

MOONS'

moving in better ways

Miniature Linear Actuators



- Easy Installation
- Small Size
- Excellent Performance

Catalogue

Miniature Linear Actuators

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Miniature Linear Actuators

MOONS' Miniature Linear Actuators are designed to meet the needs of customers' compact structure. These products have the characteristics such as high integration, small size and stable product quality. Not only provides the best performance but also easier to use.

- A variety of sizes and length selections, can cooperate with various applications
- MLA28, MLA35 & MLA42 have Step Servo motor options, Closed loop control
- MLA28, MLA35 & MLA42 have encoder & brake options
- Each size of Miniature Linear Actuators has a variety of lead screw & ball screw selections

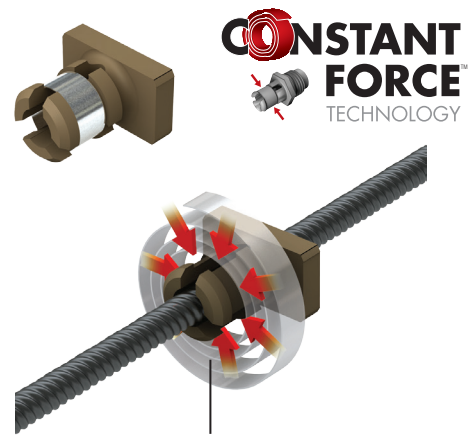
MOONS' has committed to product innovation design and technical improvement, with excellent product quality,application technology, fast and flexible services,which provide customers with high level motion control solutions.

Constant Force Technology

Constant Force™ Anti-Backlash Nut

An intuitive leap forward in nut design for lead screw applications, Constant Force Technology utilizes a constant force spring to apply a uniform pressure to the nut at all stages of the motion profile.

- Greater consistency and resistance to backlash
- Configurable for various torque requirements
- Patent pending self-adjusting anti-backlash feature
- Polymer nuts are self-lubricating and maintenance free



Patent pending Constant Force Technology nut provides consistent anti-backlash operation

Standard Fixed Nut

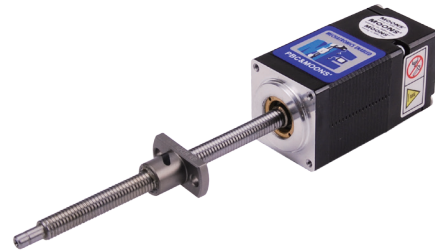
- Good rigidity and vibration damping
- Polymer nuts are self-lubricating and maintenance free



Integrated Step-Servo Technology

The Step-Servo is an innovative revolution for the world of stepper motor, it enhances the stepper motors with servo technology to create a product with exceptional feature and broad capability.

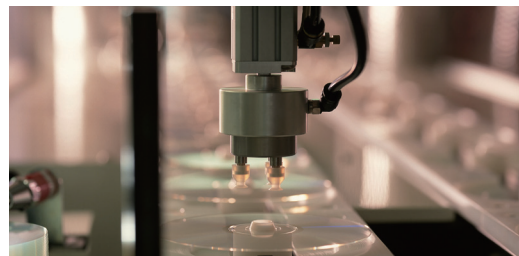
- Intelligent built-in controller
- Multi-axis field bus control
- Enhanced motor, Optimized design
- Efficient, Smooth, Accurate fast
- Low vibration, Low noise, Low heating



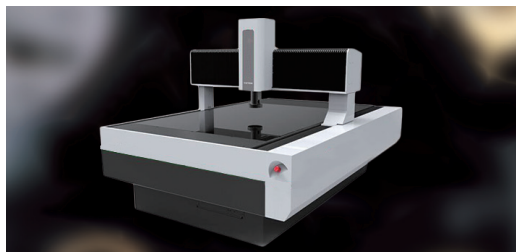
Applications



Medical Science



Factory Automation



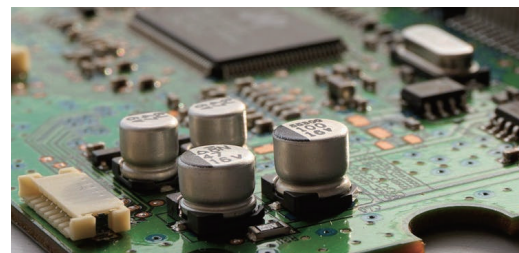
Measuring Instrument



Biochemical Analysis



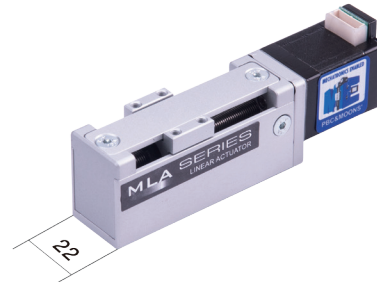
Photovoltaic Machining



Semiconductor Fabrication

MLA20 Series

- Integrated design, Easy installation
- Small size, Width 22mm
- Anti-Backlash technology, High repeatability



Ordering Information

MLA20 - 3E1 0 T - L ED 1 - XX - 0 - XXXX

Actuator Series Code

Code	Mating Motor
MLA20	NEMA08

Motor Length Code

Code	Motor Length Max(mm)
3E1	29.5(LE080S)

Additional Options Code

Code	Additional Options*
0	No additional
E	Encoder

Outlet Direction Code

Code	Outlet Direction**
T	Top
B	Bottom
L	Left
R	Right

Screw Type Code

Code	Screw Type
L	Lead Screw

Special Custom Type Code

This code defines by our technical department

Sensor Options Code

Code	Sensor Quantity
0	No Sensor
1	1 EA
2	2 EA

Stroke (MAX:80mm)

Effective stroke(Customize), Provided in 10 mm increments

Nut Type Code

Code	Nut Type
1	Standard Nut
2	Anti-Backlash Nut

Lead Code

Code	Lead (inch)
ED	0.024
EB	0.048
EG	0.096

Note:

*Additional Options: MOONS' provides encoders for LE08 series motors as additional option,see page 11 for more details.

**Outlet Direction:Customer can choose the outlet direction according to the actual requirements,see the dimensional information for outlet direction definition in next page.

