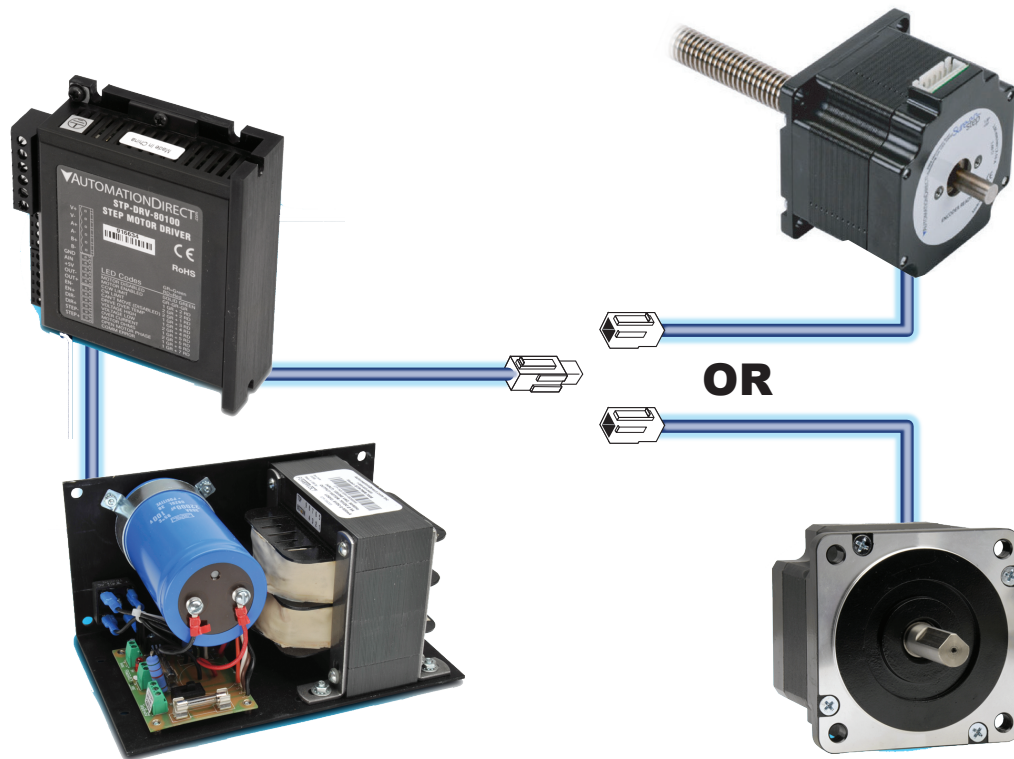
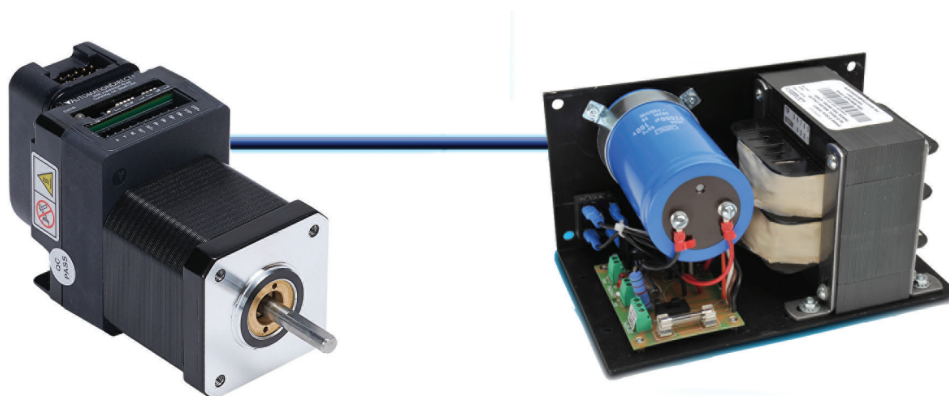


Stepper Systems

Complete SureStep system in 4 components: Power Supply, Stepper Drive, Motor Extension Cable, Motor. Standard Drives (pulse and direction input; DIP-switch configuration) and Advanced Drives (communication/analog control and setup) are available.



Complete SureStep system in 2 components: Power Supply and Integrated Stepper Motor/Drive. Standard Motor/Drives (pulse and direction input; DIP-switch configuration) and Advanced Motor/Drives (communication/analog control and setup) are available.





Stepping System Overview

High-performance microstepping drives with high-torque stepping motors

SureStep stepping systems provide simple and accurate control of position and speed. Pulses (or "step" and "direction" signals) from an AutomationDirect PLC or other indexer and motion controller are "translated" by the microstepping drive into precise movement of the stepping motor shaft. The SureStep stepping motors use 2-phase technology with 200 full steps per revolution or 1.8° per full step. Older type stepping motor drives, which operate stepping motors in full step mode, can result in stalling or lost motion due to potential problems with low speed mechanical vibration (usually between 100 to 200 RPM). To minimize this vibration problem, the SureStep microstepping drives use advanced microstepping technology to smooth the motor motion and stepping response. The SureStep family has options for open loop control (no encoder), position monitoring (external encoder feedback), and inclusive position verification (integrated motor/drives with internal encoder). Inclusive position verification provides for stall prevention and detection along with position completion after a temporary stall.

SureStep stepper drives support a wide range of selectable microstep resolutions, from 200 steps per revolution (full step) to 51,200 (full step ÷ 256) steps per revolution, depending on model.

The advanced drives can operate with traditional high-speed inputs, but can also be commanded via 0–5V analog input. They have an internal indexer that can accomplish point-to-point moves controlled via ASCII communication.

FREE configuration software!

SureMotion Pro software is available that makes setting parameters a snap for the advanced drives and advanced integrated motor/drives! SureMotion Pro replaces SureStep Pro configuration software. Download free from our website:

<https://support.automationdirect.com/products/surestep.html>

Standards and Agency Approvals

How fast can my system go?

Maximum Potential Speed Chart (rpm) *					
PLC		SureStep Drive Steps/Rev Selection **			
Model	Max Output (kHz)	400 Steps/Rev	1000 Steps/Rev	2000 Steps/Rev	10,000 Steps/Rev
DL05, DL105	7	1,050	420	210	42
DL06	10	1,500	600	300	60
H0/H2/H4/T1H-CTRIO	25	>2,500***	1,500	750	150
H2-CTRIO2	250	>2,500***			1,500
P2-HSO	1000	>2,500***			
P3-HSO	1000	>2,500***			
BRX	2000	>2,500***			

* These speeds are theoretical maximums. See torque curves of specific motors for their rpm limits.

** Full step (200 steps/rev) will allow higher top speed.

Full stepping, however, can create vibration at low speed.

*** Typical stepper systems do not run faster than 2500 rpm.

Stepping Motor RPM = (A ÷ B) x (60 seconds/minute)

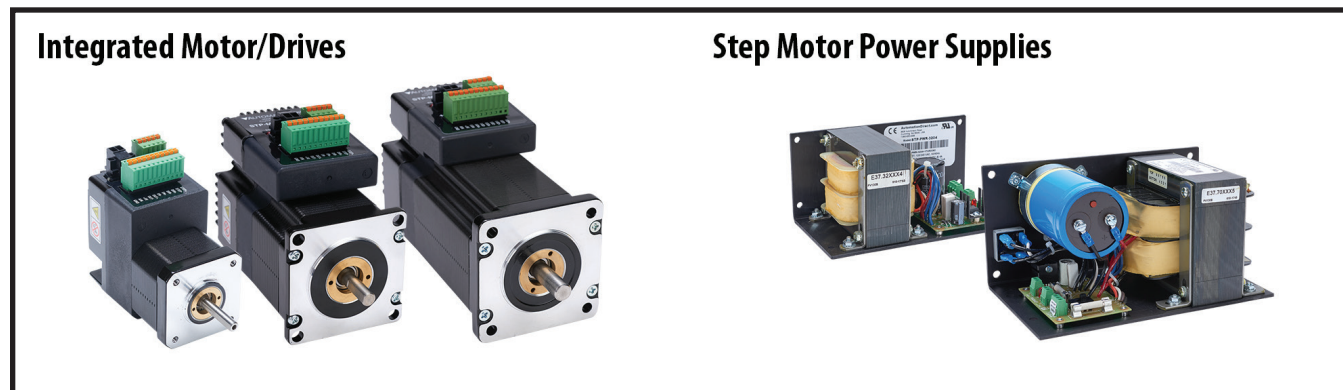
Where: A = PLC output frequency (pulses per second)
B = microstepping resolution selection (steps/revolution)

Maximum RPM =		Steps/Sec A	÷	Steps/Rev B	×	Sec/Min
Example 1:	1,500 =	10,000	÷	400	×	60
DL06 with 10 kHz Built-in Pulse Output						
Example 2:	3,750 =	25,000	÷	400	×	60
Hx-CTRIO with 25 kHz Pulse Output						

Stepping System Overview

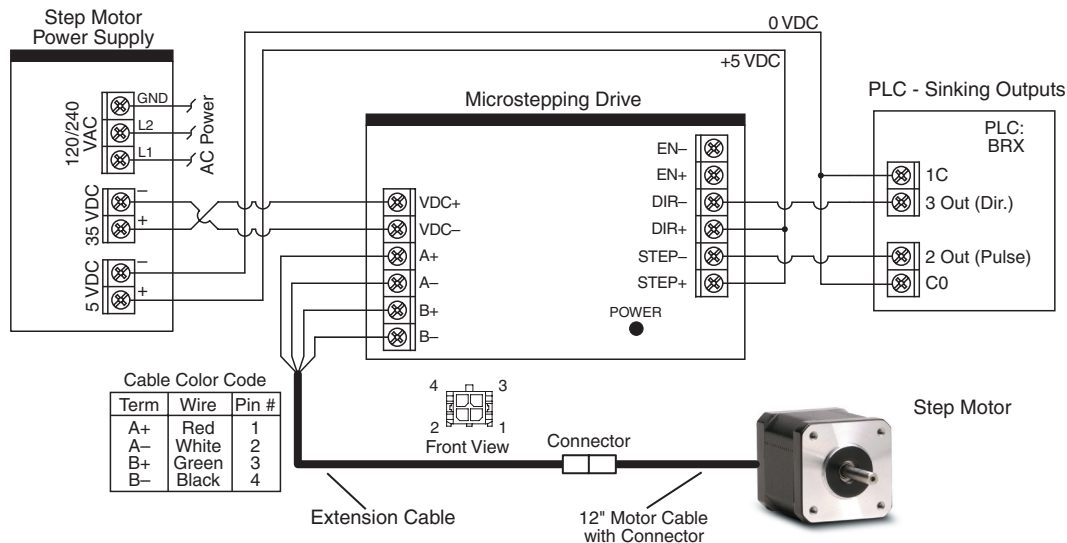
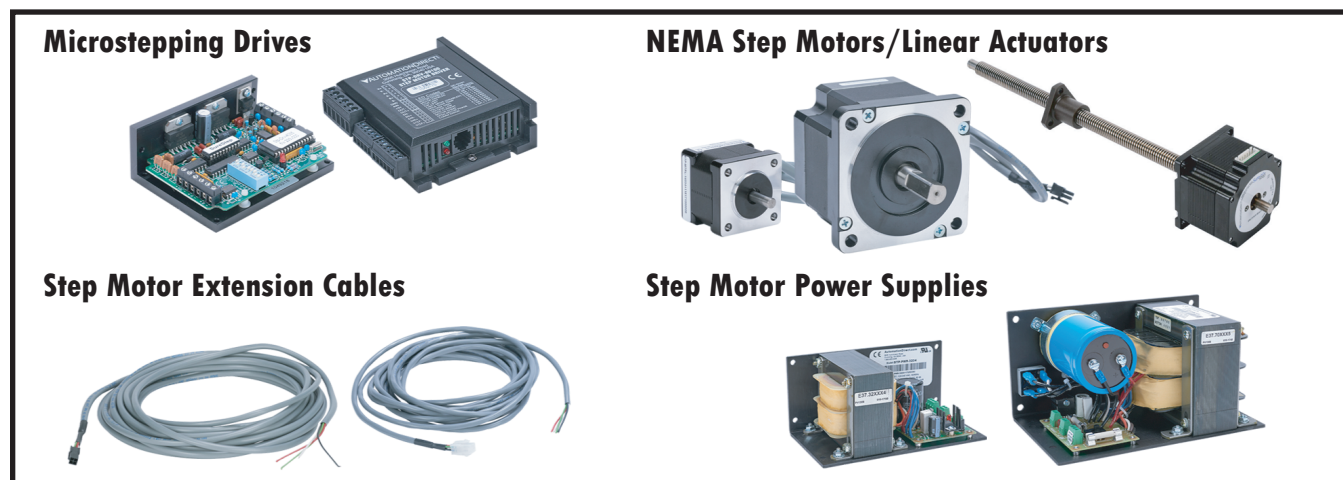
Two or Four components to make a complete system

Choose an integrated motor/drive and power supply



OR ...

Choose a separate drive, motor, motor extension cable and power supply

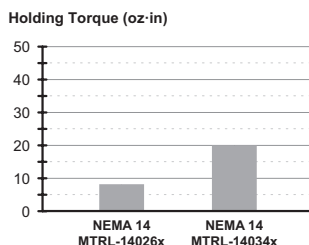


Stepping System Overview

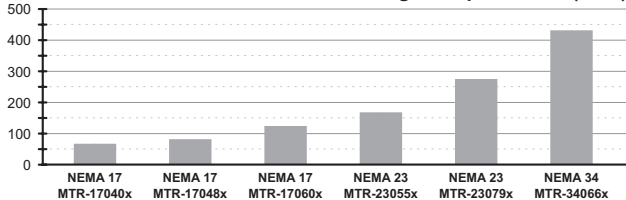
NEMA frame stepping motors

The SureStep stepping family has a wide variety of high-torque motors to handle a wide range of automation applications such as woodworking, assembly, and test machines. The motors are available in both single-shaft and dual-shaft configurations, with or without an encoder. Our square frame or "high-torque" style stepping motors are the latest in bipolar technology, resulting in very high torque to volume ratios. We have NEMA 14, 17, 23, 34, and 42 size motors with holding torque ranging from 8 to 4532 oz-in. Wash down "W" motors (IP65) are also available. Optional 6, 10, or 20-foot extension cables with locking connectors are available to interface any of the stepping motors to the microstepping drive, except the NEMA 23 and NEMA 34 STP-MTRAC-x motors. Those MTRAC motors have an integrated 10-foot pigtail cable. The

**Low Voltage
Low Torque Motors (MTRL)**

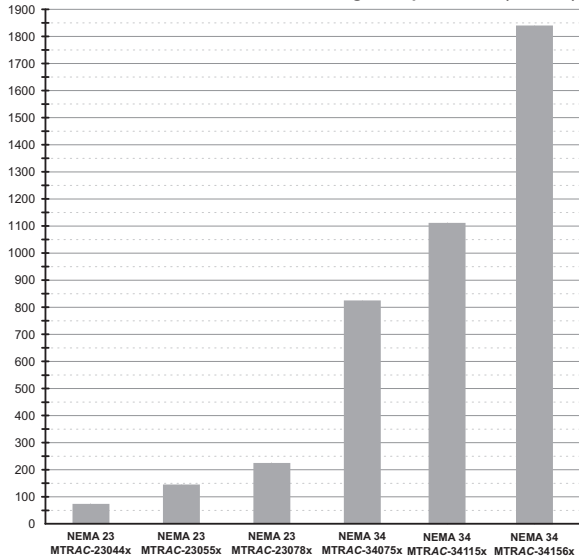


**Low Voltage
High Torque Motors (MTR)**



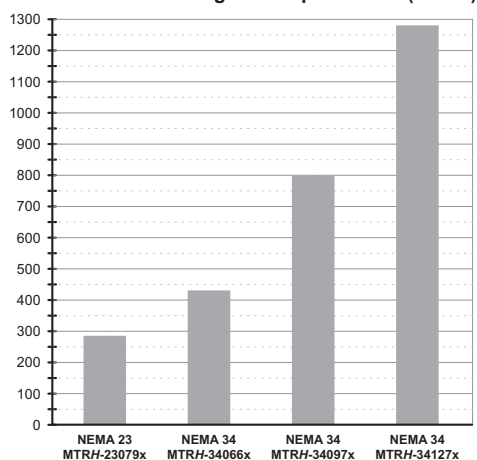
Note that the integrated motor/drive systems have a lower maximum torque due to heat constraints with the drive connected to the motor. For solutions requiring the highest torque, use the systems with our NEMA MTRH (low voltage, higher torque) or MTRAC (high voltage, high torque) motors.

**High Voltage
High Torque Motors (MTRAC)**

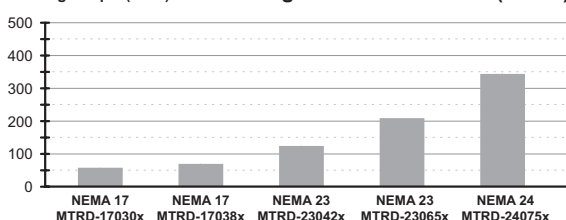


extension cables can be easily cut to length, if desired. Integrated motor/drives and separate motors with an "E" in their part number include an encoder for position feedback. The MTRAC motors are designed to work with 115 or 230 VAC powered drives and can withstand high voltages. This allows higher torque, especially at higher speeds.

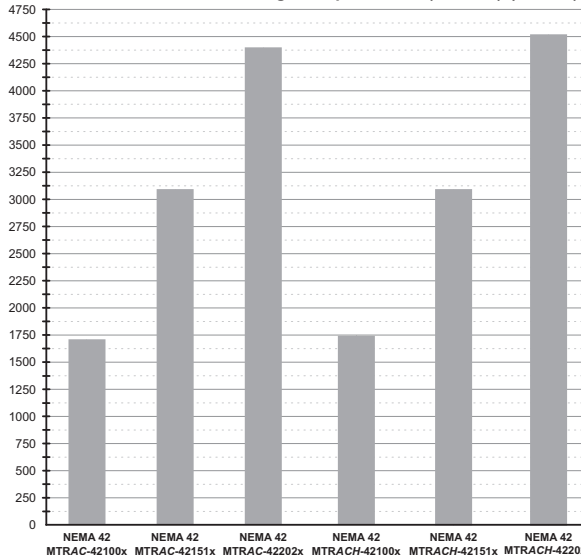
**Low Voltage
Higher Torque Motors (MTRH)**



Integrated Motors/Drives (MTRD)



**Higher Voltage
High Torque Motors (MTRACH)-42xxx**



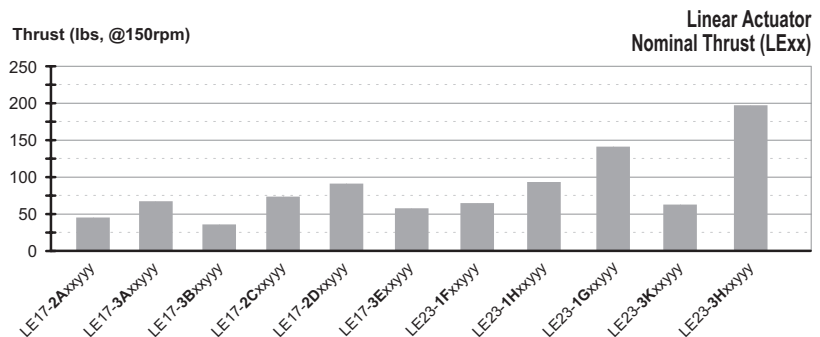
Note: While possessing similar holding torques, the MTRACH motors have much higher torque at high speeds than the MTRAC motors.



Stepping System Overview

NEMA frame stepping motors, continued

SureStep Stepper Linear Actuators combine all the great features of our stepper motors with a lead screw as the motor's shaft. NEMA 17 and 23 frame size motors are available with leads from 1.25mm/rev to 1inch/rev.



High-performance microstepping drives

SureStep microstepping drives

(STP-DRV-4035, -4830, -4845, -6575, & STP-MTRD-x)

- Standard high-speed pulse input (pulse and direction)
- On-board or removable screw terminals for easy hook-up
- Optically-isolated inputs ready for +5VDC logic from AutomationDirect PLCs, or 5–24 VDC (depending on model)
- No software or add-on resistors required for drive configuration; dipswitch and/or rotary-dial setup
- Dipswitch used for built-in self-test, microstep resolution selection, current level selection, and optional idle current reduction.
- Optional external encoder feedback for integrated models

SureStep high bus voltage microstepping drives

(STP-DRVAC-24025)

- Auto-setup measures motor parameters and configures motor current control and anti-resonance gain settings
- Uses universal AC input 90 to 240 VAC, AC input voltage must be selected by switch
- Switch selectable microstep resolution, 16 settings from 200 to 25600 steps/rev
- Switch configurable running current, anti-resonance, input signal filter, step smoothing filter, and self test
- Motor selection via 16-bit rotary switch

SureStep advanced microstepping drives

(STP-DRV-4850, STP-DRV-80100, & STP-MTRD-xR)

All the features of the standard high-performance drive, plus:

- Software configurable
- 200 - 51,200 microsteps (software selectable)
- High-speed pulse input (Quadrature, cw/ccw, pulse/direction)
- Analog velocity mode (0-5v or potentiometer)
- Internal indexer (point-to-point moves via ASCII command)
- AB quadrature/encoder following for all advanced models
- Advanced "E" integrated models contain a built-in encoder (encoder is not accessible and not available for signaling outside the drive)

Power supplies

- SureStep linear power supplies, 32V @ 4A, 48V @ 5A, 48V @ 10A, 70V @ 5A
- Input and output fuses included on power supplies
- Includes 5 VDC Logic supply for all low voltage signals
- Switching power supplies also available (12V, 24V, 48V)



Choose your SureStep System

1. Choose a motor

Determine the torque and speed required by your application. Then look at the motor speed-torque curves in the Motors and Standard Integrated and Advanced Integrated sections of this catalog chapter, or the thrust-speed curves for Linear Actuators. Choose a standalone or integrated motor or linear actuator that can run your application with plenty of speed and torque/thrust reserve (most stepper systems should have a 100% safety margin for torque/thrust). If encoder feedback is desired, be sure to choose a "D" or "E" model motor, or "ADJ" model actuator. If an IP65 rating is desired, choose a "W" motor (no IP65 linear actuator models available at this time).

Note: If you chose an Integrated motor/drive, you can skip to "Choose a Power Supply". If you chose an STP-MTRAC-23xxx or -34xxx motor, you are done. These motors use the STP-DRVAC-24025 drive, have no motor extension cable (10' leads on the motor), and require no power supply (the drive uses AC input power).

Note: The STP-MTRAC-42xxx motors cannot use the [STP-DRVAC-24025](#) drive as it doesn't provide enough current.

NEMA 14, 17, 23, 34, and 42 mounting flanges

Variety of bipolar step motors to cover a wide range of applications

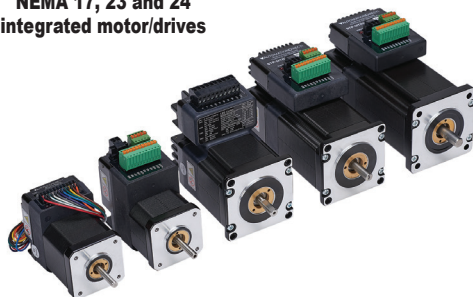
Holding torque ranges from 8 to 4532 oz-in

Single-shaft, Dual-shaft, IP65, high bus voltage, and encoder-mounted models available (Linear series does not have high bus voltage or IP65 models)

1-ft cable with locking connector on the end (not for linear actuators) (NEMA 23/34 MTRAC motors have 10' leads)

Square frame style produces high torque and achieves best torque-to-volume ratio

NEMA 17, 23 and 24 integrated motor/drives



NEMA 17 and 23 linear actuators



NEMA 42 MTRAC(H)



2. Choose a motor extension cable

[If you chose an Integrated motor/drive in Step 1, skip to "Choose a Power Supply"; an extension cable is not required.]

Our 6-, 10-, and 20-ft motor extension cables have a locking connector that mates up to the motor cable. The extension cables allow you to quickly connect the motor to the drive without having to splice wires or cut any cables.

Note: All NEMA 23/34 STP-MTRAC-x motors have integrated 10-foot cables and don't need an extension cable.

20-foot extension cable with locking connector



SureStep Motor / Cable Compatibility

Motor	Cable
STP-LE17 series linear actuator	STP-LA-EXT17-xx
STP-LE23 series linear actuator	STP-LA-EXT23-xx
STP-MTR-xxxx	STP-EXT-0xx
STP-MTR-xxxxW	STP-EXTW-0xx
STP-MTRAC-23xxx/34xxx	None
STP-MTRAC-42xxx	STP-EXT42-0xx
STP-MTRACH-42xxx	STP-EXT42H-0xx
STP-MTRH-xxxx	STP-EXTH-0xx
STP-MTRH-xxxxW	STP-EXTHW-0xx
STP-MTRL-xxxx	STP-EXTL-0xx

Choose your SureStep System

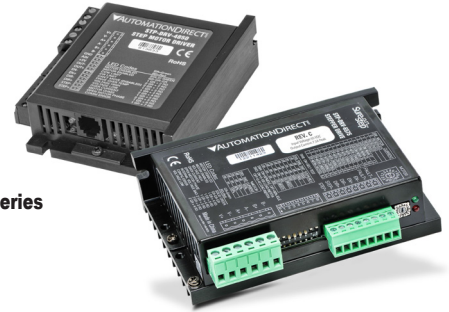
3. Choose a drive

Note: If you chose an Integrated motor/drive in Step 1, skip to "Choose a Power Supply" ... you have already chosen your drive. If you chose STP-MTRAC-23xxx or STP-MTRAC-34xxx, you are done - these motors use the STP-DRVAC-24025 drive and don't require an extension cable or DC power supply.

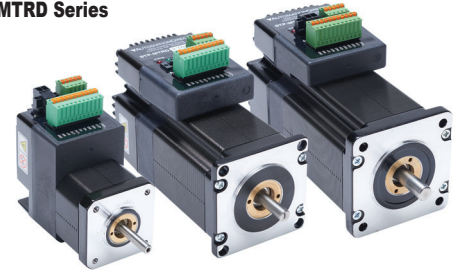
Note: The STP-MTRAC-42xxx motors cannot use the STP-DRVAC-24025 drive as it doesn't provide enough current.
The chart below is a quick selection guide. For a full list of features, check out the Technical Info later in this chapter. The requirements for what you will need from a drive are determined by your applications. Deciding whether you plan to operate the drive via high-speed pulses, analog control, encoder following, or communication commands is an important factor. The voltage supplied to the drive as determined by the speed torque curves is another important factor to consider when choosing a drive. If you need to select a drive based on RMS step motor phase current, please see the next page.

- Standard and Advanced Drives and Integrated Motor/Drives can accept high-speed pulse input control.
- Advanced Drives and some Integrated Motor/Drives can also accept serial communication control.
- STP-MTRAC-23xxx and -34xxx and STP-DRVAC motors and drives are designed for use with high voltages. These components are not designed to work at low voltages (12V, 32V, 48V, 70V).

STP-DRV Series



STP-MTRD Series



What you need	STP-DRV-4035	STP-DRV-4845	STP-DRV-4850	STP-DRV-6575	STP-DRV-80100	STP-MTRD-17x(E)	STP-MTRD-23x(E)	STP-MTRD-17xR(E)	STP-MTRD-23xR(E)	STP-MTRD-24xRV(E)
12V Speed-Torque Curve (from Step 1)	–	–	–	–	–	✓	✓	✓	✓	✓
32V Speed-Torque Curve (from Step 1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
48V Speed-Torque Curve (from Step 1)	–	✓	✓	✓	✓	–	✓	–	✓	✓
70V Speed-Torque Curve (from Step 1)	–	–	–	–	✓	–	✓	–	✓	✓
More than 3.5A/motor phase	–	✓	✓	✓	✓	–	–	–	–	–
More than 5A/motor phase ("H" motors)	–	–	–	✓	✓	–	–	–	–	–
Supply voltage	12–32	24–48	24–48	24–65	24–80	12–48	12–70	12–48	12–70	12–70
Digital Input Voltage	5V (12V*, 24V*)	5–24V	5V (12V*, 24V*)	5–24V	5V (12V*, 24V*)	5–24V	5–24V	5–24V	5–24V	5–24V
Internal Indexing (Drive can move from point A to point B with a serial communication command)	–	–	✓	–	✓	–	–	✓	✓	✓
High-speed pulse input	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Analog Velocity input	–	–	✓	–	✓	–	–	✓	✓	✓
Position Verification (internal encoder)	–	–	–	–	–	–	–	E models only	E models only	E models only
External encoder	–	–	–	–	–	E models only	E models only	–	–	–
RS-232 communication (ASCII)	–	–	✓	–	✓	–	–	–	–	–
RS-485 communication (ASCII)	–	–	–	–	–	–	–	✓	✓	✓
Variable I/O (I/O can be either a digital input or digital output)	–	–	–	–	–	–	–	–	–	✓

* External dropping resistor required for 12V and 24V I/O use. See Product Data Sheet for wiring details and resistor values.



Choose your SureStep System

3a. Using RMS Step Motor Phase Current to Select an Appropriate Stepper Drive Rated in Peak Phase Current

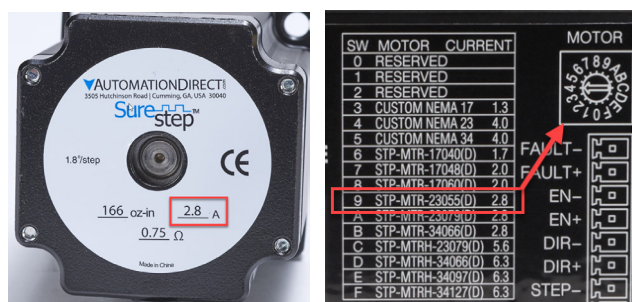
$$(\text{Drive Amps})_{\text{peak}} = 1.2 \times (\text{Motor Amps})_{\text{RMS}}$$

Generic stepper drives usually have output current specified in peak phase current while stepper motors will have their phase current specified in RMS phase current. This can cause sub-optimal drive to motor pairing unless this is understood. There is no need to understand this difference if you are selecting a system that uses the SureStep drives that are tuned for specific SureStep motors. These drives will have a rotary switch setting (STP-DRV-6575 and STP-DRVAC-24025) or a motor selection in the SureMotion Pro software (STP-DRV-4850 and STP-DRV-80100). These drives when properly paired with a SureStep motor will output 1.2 times the motor rated phase current.

When choosing a drive that only has current selections instead of motor specific selections you will want to select a peak current that is 1.2 times the motor's listed RMS current. The true peak drive current value would be 1.4 times the RMS motor value but this amount of current will cause a lot of motor heating and the torque at higher speeds will actually suffer with due to higher back electro-magnetic force caused by the inductive field of the coils changing polarity quickly.

Example of a SureStep matched stepper system

To use an STP-MTR-23055 motor with a STP-DRV-6575 drive, the drive's rotary switch should be positioned to selection 9 (STP-MTR-23055x). The STP-MTR-23055 has a phase current of 2.8 A (RMS), so the drive will actually output $1.2 \times 2.8 \text{ A (RMS)} = 3.36 \text{ A}$ (peak). You do not need to calculate peak or RMS current with a pre-configured SureStep motor and drive system.

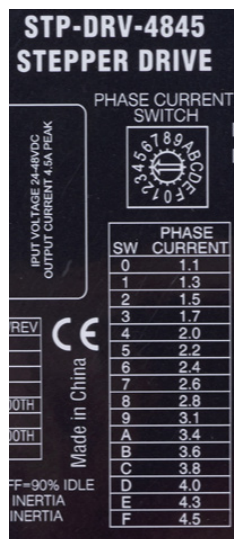


Matched stepper system

Example of an adjustable current stepper drive

To use an STP-MTR-23055 motor with a STP-DRV-4845 drive, you should calculate the correct phase current setting for the drive. The motor phase current is 2.8 A (RMS).

- If you do not understand peak vs RMS current, you would select phase current position #8, the 2.8 A selection on the drive (blue box). This setting will work (and the motor will run very cool) but will provide slightly less than the motor's rated torque.
- If a true peak current value is selected ($1.4 \times 2.8 \text{ A} = 3.92 \text{ A}$) then the rotary switch selection would be set to the C position (red box). This will cause excessive motor heating and a lack of performance at higher speeds.
- The optimal phase current selection for stepper motors is 1.2 times the motor RMS phase current ($1.2 \times 2.8 \text{ A (RMS)} = 3.36 \text{ A (peak)}$). This will be the rotary switch selection A (green box).



Rotary Switch Position	SW1 & SW2 @100%	SW1 & SW2 @90%	SW1 & SW2 @80%
0	1.1	1.0	0.9
1	1.3	1.2	1.0
2	1.5	1.4	1.2
3	1.7	1.5	1.4
4	2.0	1.8	1.6
5	2.2	2.0	1.8
6	2.4	2.2	1.9
7	2.6	2.3	2.1
8	2.8	2.5	2.2
9	3.1	2.8	2.5
A	3.4	3.1	2.7
B	3.6	3.2	2.9
C	3.8	3.4	3.0
D	4.0	3.6	3.2
E	4.3	3.9	3.4
F	4.5	4.1	3.6

Matching an adjustable stepper drive with any step motor

Choose your SureStep System

4. Choose a power supply

Since all low voltage SureStep (non-integrated) motors can operate at 32V, 48V, and 70V, the selection of a power supply is dependent on the selected speed-torque curve of the motor and on the selection of drive. If using an integrated motor/drive, then the power supply is dictated by the specifications of the integrated product. If using an STP-MTRAC-23xxx or -34xxx drive, no DC power supply is needed since the drive is powered directly from 115 to 230 VAC. Choose a power supply that matches the desired speed-

torque curve and stays within the voltage limit of the selected drive. Each SureStep linear power supply has incoming AC and outgoing DC fusing. The linear supplies have an electronic overload protected 5V supply for all your logic needs. Stepper applications without large fluctuations in load, without aggressive deceleration, and without regeneration (where the load pushes the motor) can often use a switching power supply instead.

