max Y4 output: Optical darlington, sinking or sourcing, 30 VDC max, 100 mA max Analog inputs IN1, IN2: Can be used as two single-ended inputs or one differential input. Range =software selectable 0-5, +/-5, 0-10, or +/-10 VDC. Software configurable offset, deadband, and filtering. Resolution = 12 bits (+/-10 volt range), 11 bits (+/-5 or 0-10 volt range), or 10 bits (0-5 volt range).

Dimensions (Unit : mm)

MSST5/10-S



MSST5/10-Q/C/IP



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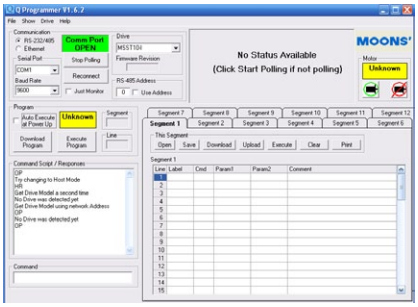
ST Configurator

Software Features

- Intuitive interface
- Drive status and alarm monitoring
- Self-test function to test drive/motor operation
- Built-in SCL Terminal
- Online help integrated

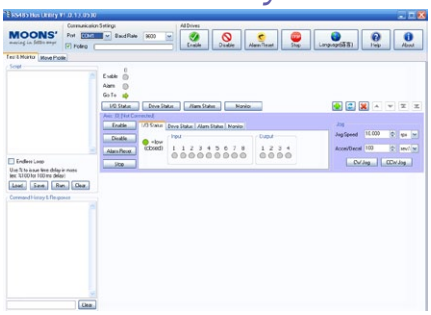
Q Programmer



Software Features

- Single-axis motion control
- Stored program execution
- Multi-tasking
- Conditional processing
- Math functions
- Data registers
- Motion Profile simulation
- Online help integrated

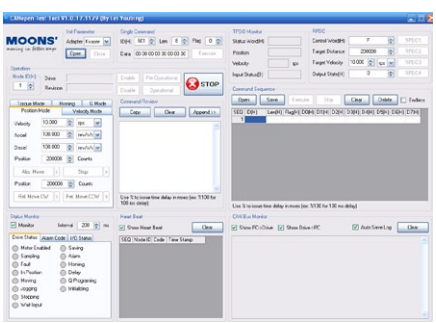
RS485 Bus Utility



Software Features

- Stream SCL commands from the command line
- Simple interface with powerful capability
- Easy setup with RS-485 for 32 axis network motion control
- Monitoring Status of I/O, drive, alarm and the other nine most useful motion parameters
- Write and save SCL command scripts
- Online help integrated
- Supports all RS-485 drives

CANopen Test Tool



Software Features

- Friendly User Interface
- Multiple operation Mode Support
- Multi-Thread, High Performance
- CAN bus monitor and log function
- Kvaser/PEAK adapter support

FREE DOWNLOAD
Our software and user manual can be downloaded from our website:

www.moonsindustries.com

All software applications run on Windows 7, Vista, XP, NT, 2000, 32-bit or 64-bit

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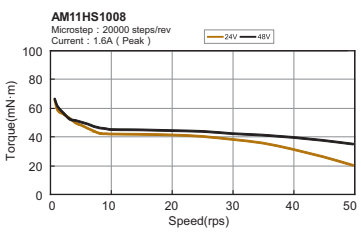
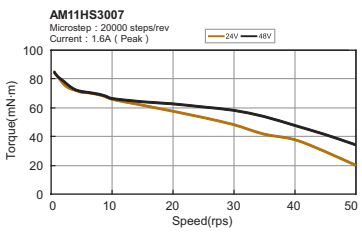
Recommended Motors