MLA20 Series

Technical Data

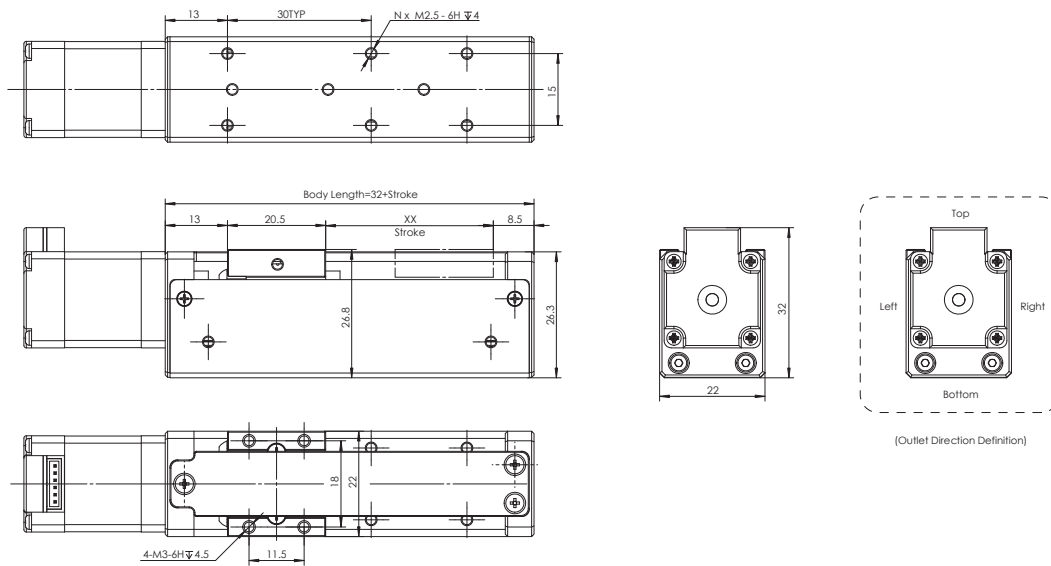
Screw Type	Lead code	Lead	Maximum Speed (mm/s)	Maximum Load(kg) Motor: LE080S		Repeatability (mm)
				Horizontal	Vertical	
Lead screw	ED	0.024"	6.096	1.5	0.5	±0.02
	EB	0.048"	12.192	1	0.5	
	EG	0.096"	24.384	0.5	0.5	

Note:

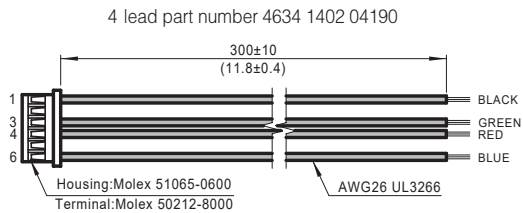
- 1.The above options are common choices, please consult our technical department for further information.
- 2.Recommended Driver, DC Input: SR2-Plus; DC Input Controller Type: ST5-S/Q/C-AN(RN).

Dimensional Information

Unit: mm

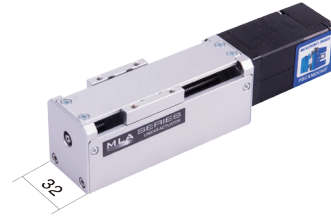


Mating Connector With Leads



MLA28 Series

- Integrated design, Easy installation
- Small size, Width 32mm
- Lead Screw /Ball Screw options available
- Integrated Step-Servo options available



Ordering Information

MLA28 - 3D1 0 T - L AE 1 - XX - 0 - XXXX

Actuator Series Code

Code	Mating Motor
MLA28	NEMA11

Motor Length Code

Code	Motor Length Max(mm)	Motor Type
3D1	32(LE111S)	Stepping
3D2	41 (LE113S)	Stepping
2D2	53(TSM11)	Step-Servo

Additional Options Code

Code	Additional Options*
0	No additional
B	Brake
E	Encoder

Outlet Direction Code

Code	Outlet Direction**
T	Top
B	Bottom
L	Left
R	Right

Screw Type Code

Code	Screw Type
L	Lead Screw
B	Ball Screw

Special Custom Type Code

This code defines by our technical department

Sensor Options Code

Code	Sensor Quantity
0	No Sensor
1	1 EA
2	2 EA

Stroke (MAX:150mm)

Effective stroke(Customize), Provided in 10 mm increments

Nut Type Code

Code	Nut Type	Mating Screw
1	Standard Nut	Lead Screw
2	Anti-Backlash Nut	
3	Standard Nut	Ball Screw

Lead Code

Code	Lead (inch)	Code	Lead *** (mm)
ED	0.024	AH	1
EC	0.025	AG	2
EB	0.048	AE	3
AM	0.1	AX	5
EQ	0.192	AJ	10
AB	0.25	BD	12
AC	0.5		

Note:

*Additional Options: Additional Options: MOONS' provides encoders & brakes for LE11 series motors as additional options,see page 11 & page 12 for more details.

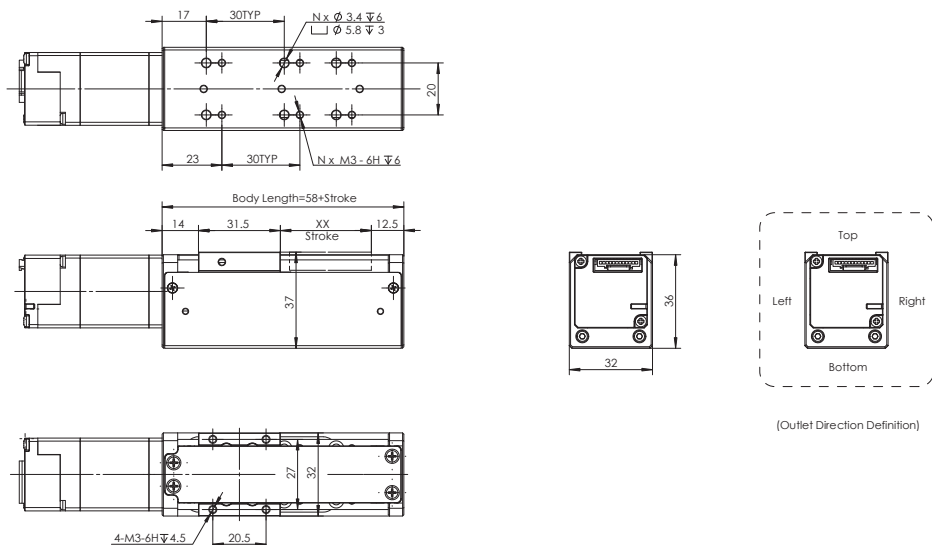
**Outlet Direction:Customer can choose the outlet direction according to the actual requirements,see the dimensional information for outlet direction definition in next page.