Permissible Drive/Power Supply Combinations

DC Powered Drive	Linear Power Supply				Switching Power Supply		
	<u>STP-PWR-3204</u>	<u>STP-PWR-4805</u>	<u>STP-PWR-4810</u>	<u>STP-PWR-7005</u>	<u>PSB12-xxxS</u>	<u>PSB24-xxxS</u>	<u>PSB48-xxxS</u>
STP-DRV-4830 12-48 VDC input (53V max)	√	√	√	–	√	√	√
STP-DRV-4845 24-48 VDC input (60V max)	√	√	√	–	–	√	√
STP-DRV-4850 24-48 VDC input (53V max)	√	√	√	–	–	√	√
STP-DRV-6575 24-65 VDC input (85V max)	√	√	√	–	–	√	√
STP-DRV-80100 24-80 VDC input (88V max)	√	√	√	√	–	√	√
STP-MTRD-17 series 12-48 VDC input (55V max)	√	√	√	–	√	√	√
STP-MTRD-23, -24 series 12-70 VDC input (75V max)	√	√	√	√	√	√	√
Supply current calculation	For systems that use multiple steppers and only one power supply, the power supply current must be at least the sum of 2/3rds of the combined motor currents: $I(ps) \geq 2/3 \times (I_{motor1} + I_{motor2} + I_{motor3} + \dots)$						

Linear Power Supply

120 or 240 VAC, 50/60 Hz
power input (switch
selectable)

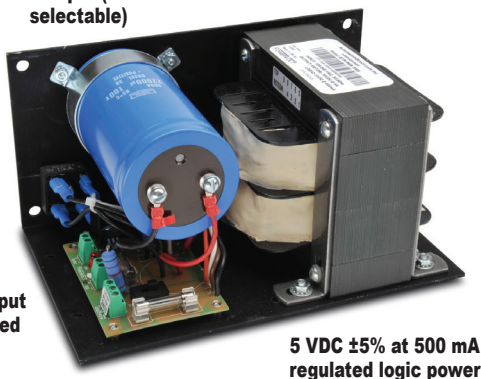
Screw terminal AC input and
DC output connections

32V, 48V and 70V
linear supplies

Power ON LEDs

unregulated
linear supplies
perfect for
stepper systems

Input and output
fusing included



5 VDC ±5% at 500 mA
regulated logic power

Switching Power Supply

85-264 VAC
(DC input range 120-375 VDC)

Rugged plastic or
aluminum housings with
integral 35mm DIN rail
mounting adapters

Adjustable
output voltage



Output voltage status LED

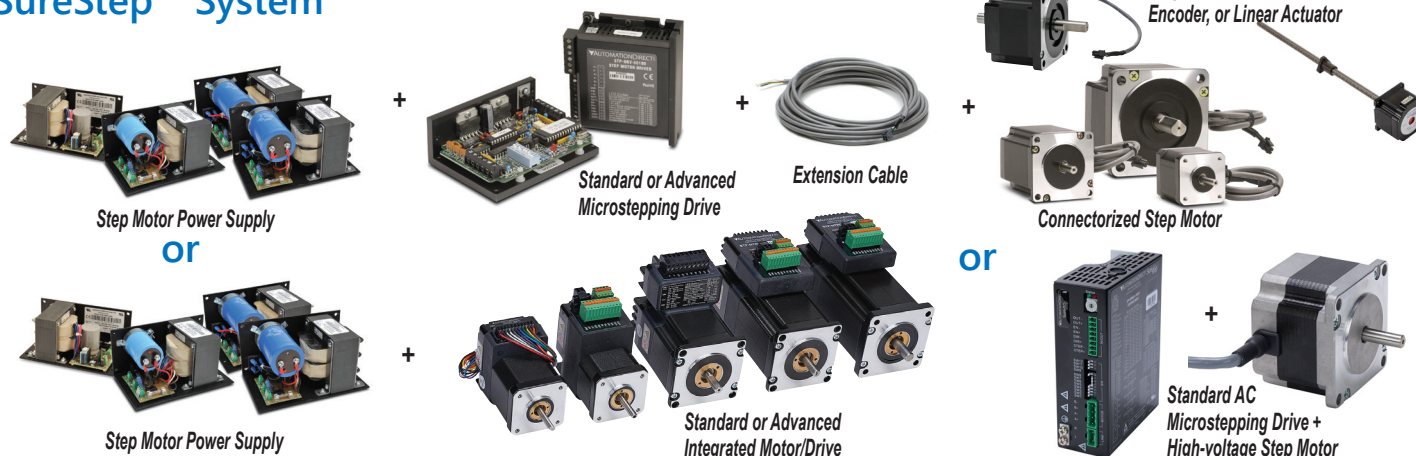
DC Output Overload and Short-Circuit
Protected

Note: For detailed information on the switching power supplies, please see:
<https://cdn.automationdirect.com/static/specs/rhinopsbc1d2.pdf>



Stepping System Components

SureStep® System



SureStep stepping family includes:

- Linear step motor power supplies
- DIP-switch configurable microstepping drives
- Software-configurable advanced microstepping drives
- Motor extension cables
- NEMA 14, 17, 23, 24, 34, and 42 frame size step motors in single shaft, dual-shaft, IP65, high bus voltage, or encoder mounted configurations
- NEMA 17, 23, and 24 frame size integrated motor/drives
- NEMA 17 and 23 linear actuators (6", 9", and 12" lengths)
- Variety of step motor accessories including encoders, control cables, and connector kits
- SureStep PC adapter, USB to RS-485
- SureMotion Pro software for advanced drive and integrated motor/drive systems

Motor features

- Low voltage, high torque, 2-phase, bipolar, 1.8° per step, 4-lead
- High voltage, high torque, 2-phase, bipolar, 1.8° per step, 8-lead
- Available in single-shaft and dual-shaft models
- Connectorized pigtails or integrated 10' cable (STP-MTRAC only)
- Optional encoder feedback (STP-MTR-xxxxE)
- IP65 versions available (STP-MTR-xxxxW)
- High bus voltage versions available (STP-MTRAC-xxxx)
- Linear actuators have lead screws for motor shafts (STP-LExx-xxxxxx)
- Linear actuators ADJ series available with encoder-ready rear shaft and machined journals on screw ends for easy bearing mounting
- Wide variety of NEMA 14, 17, 23, and 34 motors

Power supply features

- Linear, unregulated DC power supplies
- 120/240 VAC selectable input
- 32V, 48V, 70V DC output models available
- All linear models have additional 5VDC, 500mA regulated logic supply
- Fusing included for both incoming AC and outgoing DC
- 5V supply has electronic overload protection

NOTE: If a switching power supply is desired, we recommend the PSB12-xxxS, PSB24-xxxS, or PSB48-xxxS series.

Standard stepper drive features

(STP-DRV-4035, -4830, -4845, -6575, STP-MTRD-x, STP-DRVAC-24025)

- Low cost, digital step motor driver in compact package
- Operates from Step and Direction signals, or Step CW and Step CCW (jumper selectable).
- Fault output and Enable input
- Optically isolated I/O
- Digital filters prevent position error from electrical noise on command signals; jumper selectable: 150 kHz or 2MHz
- Rotary or DIP switch easily selects from many popular motors
- Electronic damping and anti-resonance
- Automatic idle current reduction to reduce heat when motor is not moving; switch selectable: 50% or 90% of running current
- Switch-selectable step resolution: 200–25,600 steps per revolution depending on drive
- Switch-selectable microstep emulation provides smoother, more reliable motion in full- and half-step modes
- Automatic self test (switch selectable)
- Optional external encoder feedback (integrated models)
- Operates from a 24–65 VDC or 12–40 VDC power supply, depending upon model. STP-DRVAC drive operates off AC voltage.
- Running current from 0.35–7.5A

Advanced stepper drive features

(STP-DRV-4850, STP-DRV-80100, STP-MTRD-xR, & STP-MTRD-xRE)

- Max 5A, 48V and max 10A, 80V models available
- Software configurable
- Programmable microsteps
- Internal indexer (via ASCII commands)
- Self test feature
- Idle current reduction
- Anti-resonance
- Torque ripple smoothing
- Step, analog, and serial communication inputs
- Serial communications allow point-to-point positioning
- AB quadrature/encoder following (integrated models)
- Optional internal encoder feedback (integrated models)
- RS-485 communications (integrated models)
- Four 5 to 24 volt digital "Variable I/O" points (NEMA 24 integrated models)
- Controllable via streaming SCL commands

Stepping System Components

SureStep Power Supply / DC Input Drive Compatibility

Drive(1)(2)	Recommended Linear Power Supply(1)(2)(5)			
	STP-PWR-3204	STP-PWR-4805	STP-PWR-4810	STP-PWR-7005(3)
STP-DRV-4035	✓	No	No	No
STP-DRV-4830	✓	✓	✓	No
STP-DRV-4845	✓	✓	✓	No
STP-DRV-4850	✓	✓	✓	No
STP-DRV-6575	✓	✓	✓	No
STP-DRV-80100	✓	✓	✓	✓
STP-MTRD-17(4)	✓	✓	✓	No
STP-MTRD-23(4)	✓	✓	✓	✓
STP-MTRD-24(4)	✓	✓	✓	✓

- 1) Do NOT use a power supply that exceeds the drive's input voltage range.
If using a linear power supply, ensure that the unloaded voltage does not float above the drive's maximum input range.
- 2) For best performance, use the lowest voltage power supply that supplies the required speed and torque.
- 3) An unloaded STP-PWR-7005 can float above the allowable input voltages of some drives if it is fed with a high AC input voltage (greater than 120VAC).
- 4) Integrated motor/drives are included here because they include a drive as well as a motor.
- 5) STP-DRVAC-x drives are AC powered and cannot be powered by DC power supplies.

SureStep Power Supply / DC Input Drive Compatibility

Drive(1)(2)	Recommended Switching Power Supply(1)(2)(4)		
	PSB12-xxxS	PSB24-xxxS	PSB48-xxxS
STP-DRV-4035	✓	✓	No
STP-DRV-4830	✓	✓	✓
STP-DRV-4845	No	✓	✓
STP-DRV-4850	No	✓	✓
STP-DRV-6575	No	✓	✓
STP-DRV-80100	No	✓	✓
STP-MTRD-17(3)	✓	✓	✓
STP-MTRD-23(3)	✓	✓	✓
STP-MTRD-24(3)	✓	✓	✓

- 1) Do NOT use a power supply that exceeds the drive's input voltage range.
- 2) For best performance, use the lowest voltage power supply that supplies the required speed and torque.
- 3) Integrated motor/drives are included here because they include a drive as well as a motor.
- 4) STP-DRVAC-x drives are AC powered and cannot be powered by DC power supplies.

SureStep AC Motor/Drive Compatibility

Model #	STP-DRVAC-24025	
	Series Wired Motor	Parallel Wired Motor
STP-MTRAC-23044(x)	✓	No
STP-MTRAC-23055(x)	✓	No
STP-MTRAC-23078(x)	✓	No
STP-MTRAC-34075(x)	✓	No
STP-MTRAC-34115(x)	✓	No
STP-MTRAC-34156(x)	✓	No

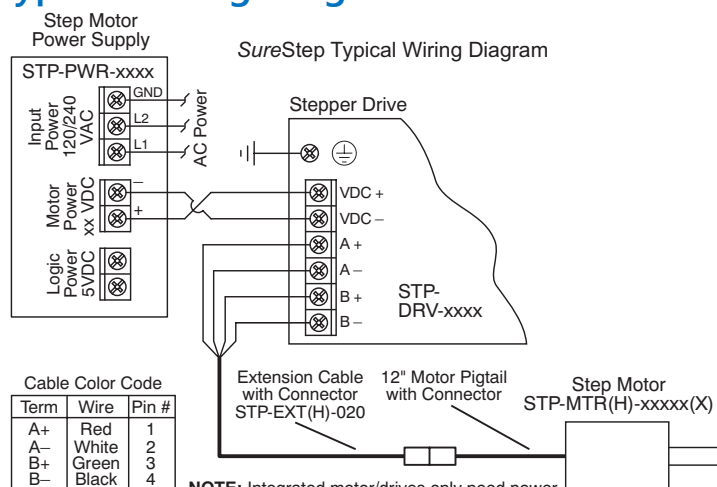
NOTE: STP-MTRAC-34156(x) motors have a 5/8" front shaft.

SureStep DC Input Drive / Motor Compatibility(3)

Motor(1)			Recommended Drive(1)					
Model # (1)	Rated Amps(2)	Extension Cable	STP-DRV-4035(1)	STP-DRV-4830	STP-DRV-4845	STP-DRV-4850(1)	STP-DRV-6575(1)	STP-DRV-80100(1)
STP-MTRL-14026(x)	0.35	STP-EXTL-0xx	✓	✓	–	✓	–	–
STP-MTRL-14034(x)	0.8		✓	✓	✓	✓	–	–
STP-MTR-17040(x)	1.7		✓	✓	✓	✓	✓	✓
STP-MTR-17048(x)	2.0		✓	✓	✓	✓	✓	✓
STP-MTR-17060(x)	2.0	STP-EXT-0xx	✓	✓	✓	✓	✓	✓
STP-MTR-23055(x)	2.8		✓	✓	✓	✓	✓	✓
STP-MTR-23079(x)	2.8		✓	✓	✓	✓	✓	✓
STP-MTR-34066(x)	2.8		✓	✓	✓	✓	✓	✓
STP-MTRAC-42100(x)	4.2	STP-EXT42-0xx	–	–	✓	✓	✓	✓
STP-MTRAC-42151(x)	6						✓	✓
STP-MTRAC-42202(x)	6						✓	✓
STP-MTRH-23079(x)	5.6						✓	✓
STP-MTRH-34066(x)	6.3	STP-EXTH-0xx			–		✓	✓
STP-MTRH-34097(x)	6.3						✓	✓
STP-MTRH-34127(x)	6.3						✓	✓
STP-MTRACH-42100(x)	6	STP-EXT42-0xx					✓	✓
STP-MTRACH-42151(x)	8						–	✓
STP-MTRACH-42202(x)	8						–	✓

- 1) The combinations above will perform according to the published speed/torque curves. Using a motor with a current rating higher than the drive's output rating will proportionally limit the motor torque.
- 2) Listed NEMA42 motor amperages are for Bipolar Series wiring. See the NEMA42 motor specs for amperages with other wiring types.
- 3) Table not applicable to integrated motor/drives as drives and motors are already paired.

Typical Wiring Diagram



NOTE: Integrated motor/drives only need power since the drive and motor are one unit. MTRAC motors do not need an extension cable, they have 10' leads coming from the motor.

NOTE: STP-MTRAC-23xxx/34xxx motors and STP-DRVAC drives are designed to work with AC input power to the drive. They are not designed to work with DC input power.



Stepping System Drives

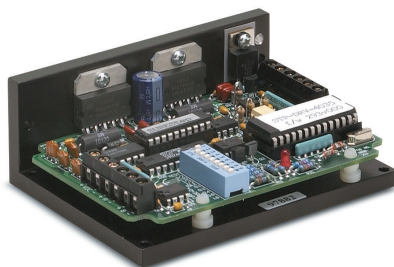
SureStep Series – Microstepping Drives Features Comparison										
Drive Model		Standard Microstepping Drives						Advanced Microstepping Drives		
		STP-DRVAC-24025	STP-DRV-4830	STP-DRV-4845	STP-DRV-6575	STP-MTRD-x	STP-DRV-4035	STP-DRV-4850	STP-DRV-80100	STP-MTRD-xR
Price		\$236.00	\$97.00	\$98.00	\$110.00	See Integrated Motor/Drives section	Retired	\$286.00	\$338.00	See Integrated Motor/Drives section
Drive Type		Microstepping drive with pulse input				Integrated stepper motor/drive	Micro-stepping drive with pulse input	Advanced microstepping drive with pulse or analog input, serial communication;includes programming/communication cable STP-232RJ11-CBL		Advanced integrated stepper motor/drive with internal encoder
		enclosed				enclosed	open-frame	enclosed		enclosed
Output Current		0.6–2.5 A/phase	0.35–3.0 A/phase	0.8–4.5 A/phase	1.0–7.5 A/phase	–	0.4–3.5 A/phase	0.1–5 A/phase	0.1–10 A/phase	–
Input Voltage		nominal: 120/240 VAC range: 90–240 VAC	nominal: 12–48 VDC range: 10–53 VDC	nominal: 24–48 VDC range: 20–60 VDC	nominal: 24–75 VDC range: 20–85 VDC	nominal: 12–48 VDC (NEMA 17) 12–70 VDC (NEMA 23) range: 10–55 VDC (NEMA 17) 11–74 VDC (NEMA 23)	nominal: 12–32 VDC range: 12–42 VDC	nominal: 24–48 VDC range: 18– 53 VDC	nominal: 24–80 VDC range: 18–88 VDC	nominal: 12–48 VDC (NEMA 17) 12–70 VDC (NEMA 23, 24) range: 10–55 VDC (NEMA 17) 11–74 VDC (NEMA 23) 10–75 VDC (NEMA 24)
Configuration Method		rotary dial, dip switches, jumpers				dip switches		SureMotion Pro software (SM-PRO : free download)		
Amplifier Type		MOSFET, dual H-bridge, 4-quadrant				Dual H-bridge, 4 quadrant	MOSFET, dual H-bridge, bipolar chopper	MOSFET, dual H-bridge, 4-quadrant		Dual H-bridge, 4 quadrant
Current Control		4-state PWM @ 20 kHz	4-state PWM @ 16 kHz	4-state PWM @ 20 kHz		4-state PWM @ 16 kHz	4-state PWM @ 20 kHz			
Microstep Resolution		dipswitch selectable						software selectable		
		200 to 25,600 steps/rev		200 to 20,000 steps/rev		200 to 25,600 steps/rev	400 to 10,000 steps/rev	200 to 51200 steps/rev		
Modes of Operation	Step & Dir	YES	YES	YES	YES	YES	YES	YES	YES	YES
	CW/CCW	YES	YES	YES	YES	YES	n/a	YES	YES	YES
	A/B Quad	n/a	n/a	n/a	n/a	n/a	n/a	YES	YES	YES
	Oscillator	n/a	n/a	n/a	n/a	n/a	n/a	YES	YES	YES
	Serial Indexing	n/a	n/a	n/a	n/a	n/a	n/a	YES	YES	YES
Digital Input Signals	Step/Pulse	step & direction, CW/CCW step				step & direction, CW/CCW step	step & direction	step & direction, CW/CCW step, A/B quadrature, run/stop & direction, jog CW/CCW, CW/CCW limits		
	Direction									
	Enable	motor disable				motor enable	motor disable	motor enable, alarm reset, speed select (oscillator mode)		
Analog Input		n/a	n/a	n/a	n/a	n/a	n/a	speed control		signal range, offset, dead band, and filtering
Output Signal		fault	n/a	fault	fault	fault	n/a	fault, motion, tach		brake, fault, motion, tach
Communication Interface		n/a	n/a	n/a	n/a	n/a	n/a	YES (programming/communication cable included)		
Non-volatile Memory Storage		n/a	n/a	n/a	n/a	n/a	n/a	YES		
Idle Current Reduction		YES								
Self Test		YES								
Additional Features		Step pulse noise filter, accepts AC power input	Step pulse noise filter	Load inertia (anti-resonance & damping feature to improve motor performance) Step pulse noise filter			n/a	Anti-resonance (Electronic Damping) Auto setup Microstep emulation Torque ripple smoothing (allows for fine adjustment of phase in the range 0.25 to 1.5 rps) Waveform (command signal) smoothing		

Refer to Specifications Tables for detailed specifications.



Stepping System Drives

SureStep® Standard Microstepping Drives



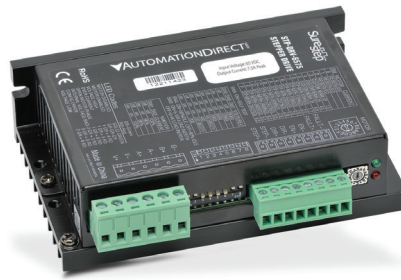
SureStep Series Specifications – Standard Microstepping Drives

Microstepping Drive		STP-DRV-4035	STP-DRV-4830
Drive Type		Microstepping drive with pulse input	Microstepping drive with pulse input
Drawing		PDF	PDF
Output Current		Selectable from 0.4 to 3.5 A/phase (maximum output power is 140W)	Selectable from 0.35 to 3.0 A/phase (peak of sine)
Input Voltage (external p/s required)		Nominal: 12–32 VDC Range: 12–42 VDC (including ripple voltage)	Nominal: 12–48 VDC Range: 10–53 VDC
Configuration Method		DIP switches	DIP switches
Amplifier Type		MOSFET, dual H-bridge, bipolar chopper	MOSFET, dual H-bridge, 4-quadrant
Current Control		4-state PWM @ 20 kHz	4-state PWM @ 16 kHz
Protection		n/a	n/a
Recommended Input Fusing		Fuse: 4A fast-acting; ADC # AGC4; Holder: ADC # DN-F6L110	Fuse: 3A fast-acting; ADC # AGC3; Holder: ADC # DN-F6L110
Input Signals	Input Circuit	Opto-coupler input with 440Ω resistance (5 to 15 mA input current); Logic Low is input 0.8 VDC or less; Logic High is input 4VDC or higher.	5–24 VDC nominal (range: 4–30 VDC); (5mA @ 4V; 15 mA @ 30V); Optically isolated, differential
	Step/Pulse	Motor steps on falling edge of pulse and minimum pulse width is 0.5 μs (1MHz)	Minimum pulse width = 1μs. Maximum pulse frequency = 150kHz or 500kHz (user selectable).
	Direction	Needs to change at least 2 microseconds before a step pulse is sent	FU NCTIONS: step & direction, CW/CCW step
	Enable	Logic 1 will disable current to the motor (current is enabled with no hook-up or logic 0)	FUNCTION: disable motor when closed
	Analog	n/a	n/a
Output Signal		n/a	n/a
Features	Current Reduction	n/a	n/a
	Idle Current Reduction	0% or 50% reduction (Idle current setting is active if motor is at rest for 1 second or more)	90% or 50% of running current. (Holding torque is reduced by the same %.)
	Microstep Resolution	400 (200x2), 1,000 (200x5), 2,000 (200x10), or 10,000 (200x50) steps/rev	200, 400, 800, 1000, 1600, 2000, 3200, 4000, 5000, 6000, 6400, 8000, 10000, 12800, 20000, 25600
	Phase Current Setting	0.4 to 3.5 A/phase with 32 selectable levels	(peak)(0.35–3.0) (0.25–2.3) RMS
	Self Test	Uses half-step to rotate 1/2 revolution in each direction at 100 steps/second.	Automatically rotates the motor back and forth two turns in each direction in order to confirm that the motor is operational.
	Step Pulse Noise Filter	n/a	Select 150kHz or 500kHz
	Load Inertia	n/a	n/a
Connectors		Screw terminal blocks with AWG 18 maximum wire size	DEGSON 15EDGK-5.08-02P-14-00AH 2-pin power connector DEGSON 15EDGK-3.1.04P-14-00A(H) 4-pin motor connector DEGSON 15EDGK-3.5-06P-14-00A(H) 6-pin I/O connector ADC part STP-CON-5 contains replacement connectors
Maximum Humidity		90% non-condensing	90% non-condensing
Storage/Ambient Temperature		-20 to 80 °C [-4 to 176 °F]	0 to 40 °C [32 to 104 °F] (mount to suitable heat sink)
Operating Temperature		0 to 55 °C [32 to 131 °F] recommended; 70 °C [158 °F] maximum	0 to 85 °C [32 to 185 °F] (interior of electronics section)
Drive Cooling Method		Natural convection (mount drive to metal surface to dissipate heat)	Natural convection (mount drive to metal surface)
Mounting		(4) #4 screws to mount on wide side; (2) #4 screws to mount on narrow side	(2) #6 screws to mount to metal surface
Weight		9.3 oz. [264 g]	3.0 oz [85.9 g]
Agency Approvals		CE	CE



Stepping System Drives

SureStep® Standard Microstepping Drives, continued



SureStep Series Specifications – Standard Microstepping Drives			
Microstepping Drive		STP-DRV-4845	STP-DRV-6575
Drive Type		Microstepping drive with pulse input	
Drawing		PDF	PDF
Output Current		Selectable from 0.8–4.5 A/phase (peak of sine)	Selectable from 1.0–7.5 A/phase (peak of sine)
Input Voltage (external p/s required)		Nominal: 24–48 VDC Range: 20–60 VDC	Nominal: 24–65 VDC Range: 20–85 VDC
Configuration Method		Rotary dial, DIP switches, jumpers	
Amplifier Type		MOSFET, dual H-bridge, 4-quadrant	
Current Control		4-state PWM @ 20 kHz	
Protection		n/a	
Recommended Input Fusing		Fuse: 4A fast-acting; ADC #AGC4; Holder: ADC # DN-F6L110 Fuse: 7A fast-acting; ADC #AGC7; Holder: ADC # DN-F6L110	
Input Signals	Input Circuit	5–24 VDC nominal (range: 4–30 VDC); (5mA @ 4V; 15 mA @ 30V); Optically isolated, differential	
	Step/Pulse	Minimum pulse width = 1µs. Maximum pulse frequency = 150kHz or 2MHz (user selectable). FUNCTIONS: step & direction, CW/CCW step	
	Direction		
	Enable	FUNCTION: disable motor when closed	
	Analog	n/a	
Output Signal		30 VDC / 80 mA max, optically isolated photodarlington, sinking or sourcing. Function = closes on drive fault.	
Features	Current Reduction	Reduce power consumption and heat generation by limiting motor running current to 100%, 90%, 80%, or 70% of maximum. Current should be increased to 100% if microstepping. (Torque is reduced/increased by the same %.)	Reduce power consumption and heat generation by limiting motor running current to 100%, 90%, or 80% of maximum. Current should be increased to 120% if microstepping. (Torque is reduced/increased by the same %.)
	Idle Current Reduction	90% or 50% of running current. (Holding torque is reduced by the same %.)	
	Microstep Resolution	200, 200 smooth, 400, 400 smooth, 2000, 5000, 12800, 20000	
	Phase Current Setting	(peak)(1.1–4.5) x 70%–100% DIP switch selectable (0.79–3.2) RMS	(1.3–6.3) x 80%–120% DIP switch selectable
	Self Test	Automatically rotates the motor back and forth two turns in each direction in order to confirm that the motor is operational.	
	Step Pulse Noise Filter	Select 150kHz or 2MHz	
	Load Inertia	Set motor and load inertia range to 0–4x or 5–10x.	
Connectors		Removable screw terminal blocks. Motor & Power Supply: 30–12 AWG; Signals: 30–14 AWG ADC part STP-CON-1 contains replacement connectors	
Maximum Humidity		90% non-condensing	
Storage/Ambient Temperature		0 to 50 °C [32 to 122 °F] (mount to suitable heat sink)	
Operating Temperature		0 to 85 °C [32 to 185 °F] (interior of electronics section)	
Drive Cooling Method		Natural convection (mount drive to metal surface)	
Mounting		(2) #6 screws to mount to metal surface	
Weight		10.8 oz [306g]	
Agency Approvals		CE, cUR _{US}	



Stepping System Drives

SureStep® Advanced Microstepping Drives



SureStep Series Specifications – Advanced Microstepping Drives		
Microstepping Drive	STP-DRV-4850	STP-DRV-80100
Drive Type	Advanced microstepping drive with pulse or analog input, serial communication (serial communication allows indexing capability)	
Drawing	PDF	PDF
Output Current	0.1-5.0 A/phase (in 0.01A increments)	0.1-10.0 A/phase (in 0.01A increments)
Input Voltage (external p/s required)	24-48 VDC (nominal) (range: 18-53 VDC)	24-80 VDC (nominal) (range: 18-88 VDC)
Configuration Method	SureMotion Pro software (included)	
Amplifier Type	MOSFET, dual H-bridge, 4-quadrant	
Current Control	4-state PWM @ 20 kHz	
Protection	Over-voltage, under-voltage, over-temperature, external output faults (phase-to-phase & phase-to-ground), inter-amplifier shorts	
Recommended Input Fusing	Fuse: 4A 3AG delay (ADC #MDL4) Fuse Holder: ADC #DN-F6L110	Fuse: 6.25A 3AG delay (ADC #MDL6-25) Fuse Holder: ADC #DN-F6L110
Input Signals	Input Circuit	Opto-coupler input with 5 to 15 mA input current; Logic Low is input 0.8 VDC or less; Logic High is input 4 VDC or higher.
	Step/Pulse	Optically isolated, differential, 5V, 330Ω; Min pulse width = 250 ns Max pulse frequency = 2MHz
	Direction	Adjustable bandwidth digital noise rejection feature FUNCTIONS: step & direction, CW/CCW step, A/B quadrature, run/stop & direction, jog CW/CCW, CW/CCW limits
	Enable	Optically isolated, 5-12V, 680Ω; FUNCTIONS: motor enable, alarm reset, speed select (oscillator mode)
	Analog	Range: 0-5 VDC; Resolution: 12 bit; FUNCTION: speed control
Output Signal	Optically isolated, 24V, 10mA max; FUNCTIONS: fault, motion, tach	
Communication Interface	RS-232; RJ11 (6P4C) receptacle	
Non-volatile Memory Storage	Configurations are saved in FLASH memory on-board the DSP.	
Features	Idle Current Reduction	Reduction range of 0-90% of running current after delay selectable in ms
	Microstep Resolution	Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev
	Modes of Operation	Step & direction, CW/CCW, A/B quadrature, oscillator, joystick, serial commands
	Phase Current Setting	0.1-5.0 A/phase (in 0.01A increments)
	Self Test	Checks internal & external power supply voltages, diagnoses open motor phases
	Additional Features	Anti-resonance (Electronic Damping) Auto setup Microstep emulation Torque ripple smoothing (allows for fine adjustment of phase in the range 0.25 to 1.5 rps) Waveform (command signal) smoothing
Connectors	Communication: RJ11 (6P4C); programming/communication cable STP-232RJ11-CBL included Other: removable screw terminal blocks; Motor & Power Supply: 26-12 AWG; Signals: 28-16 AWG	
Maximum Humidity	90% non-condensing	
Storage Temperature	-20 to 80 °C [-4 to 176 °F]	
Operating Temperature	0 to 55 °C [32 to 131 °F]; (mount to suitable heat sink)	
Drive Cooling Method	Natural convection (mount to suitable heat sink)	
Mounting	#6 mounting screws (mount to suitable heat sink)	
Weight	8 oz [227g] (approximate)	
Agency Approvals	CE	



Stepping System Drives

SureStep® High Bus Voltage Microstepping Drives



SureStep Series Specifications – Standard Microstepping Drives		
Microstepping Drive		<u>STP-DRVAC-24025</u>
Price		\$236.00
Drawing		PDF
Drive Type		Microstepping drive with pulse input
Output Current		Selectable from 0.6–2.5 A/phase (peak of sine)
Input Voltage		90–240 VAC
Configuration Method		Rotary dial, DIP switches, jumpers
Amplifier Type		MOSFET, dual H-bridge, 4-quadrant
Current Control		4-state PWM @ 20 kHz
Protection		Over temp, over voltage, under voltage, over current, excess regen, open circuit
Recommended Input Fusing		Fuse: 4A fast-acting; ADC # AGC4 ; Holder: ADC # DN-F6L110
Input Signals	Input Circuit	5–24 VDC nominal (range: 4–28 VDC); optically isolated, differential.
	Step/Pulse	Minimum pulse width = 1µs. Maximum pulse frequency = 150kHz or 2MHz (user selectable). FUNCTIONS: step & direction, CW/CCW step
	Direction	
	Enable	FUNCTION: disable motor when closed
	Analog	n/a
Output Signal		30 VDC / 100 mA max, optically isolated photodarlington, sinking or sourcing. Function = closes on drive fault.
Features	Current Reduction	n/a
	Idle Current Reduction	90% or 50% of running current. (Holding torque is reduced by the same %.)
	Microstep Resolution	200, 400, 800, 1000, 1600, 2000, 3200, 4000, 5000, 6000, 6400, 8000, 10000, 12800, 20000, 25600
	Phase Current Setting	0.6–2.5 Amps RMS
	Self Test	Automatically rotates the motor back and forth two turns in each direction in order to confirm that the motor is operational.
	Step Pulse Noise Filter	Select 150kHz or 2MHz
	Load Inertia	Set motor and load inertia range to 0–4x or 5–10x.
Connectors		DEGSON 2EDGK-7.62-02P-14-00A(H) 2-pin power connector DEGSON 2EDGK-5.08-04P-14-00A(H) 4-pin motor connector DEGSON 15EDGK-3.81-08P-14-00A(H) 8-pin I/O connector ADC part STP-CON-6 contains replacement connectors
Maximum Humidity		90% non-condensing
Storage/Ambient Temperature		0 to 40 °C [32 to 104 °F]
Operating Temperature		0 to 85 °C [32 to 185 °F] (interior of electronics section)
Drive Cooling Method		Natural convection (mount drive to metal surface)
Mounting		(2) M4 screws to mount to metal surface
Weight		1 lb 15 oz [0.88 kg]
Agency Approvals		CE, cURus

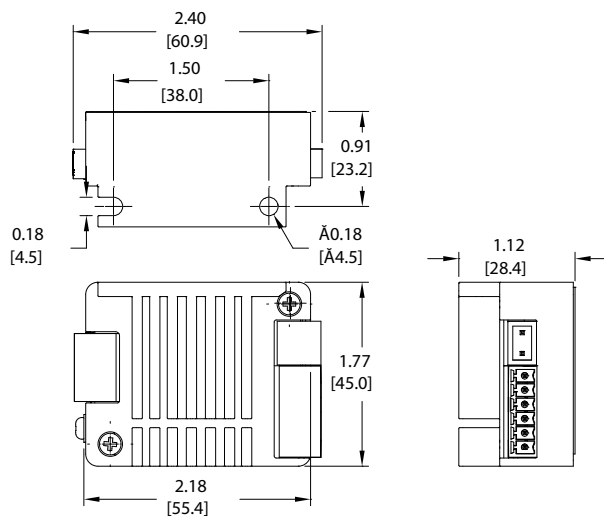


Stepping System Drives

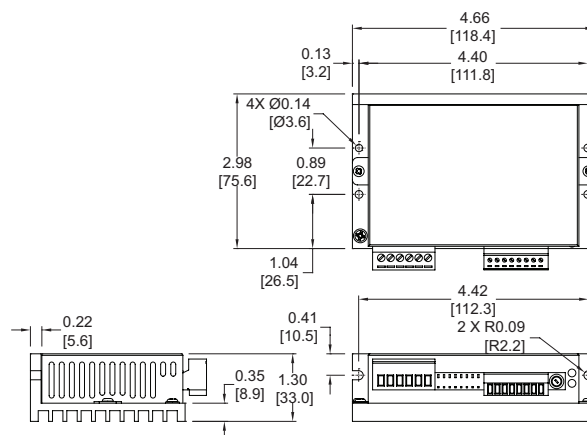
SureStep® Microstepping Drives Dimensions