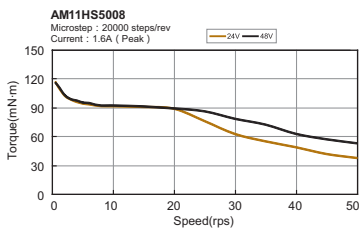
Model	Shaft	Leads	Length"L"	Holding Torque	Current	Resistance	Rotor Inertia	Motor Mass	Dielectric Strength
			mm	N·m	A/Phase	Ω/Phase	g·cm^2	Kg	
AM11HS1008-07	Single Shaft	4	31.0	0.05	1.6	2.5	9.0	0.1	500V AC 1 minute
AM11HS3007-02	Single Shaft		40.0	0.08	1.6	1.7	12.0	0.15	
AM11HS5008-01	Single Shaft		51.0	0.12	1.6	3.5	18.0	0.2	
AM14HYB401-03	Single Shaft		40.0	0.2	1.0	4.3	20.0	0.21	
AM17HD4452-02N	Single Shaft		34.3	0.25	1.8	1.5	38.0	0.23	
AM17HD4452-01N	Double Shaft								
AM17HD4452-E1000D	W/Encoder								
AM17HD2438-02N	Single Shaft		39.8	0.4	1.8	1.9	57.0	0.28	
AM17HD2438-01N	Double Shaft								
AM17HD2438-E1000D	W/Encoder								
AM17HD6426-06N	Single Shaft		48.3	0.5	1.8	2.3	82.0	0.36	
AM17HD6426-05N	Double Shaft								
AM17HD6426-E1000D	W/Encoder								
AM17HDB410-01N	Single Shaft		62.8	0.8	1.6	2.6	123	0.6	
AM23HS0421-01	Single Shaft		41.0	0.6	4.5	0.48	135.0	0.42	
AM23HS0421-02	Double Shaft								
AM23HS0421-E1000D	W/Encoder								
AM23HS2450-01	Single Shaft		54.0	1.2	4.5	0.63	260.0	0.6	
AM23HS2450-02	Double Shaft								
AM23HS2450-E1000D	W/Encoder								
AM23HS3455-01	Single Shaft		76.0	1.8	4.5	0.75	460.0	1.0	
AM23HS3455-02	Double Shaft								
AM23HS3455-E1000D	W/Encoder								
AM23HS5412-01	Single Shaft		111.0	3.2	4.5	1.2	750.0	1.5	
AM24HS2402-08N	Single Shaft		54.0	1.2	4.5	0.43	450.0	0.83	
AM24HS5401-10N	Single Shaft		85.0	2.5	4.5	0.65	900.0	1.4	
AM24HS5401-24N	Double Shaft								
AM24HS5401-E1000D	W/Encoder								
AM34HD0404-08	Single Shaft		66.5	3.0	7.0	0.24	1100.0	1.6	
AM34HD0404-09	Double Shaft								
AM34HD0404-E1000D	W/Encoder								
AM34HD1404-06	Single Shaft		96.0	5.0	7.0	0.33	1850.0	2.7	
AM34HD1404-07	Double Shaft								
AM34HD1404-E1000D	W/Encoder								
AM34HD2403-07	Single Shaft		125.5	7.1	7.0	0.49	2750.0	3.8	
AM34HD2403-08	Double Shaft								
AM34HD2403-E1000D	W/Encoder								

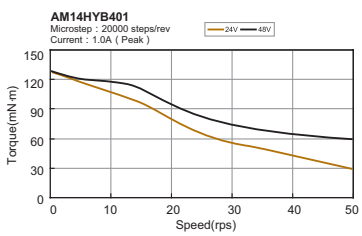
*MOONS' offers standard encoder type motor with 1000 line encoder, A/B/Z differential output.

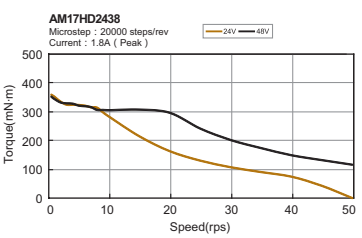
Torque Curves

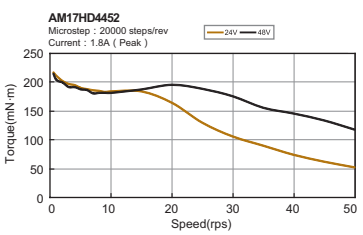












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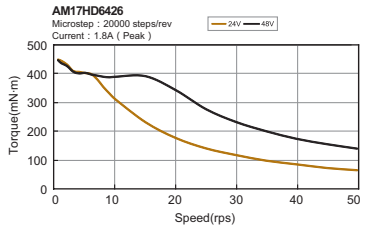
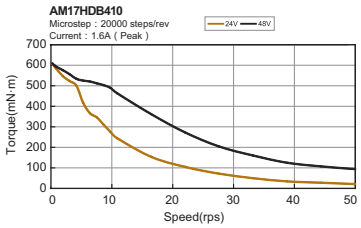
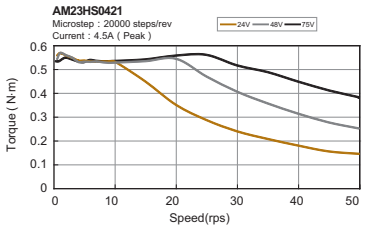
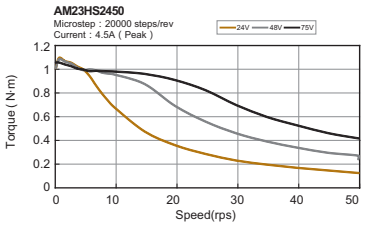
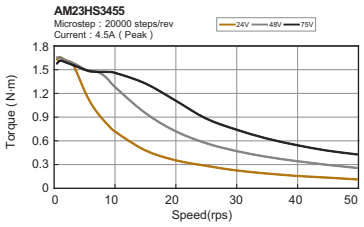
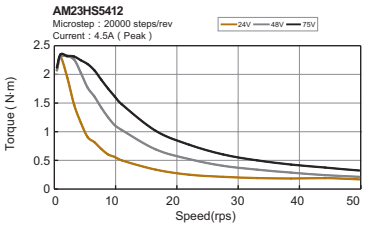