*** Lead: The lead options in the chart just for lead screw, see the technical data for ball screw lead options in next page.

Screw Type	Lead code	Lead	Maximum Speed (mm/s)	Maximum Load(kg) Motor: LE111S		Maximum Load(kg) Motor: LE113S		Maximum Load(kg) Motor: TSM11		Repeatability (mm)
				Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	
Lead screw	ED	0.024"	6.096	3	2	3	2	3	2	±0.02
	EC	0.025"	6.35	3	2	3	2	3	2	
	EB	0.048"	12.192	3	2	3	2	3	2	
	AM	0.1"	25.4	3	2	3	2	3	2	
	EQ	0.192"	48.768	2.4	1.6	3	2	3	2	
	AB	0.25"	63.5	1.8	1.2	3	2	3	2	
	AC	0.5"	127	1	0.6	1.6	1.1	1.6	1.1	
	AH	1mm	10	3	2	3	2	3	2	
	AG	2mm	20	3	2	3	2	3	2	
	AE	3mm	30	3	2	3	2	3	2	
	AX	5mm	50	2.3	1.5	3	2	3	2	
	AJ	10mm	100	1.3	0.9	2.1	1.4	2.1	1.4	
BD	12mm	120	1.1	0.7	1.8	1.2	1.8	1.2		
Ball screw	AH	1mm	10	5	3	5	3	5	3	±0.01
	AG	2mm	20	5	3	5	3	5	3	
	BG	6mm	60	4.1	1.4	4.4	1.9	4.4	1.9	
	AJ	10mm	100	3.5	0.9	3.8	1.2	3.8	1.2	

1.The above options are common choices, please consult our technical department for further information.
2.Recommended Driver. DC Input: SR2-Plus; DC Input Controller Type: ST5-S/Q/C-AN(RN).

Unit: mm



4 lead part number 4634 1402 04190

300±10
(11.8±0.4)

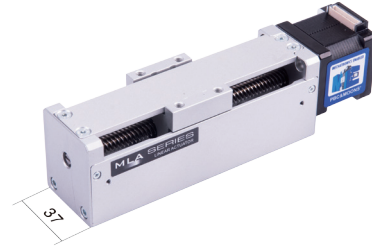
1 BLACK
2 GREEN
3 RED
4 BLUE

Housing: Molex 51065-0600
Terminal: Molex 50212-8000
AWG26 UL3266

6 Miniature Linear Actuators

MLA35 Series

- Integrated design, Easy installation
- Small Size, Width 37mm
- Lead Screw /Ball Screw options available
- Integrated Step-Servo options available



Ordering Information

MLA35 - 3C2 0 T - L AE 1 - XX - 0 - XXXX

Actuator Series Code

Code	Mating Motor
MLA35	NEMA14

Motor Length Code

Code	Motor Length Max(mm)	Motor Type
3C2	36 (LE143S)	Stepping
2B2	70(AM14RS3DMA)	Step-Servo

Additional Options Code

Code	Additional Options*
0	No additional
B	Brake
E	Encoder

Outlet Direction Code

Code	Outlet Direction**
T	Top
B	Bottom
L	Left
R	Right

Screw Type Code

Code	Screw Type
L	Lead Screw
B	Ball Screw

Special Custom Type Code

This code defines by our technical department

Sensor Options Code

Code	Sensor Quantity
0	No Sensor
1	1 EA
2	2 EA

Stroke (MAX:250mm)

Effective stroke(Customize), Provided in 10 mm increments

Nut Type Code

Code	Nut Type	Mating Screw
1	Standard Nut	Lead Screw
2	Anti-Backlash Nut	
3	Standard Nut	Ball Screw

Lead Code

Code	Lead (inch)	Code	Lead *** (mm)
ED	0.024	AH	1
EB	0.048	AG	2
EQ	0.192	AE	3
AB	0.25	AX	5
AC	0.5	AJ	10
		BD	12

Note:

*Additional Options: Additional Options: MOONS' provides encoders & brakes for LE14 series motors as additional options,see page 11 & page 12 for more details .

**Outlet Direction:Customer can choose the outlet direction according to the actual requirements,see the dimensional information for outlet direction definition in next page.

*** Lead: The lead options in the chart just for lead screw, see the technical data for ball screw lead options in next page.

MLA35 Series

Technical Data

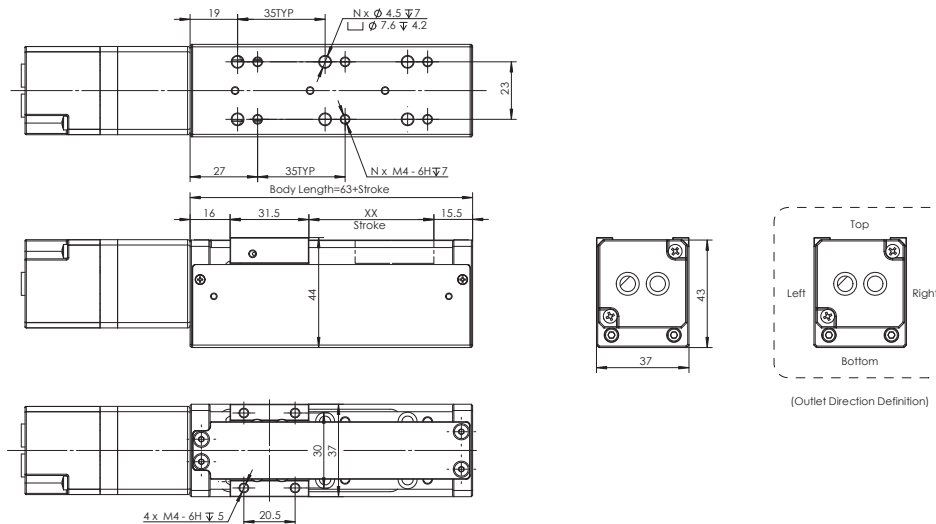
Screw Type	Lead code	Lead	Maximum Speed (mm/s)	Maximum Load(kg) Motor: LE143S		Maximum Load(kg) Motor: AM14RS3DMA		Repeatability (mm)
				Horizontal	Vertical	Horizontal	Vertical	
Lead screw	ED	0.024"	6.096	5	3	5	3	±0.02
	EB	0.048"	12.192	5	3	5	3	
	EQ	0.192"	48.768	5	3	5	3	
	AB	0.25"	63.5	4.5	3	4.2	2.8	
	AC	0.5"	127	2.4	1.6	2.2	1.5	
	AH	1mm	10	5	3	5	3	
	AG	2mm	20	5	3	5	3	
	AE	3mm	30	5	3	5	3	
	AX	5mm	50	5	3	5	3	
	AJ	10mm	100	3.2	2.1	3.1	2	
Ball screw	BD	12mm	120	2.7	1.8	2.5	1.7	±0.01
	AH	1mm	10	8	5	8	5	
	AD	2.5mm	25	8	5	8	4.7	
	AX	5mm	50	6.8	4.1	6.5	3.8	
	BH	8mm	80	5.1	3.5	4.6	3.1	
	AJ	10mm	100	4.3	2.9	3.8	2.6	
	BD	12mm	120	3.5	2.5	3.3	2.2	