Dimensions = in [mm]

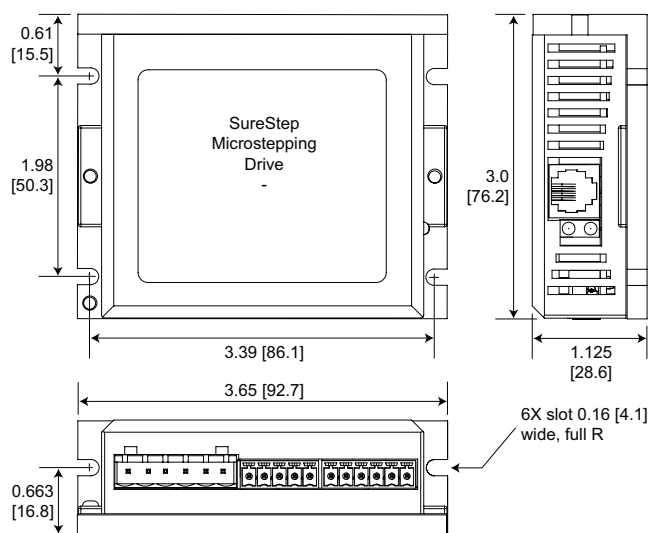
STP-DRV-4830



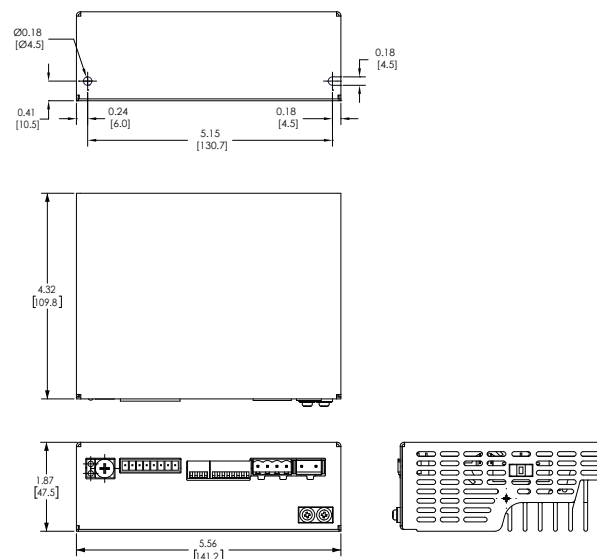
STP-DRV-4845 & STP-DRV-6575



STP-DRV-4850 & STP-DRV-80100



STP-DRVAC-24025



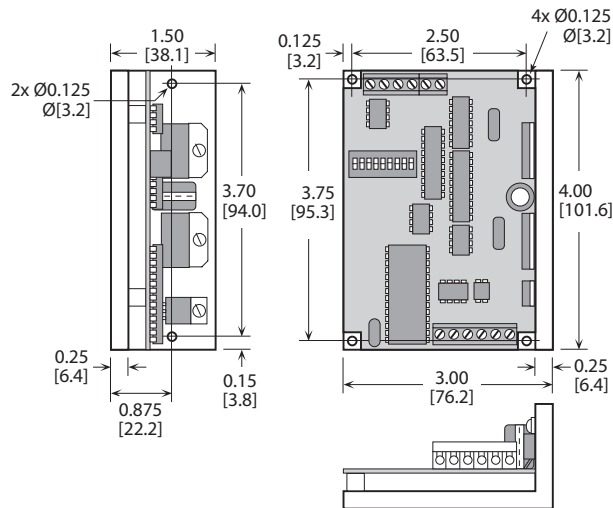


Stepping System Drives

SureStep® Microstepping Drives Dimensions

Dimensions = in [mm]

STP-DRV-4035



Stepping System Motors

SureStep® Stepping Motors

SureStep Series Part Numbers – Bipolar Stepping Motors*					
Bipolar Stepping Motors	Price	Shaft Type	Torque Level	Encoder Mounting	Drawing
STP-MTRL-14026	\$29.00	single	low	not available	PDF
STP-MTRL-14026D	\$32.50	dual		optional	PDF
STP-MTRL-14026E**	\$112.00	dual		pre-installed	PDF
STP-MTRL-14034	\$28.00	single		not available	PDF
STP-MTRL-14034D	\$41.00	dual		optional	PDF
STP-MTRL-14034E**	\$117.00	dual		pre-installed	PDF
STP-MTR-17040	\$23.00	single	high	not available	PDF
STP-MTR-17040D	\$31.00	dual		optional	PDF
STP-MTR-17040E**	\$110.00	dual		pre-installed	PDF
STP-MTR-17040W***	\$162.00	single		not available	PDF
STP-MTR-17048	\$30.00	single		not available	PDF
STP-MTR-17048D	\$36.50	dual		optional	PDF
STP-MTR-17048E**	\$116.00	dual		pre-installed	PDF
STP-MTR-17048W***	\$168.00	single		not available	PDF
STP-MTR-17060	\$54.00	single		not available	PDF
STP-MTR-17060D	\$55.00	dual		optional	PDF
STP-MTR-17060E**	\$133.00	dual		pre-installed	PDF
STP-MTR-17060W***	\$221.00	single		not available	PDF
STP-MTR-23055	\$43.50	single		not available	PDF
STP-MTR-23055D	\$49.50	dual		optional	PDF
STP-MTR-23055E**	\$137.00	dual		pre-installed	PDF
STP-MTR-23055W***	\$199.00	single		not available	PDF
STP-MTR-23079	\$56.00	single		not available	PDF
STP-MTR-23079D	\$72.00	dual		optional	PDF
STP-MTR-23079E**	\$151.00	dual		pre-installed	PDF
STP-MTR-23079W***	\$218.00	single		not available	PDF
STP-MTR-34066	\$132.00	single	higher	not available	PDF
STP-MTR-34066D	\$164.00	dual		optional	PDF
STP-MTR-34066W***	\$261.00	single		not available	PDF
STP-MTRH-23079	\$63.00	single		not available	PDF
STP-MTRH-23079D	\$85.00	dual		optional	PDF
STP-MTRH-23079E**	\$158.00	dual		pre-installed	PDF
STP-MTRH-23079W***	\$315.00	single		not available	PDF
STP-MTRH-34066	\$161.00	single		not available	PDF
STP-MTRH-34066D	\$175.00	dual		optional	PDF
STP-MTRH-34066W***	\$360.00	single		not available	PDF
STP-MTRH-34097	\$184.00	single		not available	PDF
STP-MTRH-34097D	\$217.00	dual		optional	PDF
STP-MTRH-34097W***	\$406.00	single		not available	PDF
STP-MTRH-34127	\$197.00	single		not available	PDF
STP-MTRH-34127D	\$217.00	dual		optional	PDF
STP-MTRH-34127W***	\$444.00	single		not available	PDF

* For integrated motor/drives part numbers and pricing, see the integrated motor/drives section.

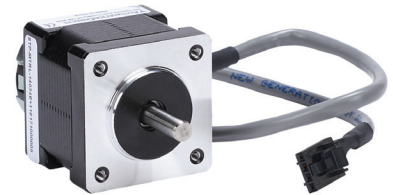
** E model motors come with an AMT112Q-V encoder pre-installed. Requires STP-CBL-EBxx for encoder wiring. To change from the default 400ppr, use AMT-PGRM-17C. See the SureStep Stepping System Encoders section for more details.

*** W models are IP65 washdown rated. All others are IP40.

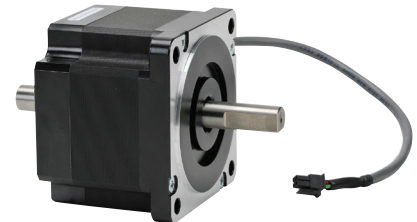
STP-MTR-xxxxx
(single-shaft)



STP-MTR-xxxxxE
(encoder mount)



STP-MTR-xxxxxD
(dual-shaft)



STP-MTR-xxxxxW
(IP65)





Stepping System Motors

SureStep® Stepping Motors

SureStep Series Part Numbers – Bipolar Stepping Motors, <i>continued</i>					
Bipolar Stepping Motors	Price	Shaft Type	Torque Level	Encoder Mounting	Drawing
<i>Motors listing continued from previous page</i>					
STP-MTRAC-23044	\$140.00	single	High voltage High torque	not available	PDF
STP-MTRAC-23044D	\$165.00	dual		optional	PDF
STP-MTRAC-23055	\$170.00	single		not available	PDF
STP-MTRAC-23055D	\$195.00	dual		optional	PDF
STP-MTRAC-23078	\$182.00	single		not available	PDF
STP-MTRAC-23078D	\$229.00	dual		optional	PDF
STP-MTRAC-34075	\$267.00	single		not available	PDF
STP-MTRAC-34075D	\$268.00	dual		optional	PDF
STP-MTRAC-34115	\$276.00	single		not available	PDF
STP-MTRAC-34115D	\$277.00	dual		optional	PDF
STP-MTRAC-34156	\$295.00	single*	High voltage Higher torque	not available	PDF
STP-MTRAC-34156D	\$296.00	dual*		optional	PDF
STP-MTRAC-42100	\$289.00	single		not available	PDF
STP-MTRAC-42100D	\$312.00	dual		optional**	PDF
STP-MTRAC-42151	\$472.00	single		not available	PDF
STP-MTRAC-42151D	\$495.00	dual		optional**	PDF
STP-MTRAC-42202	\$582.00	single		not available	PDF
STP-MTRAC-42202D	\$599.00	dual		optional**	PDF
STP-MTRACH-42100	\$289.00	single		not available	PDF
STP-MTRACH-42100D	\$312.00	dual		optional**	PDF
STP-MTRACH-42151	\$472.00	single		not available	PDF
STP-MTRACH-42151D	\$495.00	dual		optional**	PDF
STP-MTRACH-42202	\$587.00	single		not available	PDF
STP-MTRACH-42202D	\$607.00	dual		optional**	PDF

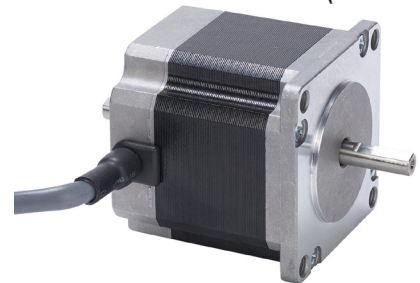
* NOTE: STP-MTRAC-34156(x) motors have a 5/8" front shaft.

** NOTE: NEMA 42 "D" motors require an [STP-MTRA-42ENC](#) adapter plate for AMT13/AMT33 encoder mounting.

STP-MTRAC-xxxxx
(single-shaft)



STP-MTRAC-xxxxxD
(dual-shaft)



STP-MTRACH-42xxxD
(dual-shaft)



SureStep® Stepping Motors Mounting Accessories

Mounting Accessories – for NEMA 17 and NEMA 42 SureStep Stepping Motors				
Part Number	Price	Description	Drawing Links	Use With
STP-MTRA-RB-85	\$9.25	Reducer bushing, 8mm OD to 5mm ID, 16mm length, aluminum alloy. Connects NEMA size 17 stepper motors to Koyo TRD-NH and TRD-SH hollow shaft encoders.	n/a	SureStep NEMA 17 motors
STP-MTRA-42ENC	\$12.00	SureStep encoder mounting plate, metal body. For use with SureStep NEMA 42 stepper motors with dual shafts. Encoder mounting screws and mounting plate screws included. Mounting holes for CUI Devices AMT132/AMT332 encoders and US Digital E6 encoders.	PDF	SureStep NEMA 42 motors

STP-MTRA-42ENC





Stepping System Motors

SureStep® Stepping Motors

SureStep Series Specifications – Connectorized Bipolar Stepping Motors													
Bipolar Stepping Motors		Low Voltage Low Torque		Low Voltage High Torque						Low Voltage Higher Torque			
		STP-MTRL-14026(x)	STP-MTRL-14034(x)	STP-MTR-17040(x)	STP-MTR-17048(x)	STP-MTR-17060(x)	STP-MTR-23055(x)	STP-MTR-23079(x)	STP-MTR-34066(x)	STP-MTRH-23079(x)	STP-MTRH-34066(x)	STP-MTRH-34097(x)	STP-MTRH-34127(x)
NEMA Frame Size		14	14	17	17	17	23	23	34	23	34	34	34
Maximum Holding Torque*	(lb·in)	0.5	1.25	3.81	5.19	7.19	10.37	17.25	27.12	17.87	27.12	50.00	80.50
	(oz·in)	8	20	61	83	115	166	276	434	286	434	800	1288
	(N·m)	0.06	0.14	0.43	0.59	0.81	1.17	1.95	3.06	2.02	3.06	5.65	9.10
Rotor Inertia	(oz·in2)	0.06	0.08	0.28	0.37	0.56	1.46	2.60	7.66	2.60	7.66	14.80	21.90
	(kg·cm2)	0.0003	0.00035	0.05	0.07	0.10	0.27	0.48	1.40	0.48	1.40	2.71	4.01
Rated Current (A/phase)		0.35	0.8	1.7	2.0	2.0	2.8	2.8	2.8	5.6	6.3	6.3	6.3
Resistance (Ω/phase)		8.5	7.66	1.6	1.4	2.0	0.75	1.1	1.11	0.4	0.25	0.3	0.49
Inductance (mH/phase)		5.77	6.92	3.0	2.7	3.3	2.4	3.8	6.6	1.2	1.5	2.1	4.1
Insulation Class		130°C [266°F] Class B; 300V rms											
Basic Step Angle		1.8°											
Shaft Runout (in)		0.002 in [0.051 mm]											
Max Shaft Radial Play @ 1lb load		0.001 in [0.025 mm]											
Perpendicularity		0.003 in [0.076 mm]											
Concentricity		0.003 in [0.076 mm]											
Maximum Radial Load (lb [kg])*		6.0 [2.7]					15.0 [6.8]		39.0 [17.7]	15.0 [6.8]	39.0 [17.7]		
Maximum Thrust Load (lb [kg])*		6.0 [2.7]					13.0 [5.9]		25.0 [11.3]	13.0 [5.9]	25.0 [11.3]		
Storage Temperature Range		-20°C to 100°C [-4°F to 212°F]											
Operating Temperature Range		-20°C to 50°C [-4°F to 122°F] (motor case temperature should be kept below 80°C [176°F])											
Operating Humidity Range		55% to 85% non-condensing											
Product Material		steel motor case; stainless steel shaft(s)											
Environmental Rating		IP40 (IP65 for “W” motors)											
Weight (lb [kg]) (E models)		0.25 [0.11] (0.3 [0.1])	0.35 [0.15] (0.4 [0.2])	0.6 [0.3] (0.7 [0.3])	0.7 [0.3] (0.8 [0.4])	0.9 [0.4] (0.9 [0.4])	1.5 [0.7] (1.5 [0.7])	2.2 [1.0] (2.4 [1.1])	3.9 [1.7]	2.4 [1.1] (2.4 [1.1])	3.9 [1.7]	5.9 [2.7]	8.4 [3.8]
Agency Approvals		CE											
Design Tips		Allow sufficient time to accelerate the load and size the step motor with a 100% torque safety factor. DO NOT disassemble step motors because motor performance will be reduced and the warranty will be voided. DO NOT connect or disconnect the step motor during operation. Mount the motor to a surface with good thermal conductivity, such as steel or aluminum, to allow heat dissipation. Use a flexible coupling with “clamp-on” connections to both the motor shaft and the load shaft to prevent radial and thrust loading on bearings from minor misalignment.											
Accessory Extension Cable		STP-EXTL-0xx		STP-EXT-0xx STP-EXTW-0xx (for “W” motors)						STP-EXTH-0xx STP-EXTHW-0xx (for “W” motors)			

* For dual-shaft motors (STP-MTR-xxxxxD):

The sum of the front and rear Torque Loads, Radial Loads, and Thrust Loads must not exceed the applicable Torque, Radial, and Thrust load ratings of the motor.



Stepping System Motors

SureStep® Stepping Motors

SureStep Series Specifications – High Voltage Bipolar Stepping Motors							
Bipolar Stepping Motors		High Voltage High Torque					
		STP-MTRAC-23044(x)	STP-MTRAC-23055(x)	STP-MTRAC-23078(x)	STP-MTRAC-34075(x)	STP-MTRAC-34115(x)	STP-MTRAC-34156(x)**
NEMA Frame Size		23	23	23	34	34	34**
Maximum Holding Torque*	(lb·in)	4.69	9.31	14.19	51.31	69.48	115.06
	(oz·in)	75	149	227	821	1110	1841
	(N·m)	0.53	1.05	1.6	5.8	7.84	13
Rotor Inertia	(oz·in2)	0.66	1.64	2.62	7.38	14.74	24.06
	(g·cm2)	120	300	480	1350	2700	4400
Rated Current (A/phase)	Series	0.71	0.71	0.71	2.15	2.05	2.55
	Parallel	1.41	1.41	1.41	4.3	4.1	5.1
Resistance (Ω/ phase)	Series	12.4	14.4	18	4	4.8	4.8
	Parallel	3.1	3.6	4.5	1.0	1.2	1.375
Inductance (mH/phase)	Series	30.4	51.2	60.8	32	43.2	44.8
	Parallel	7.6	12.8	15.2	8.0	10.8	11.2
Insulation Class		B					
Steps per Revolution		200					
Basic Step Angle		1.8°					
Shaft Runout (in)		0.002 in 0.05 mm]					
Max Shaft Radial Play @ 1lb load		0.02 in [0.51 mm]			0.025 in [0.635 mm]		0.02 in [0.51 mm]
Max End Play @ 2.2-lb Axial load		0.08 in [2.03 mm]			0.075 in [1.91 mm]		0.08 in [2.03 mm]
Connectors		8 leads, 24AWG			8 leads, 22AWG		
Temperature Rise		80°C [176°F] max					
Storage Temperature Range		-40°C to 70°C [-40°F to 158°F]					
Operating Temperature Range		-20°C to 50°C [-4°F to 122°F]					
Operating Humidity Range		5% to 95% non-condensing					
Product Material		Steel motor case; stainless steel shaft(s)					
Environmental Rating		IP40					
Weight (lb [kg])		1.03 [0.47]	1.54 [0.7]	2.2 [1.0]	4.2 [1.9]	8.4 [3.8]	11.46 [5.2]
Agency Approvals		None			cURUS		

* For dual-shaft motors (STP-MTRAC-xxxxxD):

The sum of the front and rear Torque Loads, Radial Loads, and Thrust Loads must not exceed the applicable Torque, Radial, and Thrust load ratings of the motor.

** STP-MTRAC-34156(x) motors have a 5/8" front shaft



Stepping System Motors

SureStep® Stepping Motors

SureStep Series Specifications – Connectorized Stepping Motors						
Stepping Motors		Higher voltage High torque				
		STP-MTRAC-42100(x)	STP-MTRAC-42151(x)	STP-MTRAC-42202(x)	STP-MTRACH-42100(x)	STP-MTRACH-42202(x)
NEMA Frame Size		42	42	42	42	42
Optional Encoder ¹		Y	Y	Y	Y	Y
Max Holding Torque (N·m)	Unipolar Series	9.7	19.0	26.0	9.7	26.0
	Bipolar Series	12.2	22.0	31.0	12.3	32.0
	Bipolar Parallel	12.2	22.0	31.0	12.3	32.0
Rotor Inertia (g·cm ²)		5500	10900	16200	5500	16200
Rated RMS Current (A/phase)	Unipolar Series	6	9.4	9	8.5	11.5
	Bipolar Series	4.2	6	6	6	8
	Bipolar Parallel	8.4	12	12	12	16
Resistance (Ω/phase)	Unipolar Series	0.6	0.34	0.46	0.32	0.215
	Bipolar Series	1.19	0.68	0.91	0.64	0.58
	Bipolar Parallel	0.3	0.17	0.23	0.159	0.144
Inductance (mH/phase)	Unipolar Series	5	3.6	5.5	2.5	1.9
	Bipolar Series	19.8	14.5	22	10.1	7.6
	Bipolar Parallel	5	3.6	5.5	2.5	1.9
Insulation Class		B				
Steps per Revolution		200				
Basic Step Angle		1.8°				
Shaft Runout		0.05 mm				
Max Shaft Radial Play @ 1lb load		1.1 in				
Connectors		8 leads, 18AWG				
Temperature Rise		80°C max				
Storage Temp.		-30°C to 70°C [-22°F to 158°F]				
Operating Temperature		-20°C to 40°C [-4°F to 104°F]				
Operating Humidity		5% to 95% non-condensing				
Product Material		Steel motor case, stainless steel shaft(s)				
Environmental Rating		IP40				
Weight (lb [kg])		10.6 [4.8]	17.6 [8]	25.6 [11.6]	10.6 [4.8]	25.6 [11.6]
Agency Approval		cURus				

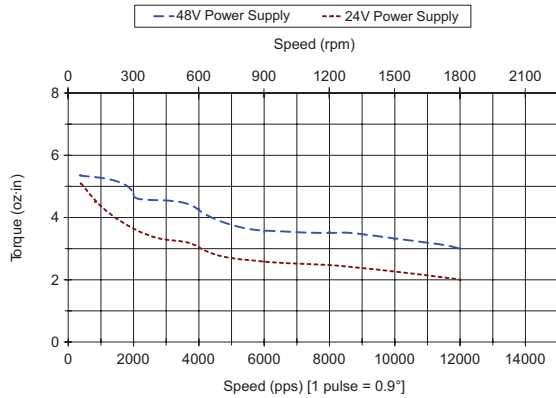
1 - Dual-shaft versions only. For US Digital E6 or CUI Devices AMT13/AMT33 encoder mounting, the [STP-MTRA-42ENC](#) encoder adapter plate is required.

Stepping System Motors

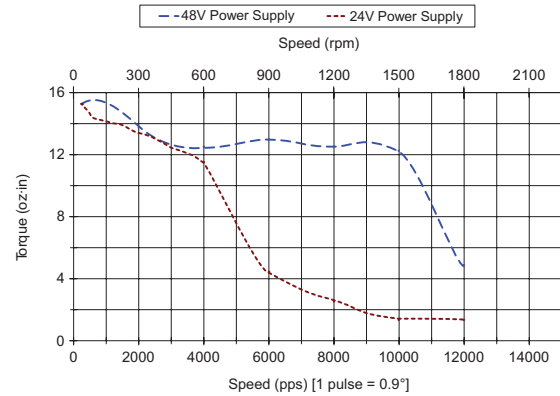
SureStep® Motor Running Torque vs. Speed Charts

STP-MTRL-14xxx(x) NEMA 14 Step Motors

STP-MTRL-14026(x) Torque vs Speed (1.8° step motor; 1/2 stepping, RMS phase current)



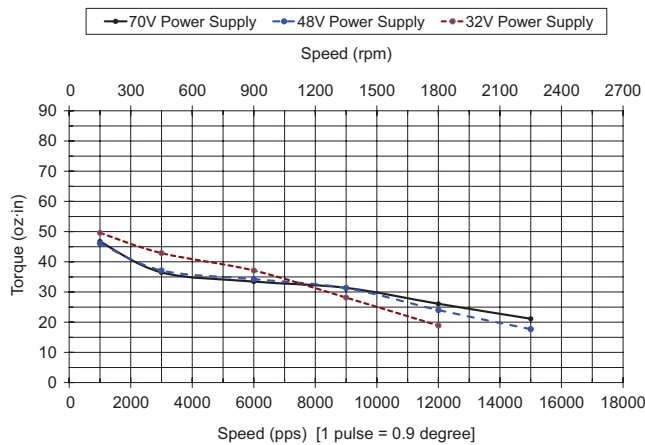
STP-MTRL-14034(x) Torque vs Speed (1.8° step motor; 1/2 stepping, RMS phase current)



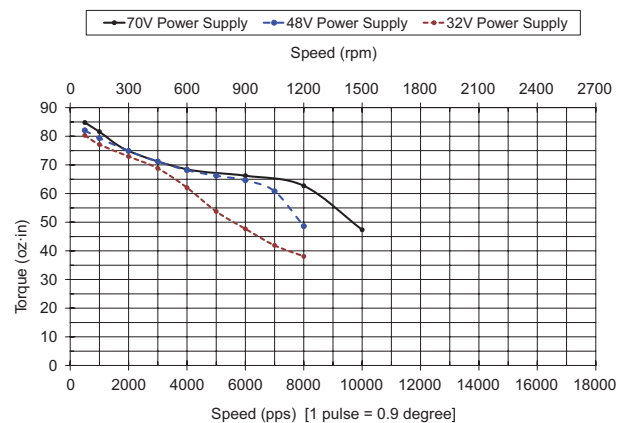
STP-MTR-17xxx(x) NEMA 17 Step Motors

Note: "W" series motors have 5% less running torque than other models

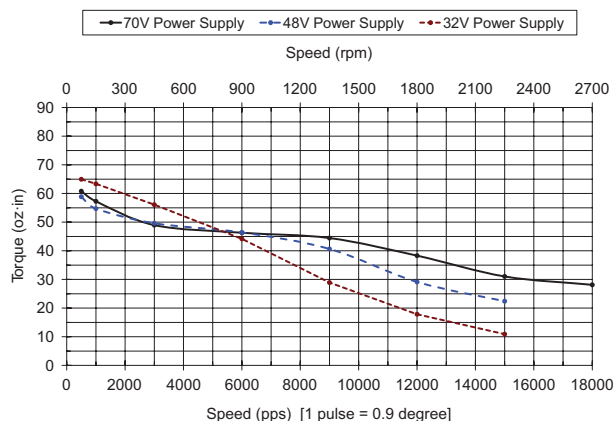
STP-MTR-17040(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



STP-MTR-17060(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



STP-MTR-17048(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



Note: Motor torque vs speed charts for STP-MTRD series integrated motor/drives can be found in the integrated motor/drives section of the full catalog



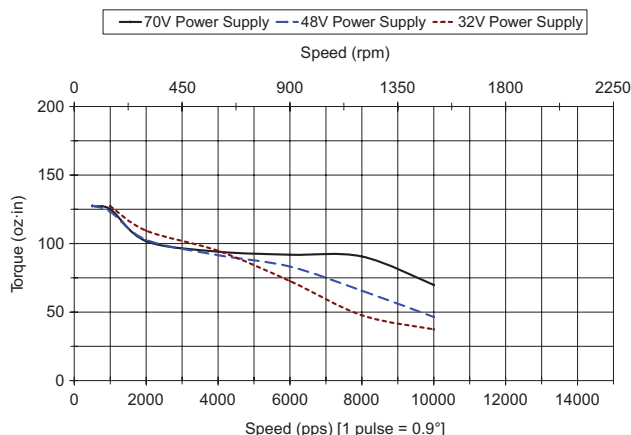
Stepping System Motors

SureStep® Motor Torque vs. Speed Charts (continued)

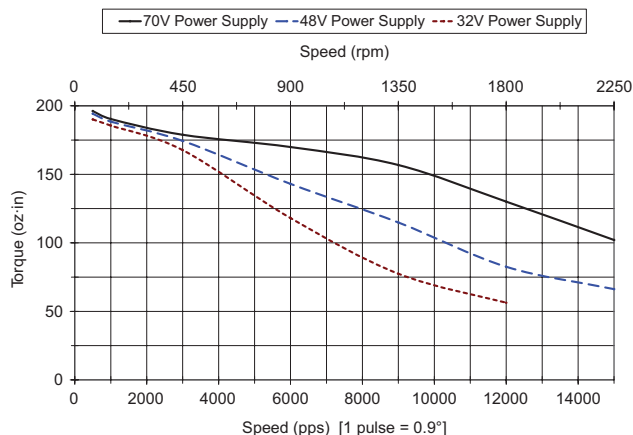
STP-MTR(H)-23xxx(x) NEMA 23 Step Motors

Note: "W" series motors have 5% less running torque than other models

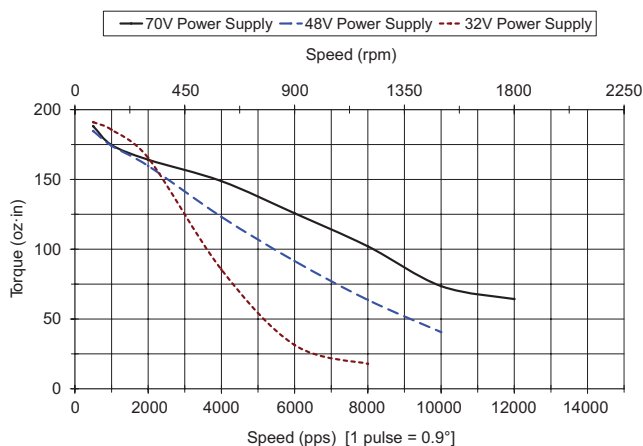
STP-MTR-23055(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



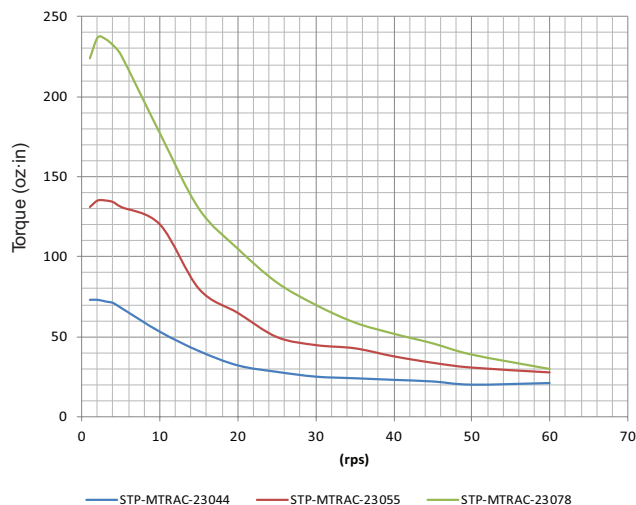
STP-MTRH-23079(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



STP-MTR-23079(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



STP-MTRAC-23xxxx Torque vs Speed @ 340VDC bus
(1.8° step motor; 1/2 stepping)





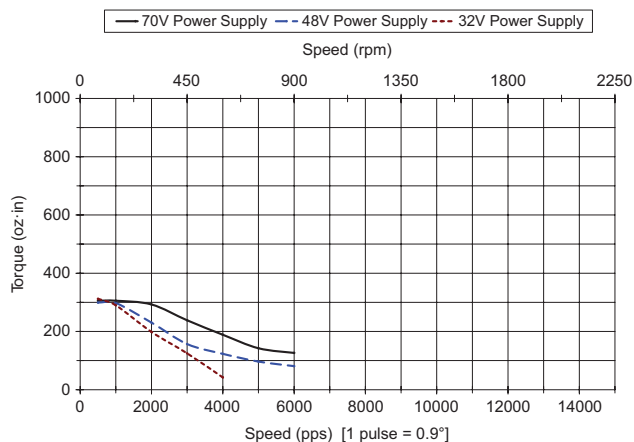
Stepping System Motors

SureStep® Motor Torque vs. Speed Charts (continued)

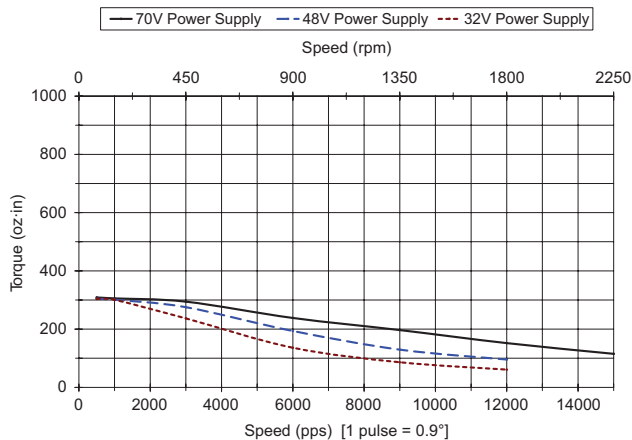
STP-MTR(H)-34xxx(x) NEMA 34 Step Motors

Note: "W" series motors have 5% less running torque than other models

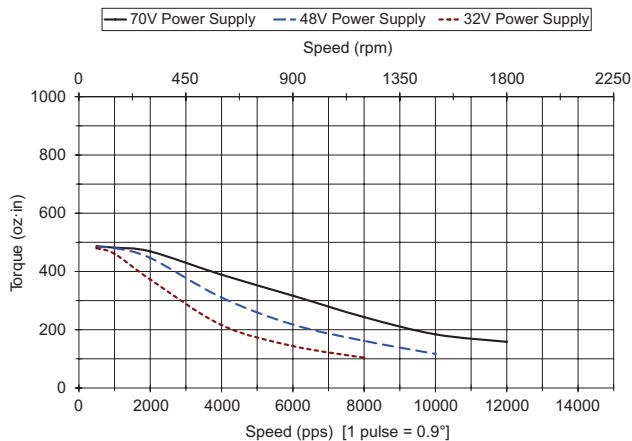
STP-MTR-34066(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



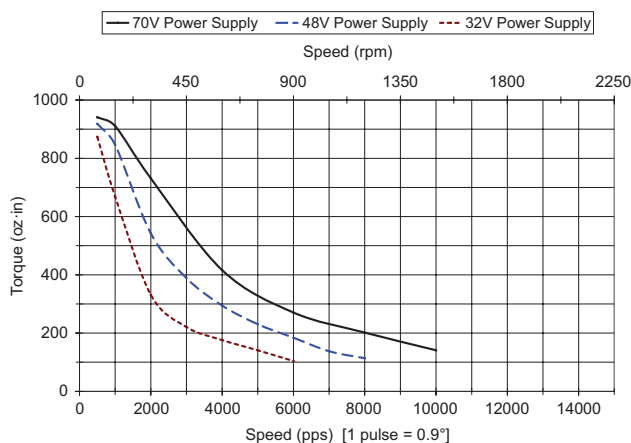
STP-MTRH-34066(x) Torque vs Speed (1.8° motor; 1/2 stepping)



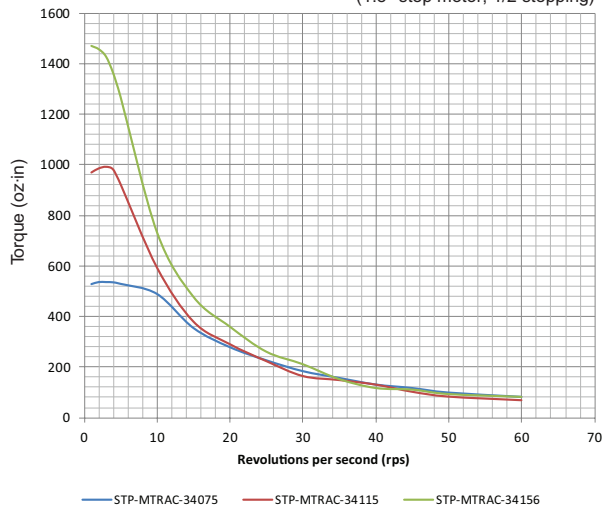
STP-MTRH-34097(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