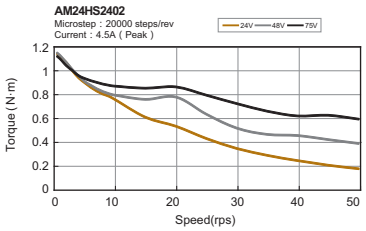


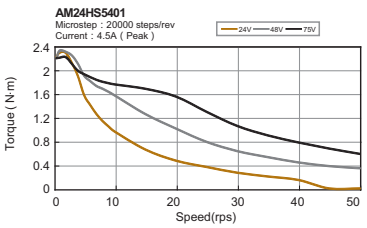


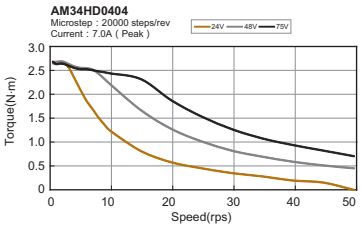


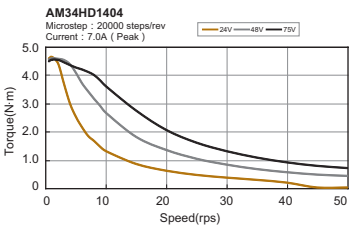


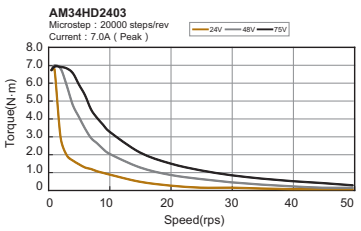












Accessories

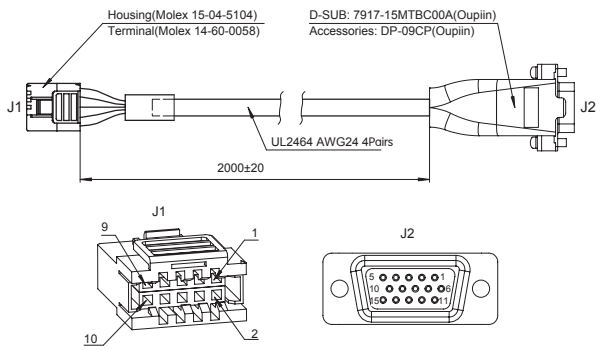
RC-880 Regeneration Clamp

Many motor and drives systems require a clamp circuit to limit increase in power supply voltage when the motor is decelerating under load. This is commonly referred to as "regeneration", and occurs when DC motors are driven by their load (backdriving). During regeneration the DC motor can produce enough voltage to actually exceed the input power supply voltage. MOONS' drives can deal with regeneration by channeling the increased motor voltage back to the source power supply. However, if the voltage is not clamp to a safe level the power supply and/or drive can be damaged or destroyed.

Max. Supply Voltage: 80V
Max. Output Current: 8A(rms)
Continuous Power: 50W

Encoder Cable

Moder:2005-200
Description: Encoder cable used with MOONS' drive



J1	Singal	J2	Color
1	NC		
2	Ground	8	GRN/WHT
3	I-	6	ORG/WHT
4	I+	5	ORG
5	A-	2	BUL/WHT
6	A+	1	BLU
7	Power+	7	GRN
8	NC		
9	B-	4	BRN/WHT
10	B+	3	BRN

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Numbering System

MSST 5 - Q - AE

Series: MSST

Output Current (peak-of-sine)
5 = 5A/Phase
10 = 10A /Phase

Control Mode
S = Basic Type
Q = Q programmer Type
C = CANopen Type
IP = EtherNet/IP Type

Communications
A = RS-232
C = CANopen
E = Ethernet
R = RS-485

Feedback
N = None
E = Encoder

Ordering Information

Model	Control	Current	Voltage	Encoder	RS-232	RS-485	CANopen	Ethernet
MSST5-S	S	0.1-5A	24-48VDC		√			
MSST10-S		0.1-10A	24-80VDC		√			
MSST5-Q-AN	Q	0.1-5A	24-48VDC		√			
MSST5-Q-AE				√	√			
MSST5-Q-RN					√	√		
MSST5-Q-RE				√	√	√		
MSST5-Q-EN								√
MSST5-Q-EE				√				√
MSST10-Q-AN		0.1-10A	24-80VDC		√			
MSST10-Q-AE				√	√			
MSST10-Q-RN					√	√		
MSST10-Q-RE				√	√	√		
MSST10-Q-EN								√
MSST10-Q-EE				√				√
MSST5-C-CN	C	0.1-5A	24-48VDC		√		√	
MSST5-C-CE				√	√		√	
MSST10-C-CN		0.1-10A	24-80VDC		√		√	
MSST10-C-CE				√	√		√	
MSST5-IP-EN	IP	0.1-5A	24-48VDC					√
MSST5-IP-EE				√				√
MSST10-IP-EN		0.1-10A	24-80VDC					√
MSST10-IP-EE				√				√

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