Note:

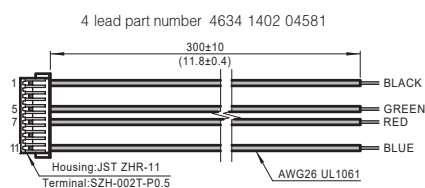
- 1.The above options are common choices, please consult our technical department for further information.
- 2.Recommended Driver, DC Input: SR2-Plus; DC Input Controller Type: ST5-S/Q/C-AN(RN).

Dimensional Information

Unit: mm



Mating Connector With Leads



Note: The above connector with leads is matched with the LSM14 series motor.

MLA42 Series

- Integrated design, Easy installation
- Small Size, Height 35.5mm
- Lead Screw /Ball Screw options available
- Integrated Step-Servo options available



Ordering Information

MLA42 - 3A1 0 T - L AR 1 - XX - 0 - XXXX

Actuator Series Code

Code	Mating Motor
MLA42	NEMA17

Motor Length Code

Code	Motor Length Max(mm)	Motor Type
3A1	39.8 (LE172S)	Stepping
3A2	48.3 (LE176S)	Stepping
2A2	83.5(TSM17)	Step-Servo

Additional Options Code

Code	Additional Options*
0	No additional
B	Brake
E	Encoder

Outlet Direction Code

Code	Outlet Direction **
T	Top
B	Bottom
L	Left
R	Right

Screw Type Code

Code	Screw Type
L	Lead Screw
B	Ball Screw

Special Custom Type Code

This code defines by our technical department

Sensor Options Code

Code	Sensor Quantity
0	No Sensor
1	1 EA
2	2 EA

Stroke (MAX:350mm)

Effective stroke(Customize), Provided in 10 mm increments

Nut Type Code

Code	Nut Type	Mating Screw
1	Standard Nut	Lead Screw
2	Anti-Backlash Nut	
3	Standard Nut	Ball Screw

Lead Code

Code	Lead (mm)	Code	Lead *** (mm)
CG	1.25	AX	5
AA	5.08	BH	8
BX	10.5	AJ	10
AH	1	BD	12
AG	2	AF	16
AR	4	AW	25

Note:

*Additional Options: Additional Options: MOONS' provides encoders & brakes for LE17 series motors as additional options,see page 11 & page 12 for more details.

**Outlet Direction:Customer can choose the outlet direction according to the actual requirements,see the dimensional information for outlet direction definition in next page.

*** Lead: The lead options in the chart just for lead screw, see the technical data for ball screw lead options in next page.

MLA42 Series

■ Technical Data

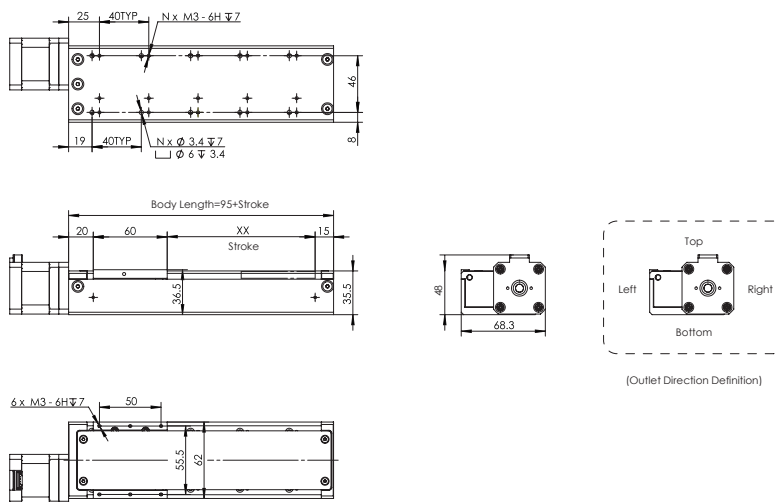
Screw Type	Lead code	Lead	Maximum Speed (mm/s)	Maximum Load(kg) Motor: LE172S		Maximum Load(kg) Motor: LE176S		Maximum Load(kg) Motor: TSM17		Repeatability (mm)
				Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	
Lead screw	CG	1.25mm	12.5	5	3	5	3	5	3	±0.02
	AA	5.08mm	50.8	5	3	5	3	5	3	
	BX	10.5mm	105	5	3	5	3	5	3	
	AH	1mm	10	5	3	5	3	5	3	
	AG	2mm	20	5	3	5	3	5	3	
	AR	4mm	40	5	3	5	3	5	3	
	AX	5mm	50	5	3	5	3	5	3	
	BH	8mm	80	5	3	5	3	5	3	
	AJ	10mm	100	5	3	5	3	5	3	
	BD	12mm	120	5	3	5	3	5	3	
	AF	16mm	160	3.8	2.5	4.8	3	4.5	2.2	
	AW	25mm	250	2.4	1.6	3.1	2	2.9	1.8	
Ball screw	AG	2mm	20	8	5	8	5	8	5	±0.01
	AX	5mm	50	8	5	8	5	8	5	
	BH	8mm	80	6.7	3.1	7.5	4.7	7.1	4.4	

Note:

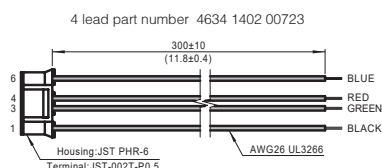
- 1.The above options are common choices, please consult our technical department for further information.
2.Recommended Driver, DC Input: SR2-Plus; DC Input Controller Type: ST5-S/Q/C-AN(RN).