STP-MTRH-34127(x) Torque vs Speed (1.8° step motor; 1/2 stepping)



STP-MTRAC-34xxxx Torque vs Speed @ 340VDC bus
(1.8° step motor; 1/2 stepping)

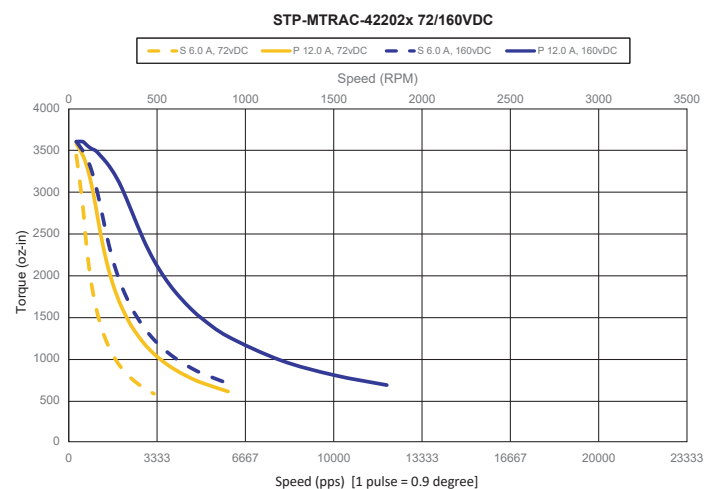
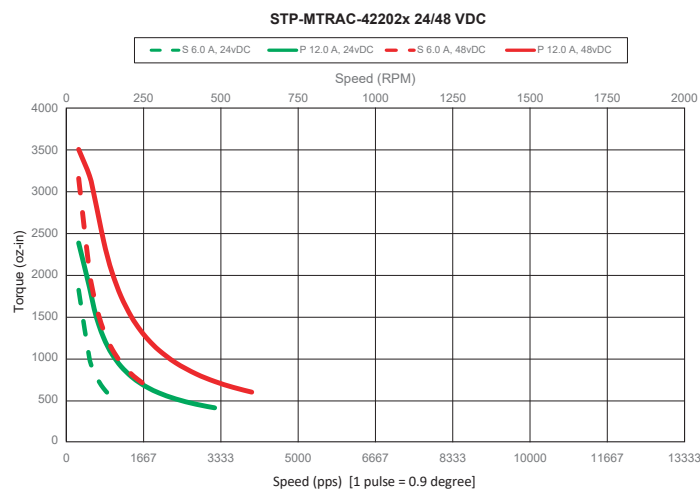
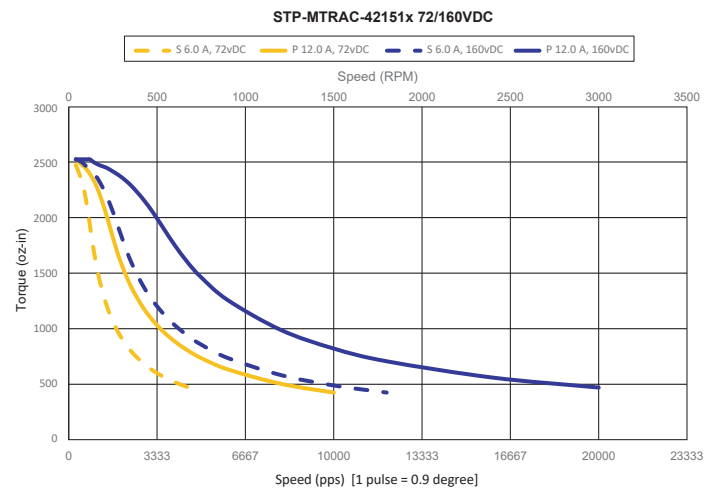
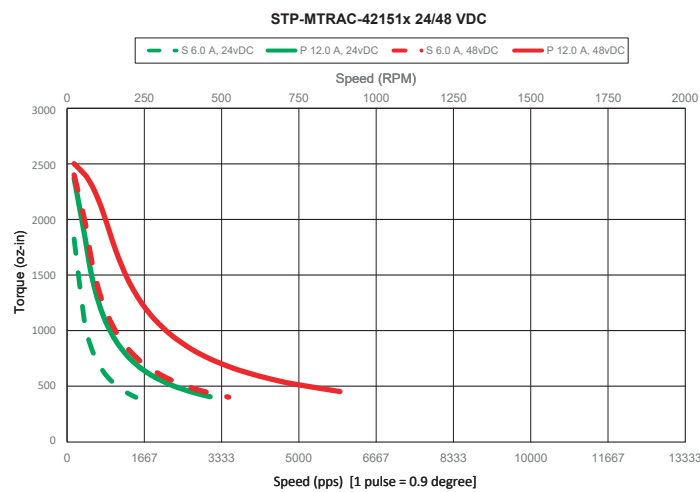
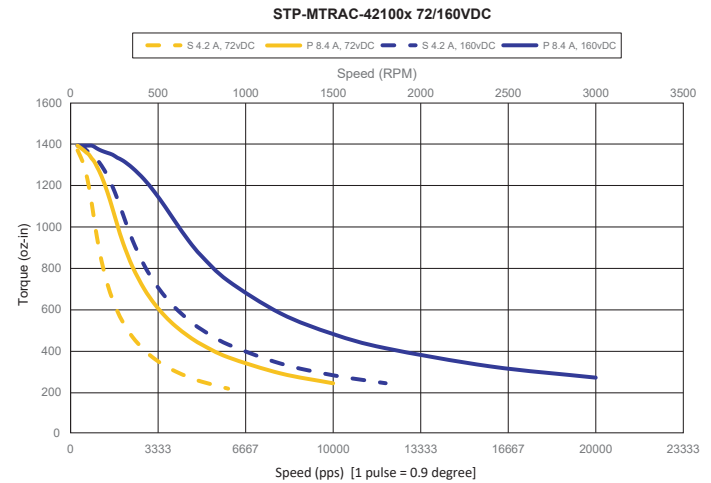
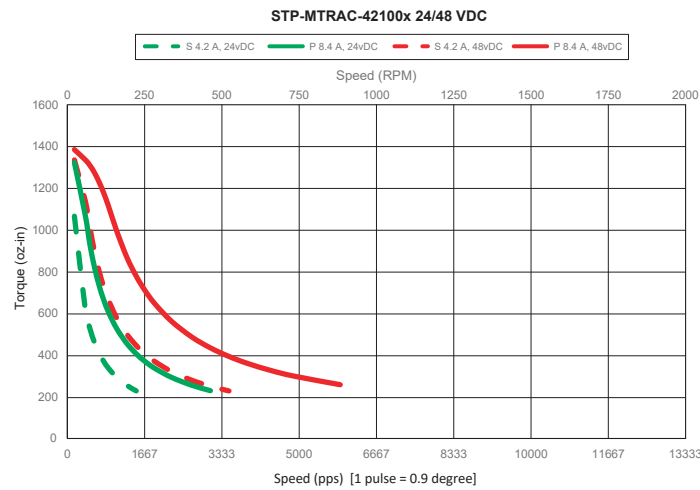


Stepping System Motors

SureStep® Motor Torque vs. Speed Charts (continued)

STP-MTRAC(H)-42xxx(x) NEMA 42 Step Motors

For all NEMA 42 charts: "S" = Series Bipolar Wiring
"P" = Parallel Bipolar Wiring

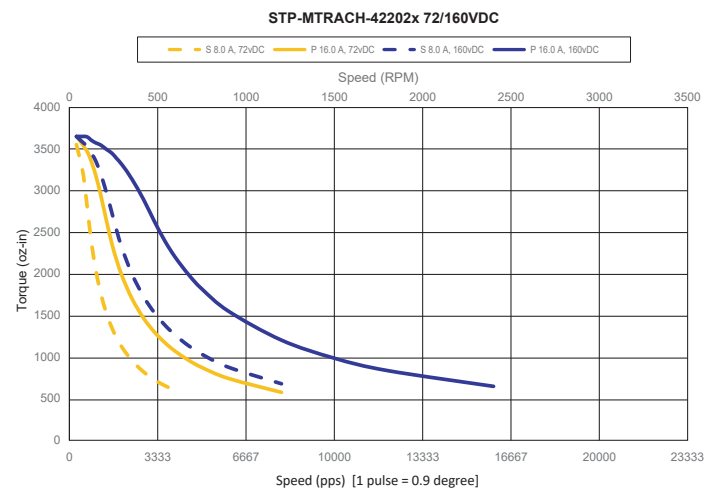
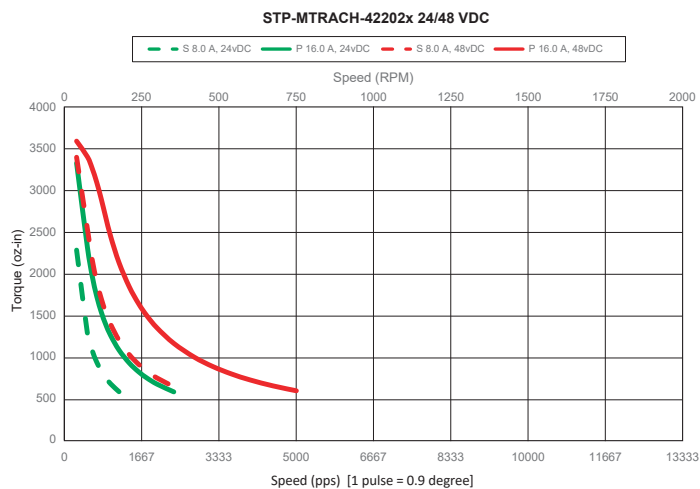
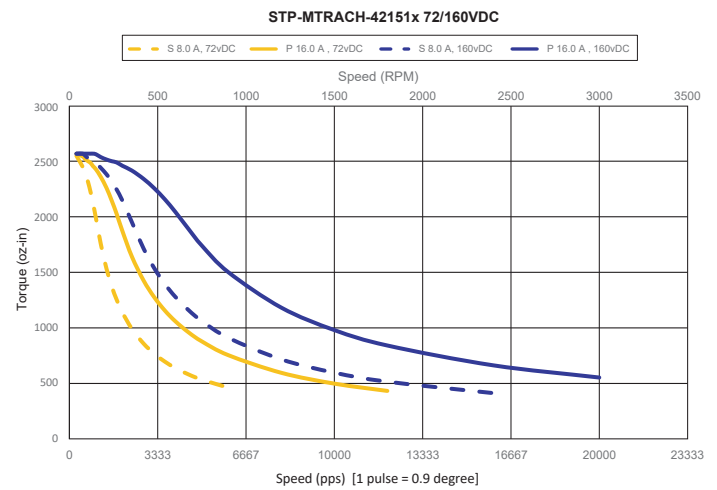
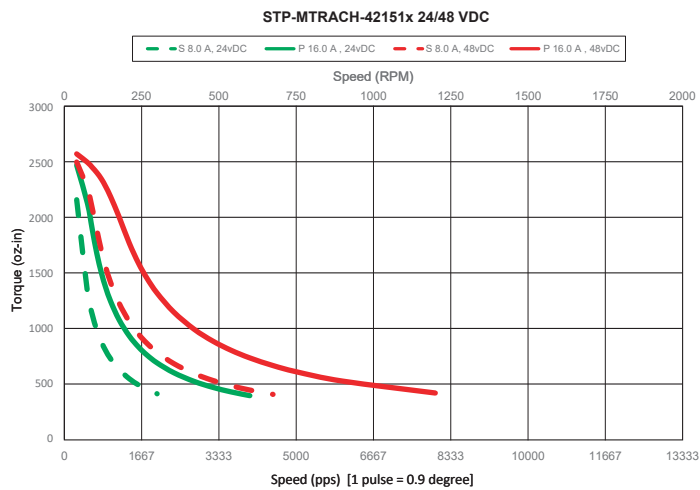
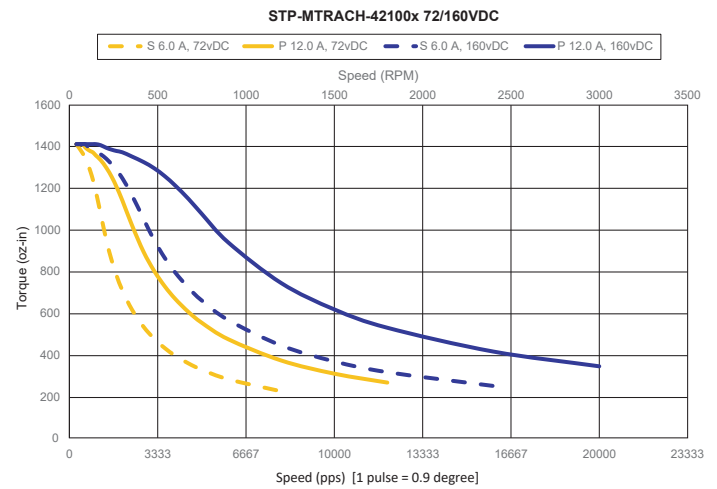
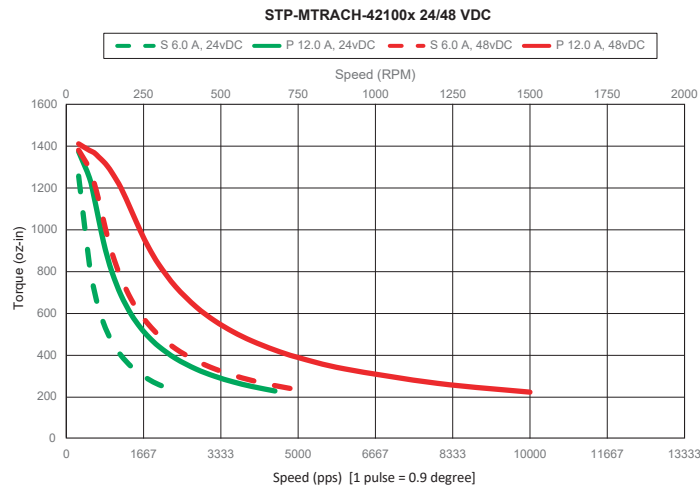


Stepping System Motors

SureStep® Motor Torque vs. Speed Charts (continued)

STP-MTRACH(H)-42xxx(x) NEMA 42 Step Motors

For all NEMA 42 charts: "S" = Series Bipolar Wiring
"P" = Parallel Bipolar Wiring

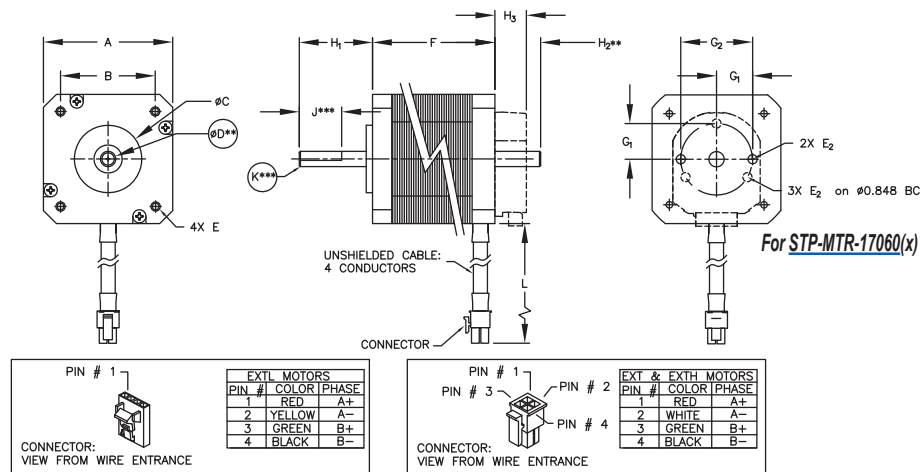




Stepping System Motors

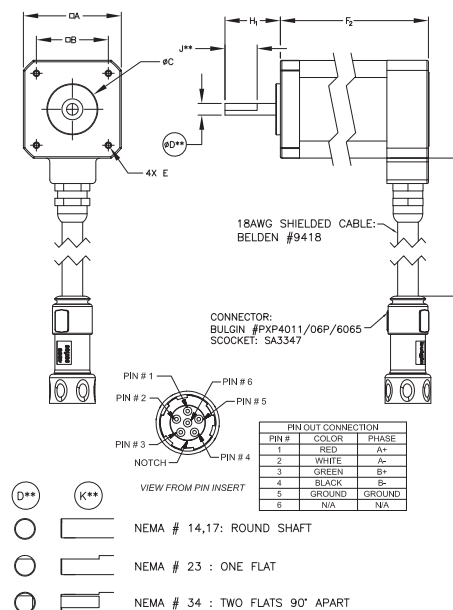
SureStep® Motor Dimensions and Cabling

STP-MTR(x)-14,17,23xxx(X) Motors



** Dimension H2 applies only to dual-shaft (D) and encoder (E) motors.
Dimension D is the same for both front and rear shafts of dual-shaft and encoder motors.
Dimensions J & K do NOT apply to rear shafts of dual-shaft and encoder motors (all rear shafts are round style).

STP-MTR-xxxxxW Motors



SureStep Series Dimensions & Cabling – NEMA 14, 17, and 23 Connectorized Bipolar Stepping Motors								
Dimensions* (in [mm]*)	Low Torque Motors		High Torque Motors					Higher Torque Motors
	STP-MTRL-14026(x)	STP-MTRL-14034(x)	STP-MTR-17040(x)	STP-MTR-17048(x)	STP-MTR-17060(x)	STP-MTR-23055(x)	STP-MTR-23079(x)	STP-MTRH-23079(x)
A	1.39 [35.3]	1.39 [35.3]	1.67 [42.3]			2.25 [57.2]		2.25 [57.2]
B	1.02 [25.9]	1.02 [25.9]	1.22 [31.0]			1.86 [47.2]		1.86 [47.2]
C			Ø 0.87 [22.1]			Ø 1.50 [38.1]		Ø 1.50 [38.1]
D**			Ø 0.20 [5.0]			Ø 0.25 [6.4]		Ø 0.25 [6.4]
E	4-40 thread 0.15 [3.8] min depth		M3 x 0.5 thread 0.15 [3.8] min depth			Ø 0.20 [5.1] through		Ø 0.20 [5.1] through
E2	M2.5 x 0.45 thread	M2.5 x 0.45 thread	M2.5 x 0.45 thread		M2 x 0.4 thread	4-40		4-40
F**	1.02 [25.9]	1.34 [34.0]	1.58 [40.1]	1.89 [48.0]	2.34 [59.5]	2.22 [56.4]	3.10 [78.7]	3.10 [78.7]
F2**	n/a		1.90 [48.3]	2.24 [56.9]	2.67 [67.8]	2.33 [59.1]	3.19 [81.0]	3.19 [81.0]
G1	0.375	0.375	0.375	0.375	0.411	0.906	0.906	0.906
G2	0.75	0.75	0.75	0.75	n/a	1.812	1.812	1.812
H1	0.60 [15.2]	0.60 [15.2]	0.94 [24.0]			0.81 [20.6]		0.81 [20.6]
H2**					0.51 [13.0]			
H3***					0.40			
J**			n/a			0.59 [15.0]		
K**			n/a			0.23 [5.8]		
L					12 [305]			
Conductor	(4) #26 AWG		(4) #20 AWG, (5) #18 AWG (for W motors)				(4) #18 AWG, (5) #18 AWG (for W motors)	
Connector	TE # 103653-3		Molex # 43025-0400, PXP4010/06S/6065 (for W motors)				Molex # 39-01-3042, PXP4010/06S/6065 (for W motors)	
Pin	TE # 1-104505-3 (LOOSE)		Molex # 43030-0007, Socket: SA3347 (for W motors)				Molex # 39-00-0039, Socket: SA3347 (for W motors)	

* mm dimensions are for reference purposes only.

** Dimension H2 applies only to dual-shaft (D) and encoder (E) motors.

Dimension D (shaft diameter) is the same for both front and rear shafts of dual-shaft (D) and encoder (E) motors.

Dimensions J & K do NOT apply to rear shafts of dual-shaft (D) and encoder (E) motors (all rear shafts are round style).

Dimension F2 applies to IP65 (W) motors only.

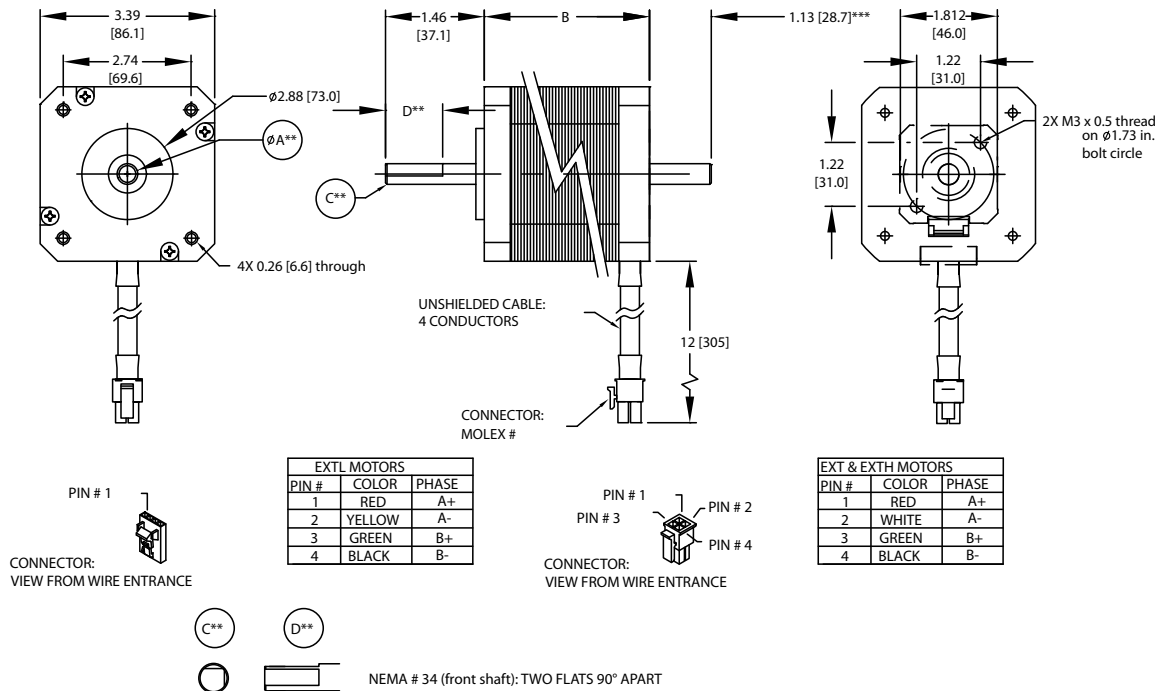
*** Dimension H3 applies only to "E" models with the encoder pre-mounted.



Stepping System Motors

SureStep® Motor Dimensions and Cabling

STP-MTR(x)-34xxx(X) Motors



** Dimension A is the same for both front and rear shafts of dual-shaft motors.

** Dimensions C & D do NOT apply to rear shafts of dual-shaft motors (all rear shafts are round style).

*** Dimension applies only to dual-shaft (D) motors.

SureStep Series Dimensions & Cabling – NEMA 34 Connectorized Bipolar Stepping Motors				
Dimensions (in [mm]*)	High Torque Motors	Higher Torque Motors		
	STP-MTR-34066(x)	STP-MTRH-34066(x)	STP-MTRH-34097(x)	STP-MTRH-34127(x)
A**	Ø 0.50 [12.7]			
B	2.64 [67.1]	2.64 [67.1]	3.82 [97.0]	5.00 [127.0]
C**	0.98 [25.0]			
D**	0.45 [11.4]			
Conductor	(4) #20 AWG, (5) #18 AWG (for W motors)	(4) #18 AWG, (5) #18 AWG (for W motors)		
Connector	Molex # 43025-0400, PXP4010/06S/6065 (for W motors)	Molex # 39-01-3042, PXP4010/06S/6065 (for W motors)		
Pin	Molex # 43030-0007, Socket: SA3347 (for W motors)	Molex # 39-00-0039, Socket: SA3347 (for W motors)		

* mm dimensions are for reference purposes only.

** Dimension A (shaft diameter) is the same for both front and rear shafts of dual-shaft (D series) motors. Dimensions C & D do NOT apply to rear shafts of dual-shaft (D series) motors (all rear shafts are round style).

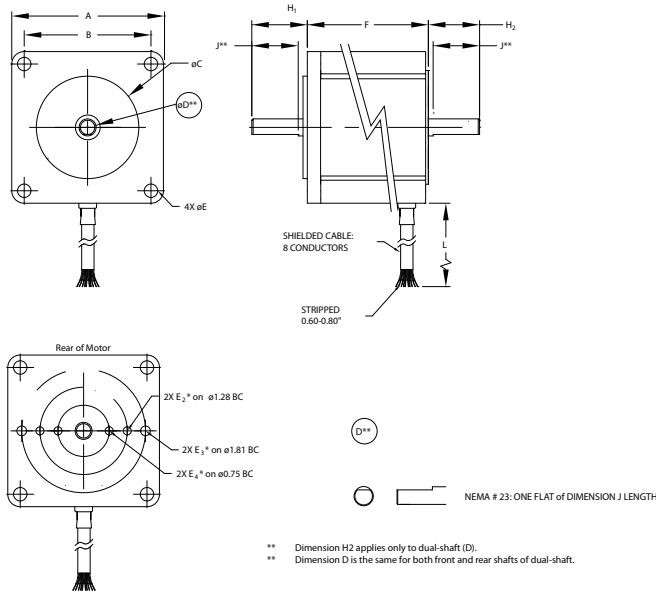
*** This dimension only applies to dual-shaft (D series) motors.



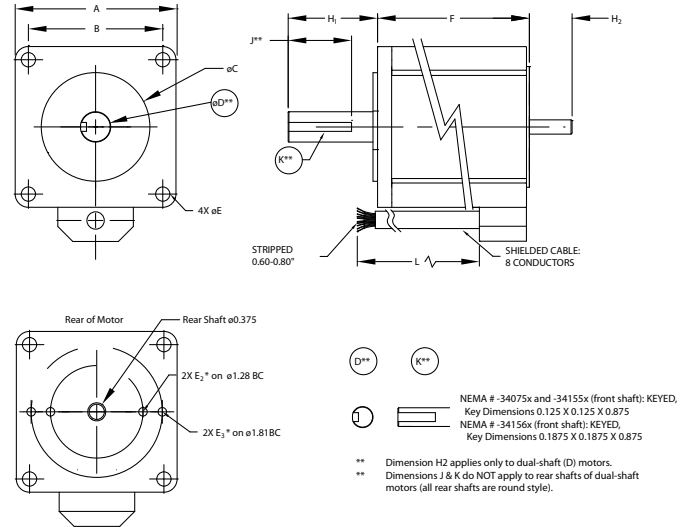
Stepping System Motors

SureStep® Motor Dimensions and Cabling

STP-MTRAC-23xxx Motors



STP-MTRAC-34xxx Motors



** Dimension H2 applies only to dual-shaft (D) motors.
** Dimension D is the same for both front and rear shafts of dual-shaft.

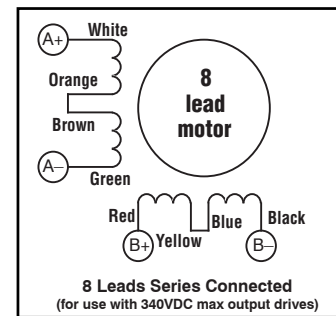
SureStep Series Dimensions & Cabling – High Voltage Bipolar Stepping Motors

Dimensions* (in [mm])*	High Voltage High Torque					
	STP-MTRAC- 23044(x)	STP-MTRAC- 23055(x)	STP-MTRAC- 23078(x)	STP-MTRAC- 34075(x)	STP-MTRAC- 34115(x)	STP-MTRAC- 34156(x)
A	2.25 [57.15]	2.25 [57.15]	2.25 [57.15]	3.39 [86.1]	3.39 [86.1]	3.39 [86.1]
B	1.86 [47.24]	1.86 [47.24]	1.86 [47.24]	2.74 [69.6]	2.74 [69.6]	2.74 [69.6]
C	1.50 [38.1]	1.50 [38.1]	1.50 [38.1]	2.87 [72.9]	2.87 [72.9]	2.87 [72.9]
D**	0.25 [6.35]	0.25 [6.35]	0.25 [6.35]	0.5 [12.7]	0.5 [12.7]	0.625 [15.9]
E	0.2 [5.08]	0.2 [5.08]	0.2 [5.08]	0.22 [5.59]	0.26 [6.6]	0.22 [5.59]
E2***	2-56 thru	2-56 thru	2-56 thru	2-56 UNC Tap 0.2 Deep	2-56 UNC Tap 0.2 Deep	2-56 UNC Tap 0.2 Deep
E3***	4-40 UNC x 0.2 Deep	4-40 UNC x 0.2 Deep	4-40 UNC x 0.2 Deep	4-40 UNC Tap 0.2 Deep	4-40 UNC Tap 0.2 Deep	4-40 UNC Tap 0.2 Deep
E4***	2-56 UNC Tap 0.2 Deep	2-56 UNC Tap 0.2 Deep	2-56 UNC Tap 0.2 Deep	—	—	—
F	1.71 [43.43]	2.16 [54.86]	3.05 [77.47]	2.95 [74.93]	4.52 [114.81]	6.14 [155.96]
H1	0.81 [20.57]	0.81 [20.57]	0.81 [20.57]	1.25 [31.75]	1.25 [31.75]	1.25 [31.75]
H2***	0.63 [16.0]	0.63 [16.0]	0.63 [16.0]	1.12 [28.45]	1.12 [28.45]	1.12 [28.45]
J	0.60 [15.24]	0.60 [15.24]	0.60 [15.24]	0.87 [22.1]	0.87 [22.1]	0.87 [22.1]
L	120 [3048]	120 [3048]	120 [3048]	120 [3048]	120 [3048]	120 [3048]

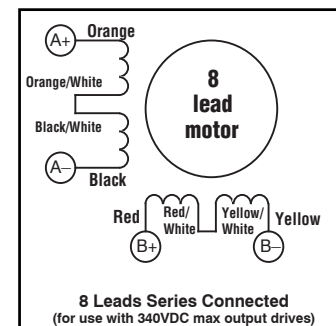
* mm dimensions are for reference purposes only.

** Dimension D (shaft diameter) is the same for both front and rear shafts of NEMA 23 dual-shaft motors. See diagrams for NEMA 34.

*** Dimension applies only to dual-shaft (D) motors.



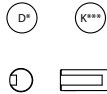
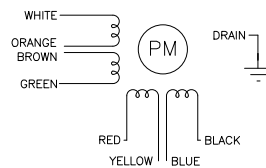
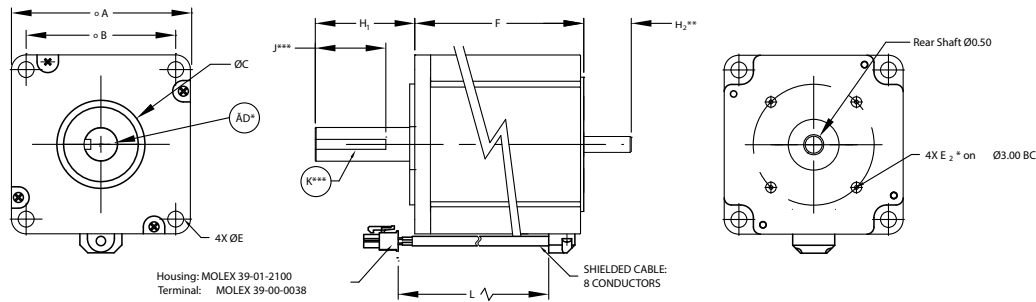
**STP-MTRAC-230xx(x),
34156(x) Motor Wiring**



**STP-MTRAC-34075(x),
34115(x) Motor Wiring**

Stepping System Motors

STP-MTRAC-42xxx Motors

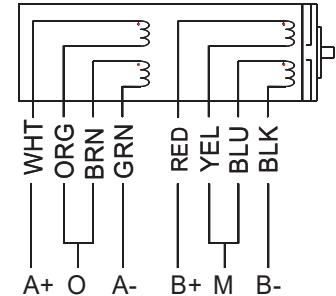


NEMA # 42 (front shaft): KEYED, Key Dimensions 0.188 X 0.188 X 1.377

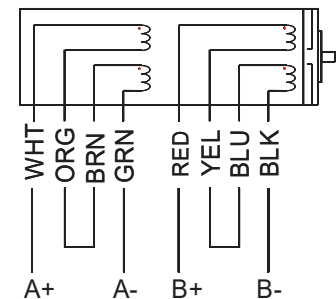
- * Dimension D applies only to the front shaft.
- ** Dimension H2 applies only to dual-shaft (D) motors.
- *** Dimensions J & Key do NOT apply to rear shafts of dual-shaft motors

(all rear shafts are round style).