■ Dimensional Information

Unit: mm



■ Mating Connector With Leads



Note: The above connector with leads is matched with the LSM17 series motor.

Encoder Options-Suitable for applications that require feedback

Parameter

Mating Motor	Supply Voltage (VDC)			CPR	PPR	Operating Temperature(°C)		Vibration (g) (5HZ-2KHZ)	Output	
	Min.	Typ.	Max.			Low	High			
LSM08/11	4.5	5	5.5	400	1600	-20	100	20	Single-ended Electrical	Differential Electrical
LSM14/17/23				1000	4000	-40	100			



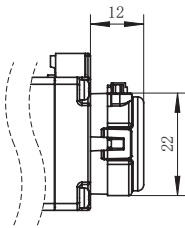
LSM11 with encoder



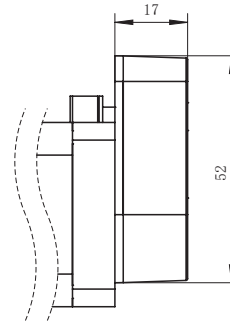
LSM17 with encoder

Dimensional Information

Unit: mm



The encoder mating LE08/11

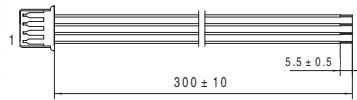


The encoder mating LE14/17/23

Mating Connector With Leads

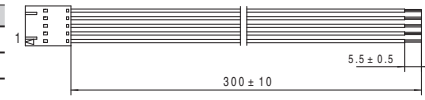
Single-ended Electrical

Pin	Function	Color
1	+5VDC Power	Black
2	A Channel	Green
3	Ground	Red
4	B Channel	Blud



For the encoder mating LE08/11

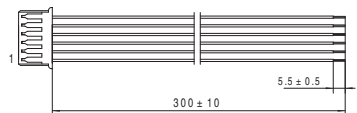
Pin	Function	Color
1	Ground	Black
2	Index	Green
3	A Channel	Red
4	+5VDC Power	Blud
5	B Channel	Yellow



For the encoder mating LE14/17/23

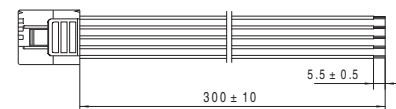
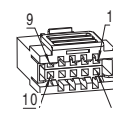
Differential Electrical

Pin	Function	Color
1	Ground	Black
2	A+Channel	Green
3	A- Channel	Red
4	Power	Blud
5	B+Channel	Yellow
6	B- Channel	White



For the encoder mating LE08/11

Pin	Function	Color
1	-	-
2	Ground	Black
3	I- Channel	Green
4	I+Channel	Red
5	A- Channel	Blud
6	A+Channel	Yellow
7	Power	White
8	-	-
9	B- Channel	Orange
10	B+Channel	Brown



For the encoder mating LE14/17/23

Brake Options

Parameter

Mating Motor	Supply Voltage (VDC)	Braking Torque (N·M)	Power (W)	Reaction Time (ms)	Insulation Grade
LSM11/14	24	0.4	4	15	B
LSM17	24	0.6	5	50	B
LSM23	24	1.2	4.5	50	B

Note:

1. All the brakes with 300mm leads.

2. 12 VDC brake options are available, please consult our technical department for further information.



LE11 with brake



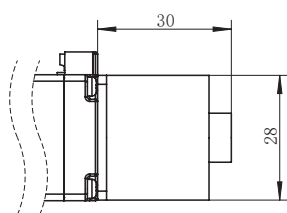
LE17 with brake



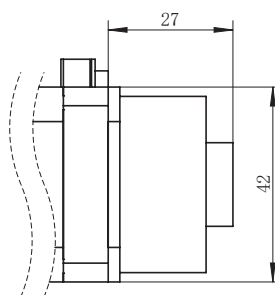
LE23 with brake

Dimensional Information

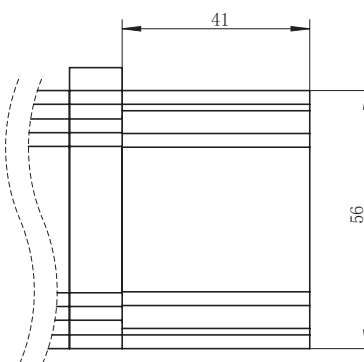
Unit: mm



The brake mating LE11/14



The brake mating LE17



The brake mating LE23

DC Input Stepper Drive-SR Series

SR Series Drives

The SR series are compact, powerful, digital stepper drives feature advanced microstepping performance and sophisticated current control. All drive setup is done via dip or rotary switches.

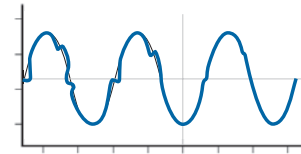
- Advanced Current Control
- Anti-Resonance
- Torque Ripple Smoothing
- Microstep Emulation
- Self Test



■ Features

Anti-Resonance

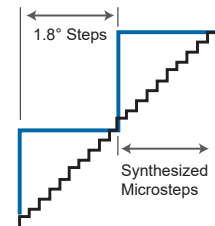
Step motor systems have a natural tendency to resonate at certain speeds. The SR drives automatically calculate the system's natural frequency and apply damping to the control algorithm. This greatly improves midrange stability, allows higher speeds and greater torque utilization, and also improves settling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



Provides better motor performance and higher speeds

Microstep Emulation

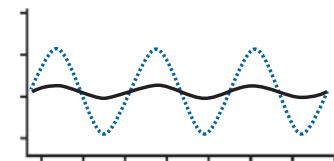
With Microstep Emulation, low resolution systems can still provide smooth motion. The drive can take low resolution step pulses and create fine resolution motion.



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.