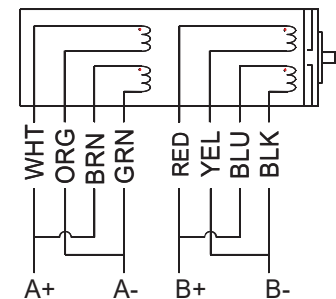
Uni-polar



Bi-polar series



Bi-polar parallel



SureStep Series Dimensions & Cabling – Higher Voltage Bipolar Stepping Motors

Dimensions* (in [mm]*)	Higher Voltage High Torque									
	STP-MTRAC-42100	STP-MTRACH-42100	STP-MTRAC-42151	STP-MTRACH-42151	STP-MTRAC-42202	STP-MTRACH-42202	STP-MTRAC-42100D	STP-MTRACH-42100D	STP-MTRAC-42151D	STP-MTRACH-42151D
A	4.33 [110]	4.33 [110]	4.33 [110]	4.33 [110]	4.33 [110]	4.33 [110]	4.33 [110]	4.33 [110]	4.33 [110]	4.33 [110]
B	3.50 [88.9]	3.50 [88.9]	3.50 [88.9]	3.50 [88.9]	3.50 [88.9]	3.50 [88.9]	3.50 [88.9]	3.50 [88.9]	3.50 [88.9]	3.50 [88.9]
C	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]
D**	0.75 [19.05]	0.75 [19.05]	0.75 [19.05]	0.75 [19.05]	0.75 [19.05]	0.75 [19.05]	0.75 [19.05]	0.75 [19.05]	0.75 [19.05]	0.75 [19.05]
E	0.327 [8.31]	0.327 [8.31]	0.327 [8.31]	0.327 [8.31]	0.327 [8.31]	0.327 [8.31]	0.327 [8.31]	0.327 [8.31]	0.327 [8.31]	0.327 [8.31]
E2	n/a	n/a	n/a	n/a	n/a	n/a	4-40 UNC Tap 0.2 Deep	4-40 UNC Tap 0.2 Deep	4-40 UNC Tap 0.2 Deep	4-40 UNC Tap 0.2 Deep
F	3.88	5.94	7.91	3.88***	5.94***	7.91***				
H1	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]	2.19 [55.6]
H2	n/a	n/a	n/a	n/a	n/a	n/a	1.12 [28.4]	1.12 [28.4]	1.12 [28.4]	1.12 [28.4]
J**	1.37 [34.8]	1.37 [34.8]	1.37 [34.8]	1.37 [34.8]	1.37 [34.8]	1.37 [34.8]	1.37 [34.8]	1.37 [34.8]	1.37 [34.8]	1.37 [34.8]
L	12 [305]									

* mm dimensions are for reference purposes only.

** Dimension D (shaft diameter), J, and Key do not apply to rear shafts of dual-shaft motors.

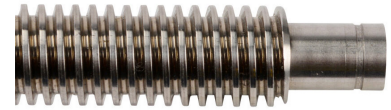
*** For encoder mounting the required STP-MTRA-42ENC bracket will add 0.13 inches [3.2 mm] to the length of the motor.

Linear Actuators

SureStep® Linear Actuators

SureStep Linear Actuators consist of Surestep NEMA 17 or NEMA 23 stepper motors that incorporate a stainless steel lead screw as the rotor. This translates the motor's torque into linear thrust. No maintenance, non-lubricated PTFE-infused polymer lead screw nuts allow for a long life. Triangular nuts come standard on the actuators. Replacement triangular nuts and spare round nuts are available. The motors in these actuators are from the same family of motors as the other SureStep stepper motors. The linear actuators come in 6, 9, and 12 inch lengths. A 1-ft motor power cable ships with the actuator and plugs into the motor's integrated connectors. Longer motor power cables are available in 6, 10, and 20 foot lengths.

Linear actuators ending in "ANN" are the most cost effective. Actuators ending in "ADJ" have a journal machined at the end of the screw to accept a bearing for mounting. There is also a groove cut into the journal for a retaining clip. See the SureStep User Manual for more details and bearing/clip specifications. The "ADJ" actuators also feature a rear motor shaft and encoder mounting holes pre-drilled and tapped. See our line of CUI stepper motor encoders for a complete line of available encoders that can mount onto the linear actuators.



ADJ series journal end

SureStep Series Part Numbers – Linear Actuators																		
Linear Actuator	Price	Screw End Machining	NEMA Frame Size	Lead Screw Length	Lead Screw Material	Lead (in/rev or mm/rev)	Linear Travel (per 1.8° rotation)		Nominal Thrust (lbs)	Motor Weight (lbs)	Drawing							
							in/step	mm/step										
STP-LE17-2A06ANN	\$127.00	None	17	6"	Stainless Steel	0.25"	0.00125	0.03175	45	0.7	PDF							
STP-LE17-2C06ANN	\$129.00					3mm	0.00059	0.015	73	0.7	PDF							
STP-LE17-2D06ANN	\$131.00					1.25 mm	0.00025	0.00625	87	0.8	PDF							
STP-LE17-3A06ANN	\$137.00					0.25"	0.00125	0.03175	69	0.9	PDF							
STP-LE17-3B06ANN	\$145.00					0.5"	0.0025	0.0635	38	0.9	PDF							
STP-LE17-3E06ANN	\$142.00					8mm	0.0016	0.04	55	1.0	PDF							
STP-LE17-2A06ADJ	\$141.00	Journal and groove				23	6"	Stainless Steel	0.25"	0.00125	0.03175	45	0.7	PDF				
STP-LE17-2C06ADJ	\$145.00								3mm	0.00059	0.015	73	0.7	PDF				
STP-LE17-2D06ADJ	\$146.00								1.25 mm	0.00025	0.00625	87	0.8	PDF				
STP-LE17-3A06ADJ	\$160.00								0.25"	0.00125	0.03175	69	0.9	PDF				
STP-LE17-3B06ADJ	\$161.00								0.5"	0.0025	0.0635	38	0.9	PDF				
STP-LE17-3E06ADJ	\$159.00								8mm	0.0016	0.04	55	1.0	PDF				
STP-LE23-1F06ANN	\$172.00	None	23						6"	Stainless Steel	10.5 mm	0.0021	0.0525	63	1.4	PDF		
STP-LE23-1H06ANN	\$188.00										6mm	0.0012	0.03	87	1.4	PDF		
STP-LE23-1G06ANN	\$189.00										2mm	0.0004	0.01	137	1.4	PDF		
STP-LE23-3K06ANN	\$248.00										1"	0.005	0.127	62	2.7	PDF		
STP-LE23-3H06ANN	\$232.00										6mm	0.0012	0.03	193	2.7	PDF		
STP-LE23-1F06ADJ	\$199.00	Journal and groove									23	6"	Stainless Steel	10.5 mm	0.0021	0.0525	63	1.4
STP-LE23-1H06ADJ	\$217.00					6mm								0.0012	0.03	87	1.4	PDF
STP-LE23-1G06ADJ	\$218.00					2mm								0.0004	0.01	137	1.4	PDF
STP-LE23-3K06ADJ	\$263.00					1"								0.005	0.127	62	2.7	PDF
STP-LE23-3H06ADJ	\$250.00					6mm								0.0012	0.03	193	2.7	PDF

Motors listing continued on next page



[STP-LE17-3B06ADJ](#)



[STP-LE17-2A06ANN](#)

Linear Actuators

SureStep® Linear Actuators



STP-LE23-1G09ADJ

SureStep Series Part Numbers – Linear Actuators (Cont'd)													
Linear Actuators	Price	Screw End Machining	NEMA Frame Size	Lead Screw Length	Lead Screw Material	Lead (in/rev or mm/rev)	Linear Travel (per 1.8° rot.)		Nominal Thrust (lbs)	Motor Weight (lbs)	Drawing		
							in/step	mm/step					
STP-LE17-2A09ANN	\$135.00	None	17	9"	Stainless Steel	0.25"	0.00125	0.03175	45	0.8	PDF		
STP-LE17-2C09ANN	\$131.00					3mm	0.00059	0.015	73	0.8	PDF		
STP-LE17-2D09ANN	\$133.00					1.25 mm	0.00025	0.00625	87	0.9	PDF		
STP-LE17-3A09ANN	\$148.00					0.25"	0.00125	0.03175	69	1.1	PDF		
STP-LE17-3B09ANN	\$148.00					0.5"	0.0025	0.0635	38	1.1	PDF		
STP-LE17-3E09ANN	\$146.00					8mm	0.0016	0.04	55	1.2	PDF		
STP-LE17-2A09ADJ	\$152.00	Journal and groove				23	12"	0.25"	0.00125	0.03175	45	0.8	PDF
STP-LE17-2C09ADJ	\$146.00							3mm	0.00059	0.015	73	0.8	PDF
STP-LE17-2D09ADJ	\$151.00							1.25 mm	0.00025	0.00625	87	0.9	PDF
STP-LE17-3A09ADJ	\$163.00							0.25"	0.00125	0.03175	69	1.1	PDF
STP-LE17-3B09ADJ	\$163.00							0.5"	0.0025	0.0635	38	1.1	PDF
STP-LE17-3E09ADJ	\$162.00							8mm	0.0016	0.04	55	1.2	PDF
STP-LE23-1F09ANN	\$190.00	None	23					10.5 mm	0.0021	0.0525	63	1.6	PDF
STP-LE23-1H09ANN	\$205.00							6mm	0.0012	0.03	87	1.7	PDF
STP-LE23-1G09ANN	\$208.00							2mm	0.0004	0.01	137	1.7	PDF
STP-LE23-3K09ANN	\$259.00							1"	0.005	0.127	62	3.0	PDF
STP-LE23-3H09ANN	\$239.00							6mm	0.0012	0.03	193	3.0	PDF
STP-LE23-1F09ADJ	\$205.00	Journal and groove						10.5 mm	0.0021	0.0525	63	1.6	PDF
STP-LE23-1H09ADJ	\$223.00					6mm		0.0012	0.03	87	1.7	PDF	
STP-LE23-1G09ADJ	\$225.00					2mm		0.0004	0.01	137	1.7	PDF	
STP-LE23-3K09ADJ	\$262.00					1"		0.005	0.127	62	3.0	PDF	
STP-LE23-3H09ADJ	\$256.00					6mm		0.0012	0.03	193	3.0	PDF	
STP-LE17-2A12ANN	\$131.00	None	17			0.25"		0.00125	0.03175	45	0.9	PDF	
STP-LE17-2C12ANN	\$133.00					3mm		0.00059	0.015	73	0.9	PDF	
STP-LE17-2D12ANN	\$136.00					1.25 mm		0.00025	0.00625	87	1.0	PDF	
STP-LE17-3A12ANN	\$149.00					0.25"		0.00125	0.03175	69	1.3	PDF	
STP-LE17-3B12ANN	\$153.00					0.5"		0.0025	0.0635	38	1.3	PDF	
STP-LE17-3E12ANN	\$151.00					8mm		0.0016	0.04	55	1.4	PDF	
STP-LE17-2A12ADJ	\$152.00	Journal and groove				23		0.25"	0.00125	0.03175	45	0.9	PDF
STP-LE17-2C12ADJ	\$150.00							3mm	0.00059	0.015	73	0.9	PDF
STP-LE17-2D12ADJ	\$153.00							1.25 mm	0.00025	0.00625	87	1.0	PDF
STP-LE17-3A12ADJ	\$167.00							0.25"	0.00125	0.03175	69	1.3	PDF
STP-LE17-3B12ADJ	\$167.00							0.5"	0.0025	0.0635	38	1.3	PDF
STP-LE17-3E12ADJ	\$165.00							8mm	0.0016	0.04	55	1.4	PDF
STP-LE23-1F12ANN	\$194.00	None	23	10.5 mm				0.0021	0.0525	63	1.8	PDF	
STP-LE23-1H12ANN	\$212.00			6mm				0.0012	0.03	87	2.0	PDF	
STP-LE23-1G12ANN	\$217.00			2mm				0.0004	0.01	137	2.0	PDF	
STP-LE23-3K12ANN	\$269.00			1"				0.005	0.127	62	3.3	PDF	
STP-LE23-3H12ANN	\$246.00			6mm				0.0012	0.03	193	3.3	PDF	
STP-LE23-1F12ADJ	\$211.00	Journal and groove		10.5 mm				0.0021	0.0525	63	1.8	PDF	
STP-LE23-1H12ADJ	\$227.00			6mm		0.0012	0.03	87	2.0	PDF			
STP-LE23-1G12ADJ	\$230.00			2mm		0.0004	0.01	137	2.0	PDF			
STP-LE23-3K12ADJ	\$266.00			1"		0.005	0.127	62	3.3	PDF			
STP-LE23-3H12ADJ	\$261.00			6mm		0.0012	0.03	193	3.3	PDF			

Linear Actuators

SureStep® Linear Actuators Specifications

SureStep Series Specifications – NEMA 17 Linear Actuators						
Linear Actuator Motors	STP-LE17-2Axyyy	STP-LE17-2Cxyyy	STP-LE17-2Dxyyy	STP-LE17-3Axyyy	STP-LE17-3Bxyyy	STP-LE17-3Exyyy
NEMA Frame Size	17					
Phases	2					
Rated Current	2A					
Phase Resistance	1.04 Ω ± 10% (@20°C)			1.25 Ω ± 15% (@20°C)		
Phase Inductance	2.5 mH ± 20% (1kHz 1V rms)			2.8 mH ± 20% (1kHz 1V rms)		
Rotor Inertia	57 g·cm2			82 g·cm2		
Rotational Shaft Holding Torque	0.46 N·m (65.14 oz-in)			0.63 N·m (89.21 oz-in)		
No. of Motor Stacks	2			3		
Motor Length	39.8 mm			48.3 mm		
Lead Screw Material	SUS303Cu (cold-finished stainless steel)					
Nut Material	TECAFORM AD AF (PTFE-infused polymer)					
Lead	0.25"/rev	3 mm/rev	1.25 mm/rev	0.25"/rev	0.5"/rev	8mm/rev
Linear Travel/Step (per 1.8° rotation)	0.00125 in/step	0.015 mm/step	0.00625 mm/step	0.00125 in/step	0.0025 in/step	0.04 mm/step
Linear Speed (@150rpm)1	0.625 in/sec	7.5 mm/sec	3.125 mm/sec	0.625 in/sec	1.25 in/sec	20 mm/sec
Thrust (@150rpm)	45lbs	73lbs	87lbs	69lbs	38lbs	55lbs
Load Limit (lbs)2	75	75	80	75	75	80
Radial Deflection (Max)3	6" lead screw: 0.015" 9" lead screw: 0.0225" 12" lead screw 0.03"					
Ambient Operating Temperature	-20-50°C					
Insulation Class	B (130°C)					
Screw Diameter	0.25"	6.5 mm	8mm	0.25"	0.25"	8mm
Agency Approvals	CE					
1 To determine your linear speed as it relates to RPM use the following formula: Linear Speed = RPM x (Lead/60 sec)						
2 The load limit indicates max load before the nut begins to have its lifespan negatively impacted, not what the linear actuator can move.						
3 Calculated deflection is the deflection value measured at the end of the lead screw.						
Note: For dual-shaft motors (STP-LExx-xxxxADJ series) the sum of the front and rear torque loads, radial loads, and thrust loads must not exceed the applicable torque, radial and thrust load ratings of the motor.						

Linear Actuators

SureStep® Linear Actuators Specifications

SureStep Series Specifications – NEMA 23 Linear Actuators					
Linear Actuator Motors	STP-LE23-1Fxyyy	STP-LE23-1Hxyyy	STP-LE23-1Gxyyy	STP-LE23-3Kxyyy	STP-LE23-3Hxyyy
NEMA Frame Size	23				
Phases	2				
Rated Current	2.1 A			3A	
Phase Resistance	1.6 Ω ± 10% (@20°C)			1.1 Ω ± 10% (@20°C)	
Phase Inductance	3.9 mH ± 20% (1kHz 1V rms)			5.0 mH ± 20% (1kHz 1V rms)	
Rotor Inertia	180 g·cm2			460 g·cm2	
Rotational Shaft Holding Torque	0.9 N·m (127.45 oz-in)			2.3 N·m (325.70 oz-in)	
No. of Motor Stacks	1			3	
Motor Length	45mm			79mm	
Lead Screw Material	SUS303Cu (cold-finished stainless steel)				
Nut Material	TECAFORM AD AF (PTFE-infused polymer)				
Lead	10.5 mm/rev	6mm/rev	2mm/rev	1"/rev	6mm/rev
Linear Travel/Step (per 1.8° rotation)	0.0525 mm/step	0.03 mm/step	0.01 mm/step	0.005 in/step	0.03 mm/step
Linear Speed (@150rpm)1	26.25 mm/sec	15 mm/sec	5 mm/sec	2.5 in/sec	15 mm/sec
Thrust (@150rpm)	63lbs	87lbs	137 lbs	62 lbs	193 lbs
Load Limit (lbs)2	100	175	175	175	175
Radial Deflection (Max)3	6" lead screw: 0.015" 9" lead screw: 0.0225" 12" lead screw 0.03"				
Ambient Operating Temperature	-20-50°C				
Insulation Class	B (130°C)				
Screw Diameter	10mm	12mm	12mm	0.5"	12mm
Agency Approvals	CE				

¹ To determine your linear speed as it relates to RPM use the following formula: Linear Speed = RPM x (Lead/60 sec)

² The load limit indicates max load before the nut begins to have its lifespan negatively impacted, not what the linear actuator can move.

³ Calculated deflection is the deflection value measured at the end of the lead screw.

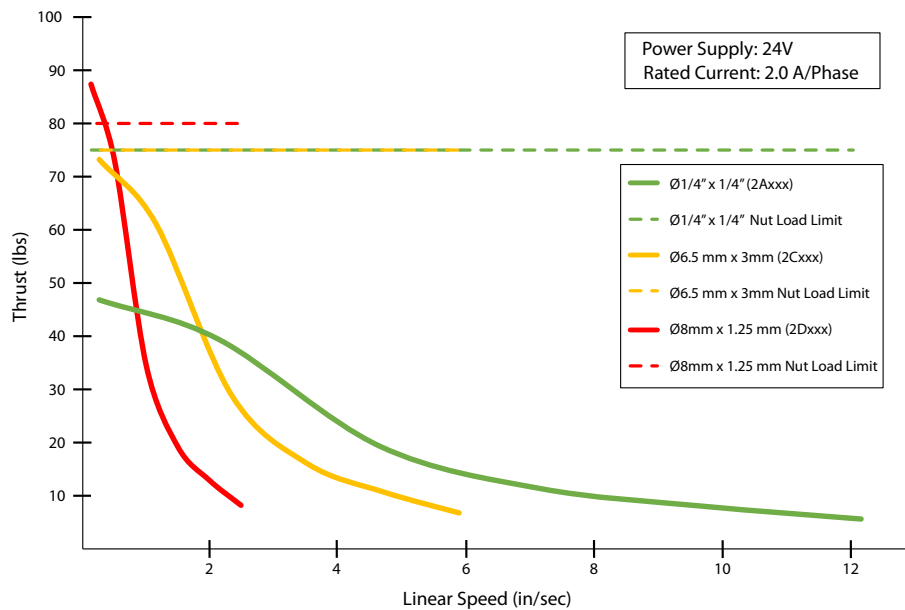
Note: For dual-shaft motors (STP-LExx-xxxxADJ series) the sum of the front and rear torque loads, radial loads, and thrust loads must not exceed the applicable torque, radial and thrust load ratings of the motor.

Linear Actuators

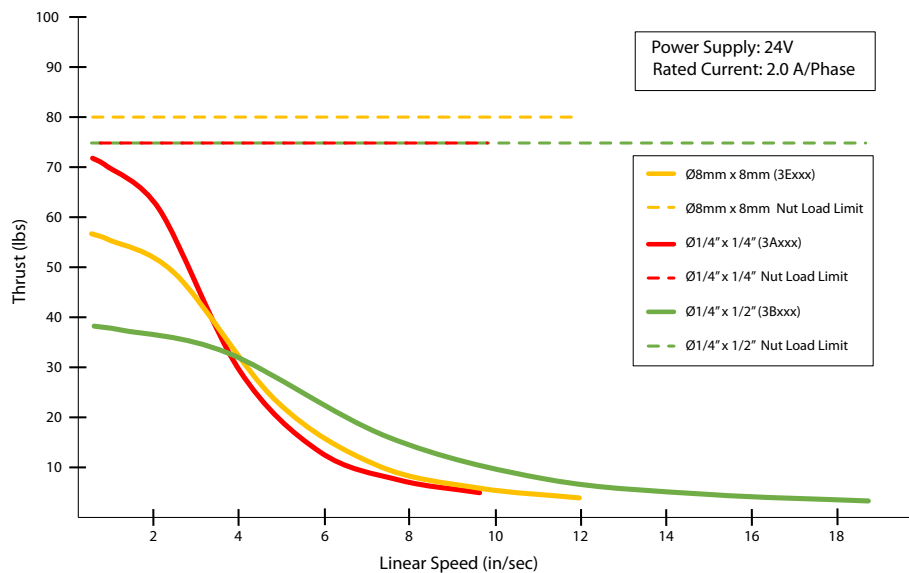
SureStep® Linear Actuator Thrust vs. Speed Charts

The charts below detail the thrust output by the motor depending on the linear speed of the motor. The highest thrust is achievable at the lowest speeds. Note that for some motors, the output thrust (solid lines) can exceed the load tolerance (horizontal dashed lines) of the nut on the shaft. **Allow sufficient time to accelerate the load and size the step motor with a 100% thrust safety factor (i.e.: design the system using a maximum of 50% of the motor's thrust).**

STP-LE17-2xxxx NEMA 17 Step Motor Linear Actuators (Double-stack motors)



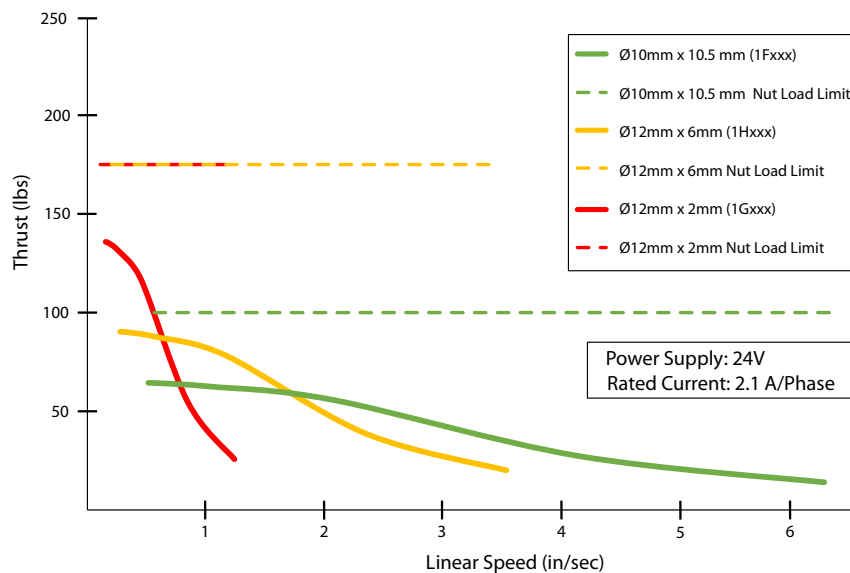
STP-LE17-3xxxx NEMA 17 Step Motor Linear Actuators (Triple-stack motors)



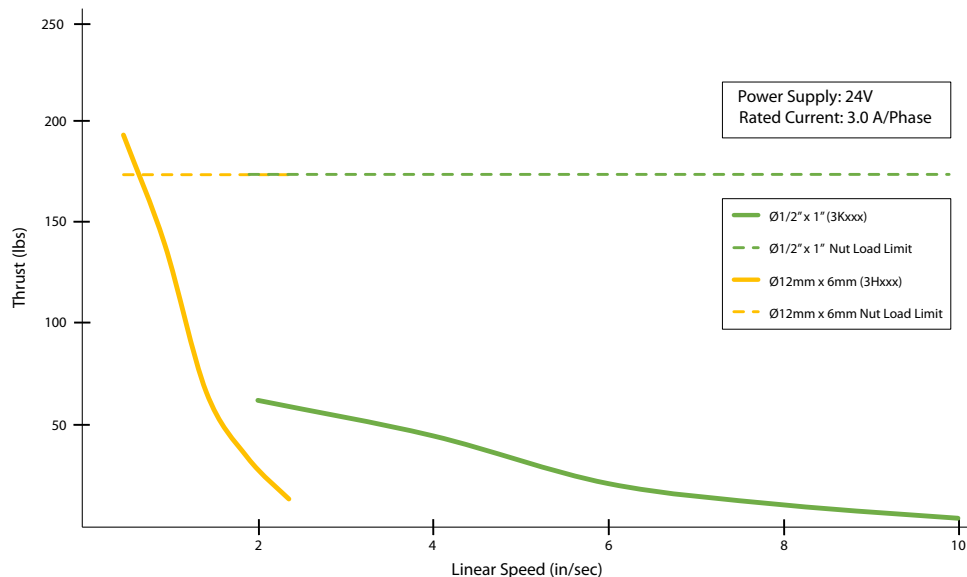
Linear Actuators

SureStep® Linear Actuator Thrust vs. Speed Charts, continued

STP-LE23-1xxxx NEMA 23 Step Motor Linear Actuators (Single-stack motors)

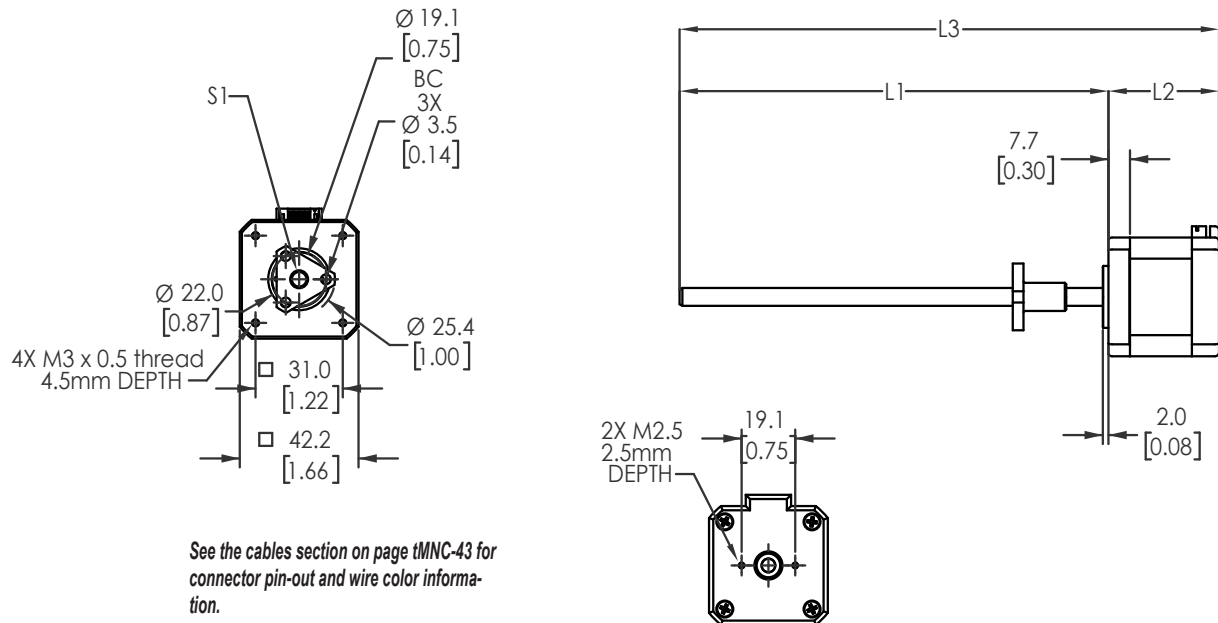


STP-LE23-3xxxx NEMA 23 Step Motor Linear Actuators (Triple-stack motors)



SureStep® Linear Actuator Dimensions and Cabling

STP-LE17-xxxxANN Motors



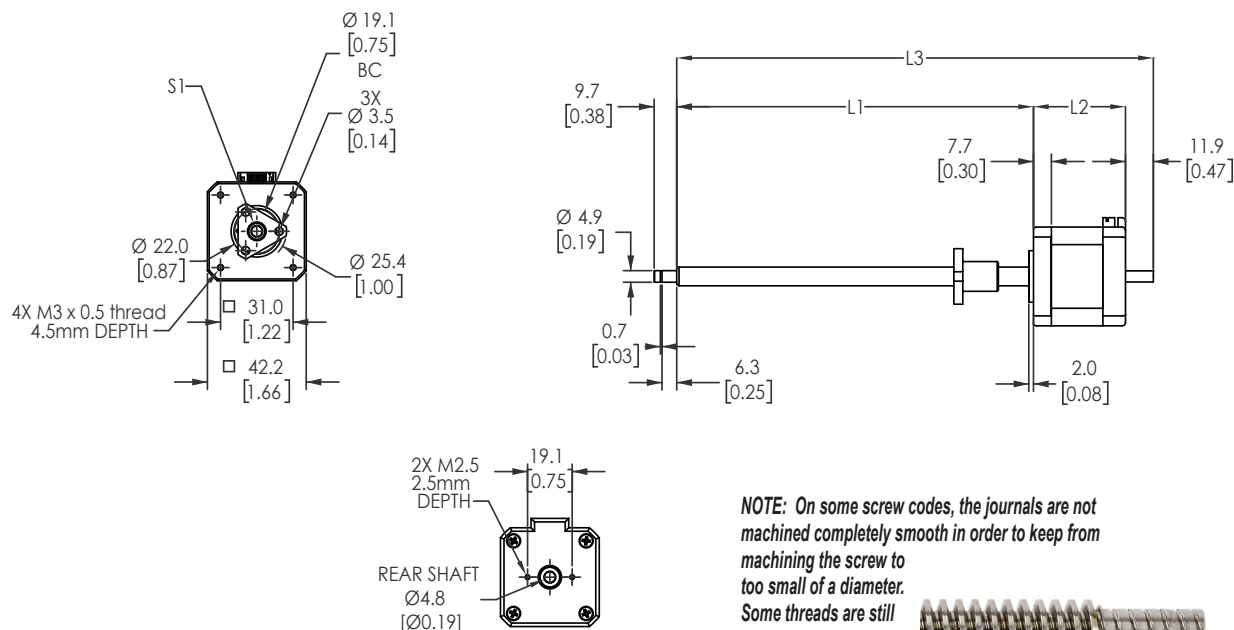
STP-LE17-xxxxANN Dimensions (mm [inch])				
Part #	L1	L2	L3	S1
<u>STP-LE17-2A06ANN</u>	152.4 [6.00]	39.3 [1.55]	191.7 [7.55]	6.4 [0.25] 0.25" Lead
<u>STP-LE17-2A09ANN</u>	228.6 [9.00]	39.3 [1.55]	267.9 [10.55]	6.4 [0.25] 0.25" Lead
<u>STP-LE17-2A12ANN</u>	304.8 [12.00]	39.3 [1.55]	344.1 [13.55]	6.4 [0.25] 0.25" Lead
<u>STP-LE17-2C06ANN</u>	152.4 [6.00]	39.3 [1.55]	191.7 [7.55]	6.5 [0.47] 3.0 mm Lead
<u>STP-LE17-2C09ANN</u>	228.6 [9.00]	39.3 [1.55]	267.9 [10.55]	6.5 [0.47] 3.0 mm Lead
<u>STP-LE17-2C12ANN</u>	304.8 [12.00]	39.3 [1.55]	344.1 [13.55]	6.5 [0.47] 3.0 mm Lead
<u>STP-LE17-2D06ANN</u>	152.4 [6.00]	39.3 [1.55]	191.7 [7.55]	8.0 [0.31] 1.25 mm Lead
<u>STP-LE17-2D09ANN</u>	228.6 [9.00]	39.3 [1.55]	267.9 [10.55]	8.0 [0.31] 1.25 mm Lead
<u>STP-LE17-2D12ANN</u>	304.8 [12.00]	39.3 [1.55]	344.1 [13.55]	8.0 [0.31] 1.25 mm Lead
<u>STP-LE17-3A06ANN</u>	152.4 [6.00]	47.8 [1.88]	200.2 [7.88]	6.4 [0.25] 0.25" Lead
<u>STP-LE17-3A09ANN</u>	228.6 [9.00]	47.8 [1.88]	276.4 [10.88]	6.4 [0.25] 0.25" Lead
<u>STP-LE17-3A12ANN</u>	304.8 [12.00]	47.8 [1.88]	352.6 [13.88]	6.4 [0.25] 0.25" Lead
<u>STP-LE17-3B06ANN</u>	152.4 [6.00]	47.8 [1.88]	200.2 [7.88]	6.4 [0.25] 0.5" Lead
<u>STP-LE17-3B09ANN</u>	228.6 [9.00]	47.8 [1.88]	276.4 [10.88]	6.4 [0.25] 0.5" Lead
<u>STP-LE17-3B12ANN</u>	304.8 [12.00]	47.8 [1.88]	352.6 [13.88]	6.4 [0.25] 0.5" Lead
<u>STP-LE17-3E06ANN</u>	152.4 [6.00]	47.8 [1.88]	200.2 [7.88]	8.0 [0.31] 8.0 mm Lead
<u>STP-LE17-3E09ANN</u>	228.6 [9.00]	47.8 [1.88]	276.4 [10.88]	8.0 [0.31] 8.0 mm Lead
<u>STP-LE17-3E12ANN</u>	304.8 [12.00]	47.8 [1.88]	352.6 [13.88]	8.0 [0.31] 8.0 mm Lead



Linear Actuators

SureStep® Linear Actuator Dimensions and Cabling

STP-LE17-xxxxADJ Motors



See the encoder compatibility section on page tMNC-44 for a list of compatible encoders.

See the cables section on page tMNC-43 for connector pin-out and wire color information.

NOTE: On some screw codes, the journals are not machined completely smooth in order to keep from machining the screw to too small of a diameter. Some threads are still visible. This is intentional and will not affect bearing performance.

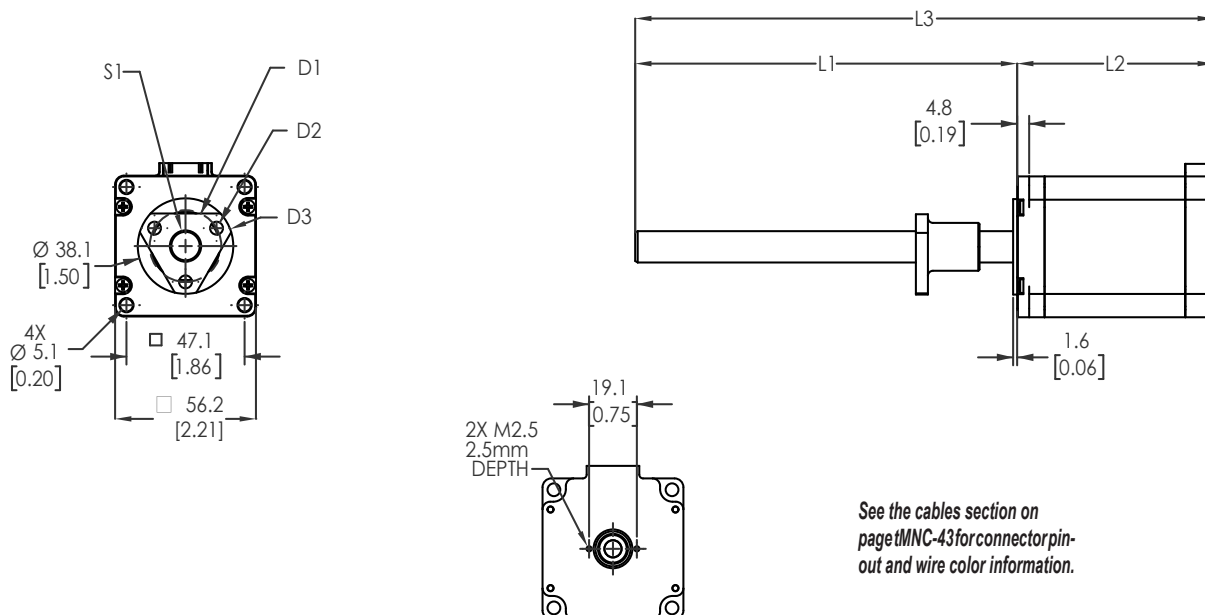


STP-LE17-xxxxADJ Dimensions (mm [inch])				
Part #	L1	L2	L3	S1
<u>STP-LE17-2A06ADJ</u>	152.4 [6.00]	39.3 [1.55]	203.6 [8.02]	6.4 [0.25] 0.25" Lead
<u>STP-LE17-2A09ADJ</u>	228.6 [9.00]	39.3 [1.55]	279.8 [11.02]	6.4 [0.25] 0.25" Lead
<u>STP-LE17-2A12ADJ</u>	304.8 [12.00]	39.3 [1.55]	356.0 [14.02]	6.4 [0.25] 0.25" Lead
<u>STP-LE17-2C06ADJ</u>	152.4 [6.00]	39.3 [1.55]	203.6 [8.02]	6.5 [0.47] 3.0 mm Lead
<u>STP-LE17-2C09ADJ</u>	228.6 [9.00]	39.3 [1.55]	279.8 [11.02]	6.5 [0.47] 3.0 mm Lead
<u>STP-LE17-2C12ADJ</u>	304.8 [12.00]	39.3 [1.55]	356.0 [14.02]	6.5 [0.47] 3.0 mm Lead
<u>STP-LE17-2D06ADJ</u>	152.4 [6.00]	39.3 [1.55]	203.6 [8.02]	8.0 [0.31] 1.25 mm Lead
<u>STP-LE17-2D09ADJ</u>	228.6 [9.00]	39.3 [1.55]	279.8 [11.02]	8.0 [0.31] 1.25 mm Lead
<u>STP-LE17-2D12ADJ</u>	304.8 [12.00]	39.3 [1.55]	356.0 [14.02]	8.0 [0.31] 1.25 mm Lead
<u>STP-LE17-3A06ADJ</u>	152.4 [6.00]	47.8 [1.88]	212.1 [8.35]	6.4 [0.25] 0.25" Lead
<u>STP-LE17-3A09ADJ</u>	228.6 [9.00]	47.8 [1.88]	288.3 [11.35]	6.4 [0.25] 0.25" Lead
<u>STP-LE17-3A12ADJ</u>	304.8 [12.00]	47.8 [1.88]	364.5 [15.35]	6.4 [0.25] 0.25" Lead
<u>STP-LE17-3B06ADJ</u>	152.4 [6.00]	47.8 [1.88]	212.1 [8.35]	6.4 [0.25] 0.5" Lead
<u>STP-LE17-3B09ADJ</u>	228.6 [9.00]	47.8 [1.88]	288.3 [11.35]	6.4 [0.25] 0.5" Lead
<u>STP-LE17-3B12ADJ</u>	304.8 [12.00]	47.8 [1.88]	364.5 [15.35]	6.4 [0.25] 0.5" Lead
<u>STP-LE17-3E06ADJ</u>	152.4 [6.00]	47.8 [1.88]	212.1 [8.35]	8.0 [0.31] 8.0 mm Lead
<u>STP-LE17-3E09ADJ</u>	228.6 [9.00]	47.8 [1.88]	288.3 [11.35]	8.0 [0.31] 8.0 mm Lead
<u>STP-LE17-3E12ADJ</u>	304.8 [12.00]	47.8 [1.88]	364.5 [15.35]	8.0 [0.31] 8.0 mm Lead

Linear Actuators

SureStep® Linear Actuator Dimensions and Cabling

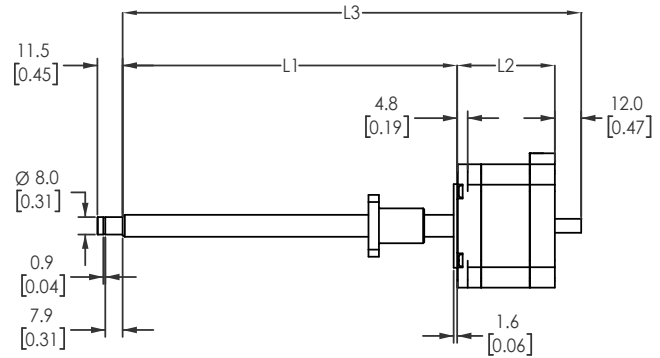
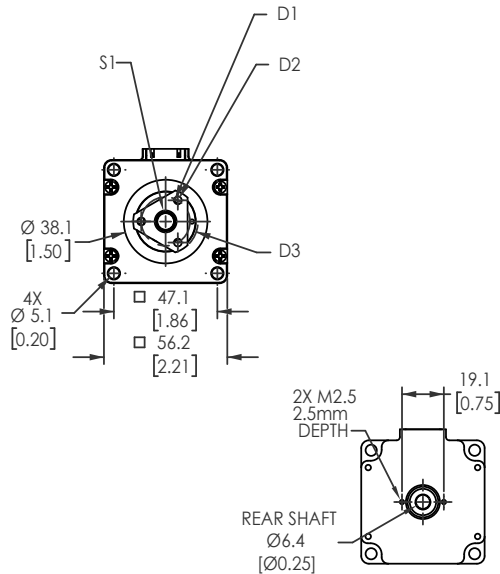
STP-LE23-xxxxANN Motors



STP-LE23-xxxxANN Dimensions (mm [inch])							
Part #	L1	L2	L3	D1	D2	D3	S1
STP-LE23-1F06ANN	152.4 [6.00]	44.5 [1.75]	196.9 [7.75]	Ø22.2 [0.87] BC	3x Ø3.56 [0.14]	Ø29.5 [1.16]	10.0 [0.39] 10.5 mm Lead
STP-LE23-1F09ANN	228.6 [9.00]	44.5 [1.75]	273.1 [10.75]	Ø22.2 [0.87] BC	3x Ø3.56 [0.14]	Ø29.5 [1.16]	10.0 [0.39] 10.5 mm Lead
STP-LE23-1F12ANN	304.8 [12.00]	44.5 [1.75]	349.3 [13.75]	Ø22.2 [0.87] BC	3x Ø3.56 [0.14]	Ø29.5 [1.16]	10.0 [0.39] 10.5 mm Lead
STP-LE23-1G06ANN	152.4 [6.00]	44.5 [1.75]	196.9 [7.75]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 2.0 mm Lead
STP-LE23-1G09ANN	228.6 [9.00]	44.5 [1.75]	273.1 [10.75]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 2.0 mm Lead
STP-LE23-1G12ANN	304.8 [12.00]	44.5 [1.75]	349.3 [13.75]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 2.0 mm Lead
STP-LE23-1H06ANN	152.4 [6.00]	44.5 [1.75]	196.9 [7.75]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 6.0 mm Lead
STP-LE23-1H09ANN	228.6 [9.00]	44.5 [1.75]	273.1 [10.75]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 6.0 mm Lead
STP-LE23-1H12ANN	304.8 [12.00]	44.5 [1.75]	349.3 [13.75]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 6.0 mm Lead
STP-LE23-3H06ANN	152.4 [6.00]	78.5 [3.09]	230.9 [9.09]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 6.0 mm Lead
STP-LE23-3H09ANN	228.6 [9.00]	78.5 [3.09]	307.1 [12.09]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 6.0 mm Lead
STP-LE23-3H12ANN	304.8 [12.00]	78.5 [3.09]	383.3 [15.09]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 6.0 mm Lead
STP-LE23-3K06ANN	152.4 [6.00]	78.5 [3.09]	230.9 [9.09]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.5 [0.50] 1in Lead
STP-LE23-3K09ANN	228.6 [9.00]	78.5 [3.09]	307.1 [12.09]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.5 [0.50] 1in Lead
STP-LE23-3K12ANN	304.8 [12.00]	78.5 [3.09]	383.3 [15.09]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.5 [0.50] 1in Lead

SureStep® Linear Actuator Dimensions and Cabling

STP-LE23-xxxxADJ Motors



See the cables section on
page tMNC-43 for connector pin-
out and wire color information.

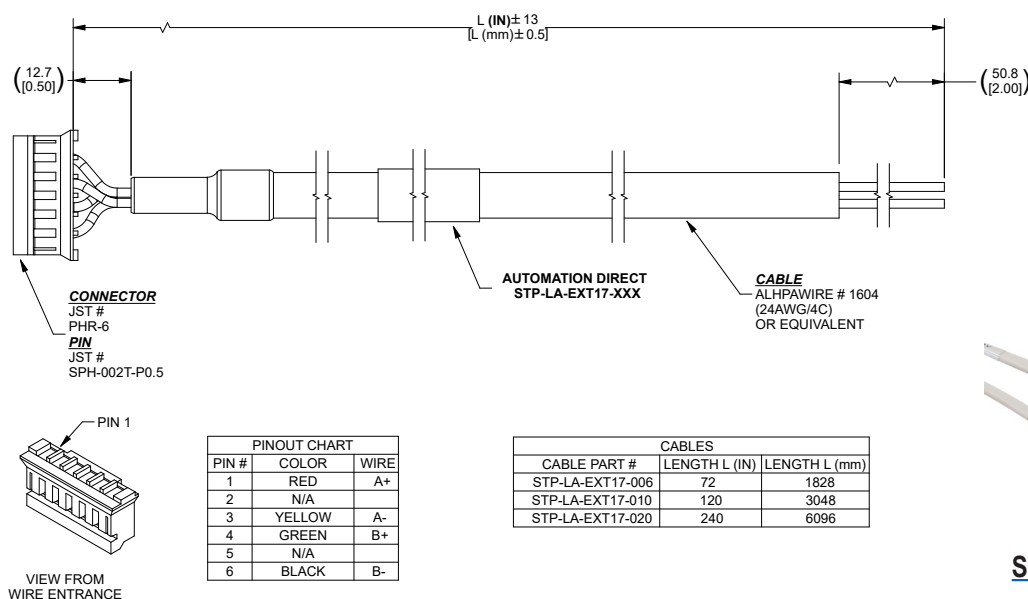
See the encoder compatibil-
ity section on page tMNC-44 for
a list of compatible encoders.

STP-LE23-xxxxADJ Dimensions (mm [inch])							
Part #	L1	L2	L3	D1	D2	D3	S1
STP-LE23-1F06ADJ	152.4 [6.00]	44.5 [1.75]	208.9 [8.22]	Ø22.2 [0.87] BC	3x Ø3.56 [0.14]	Ø29.5 [1.16]	10.0 [0.39] 10.5 mm Lead
STP-LE23-1F09ADJ	228.6 [9.00]	44.5 [1.75]	285.1 [11.22]	Ø22.2 [0.87] BC	3x Ø3.56 [0.14]	Ø29.5 [1.16]	10.0 [0.39] 10.5 mm Lead
STP-LE23-1F12ADJ	304.8 [12.00]	44.5 [1.75]	361.3 [14.22]	Ø22.2 [0.87] BC	3x Ø3.56 [0.14]	Ø29.5 [1.16]	10.0 [0.39] 10.5 mm Lead
STP-LE23-1G06ADJ	152.4 [6.00]	44.5 [1.75]	208.9 [8.22]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 2.0 mm Lead
STP-LE23-1G09ADJ	228.6 [9.00]	44.5 [1.75]	285.1 [11.22]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 2.0 mm Lead
STP-LE23-1G12ADJ	304.8 [12.00]	44.5 [1.75]	361.3 [14.22]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 2.0 mm Lead
STP-LE23-1H06ADJ	152.4 [6.00]	44.5 [1.75]	208.9 [8.22]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 6.0 mm Lead
STP-LE23-1H09ADJ	228.6 [9.00]	44.5 [1.75]	285.1 [11.22]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 6.0 mm Lead
STP-LE23-1H12ADJ	304.8 [12.00]	44.5 [1.75]	361.3 [14.22]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 6.0 mm Lead
STP-LE23-3H06ADJ	152.4 [6.00]	78.5 [3.09]	242.9 [9.06]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 6.0 mm Lead
STP-LE23-3H09ADJ	228.6 [9.00]	78.5 [3.09]	319.1 [12.56]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 6.0 mm Lead
STP-LE23-3H12ADJ	304.8 [12.00]	78.5 [3.09]	395.3 [15.56]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.0 [0.47] 6.0 mm Lead
STP-LE23-3K06ADJ	152.4 [6.00]	78.5 [3.09]	242.9 [9.06]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.5 [0.50] 1in Lead
STP-LE23-3K09ADJ	228.6 [9.00]	78.5 [3.09]	319.1 [12.56]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.5 [0.50] 1in Lead
STP-LE23-3K12ADJ	304.8 [12.00]	78.5 [3.09]	395.3 [15.56]	Ø28.58 [1.13] BC	3x Ø5.2 [0.20]	Ø38.1 [1.50]	12.5 [0.50] 1in Lead

SureStep® Linear Actuators Cables

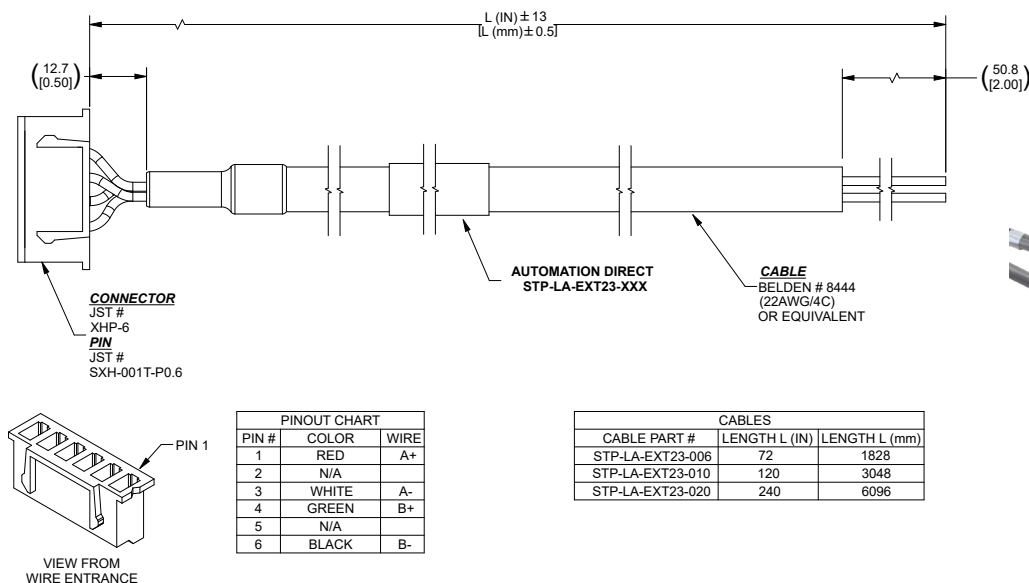
Cables for SureStep Series Linear Actuators			
Part Number	Price	Description	Drawing
STP-LA-EXT17-006	\$26.00	SureStep extension cable, 6-pin (4-wire) connector to pigtail, 6ft cable length. For use with SureStep NEMA 17 STP-LE series linear actuators.	PDF
STP-LA-EXT17-010	\$33.50	SureStep extension cable, 6-pin (4-wire) connector to pigtail, 10ft cable length. For use with SureStep NEMA 17 STP-LE series linear actuators.	PDF
STP-LA-EXT17-020	\$55.00	SureStep extension cable, 6-pin (4-wire) connector to pigtail, 20ft cable length. For use with SureStep NEMA 17 STP-LE series linear actuators.	PDF
STP-LA-EXT23-006	\$29.50	SureStep extension cable, 6-pin (4-wire) connector to pigtail, 6ft cable length. For use with SureStep NEMA 23 STP-LE series linear actuators.	PDF
STP-LA-EXT23-010	\$39.00	SureStep extension cable, 6-pin (4-wire) connector to pigtail, 10ft cable length. For use with SureStep NEMA 23 STP-LE series linear actuators.	PDF
STP-LA-EXT23-020	\$60.00	SureStep extension cable, 6-pin (4-wire) connector to pigtail, 20ft cable length. For use with SureStep NEMA 23 STP-LE series linear actuators.	PDF

STP-LA-EXT17-0xx Dimensions (mm [in])



[STP-LA-EXT17-006](#)

STP-LA-EXT23-0xx Dimensions (mm [in])



[STP-LA-EXT23-006](#)

Linear Actuators

SureStep® Linear Actuators Accessories

Replacement Parts for SureStep Series Linear Actuators			
Part Number	Price	Description	Drawing
STP-LA-NTFA	\$25.00	SureStep lead screw flange nut, replacement, triangular, 0.25 in/rev, 0.25 inch lead screw diameter. For use with SureStep STP-LE series screw code A linear actuators.	PDF
STP-LA-NTFB	\$25.00	SureStep lead screw flange nut, replacement, triangular, 0.5 in/rev, 0.25 inch lead screw diameter. For use with SureStep STP-LE series screw code B linear actuators.	PDF
STP-LA-NTFC	\$25.00	SureStep lead screw flange nut, replacement, triangular, 3mm/rev, 6.5 mm lead screw diameter. For use with SureStep STP-LE series screw code C linear actuators.	PDF
STP-LA-NTFD	\$24.00	SureStep lead screw flange nut, replacement, triangular, 1.25 mm/rev, 8mm lead screw diameter. For use with SureStep STP-LE series screw code D linear actuators.	PDF
STP-LA-NTFE	\$28.00	SureStep lead screw flange nut, replacement, triangular, 8mm/rev, 8mm lead screw diameter. For use with SureStep STP-LE series screw code E linear actuators.	PDF
STP-LA-NTFF	\$40.00	SureStep lead screw flange nut, replacement, triangular, 10.5 mm/rev, 10mm lead screw diameter. For use with SureStep STP-LE series screw code F linear actuators.	PDF
STP-LA-NTFG	\$42.50	SureStep lead screw flange nut, replacement, triangular, 2mm/rev, 12mm lead screw diameter. For use with SureStep STP-LE series screw code G linear actuators.	PDF
STP-LA-NTFH	\$42.50	SureStep lead screw flange nut, replacement, triangular, 6mm/rev, 12mm lead screw diameter. For use with SureStep STP-LE series screw code H linear actuators.	PDF
STP-LA-NTFK	\$44.00	SureStep lead screw flange nut, replacement, triangular, 1in/rev, 0.5 inch lead screw diameter. For use with SureStep STP-LE series screw code K linear actuators.	PDF
STP-LA-NRFA	\$24.00	SureStep lead screw flange nut, round, 0.25 in/rev, 0.25 inch lead screw diameter. For use with SureStep STP-LE series screw code A linear actuators.	PDF
STP-LA-NRFB	\$24.00	SureStep lead screw flange nut, round, 0.5 in/rev, 0.25 in lead screw diameter. For use with SureStep STP-LE series screw code B linear actuators.	PDF
STP-LA-NRFC	\$24.00	SureStep lead screw flange nut, round, 3mm/rev, 6.5 mm lead screw diameter. For use with SureStep STP-LE series screw code C linear actuators.	PDF
STP-LA-NRFD	\$24.00	SureStep lead screw flange nut, round, 1.25 mm/rev, 8mm lead screw diameter. For use with SureStep STP-LE series screw code D linear actuators.	PDF
STP-LA-NRFE	\$25.00	SureStep lead screw flange nut, round, 8mm/rev, 8mm lead screw diameter. For use with SureStep STP-LE series screw code E linear actuators.	PDF
STP-LA-NRFF	\$27.50	SureStep lead screw flange nut, round, 10.5 mm/rev, 10mm lead screw diameter. For use with SureStep STP-LE series screw code F linear actuators.	PDF
STP-LA-NRFG	\$42.50	SureStep lead screw flange nut, round, 2mm/rev, 12mm lead screw diameter. For use with SureStep STP-LE series screw code G linear actuators.	PDF
STP-LA-NRFH	\$42.50	SureStep lead screw flange nut, round, 6mm/rev, 12mm lead screw diameter. For use with SureStep STP-LE series screw code H linear actuators.	PDF
STP-LA-NRFK	\$42.50	SureStep lead screw flange nut, round, 1in/rev, 0.5 inch lead screw diameter. For use with SureStep STP-LE series screw code K linear actuators.	PDF

All STP-LA series nuts are formed from TECAFORM AD AF (a PTFE-infused polymer) and require no lubrication. Using any sort of lubricant is not recommended as it will eventually dry out and contaminate the screw.

SureStep Linear Actuators have a "Screw Code" built into the part number. Each screw has a specific diameter and lead (pitch). The "Y" variable in the Linear Actuator part numbers below represents the Screw Code:

STP-LE17-xYxxxxx

STP-LE23-xYxxxxx

To find a compatible nut, match the actuator's Screw Code to the nut screw code ("Y" below):

STP-LA-xxxY

Example: An [STP-LA-NTFB](#) nut will fit onto an [STP-LE17-3B06ADJ](#) actuator.



[STP-LA-NTFA](#)



[STP-LA-NRFA](#)

NEMA 17 Linear Actuator Compatible Encoders

NEMA 17 Compatible Encoders	
CUI Devices Configurable Encoders	SureStep Encoders
AMT102-V (config. ppr, Push-pull)	STP-MTRA-ENC1 (1000ppr, Line Driver)
AMT103-V (config. ppr, Push-pull)	STP-MTRA-ENC3 (400ppr, Line Driver)
AMT112S-V (config. ppr, Push-pull)	STP-MTRA-ENC2 (1000ppr, Push-pull)
AMT112Q-V (config. ppr, Line Driver)	STP-MTRA-ENC4 (400ppr, Push-pull)
AMT312D-V (config. ppr, Line Driver)	STP-MTRA-ENC9 (config. ppr, Line Driver)
AMT312S-V (config. ppr, Push-pull)	STP-MTRA-ENC10 (config. ppr, Push-pull)

NEMA 23 Linear Actuator Compatible Encoders

NEMA 23 Compatible Encoders	
CUI Devices Configurable Encoders	SureStep Encoders
AMT102-V (config. ppr, Push-pull)	STP-MTRA-ENC5 (1000ppr, Line Driver)
AMT103-V (config. ppr, Push-pull)	STP-MTRA-ENC7 (400ppr, Line Driver)
AMT112S-V (config. ppr, Push-pull)	STP-MTRA-ENC6 (1000ppr, Push-pull)
AMT112Q-V (config. ppr, Line Driver)	STP-MTRA-ENC8 (400ppr, Push-pull)
AMT312D-V (config. ppr, Line Driver)	STP-MTRA-ENC9 (config. ppr, Line Driver)
AMT312S-V (config. ppr, Push-pull)	STP-MTRA-ENC10 (config. ppr, Push-pull)



Stepping System Power Supplies

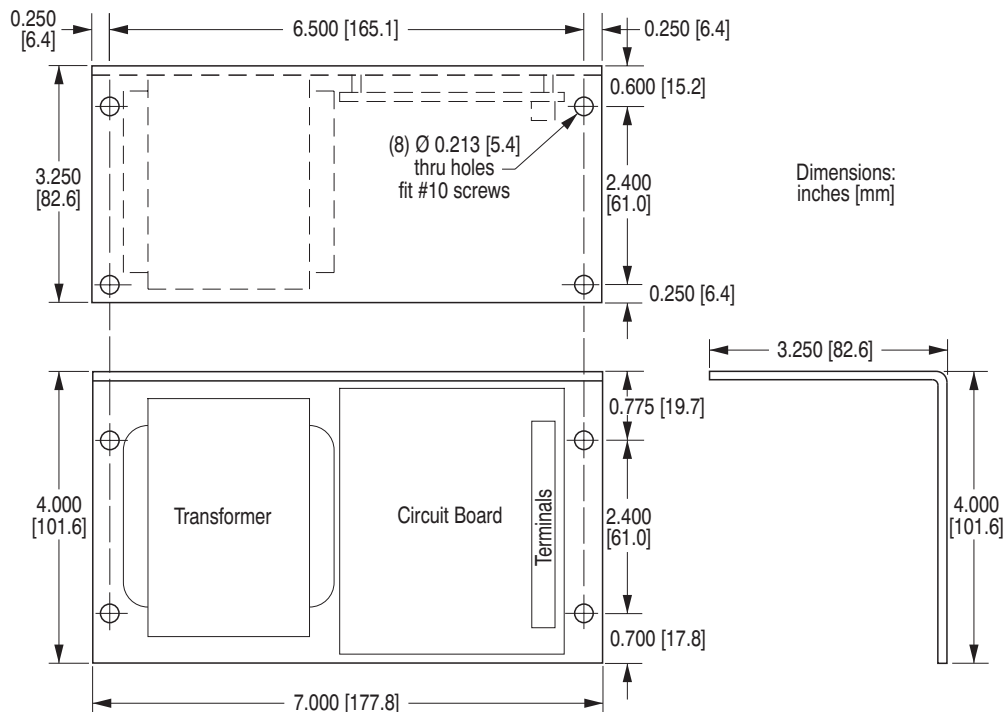
SureStep® Power Supplies

SureStep Series Specifications – Stepping System Power Supplies				
Power Supply	STP-PWR-3204	STP-PWR-4805	STP-PWR-4810	STP-PWR-7005
Drawing	PDF	PDF	PDF	PDF
Price	\$150.00	\$183.00	\$237.00	\$233.00
Input Power (fuse protected *)	1-phase, 120/240 VAC, 50/60 Hz, 150 VA Fuse*: 3A	1-phase, 120/240 VAC, 50/60 Hz, 350 VA Fuse*: 5A	1-phase, 120/240 VAC, 50/60 Hz, 650 VA Fuse*: 8A	1-phase, 120/240 VAC, 50/60 Hz, 500 VA Fuse*: 7A
Input Voltage Range (switch selectable)	120/240 VAC $\pm 10\%$ (Voltage range switch is set to 240 VAC from factory)			
Inrush Current	120 VAC < 12 A / 240 VAC < 14 A	120 VAC < 20A / 240 VAC < 24A	120 VAC < 40A / 240 VAC < 50A	
Motor Supply Output (linear unregulated, fuse protected *, and power on LED indicator)	32 VDC @ 4A (fully loaded) 35 VDC @ 1A load 41 VDC @ no load Fuse*: 6A (Electrically isolated from Logic Supply Output)	46.5 VDC @ 5A (fully loaded) 52 VDC @ 1A load 57.5 VDC @ no load Fuse*: 8A	46.5 VDC @ 10A (fully loaded) 50 VDC @ 1A load 57.5 VDC @ no load Fuse*: 15A	70 VDC @ 5A (fully loaded) 79 VDC @ 1A load 86.5 VDC @ no load Fuse*: 8A
Logic Supply Output (regulated and power on LED indicator)	5 VDC $\pm 5\%$ @ 500 mA (Electronically Overload Protected) (Electrically isolated from Motor Supply Output)			
Watt Loss	13W	25W	51W	42W
Storage Temperature Range	-55 to 85 °C [-67 to 185 °F]			
Operating Temperature Range	0 to 50 °C [32 to 122 °F] full rated; derate current 1.1% per degree above 50°C; 70 °C [158 °F] maximum			
Humidity	95% (non-condensing) relative humidity maximum			
Cooling Method	Natural convection (mount power supply to metal surface if possible)			
Mounting	Mount on either wide or narrow side with machine screws per dimension diagrams			
Weight (lb [kg])	6.5 [2.9]	11 [4.9]	18 [8.3]	16 [7.2]
Connections	Screw Terminals			
Agency Approvals	UL (file # E181899), CSA, CE			

* Fuses to be replaced by qualified service personnel only. Use (1-1/4 x 1/4 in) ceramic fast-acting fuses (Edison type ABC from AutomationDirect, or equivalent).

Power Supply Dimensions

STP-PWR-3204 Power Supply

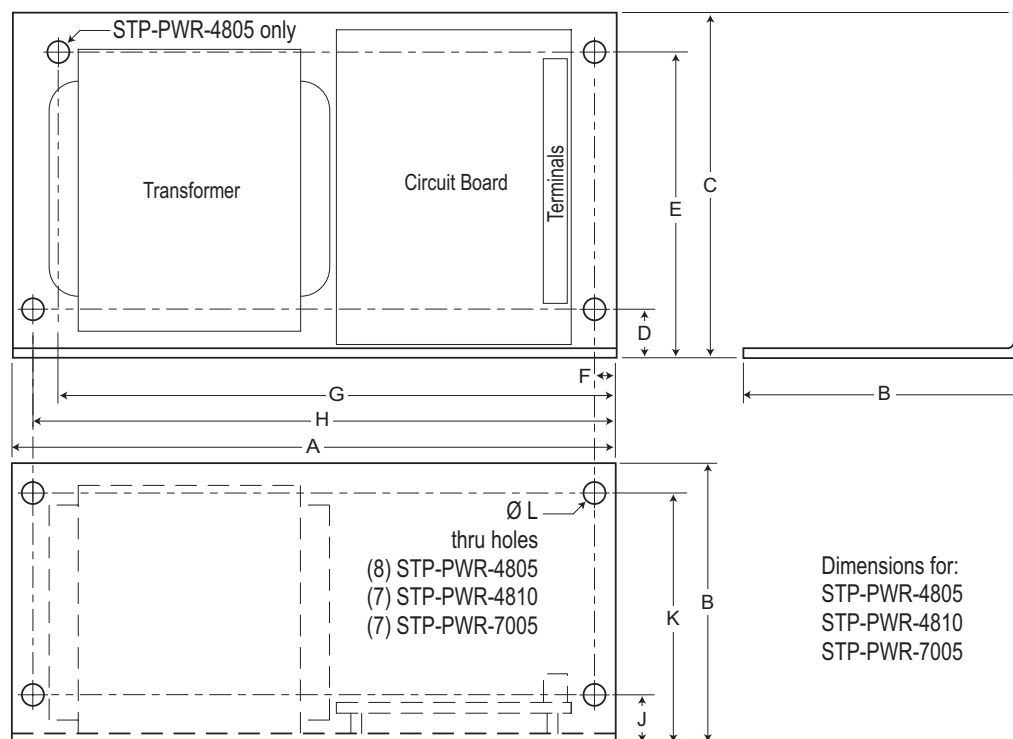




Stepping System Power Supplies

SureStep® Power Supply Dimensions (continued)

STP-PWR-4805, -4810, -7005 Power Supplies



SureStep Series Dimensions – 48V & 70V Power Supplies												
Power Supply Part Number	Dimensions* (in [mm])*											Mtg Screw
	A	B	C	D	E	F	G	H	J	K	L	
STP-PWR-4805	8.10 [205.7]	3.88 [98.6]	5.00 [127.0]	0.87 [22.1]	4.67 [118.6]	0.25 [6.4]	7.15 [181.6]	7.75 [196.9]	0.50 [12.7]	3.53 [89.7]	0.200 [5.1]	#10
STP-PWR-4810	9.00 [228.6]	4.62 [117.3]	5.62 [142.7]	1.56 [39.6]	4.06 [103.1]	0.35 [8.9]	n/a	8.59 [218.2]	0.50 [12.7]	4.27 [108.5]	9/32 [7.1]	1/4
STP-PWR-7005												

* mm dimensions are for reference purposes only.

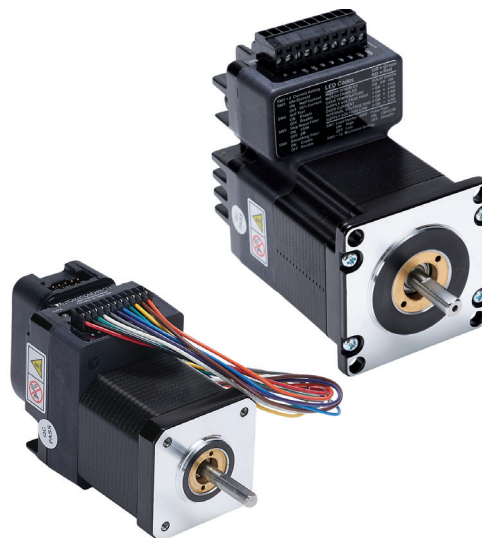


Integrated Microstepping Motors and Drives

SureStep® Integrated Motors System

General integrated motor/drive features

- DC power supply required (12-48 VDC or 12-70 VDC)
- Pulse/Direction or CW Pulse/CCW Pulse
- Digital input filtering
- "E" models include an encoder
- Three optically isolated digital inputs, 5 to 24 volts
- Step input signal smoothing (microstep emulation), performs high resolution stepping by synthesizing coarse steps into fine microsteps
- Dynamic smoothing, software-configurable filtering for use in removing spectral components from command sequence, reduces jerk, limiting excitation of system resonance
- Anti-resonance (electronic damping): raises the system-damping ratio to eliminate midrange instability and allow stable operation throughout the speed range of the motor
- Idle current reduction range of 0-90% of running current after a delay selectable in milliseconds (Standard models = 50/90%, DIP switch selectable)
- Configurable hardware digital noise filter, software noise filter
- Non-volatile storage, configurations are saved in FLASH memory on-board the DSP
- Dynamic current control, software configurable for running current, accel current, idle current, to make motion smoother and the motor run cooler



Standard NEMA 17 and 23 motor/drives

Standard integrated motor/drive features

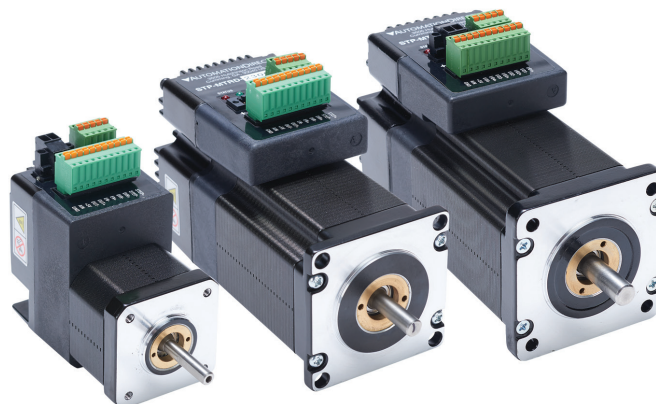
(STP-MTRD-x)

- "E" models have an externally wireable encoder which can provide feedback to an external controller
- Configurable via DIP switches
- Available torque from 68 to 210 oz-in

Advanced integrated motor/drive features

(STP-MTRD-xR)

- Step and Direction, CW/CCW, and AB Quadrature/Encoder following
- Velocity (Oscillator) and position mode
- Control via streaming SCL commands
- RS-485 ASCII (2- or 4-wire) communications
- On "E" models, the internal encoder provides improved position and speed control
- Four "Variable I/O" points, 5 to 24 volts (NEMA 24 models)
- Analog input for speed and position, 0 to 5 VDC
- Configurable via SureMotion Pro software
- Available torque from 54 to 340 oz-in



Advanced NEMA 17, 23, and 24 motor/drives

SureStep Series Part Numbers Standard Integrated Motor/Drives			
Integrated Motor/Drive	NEMA Size	Price	Drawing
<u>STP-MTRD-17038</u>	17	\$170.00	<u>PDF</u>
<u>STP-MTRD-17038E</u>	17	\$260.00	<u>PDF</u>
<u>STP-MTRD-23042</u>	23	\$205.00	<u>PDF</u>
<u>STP-MTRD-23042E</u>	23	\$350.00	<u>PDF</u>
<u>STP-MTRD-23065</u>	23	\$247.00	<u>PDF</u>
<u>STP-MTRD-23065E</u>	23	\$369.00	<u>PDF</u>

Note: Standard integrated motor/drives with an "E" have an external encoder that can be wired to an external controller.