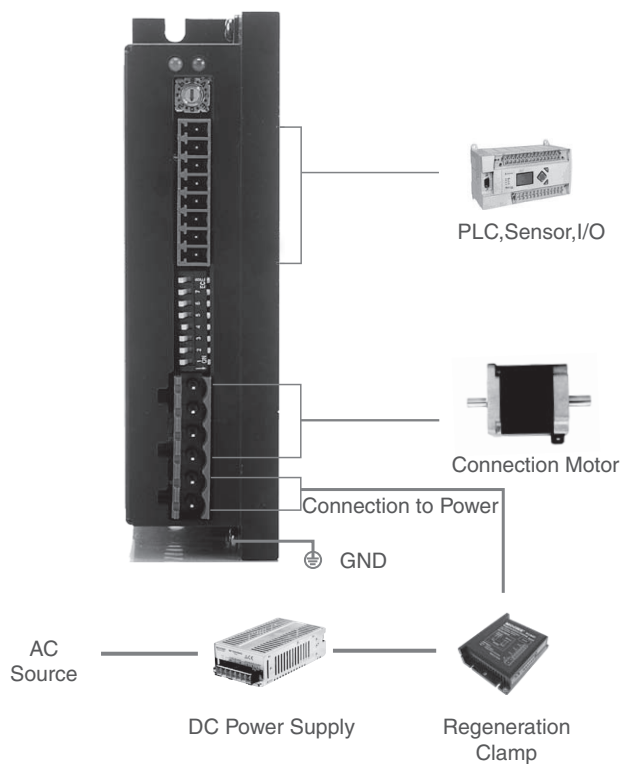


Improves overall system performance

Auto Setup & Self Test

At start-up the drive measures motor parameters, including the resistance and inductance, then uses this information to optimize system performance. The drive can also detect open and short circuits.

■ System Configuration



■ Numbering System

SR	2	-	PLUS
Series	Max. Current 2=2.2A Max. 3=3.0A Max. 4=4.5A Max. 8=7.8A Max.		Blank=Standard Plus=Enhanced Mini=Compact

■ Ordering Information

Model	Current	Voltage	Microstep Selection	Current Selection
SR2-Plus	0.3-2.2A	12-48VDC	16	8
SR3-mini	0.4-3.0A	12-48VDC	16	8
SR4-Plus	1.0-4.5A	24-48VDC	16	8
SR8-Plus	2.4-7.8A	24-75VDC	16	8

■ Drive Specifications

Specification	
Speed Range	Up to 3000RPM
Operating Temperature	0 - 40C°
Ambient Humidity	90% or less(non-condensing)
Vibration Resistance	5.9m/s ² maximum
Storage Temperature	-10 - 70C°
Heat Sinking Method	Natural cooling or fan-forced cooling
Atmosphere	Avoid dust, oily mist and corrosive air
Mass	SR2-Plus/SR3-mini: Approx. 120g
	SR4/8-Plus: Approx. 310g
Certification	RoHS , CE (EMC): EN 61800-3:2004
Features	
Idle Current	Automatic idle current reduction to reduce heat after motor stops moving for 1 second Dip switch selectable 50% or 90%
Anti-Resonance	Raises the system-damping ratio to eliminate midrange instability and allow stable operation throughout the speed range of the motor, dip switch selectable load inertia
Control Mode	Pulse input control Step&Dir
Input Signal Filter	Digital filters prevent position error from electrical noise on command signals, Dip switch selectable 2MHz or 150KHz
Microstep Emulation	Switch selectable microstep emulation provides smoother, more reliable motion
Motor Database	Rotary switch easily selects from many popular motors
Self Test	Switch selectable automatic self test, while self test, drive will rotate the motor back and forth, two turns in each direction
Fault output	Optically isolated,30VDC max, 100mA max

■ Electrical Specifications

SR2-Plus

Parameter	Min.	Typical	Max.	UNIT
Power Supply	12	-	42	VDC
Output Current (Peak)	0.3	-	2.2	Amps
Cost current of digital input signal	6	10	15	mA
Step Frequency	2	-	2M	Hz
STEP minimum pulse width	250	-	-	ns
DIR minimum pulse width	80	-	-	us
Under Voltage Protection	-	10	-	VDC
Over Voltage Protection	-	52	-	VDC
Input Signal Voltage	4	-	28	VDC
Initialization time	-	-	2.5	S
OUT maximum output current	-	-	100	mA
OUT maximum voltage	-	-	30	VDC

SR4-Plus

Parameter	Min.	Typical	Max.	UNIT
Power Supply	24	-	48	VDC
Output Current (Peak)	1	-	4.5	Amps
Cost current of digital input signal	6	10	15	mA
Step Frequency	2	-	2M	Hz
STEP minimum pulse width	250	-	-	ns
DIR minimum pulse width	80	-	-	us
Under Voltage Protection	-	20	-	VDC
Over Voltage Protection	-	60	-	VDC
Input Signal Voltage	4	-	28	VDC
Initialization time	-	-	2.5	S
OUT maximum output current	-	-	100	mA
OUT maximum voltage	-	-	30	VDC

SR3-mini

Parameter	Min.	Typical	Max.	UNIT
Power Supply	12	-	48	VDC
Output Current (Peak)	0.4	-	3	Amps
Cost current of digital input signal	6	10	15	mA
Step Frequency	2	-	500K	Hz
STEP minimum pulse width	1000	-	-	ns
DIR minimum pulse width	80	-	-	us
Under Voltage Protection	-	10	-	VDC
Over Voltage Protection	-	53	-	VDC
Input Signal Voltage	4	-	28	VDC
Initialization time	-	-	2.5	S

SR8-Plus

Parameter	Min.	Typical	Max.	UNIT
Power Supply	24	-	75	VDC
Output Current (Peak)	2.4	-	7.8	Amps
Cost current of digital input signal	6	10	15	mA
Step Frequency	2	-	2M	Hz
STEP minimum pulse width	250	-	-	ns
DIR minimum pulse width	80	-	-	us
Under Voltage Protection	-	20	-	VDC
Over Voltage Protection	-	85	-	VDC
Input Signal Voltage	4	-	28	VDC
Initialization time	-	-	2.5	S
OUT maximum output current	-	-	100	mA
OUT maximum voltage	-	-	30	VDC

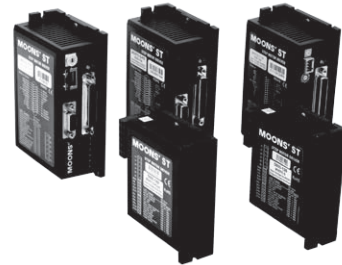
DC Input Controller Type Stepper Drive-ST Series

ST Series

The ST series are compact digital stepper drives with multiple control options and many sophisticated features. Step motors run smoother and faster than ever with features of advanced current control.

With multiple control options, ST series support stand-alone programming and various bus control as RS-232/485, Ethernet UDP/TCP, CANopen and Ethernet/IP.

The ST series also has optional encoder feedback with close loop for improved system performance and reliability.

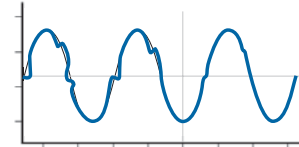


- **Advanced Current Control**
- **Anti-Resonance**
- **Torque Ripple Smoothing**
- **Microstep Emulation**
- **Stall Detection and Stall Prevention**

■ Features

Anti-Resonance

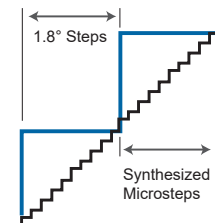
Step motor systems have a natural tendency to resonate at certain speeds. The MSST drives automatically calculate the system's natural frequency and apply damping to the control algorithm. This greatly improves midrange stability, allows higher speeds and greater torque utilization, and also improves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



Provides better motor performance and higher speeds

Microstep Emulation

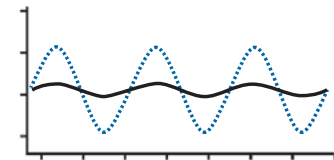
With Microstep Emulation, low resolution systems can still provide smooth motion. The drive can take low resolution step pulses and create fine resolution motion.



Delivers smoother motion in any application

Torque Ripple Smoothing

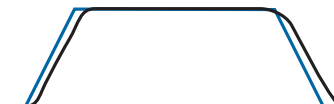
All step motors have an inherent low speed torque ripple that can affect the motion profile of the motor. By analyzing this torque ripple the system can apply a negative harmonic to counter this effect. This gives the motor much smoother motion at low speed.



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)

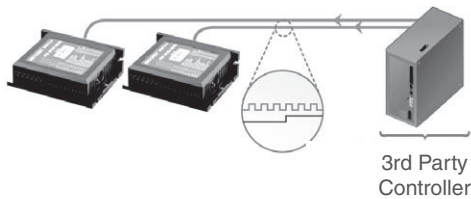
The optional encoder detects the rotor's position to provide Stall Detection and Stall Prevention functions.

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.

■ Which model is right for your application?

Step & Direction



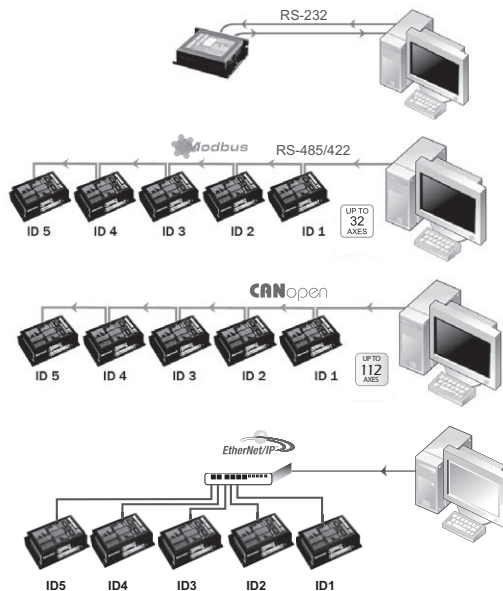
- Step & Direction
- CW & CCW pulse
- Master Encoder

Oscillator / Run-Stop



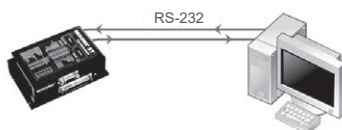
- Software Configuration
- Two Speeds
- Vary speed with analog input
- Joystick compatible

Host Control



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

Stand Alone Programmable



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

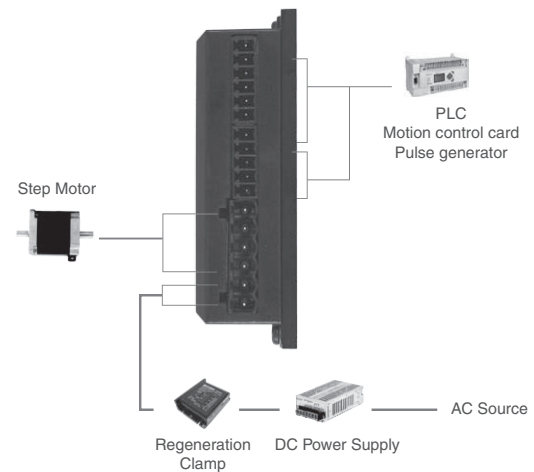
■ ST Lineup Control Modes

-S Pulse Input Control

Controlled via pulse generator.

Main Features

- Accepts three types of pulse signal input as Pulse&Direction, CW/CCW and A/B Quadrature

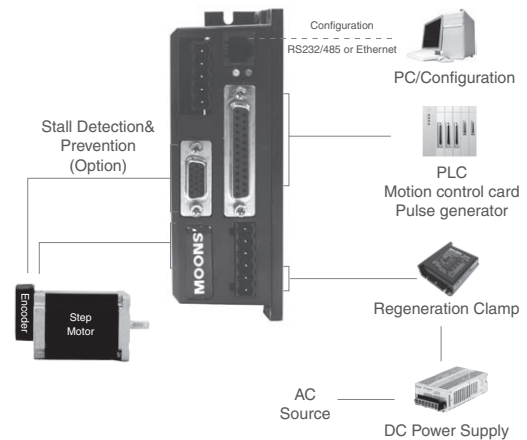


-Q Built-in programmable motion controller (Includes Modbus/RTU Type)

Run stand-alone with sophisticated and functional programs. Commands for controlling motion, inputs & outputs, drive configuration and status, as well as math operations, register manipulation, and multi-tasking.

Main Features

- Stand-alone operation plus Serial host control
- Math operations
- Register manipulation
- Multi-tasking
- With all features in S type

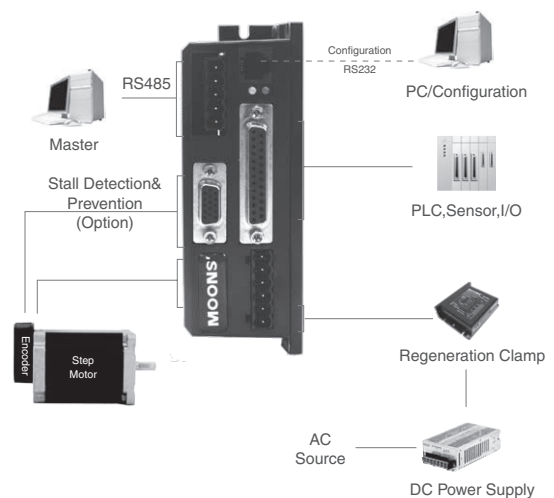


-S/Q Basic type with RS-232/RS-485 communication

Controlled via pulse signals, analog signal or MOONS' SCL streaming series commands.