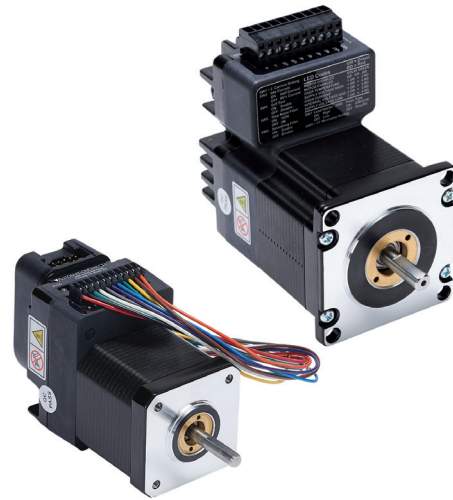
SureStep Series Part Numbers Advanced Integrated Motor/Drives			
Integrated Motor/Drive	NEMA Size	Price	Drawing
<u>STP-MTRD-17030R</u>	17	\$305.00	<u>PDF</u>
<u>STP-MTRD-17030RE</u>	17	\$490.00	<u>PDF</u>
<u>STP-MTRD-17038R</u>	17	\$310.00	<u>PDF</u>
<u>STP-MTRD-17038RE</u>	17	\$483.00	<u>PDF</u>
<u>STP-MTRD-23042R</u>	23	\$346.00	<u>PDF</u>
<u>STP-MTRD-23042RE</u>	23	\$494.00	<u>PDF</u>
<u>STP-MTRD-23065R</u>	23	\$347.00	<u>PDF</u>
<u>STP-MTRD-23065RE</u>	23	\$507.00	<u>PDF</u>
<u>STP-MTRD-24075RV</u>	24	\$449.00	<u>PDF</u>
<u>STP-MTRD-24075RVE</u>	24	\$525.00	<u>PDF</u>

Note: Advanced integrated motor/drives with an "E" have an internal encoder used for stall prevention (cannot be wired to an external PLC or controller).



Integrated Microstepping Motors and Drives

SureStep® Standard Integrated Motor/Drives Specifications



SureStep Integrated Series Specifications – Standard				
Microstepping Drive/Motor		<u>STP-MTRD-17038</u> <u>STP-MTRD-17038E</u>	<u>STP-MTRD-23042</u> <u>STP-MTRD-23042E</u>	<u>STP-MTRD-23065</u> <u>STP-MTRD-23065E</u>
Input Voltage (external p/s required)		12-48 VDC	12-70 VDC	12-70 VDC
Configuration Method		DIP switches		
Current Controller		Digital MOSFET, PWM @ 16kHz		
Encoder Feedback		“E” models only. External encoder must be wired to external feedback device.		
Encoder Specs (“E” models only)		1000 ppr, Line Driver, Supply Voltage (Typ: 5V, Max: 5.5 V, Min: 4.5 V). Detailed specs, other encoder options, and PLC compatibility are listed in Appendix A of the SureStep user manual.		
Motor/Drive Protection		Short circuit, over-voltage, under-voltage, over-temp		
Input Signals	Step/Pulse	5-24 VDC nominal (range 4-30VDC); (5mA @ 4V; 15 mA @ 30V); Optically isolated. Minimum pulse width = 3μs (at 2 MHz), 0.25μs (at 150kHz), Maximum pulse frequency = 150kHz or 2MHz (switch selectable), Function = Step Input, Limit CW		
	Direction	5-24 VDC nominal (range 4-30VDC); (5mA @ 4V; 15 mA @ 30V); Optically isolated. Minimum pulse width = 3μs (at 2 MHz), 0.25μs (at 150kHz), Maximum pulse frequency = 150kHz or 2MHz (switch selectable), Function = Direction Input, Limit CCW		
	Enable	5-24 VDC nominal (range 4-30VDC); (5mA @ 4V; 15 mA @ 30V); Optically isolated. Minimum pulse width = 3μs (at 2 MHz), 0.25μs (at 150kHz), Maximum pulse frequency = 150kHz or 2MHz (switch selectable), Function = Enable Input		
Output Signal		30 VDC / 100mA max, photodarlington, voltage drop = 1.2V max at 100mA Function = Alarm Output		
Jumper Selectable Functions	Step Pulse Type	Step and Direction: Step signal = step/pulse; Direction signal = direction. Step CW & CCW: Step signal = CW step; Direction signal = CCW step.		
	Step Pulse Noise Filter	Selectable 150 kHz or 2MHz		
Features	Current Reduction	This is the percentage of full current that the motor will use when the shaft is rotating. 100%, 90%, 70%, and 50% current selections.		
	Idle Current Reduction	Reduce power consumption and heat generation by limiting motor idle current to 90% or 50% of running current. (Holding torque is reduced by the same %.)		
	Microstep Resolution	200-25000 (dip switch selectable)		
	Self Test	Automatically rotate the motor back and forth 2 1/2 turns in each direction in order to confirm that the motor is operational.		
	Load Inertia	Anti-resonance and damping feature improves motor performance. Set motor and load inertia range to 0–4x or 5–10x.		
Connectors		Control	Housing: Tyco 4-643498-1 Cover: Tyco 1-643075-1	Connector part number: Weidmuller 1610200000, included in STP-CON-3
		Encoder	Two 5 pin inserts (Molex# 14-60-0058), one housing Molex# 15-04-5104	
Drive Cooling Method		Natural convection (mount to suitable heat sink)		
Status LEDs		One red/green		
Mounting		Four M3 screws	Four #6 screws	



Integrated Microstepping Motors and Drives

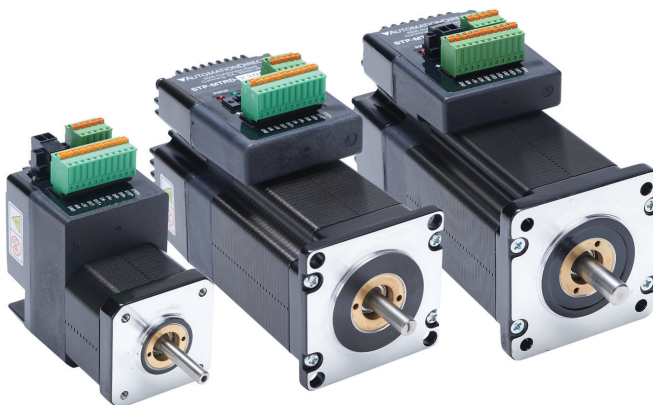
SureStep® Standard Integrated Motor/Drives Specifications

SureStep Integrated Series Specifications – Standard				
Integrated Stepping Motor/Drives		<u>STP-MTRD-17038</u> <u>STP-MTRD-17038E</u>	<u>STP-MTRD-23042</u> <u>STP-MTRD-23042E</u>	<u>STP-MTRD-23065</u> <u>STP-MTRD-23065E</u>
NEMA Frame Size		NEMA 17	NEMA 23	NEMA 23
Maximum Holding Torque	(lb-in)	4.25	7.8125	13.125
	(oz-in)	68	125	210
	(N-m)	0.480189	0.8827	1.482936
Rotor Inertia	(oz-in ²)	0.448	1.420	2.515
	(kg-cm ²)	0.082	0.260	0.460
Insulation Class		Class B (130°C)		
Basic Step Angle		1.8 degrees		
Shaft Runout (in)		0.03	0.05	
Max Shaft Radial Play @ 1lb load		0.02		
Perpendicularity (mm)		0.08		
Concentricity (mm)		0.05		
* Maximum Radial Load (lb [kg])		6.7	13.9	
* Maximum Thrust Load (lb [kg])		34	63	
Storage Temperature Range		0-40°C (32-104°F)		
Operating Temperature Range		0-85°C		
Operating Humidity Range		90% max, non-condensing		
Product Material		Aluminum, steel, plastic, FR4, etc		
Environmental Rating		IP40		
Weight (oz [g])		14.7 [417]	30 [850]	42 [1200]
Agency Approvals		CE		
Design Tips		Allow sufficient time to accelerate the load and size the step motor with a 100% torque safety factor. DO NOT disassemble step motors because motor performance will be reduced and the warranty will be voided. DO NOT connect or disconnect the step motor during operation. Mount the motor to a surface with good thermal conductivity, such as steel or aluminum, to allow heat dissipation. Use a flexible coupling with "clamp-on" connections to both the motor shaft and the load shaft to prevent radial and thrust loading on bearings from minor misalignment and to prevent loosening due to vibration.		



Integrated Microstepping Motors and Drives

SureStep® Advanced Integrated Motor/Drives



SureStep Integrated Series Specifications – Advanced

Integrated Motor/Drive		<u>STP-MTRD-17030RSTP-MTRD-17030RE</u> <u>STP-MTRD-17030RE</u>	<u>STP-MTRD-17038RSTP-MTRD-17038RE</u> <u>STP-MTRD-17038RE</u>	<u>STP-MTRD-23042R</u> <u>STP-MTRD-23042RE</u>	<u>STP-MTRD-23065R</u> <u>STP-MTRD-23065RE</u>
Input Voltage (external p/s required)		12-48 VDC		12-70 VDC	
Configuration Method		SureMotion Pro software (SM-PRO : free download)			
Supply Output		+4.8 - 5 volts @ 50mA maximum			
Current Controller		Dual H-Bridge, 4 Quadrant, 4 state PWM @ 16kHz		Dual H-Bridge, 4 Quadrant, 4 state PWM @ 20kHz	
Encoder Feedback		“E” models only. Encoder is internal and provides position verification and stall prevention control by default.			
Motor/Drive Protection		Short circuit, over-voltage, under-voltage, over-temp			
Input Signals	Step/Pulse	5-24 VDC nominal. Optically isolated. Minimum pulse width = 250ns (at 3 MHz). Maximum pulse frequency = 3MHz, max current draw = 12mA Function = Step Input, Jog CW, Limit CW, Start/Stop, General Purpose			
	Direction	5-24 VDC nominal. Optically isolated. Minimum pulse width = 250ns (at 3 MHz). Maximum pulse frequency = 3MHz, max current draw = 12mA Function = Direction Input, Jog CCW, Limit CCW, General Purpose			
	Enable	5-24 VDC nominal. Optically isolated. Minimum pulse width = 250ns (at 3 MHz). Maximum pulse frequency = 3MHz, max current draw = 12mA Function = Enable Input, Reset Input, Change Speed, General Purpose			
	Analog	0-5 VDC nominal (AIN referenced to GND). Input impedance: 30K ohms minimum, resolution = 12 bits Function = analog control modes and general purpose analog usage; programmable for signal range, offset, dead band, and filtering			
Output Signal		30VDC, 40mA maximum. Optically isolated, open collector. Maximum pulse frequency 10kHz. Functions = Brake Output, Alarm Output, Motion Output, Tach Output, General Purpose			
Communication Interface		RS-485 ASCII			
Non-volatile Memory Storage		Configurations are saved in FLASH memory on-board the DSP			
Features	Current Reduction	Selectable in SureMotion Pro software			
	Idle Current Reduction	Reduction range of 0–90% of running current after delay selectable in ms			
	Microstep Resolution	Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev			
	Modes of Operation	Pulse (step) & direction, CW/CCW, A/B quadrature, velocity (oscillator), SCL streaming commands			
	Self Test	Checks internal and external power supply voltages. Diagnoses open motor phases and motor resistance changes > 40%			
Connectors	DC Power	2-position screw terminal: Weidmuller 1615780000			
	I/O	11-position spring cage: Phoenix 1881419			
	Comm	5-position spring cage: Phoenix 1881354			
Drive Cooling Method		Natural convection (mount to suitable heat sink)			
Status LEDs		1 red, 1 green			
Mounting		Four M3 screws		Four #6 screws	



Integrated Microstepping Motors and Drives

SureStep® Advanced Integrated Motor/Drives

SureStep Integrated Series Specifications – Advanced Variable I/O		
Integrated Motor/Drive		<u>STP-MTRD-24075RV / STP-MTRD-24075RVE</u>
Input Voltage (external p/s required)		12-70 VDC
Configuration Method		SureMotion Pro software (SM-PRO : free download)
Supply Output		+4.8 - 5 volts @ 50mA maximum
Current Controller		Dual H-Bridge, 4 Quadrant, 4 state PWM @ 20kHz
Encoder Feedback		"E" models only. Encoder is internal and provides position verification and stall prevention control by default.
Motor/Drive Protection		Short circuit, over-voltage, under-voltage, over-temp
Variable I/O	I/O 1 (Step/Pulse)	INPUT: 5-24 VDC nominal. Optically isolated. Minimum pulse width = 250ns (at 3MHz). Maximum pulse frequency = 3MHz, max current draw = 12mA, Function = Step Input, Jog CW, Enable Input, Start/Stop, General Purpose OUTPUT: 30VDC, 40mA maximum. Optically isolated, open collector. Maximum pulse frequency 10kHz. Functions = Brake Output, Fault Output, Motion Output, Tach Output, General Purpose
	I/O 2 (Direction)	INPUT: 5-24 VDC nominal. Optically isolated. Minimum pulse width = 250ns (at 3MHz). Maximum pulse frequency = 3MHz, max current draw = 12mA, Function = Direction Input, Jog CCW, Alarm Reset Input, General Purpose OUTPUT: 30VDC, 40mA maximum. Optically isolated, open collector. Maximum pulse frequency 10kHz. Functions = Brake Output, Fault Output, Motion Output, Tach Output, General Purpose
	I/O 3	INPUT: 5-24 VDC nominal. Optically isolated. Minimum pulse width = 250ns (at 3MHz). Maximum pulse frequency = 3MHz, max current draw = 12mA, Function = Limit CW Input, Enable Input, Change Speed Input, General Purpose OUTPUT: 30VDC, 40mA maximum. Optically isolated, open collector. Maximum pulse frequency 10kHz. Functions = Brake Output, Fault Output, Motion Output, Tach Output, General Purpose
	I/O 4	INPUT: 5-24 VDC nominal. Optically isolated. Minimum pulse width = 250ns (at 3 MHz). Maximum pulse frequency = 3MHz, max current draw = 12mA, Function = Limit CCW Input, Alarm Reset Input, General Purpose OUTPUT: 30VDC, 40mA maximum. Optically isolated, open collector. Maximum pulse frequency 10kHz. Functions = Brake Output, Fault Output, Motion Output, Tach Output, General Purpose
Analog		0-5 VDC nominal (AIN referenced to GND). Input impedance: 30K ohms minimum, resolution = 12 bits, Function = analog control modes and general purpose analog usage; programmable for signal range, offset, dead band, and filtering
Communication Interface		RS-485 ASCII (2- or 4-wire)
Non-volatile Memory Storage		Configurations are saved in FLASH memory on-board the DSP
Features	Current Reduction	Selectable in SureMotion Pro software
	Idle Current Reduction	Reduction range of 0–90% of running current after delay selectable in ms
	Microstep Resolution	Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev
	Modes of Operation	Pulse (step) & direction, CW/CCW, A/B quadrature, velocity (oscillator), SCL streaming commands
	Self Test	Checks internal and external power supply voltages. Diagnoses open motor phases and motor resistance changes > 40%
Connectors	DC Power	2-position screw terminal: Weidmuller 1615780000
	I/O	11-position spring cage: Phoenix 1881419
	Comm	5-position spring cage: Phoenix 1881354
Drive Cooling Method		Natural convection (mount to suitable heat sink)
Status LEDs		1 red, 1 green
Mounting		Four #6 screws



Integrated Microstepping Motors and Drives

SureStep® Advanced Integrated Motor/Drives

SureStep Integrated Series Specifications – Advanced						
Integrated Motor/Drive		<i>STP-MTRD-17030R</i> <i>STP-MTRD-17030RE</i>	<i>STP-MTRD-17038R</i> <i>STP-MTRD-17038RE</i>	<i>STP-MTRD-23042R</i> <i>STP-MTRD-23042RE</i>	<i>STP-MTRD-23065R</i> <i>STP-MTRD-23065RE</i>	<i>STP-MTRD-24075RV</i> <i>STP-MTRD-24075RVE</i>
NEMA Frame Size		NEMA 17	NEMA 17	NEMA 23	NEMA 23	NEMA 24
* Maximum Holding Torque	(lb-in)	3.375	4.25	7.8125	13.125	21.25
	(oz-in)	54	68	125	210	340
	(N-m)	0.381326	0.480189	0.8827	1.482936	2.400944
Rotor Inertia	(oz-in ²)	0.310	0.448	1.420	2.515	4.900
	(kg-cm ²)	0.057	0.082	0.260	0.460	0.897
Insulation Class		Class B (130°C)				
Basic Step Angle		1.8 degrees				
Shaft Runout (in)		0.03		0.05		
Max Shaft Radial Play @ 1lb load		0.02				
Perpendicularity (mm)		0.08				
Concentricity (mm)		0.05				
* Maximum Radial Load (lb [kg])		6.7		13.9		
* Maximum Thrust Load (lb [kg])		34		63		
Storage Temperature Range		0-40°C (32-104°F)				
Operating Temperature Range		0-85°C				0-70°C
Operating Humidity Range		90% max, non-condensing				
Product Material		Aluminum, steel, plastic, FR4, etc.				
Environmental Rating		IP40				
Weight (oz [g])		12.7 [360]	15.6 [441]	30 [850]	42 [1191]	56 [1580]
Agency Approvals		CE*				
Design Tips		Allow sufficient time to accelerate the load and size the step motor with a 100% torque safety factor. DO NOT disassemble step motors because motor performance will be reduced and the warranty will be voided. DO NOT connect or disconnect the step motor during operation. Mount the motor to a surface with good thermal conductivity, such as steel or aluminum, to allow heat dissipation. Use a flexible coupling with “clamp-on” connections to both the motor shaft and the load shaft to prevent radial and thrust loading on bearings from minor misalignment and to prevent loosening due to vibration.				

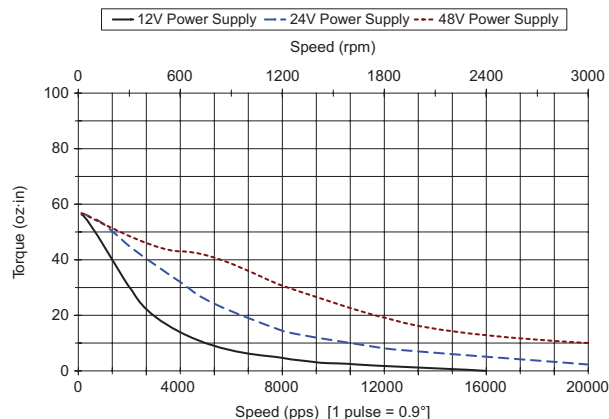
* For NEMA 24 motors, an EMI filter ([RES10F03](#)) is needed on the power supply for CE compliance.



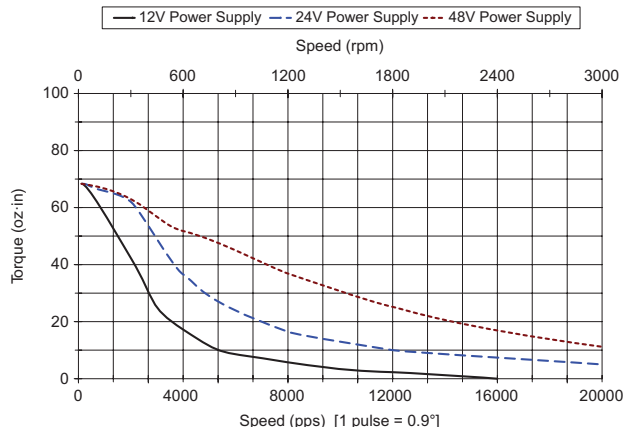
Integrated Microstepping Motors and Drives

SureStep® Integrated Motor/Drives Motor Torque vs. Speed

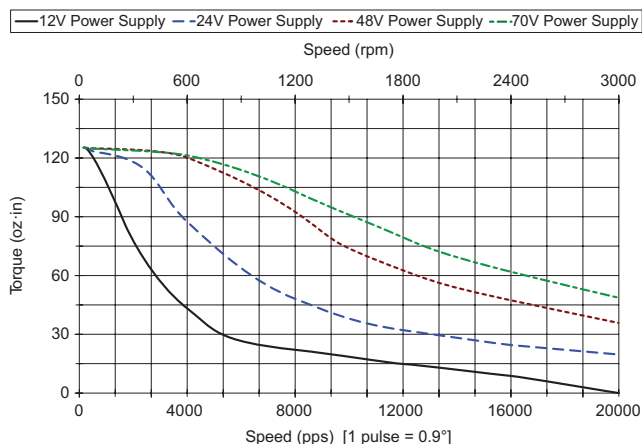
STP-MTRD-17030 Torque vs Speed (1.8° step motor; 1/2 stepping)



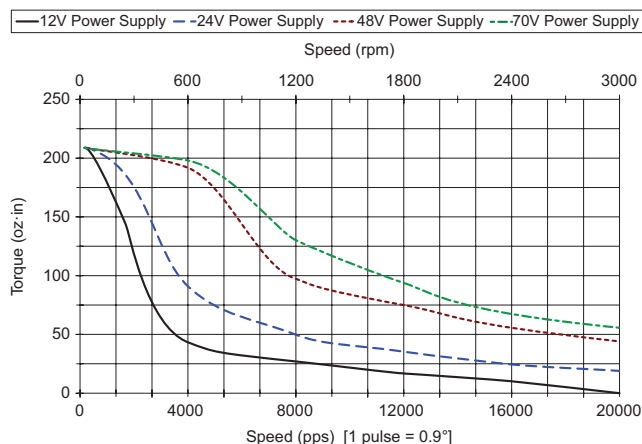
STP-MTRD-17038 Torque vs Speed (1.8° step motor; 1/2 stepping)



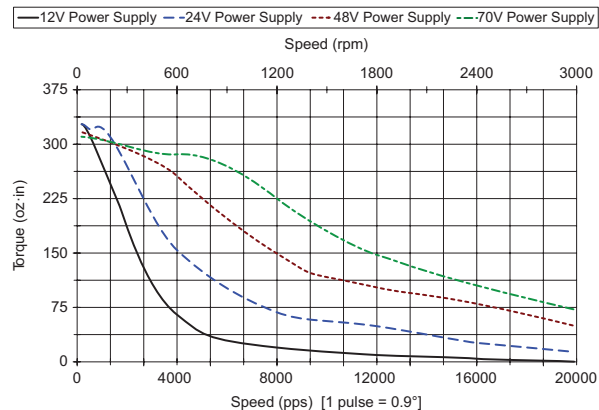
STP-MTRD-23042 Torque vs Speed (1.8° step motor; 1/2 stepping)



STP-MTRD-23065 Torque vs Speed (1.8° step motor; 1/2 stepping)



STP-MTRD-24075 Torque vs Speed (1.8° step motor; 1/2 stepping)



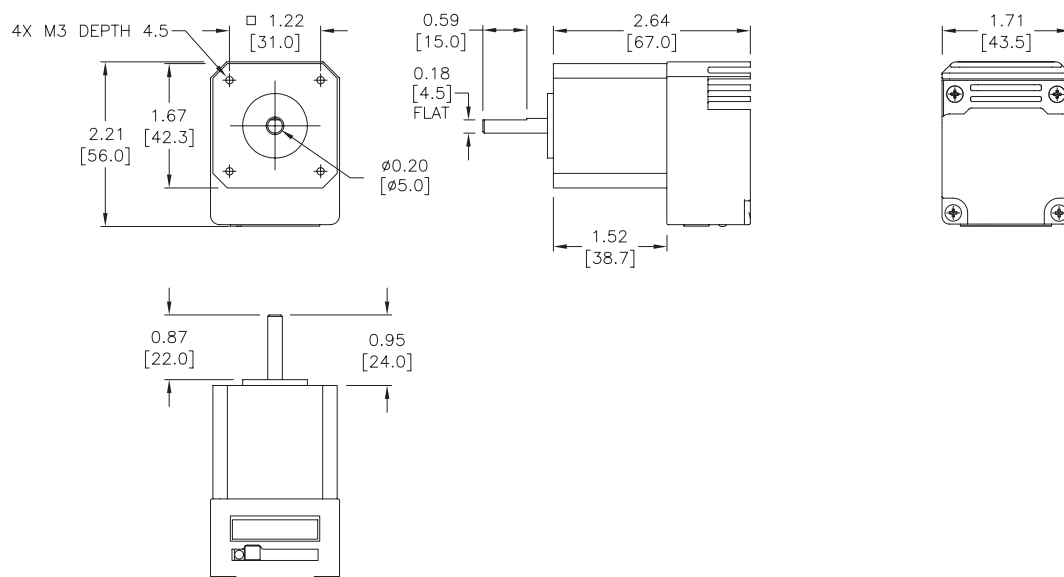


Integrated Microstepping Motors and Drives

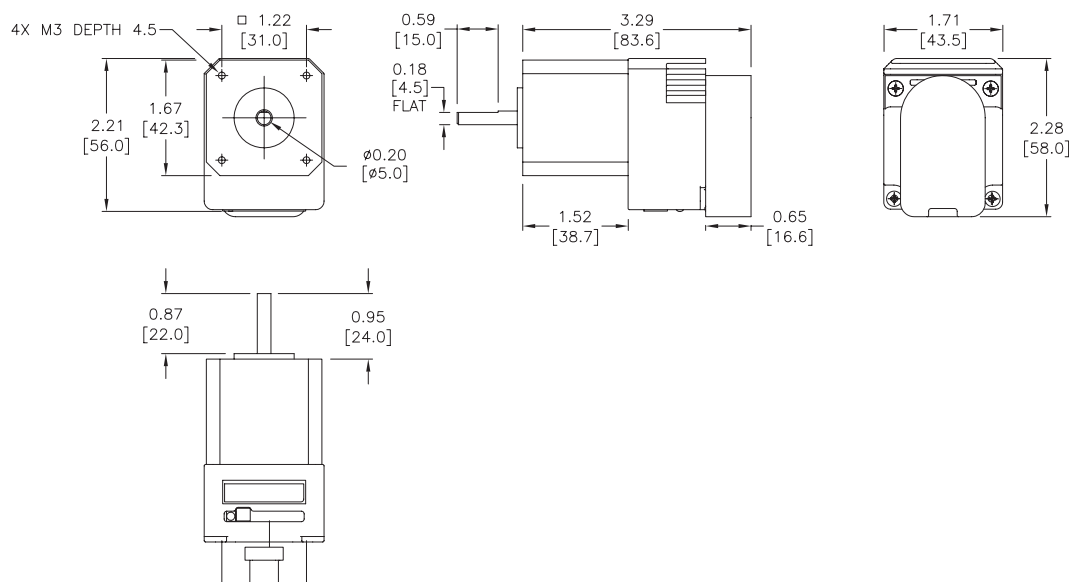
SureStep® Standard Integrated Motor/Drives Dimensions

Dimensions = in [mm]

STP-MTRD-17038



STP-MTRD-17038E



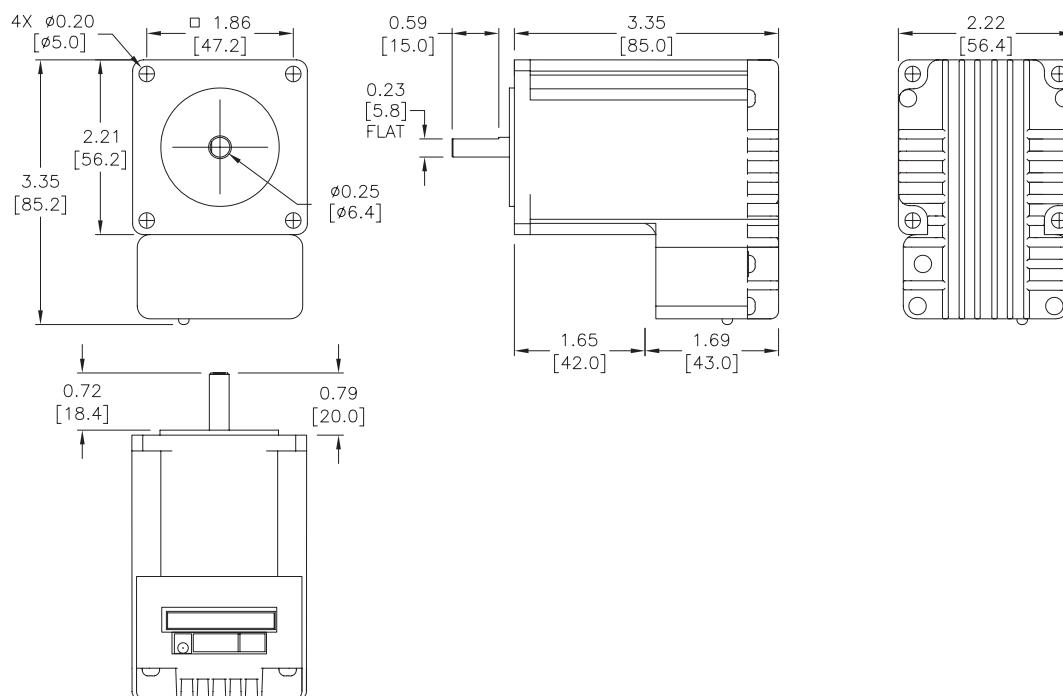


Integrated Microstepping Motors and Drives

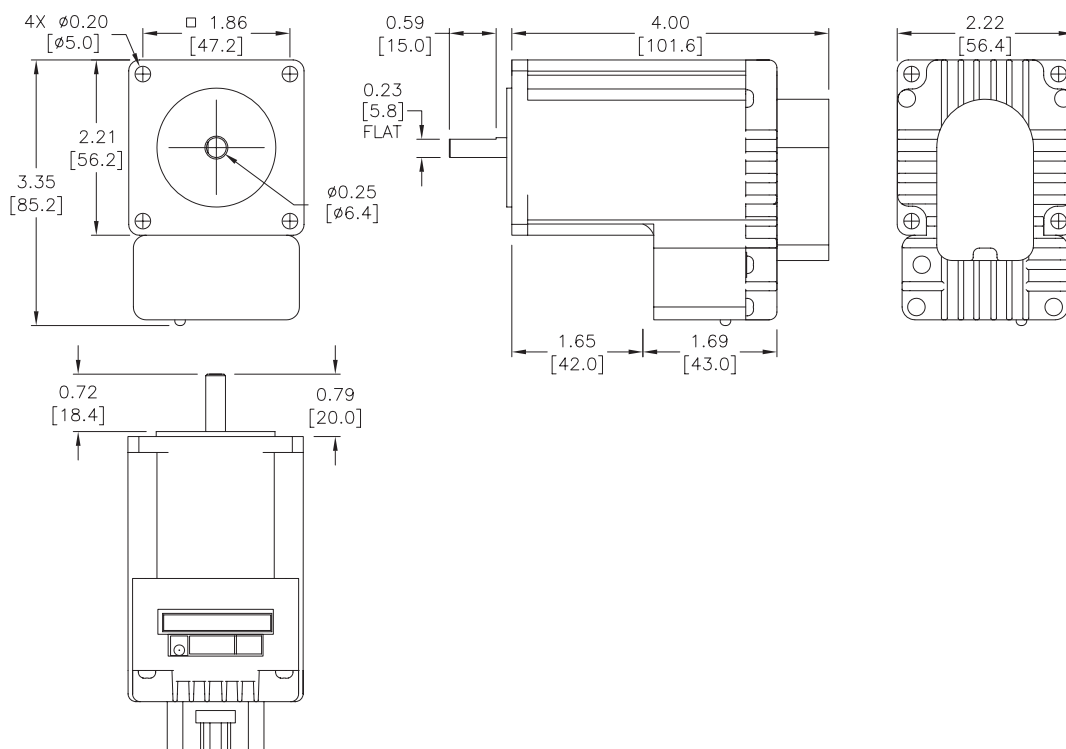
SureStep® Standard Integrated Motor/Drives Dimensions, continued

Dimensions = in [mm]