Main Features

- Pulse control
- Analog control
- Host real time control using SCL via RS-232/RS-485
- Up to 32 axes per channel for RS-485

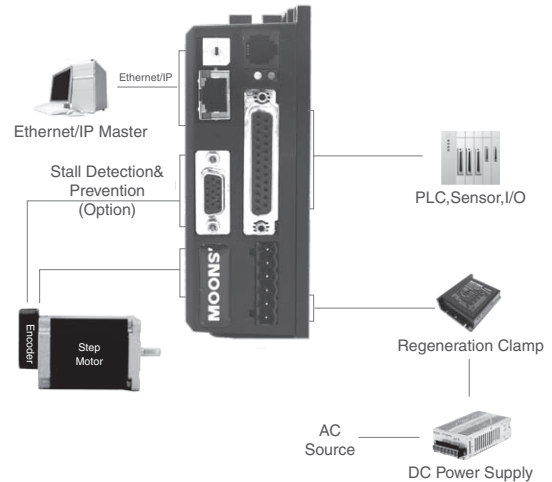


-Q With Ethernet communication

Run stand-alone with sophisticated and functional programs, controlled via MOONS' SCL streaming commands.

Main Features

- Stand-alone operation
- Host real time control using SCL via Ethernet UDP/TCP

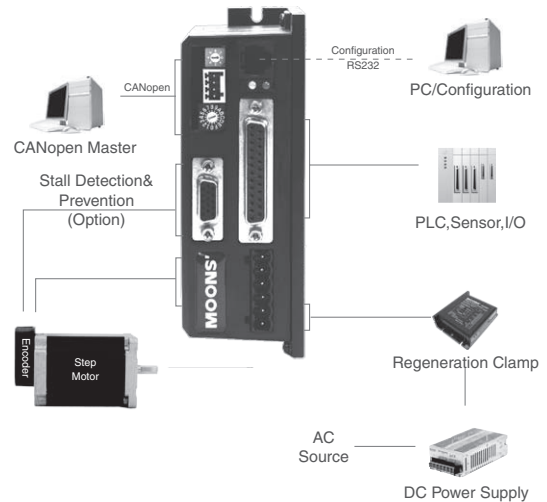


-C With CANopen communication

Operates on a CANopen communication network and conforms to CiA301 and CiA402. It supports running stored Q programs via MOONS'-specific CANopen objects.

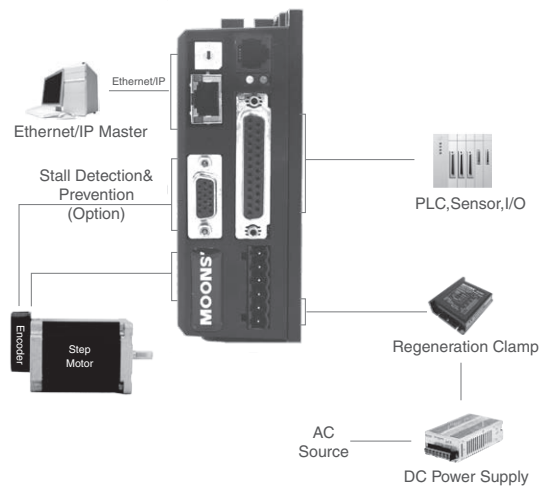
Main Features

- CANopen network
- Up to 112 axes per channel
- Objects for Q programming



-IP With EtherNet/IP communication

Communicate with PLCs and other industrial devices supporting the EtherNet/IP standard. They can also be commanded to execute stored Q programs.



■ Numbering System

MSST	5	-	Q	-	A	E
Series						Feedback(Blank in S type)
Output Current						N = None
5 = 5A Peak						E = Encoder
10 = 10A Peak						Communication(Blank in S type)
Control Mode						A = RS-232
S = Basic Type						C = CANopen
Q = Q Program Type(Modbus/RTU)						E = Ethernet
C = CANopen						R = RS-485
IP = EtherNet/IP						

■ Ordering Information

Model	Control	Current	Voltage	Encoder	RS-232	RS-485	Modbus/RTU	CANopen	Ethernet	EtherNet/IP
MSST5-S	S	0.1-5A	24-48VDC		✓					
MSST10-S		0.1-10A	24-75VDC		✓					
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	24-75VDC		✓					
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	24-75VDC		✓			✓		
MSST10-C-CE				✓	✓			✓		
MSST5-IP-EN	IP	0.1-5A	24-48VDC						✓	✓
MSST5-IP-EE				✓					✓	✓
MSST10-IP-EN		0.1-10A	24-75VDC						✓	✓
MSST10-IP-EE				✓					✓	✓

■ Drive Specifications

Amplifier Type	Dual H-Bridge, 4 Quadrant
Current Control	4 state PWM at 16 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
Approvals	RoHS, CE
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	<p>STEP, DIR inputs: Optically isolated, differential, 5 VDC, minimum pulse width = 250 ns, maximum pulse frequency = 2 MHz</p> <p>EN input: Optically isolated, 5-12 VDC</p> <p>OUT output: Optically isolated, 24 VDC max, 10 mA max</p> <p>AIN analog input: Range = 0-5 VDC, resolution = 12 bits</p>
-Q/C/IP	<p>X1, X2 inputs: Optically isolated, differential, 5 VDC, minimum pulse width = 250 ns, maximum pulse frequency = 2 MHz</p> <p>X3-X6 inputs: Optically isolated, single-ended, shared common, sinking or sourcing, 12-24 VDC</p> <p>X7, X8 inputs: Optically isolated, differential, 12-24 VDC</p> <p>Y1-Y3 outputs: Optical darlington, single-ended, shared common, sinking, 30 VDC max, 100 mA max</p> <p>Y4 output: Optical darlington, sinking or sourcing, 30 VDC max, 100 mA max</p> <p>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.</p> <p>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).</p>

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