STP-MTRD-23042



STP-MTRD-23042E



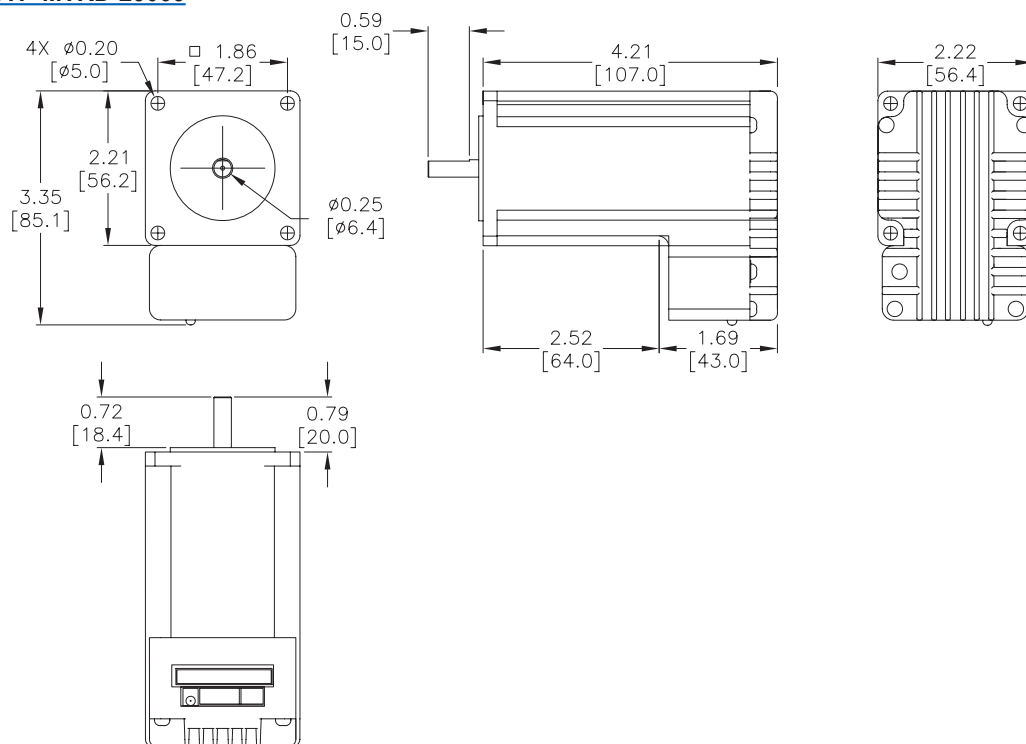


Integrated Microstepping Motors and Drives

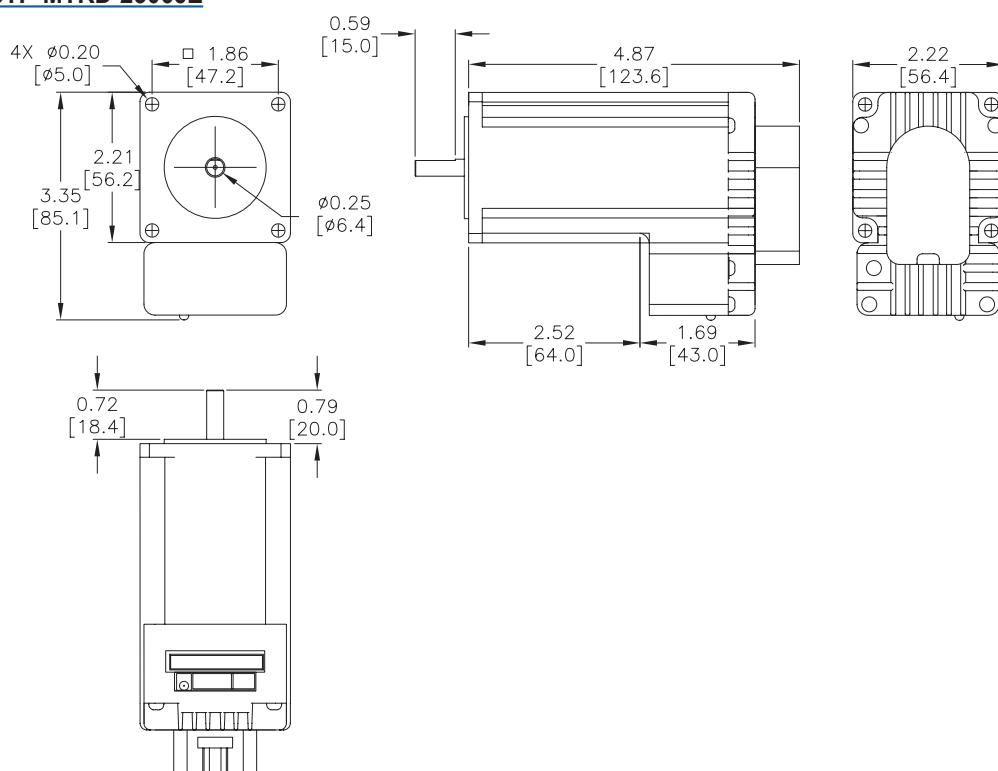
SureStep® Standard Integrated Motor/Drives Dimensions, continued

Dimensions = in [mm]

STP-MTRD-23065



STP-MTRD-23065E



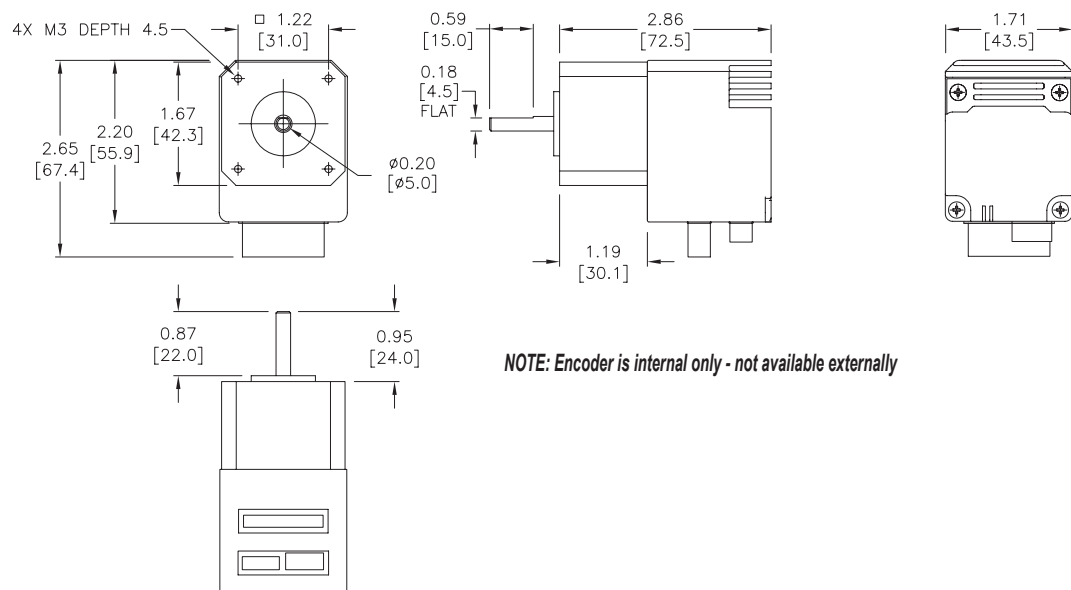


Integrated Microstepping Motors and Drives

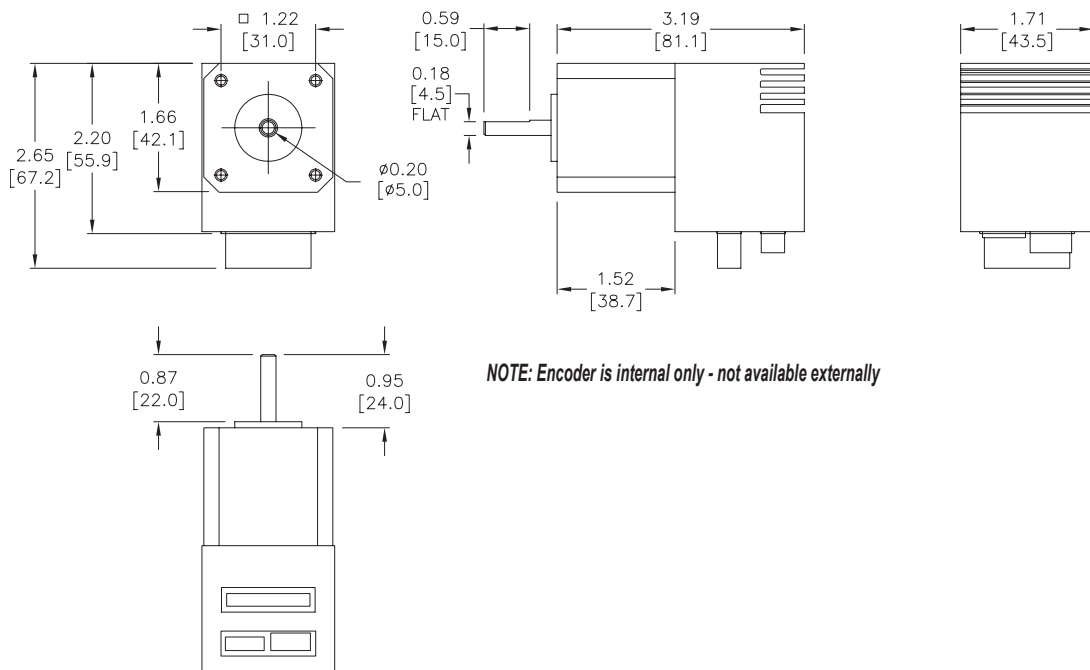
SureStep® Advanced Integrated Motor/Drives Dimensions

Dimensions = in [mm]

STP-MTRD-17030R / STP-MTRD-17030RE



STP-MTRD-17038R / STP-MTRD-17038RE



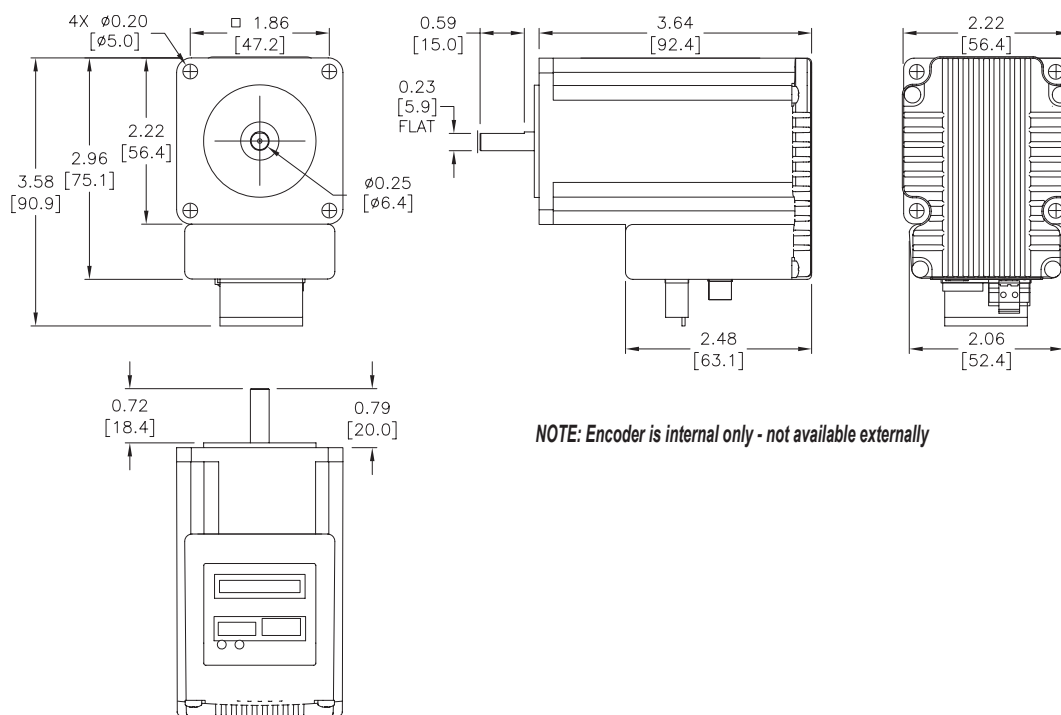


Integrated Microstepping Motors and Drives

SureStep® Advanced Integrated Motor/Drives Dimensions, continued

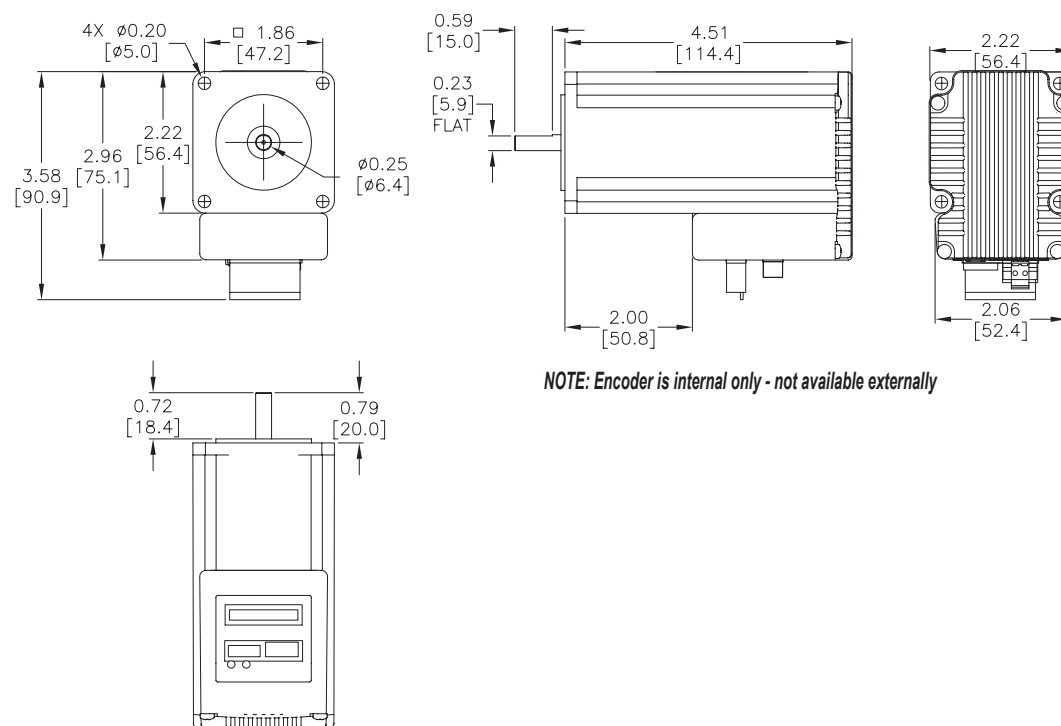
Dimensions = in [mm]

STP-MTRD-23042R / STP-MTRD-23042RE



NOTE: Encoder is internal only - not available externally

STP-MTRD-23065R / STP-MTRD-23065RE



NOTE: Encoder is internal only - not available externally

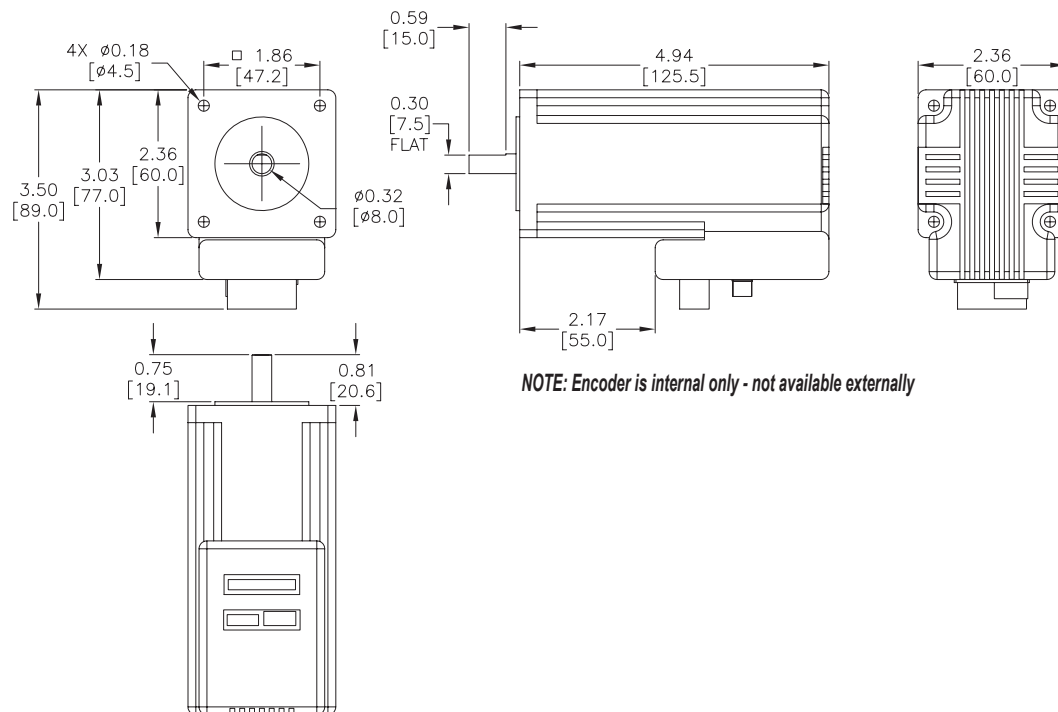


Integrated Microstepping Motors and Drives

SureStep® Advanced Integrated Motor/Drives Dimensions, continued

Dimensions = in [mm]

STP-MTRD-24075RV / STP-MTRD-24075RVE



NOTE: Encoder is internal only - not available externally



Stepping System Accessories

SureStep® Microstepping Drives Accessories

Braking Accessories

As a load rapidly decelerates from a high speed, much of the kinetic energy of that load is transferred back to the motor. This energy is then pushed back to the drive and power supply, resulting in increased system voltage. If there is enough overhauling load on the motor, the DC voltage will go above the drive and/or power supply limits. In general, the more torque the motor is capable of producing then the more energy it can push back into the drive.

When using a regulated/switching power supply, this can trip the overvoltage protection of the power supply or drive, and cause it to shut down.

To solve this problem, AutomationDirect offers a regeneration clamp as an optional accessory. The regen clamp has a built-in 50W braking resistor. The STP-DRVA-RC-050A does not have the ability to use an external resistor.



Regeneration Clamp STP-DRVA-RC-050A

Regeneration Clamp Features

STP-DRVA-RC-050A

- Built-in 50W power resistor for more continuous current handling
- Mounted on a heat sink
- Voltage range: 24–80 VDC; no user adjustments required
- Power: 50W continuous; 800W peak
- Indicators (LED):
Green = power supply voltage is present
Red = clamp is operating (usually when stepper is decelerating)
- Protection: The external power supply is internally connected to an "Input Diode" in the regen clamp that protects the power supply from high regeneration voltages. This diode protects the system from connecting the power supply in reverse. If the clamp circuit fails, the diode will continue to protect the power supply from over-voltage.
- Three drive connections, 7A max per channel, 15A total output current
- Removable terminal blocks (replacement kit STP-CON-4)
- Uses 18-20 AWG wire for connections

SureStep Damper

A step motor inertia damper can smooth out steps in a typical step motor resulting in a quieter and smoother motion when rotating between steps. Reducing the resonance and possible micro oscillations when moving from step to step is the main purpose of a "hockey puck" style damper, but it can also be used as a hand wheel to directly rotate the position of the rotor when power is removed from the motor. The damper is a properly sized machined piece of aluminum encased in plastic. It is sized and weighted for general damping of the respective frame size motor.



Damper

Sure Step Series Specifications – Microstepping Drives Optional Accessories			
Part Number	Price	Description	Drawing
<u>STP-DRVA-RC-050A*</u>	\$91.00	Regen Clamp: 50W, for DC input stepper and servo drives, enclosed	PDF
<u>STP-MTRA-17DMP</u>	\$16.50	SureStep damper, metal body. For use with NEMA 17 stepper motors with 5mm shafts. Mounting set screw included.	PDF
<u>STP-MTRA-23DMP</u>	\$37.50	SureStep damper, metal body. For use with NEMA 23 stepper motors with 1/4 inch shafts. Mounting set screw included.	PDF

* Do not use the regeneration clamp in an atmosphere containing corrosive gases.

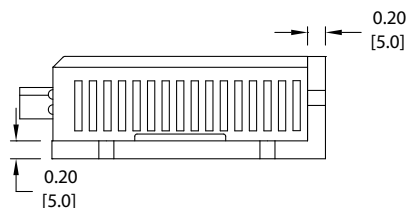
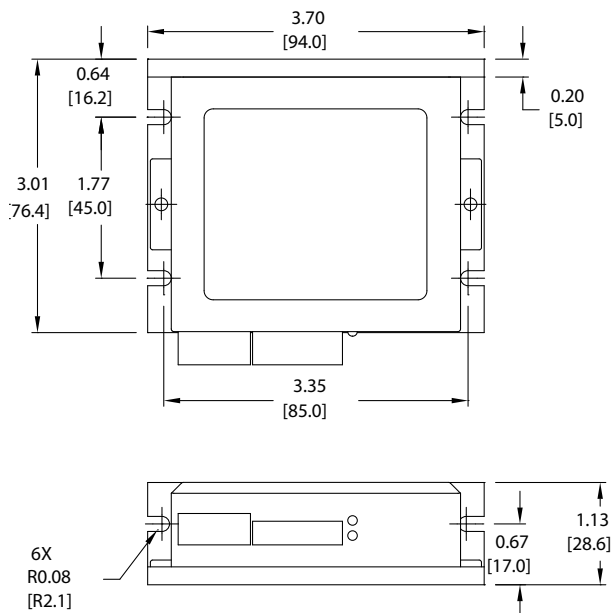


Stepping System Accessories

SureStep® Microstepping Drives Accessories

Dimensions = in [mm]

STP-DRVA-RC-050A





Stepping System Accessories

SureStep® Microstepping Drives Accessories

USB to RS-485 Adapter

The STP-USB485-4W is a USB to RS-232/RS-485 converter that can be used in 2-wire or 4-wire serial networks. Serial communication can be wired up via the 9-pin D-sub connector or through the 6-screw terminals.

The STP-USB485-4W can be set for several different configurations. These modes are set up by the 4 DIP switches on the outside of the case (RS-232/RS-485, full/half duplex) and by the 7 jumpers located inside the case (termination/bias resistors).

SureStep Advanced Drives communicate via RS-232 (for control and for configuration via SureMotion Pro).

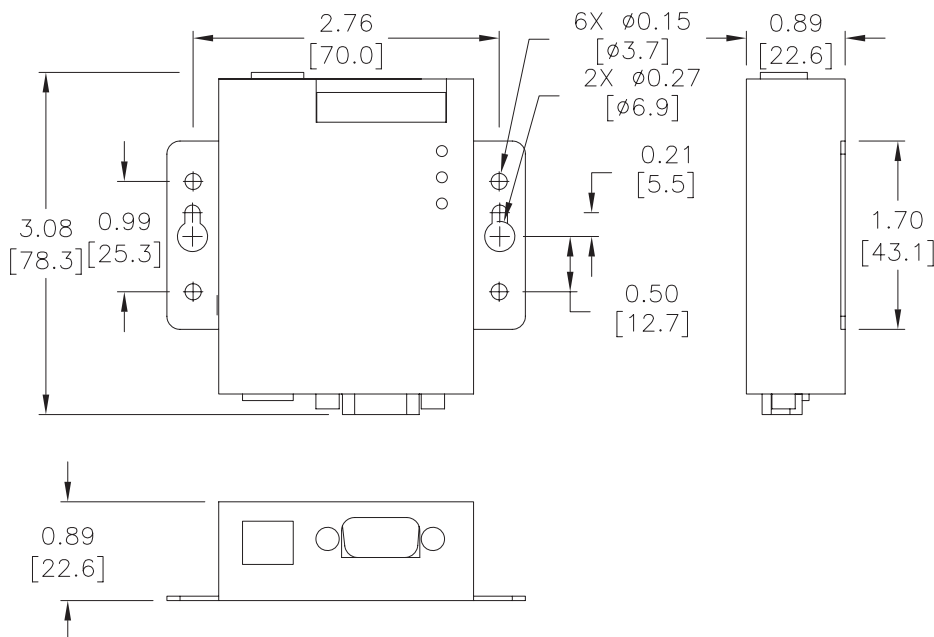
The Advanced Integrated motor/drives use RS-485. While the Advanced Integrated motor/drives can be wired for either 2- or 4-wire networks, 4-wire is required for use with SureMotion Pro due to the Firmware Download utility and the Status Monitor Screen.

Depending on the host controller's RS-485 implementation, either 2- or 4-wire RS-485 can be used for control. All RS-485 PLCs that have 2-wire capability (Productivity, BRX, Click, DirectLogic, etc.) can control the Advanced Integrated steppers.



SureStep PC Adapter - STP-USB485-4W	
Price	\$132.00
Drawing	PDF
Communications	2-wire RS-232 2- or 4-wire RS-485
Configure With	Internal jumpers and external DIP switches
Compatible Cables	STP-232RJ11-CBL STP-485DB9-CBL-2 USB

Dimensions = in [mm]





Stepping System Accessories

SureStep® Stepping System Encoders

Replacement Encoders

The [STP-MTRA-ENC1](#) is a replacement for the encoder that comes standard with the STP-MTRD-17038E, STP-MTRD-23042E, and STP-MTRD-23065E integrated motor/drives. Note that the encoder included with (E) model advanced integrated motor/drives is internal and cannot be replaced.

The [AMT112Q-V](#) is a replacement for the encoder that comes standard with the STP-MTR(x)-xxxxE stand alone step motors.

Installation tool and mounting hardware is included with all replacement encoders. For more information and details on how to wire the replacement encoders, please see the SureStep User Manual.

Optional Encoders

Optional encoders can be purchased separately for standard integrated motor/drives and standalone dual-shaft motors in all NEMA 14, 17, and 23 sizes, and also for STP-MTRAC-34xxxD motors (currently not available for STP-MTRx-34xxxD motors). All (D) model (dual-shaft) step motors come with pre-drilled holes in the rear end cap for easy encoder mounting. Pre-installed encoders on standalone dual-shaft motors and standard integrated motor/drives can be retrofitted with an appropriate optional encoder if desired. Please see the chart on the following page for encoder compatibility.

Features:

- Fixed resolutions include 400ppr or 1000ppr
- Configurable models have up to 4096ppr (default = 400ppr)
- Choose line driver or push-pull (totem) output signals



STP-MTRA-ENC2



AMT112Q-V



STP-MTRA-ENC11

Sure Step Series Specifications – Encoders			
Part Number	Price	Description	Drawing
STP-MTRA-ENC1	\$91.00	SureStep incremental (quadrature) modular encoder, 5VDC, line driver (differential) output, 1000 ppr. For use with SureStep stepper motors with 5mm rear shaft. Installation tool and mounting hardware included.	PDF
STP-MTRA-ENC2	\$79.00	SureStep incremental (quadrature) modular encoder, 5VDC, Push-pull (totem) output, 1000 ppr. For use with SureStep stepper motors with 5mm rear shaft. Installation tool and mounting hardware included.	PDF
STP-MTRA-ENC3	\$89.00	SureStep incremental (quadrature) modular encoder, 5VDC, line driver (differential) output, 400 ppr. For use with SureStep stepper motors with 5mm rear shaft. Installation tool and mounting hardware included.	PDF
STP-MTRA-ENC4	\$76.00	SureStep incremental (quadrature) modular encoder, 5VDC, Push-pull (totem) output, 400 ppr. For use with SureStep stepper motors with 5mm rear shaft. Installation tool and mounting hardware included.	PDF
STP-MTRA-ENC5	\$91.00	SureStep incremental (quadrature) modular encoder, 5VDC, line driver (differential) output, 1000 ppr. For use with SureStep stepper motors with 1/4 inch rear shaft. Installation tool and mounting hardware included.	PDF
STP-MTRA-ENC6	\$79.00	SureStep incremental (quadrature) modular encoder, 5VDC, Push-pull (totem) output, 1000 ppr. For use with SureStep stepper motors with 1/4 inch rear shaft. Installation tool and mounting hardware included.	PDF
STP-MTRA-ENC7	\$89.00	SureStep incremental (quadrature) modular encoder, 5VDC, line driver (differential) output, 400 ppr. For use with SureStep stepper motors with 1/4 inch rear shaft. Installation tool and mounting hardware included.	PDF
STP-MTRA-ENC8	\$76.00	SureStep incremental (quadrature) modular encoder, 5VDC, Push-pull (totem) output, 400 ppr. For use with SureStep stepper motors with 1/4 inch rear shaft. Installation tool and mounting hardware included.	PDF
STP-MTRA-ENC11	\$105.00	SureStep incremental (quadrature) modular encoder, 5 VDC, line driver (differential) output, 1000 ppr. For use with SureStep stepper motors with 3/8in rear shaft. Installation hardware included. Requires STP-CBL-EAxx cable.	PDF
STP-MTRA-ENC12	\$92.00	SureStep incremental (quadrature) modular encoder, 5 VDC, push-pull (totem) output, 1000 ppr. For use with SureStep stepper motors with 3/8in rear shaft. Installation hardware included. Requires STP-CBL-EDxx cable.	PDF
STP-MTRA-ENC13	\$103.00	SureStep incremental (quadrature) modular encoder, 5 VDC, line driver (differential) output, 400 ppr. For use with SureStep stepper motors with 3/8in rear shaft. Installation hardware included. Requires STP-CBL-EAxx cable.	PDF
STP-MTRA-ENC14	\$90.00	SureStep incremental (quadrature) modular encoder, 5 VDC, push-pull (totem) output, 400 ppr. For use with SureStep stepper motors with 3/8in rear shaft. Installation hardware included. Requires STP-CBL-EDxx cable.	PDF



Stepping System Accessories

SureStep® Stepping System Encoders

Sure Step Series Encoder Compatibility						
Part Number	PPR	Bore Diameter	Output Type	Encoder Cable	PLC Compatibility	Motor Compatibility
<u>STP-MTRA-ENC1</u>	1000	5mm	Line Driver	STP-CBL-EAxx	P2-HSI, P3-HSI, BRX*, CLICK C0-1xDxE-D*	STP-MTRx-14xxxD STP-MTRx-14xxxE STP-MTRx-17xxxD STP-MTRx-17xxxE Standard STP-MTRD-xxxxxE
<u>STP-MTRA-ENC2</u>			Push-pull (totem)	STP-CBL-EDxx	BRX*, CLICK C0-1xDxE-D*	
<u>STP-MTRA-ENC3</u>	400		Line Driver	STP-CBL-EAxx	P2-HSI, P3-HSI, BRX*, CLICK C0-1xDxE-D*	
<u>STP-MTRA-ENC4</u>			Push-pull (totem)	STP-CBL-EDxx	BRX*, CLICK C0-1xDxE-D*	
<u>STP-MTRA-ENC5</u>	1000	0.25 inch	Line Driver	STP-CBL-EAxx	P2-HSI, P3-HSI, BRX*, CLICK C0-1xDxE-D*	STP-MTRx-23xxxD STP-MTRx-23xxxE STP-MTRAC-23xxxD
<u>STP-MTRA-ENC6</u>			Push-pull (totem)	STP-CBL-EDxx	BRX*, CLICK C0-1xDxE-D*	
<u>STP-MTRA-ENC7</u>	400		Line Driver	STP-CBL-EAxx	P2-HSI, P3-HSI, BRX*, CLICK C0-1xDxE-D*	
<u>STP-MTRA-ENC8</u>			Push-pull (totem)	STP-CBL-EDxx	BRX*, CLICK C0-1xDxE-D*	
<u>STP-MTRA-ENC11</u>	1000	0.375 inch	Line Driver	STP-CBL-EAxx	P2-HSI, P3-HSI, BRX*, CLICK C0-1xDxE-D*	STP-MTRAC-34xxxD
<u>STP-MTRA-ENC12</u>			Push-pull (totem)	STP-CBL-EDxx	BRX*, CLICK C0-1xDxE-D*	
<u>STP-MTRA-ENC13</u>	400		Line Driver	STP-CBL-EAxx	P2-HSI, P3-HSI, BRX*, CLICK C0-1xDxE-D*	
<u>STP-MTRA-ENC14</u>			Push-pull (totem)	STP-CBL-EDxx	BRX*, CLICK C0-1xDxE-D*	

* Requires [FC-ISO-C](#)

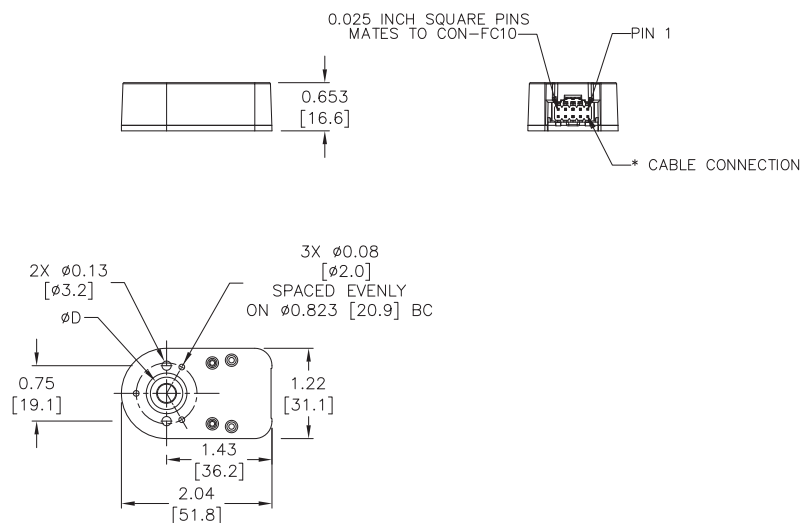


Stepping System Accessories

SureStep® Stepping System Encoders

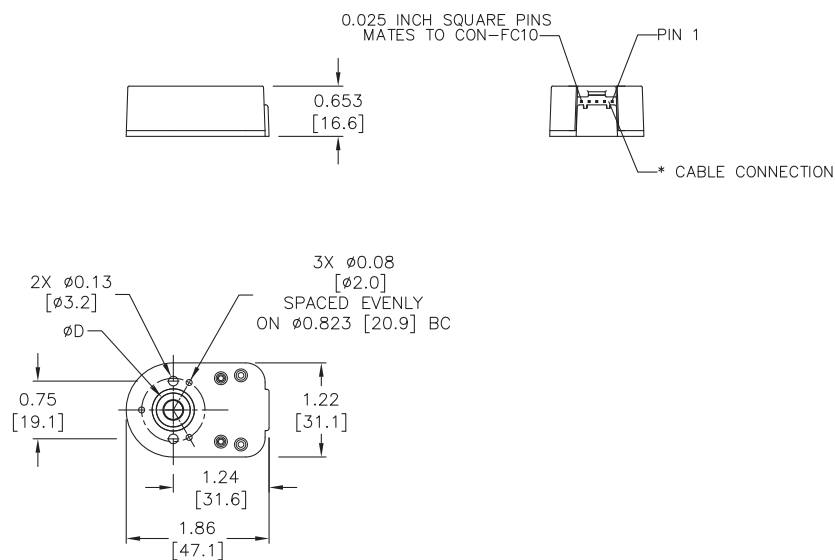
Dimensions = in [mm]

STP-MTRA-ENC1, 3, 5, 7



Bolt Hole Circles for Mounting	
Encoder	Holes
ENC1, ENC2, ENC3, ENC4, ENC5, ENC6, ENC7, ENC8	2 holes @ 19.05mm (.75") 3 holes @ 20.9mm (.823")

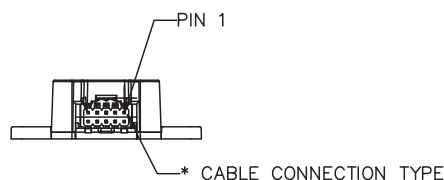
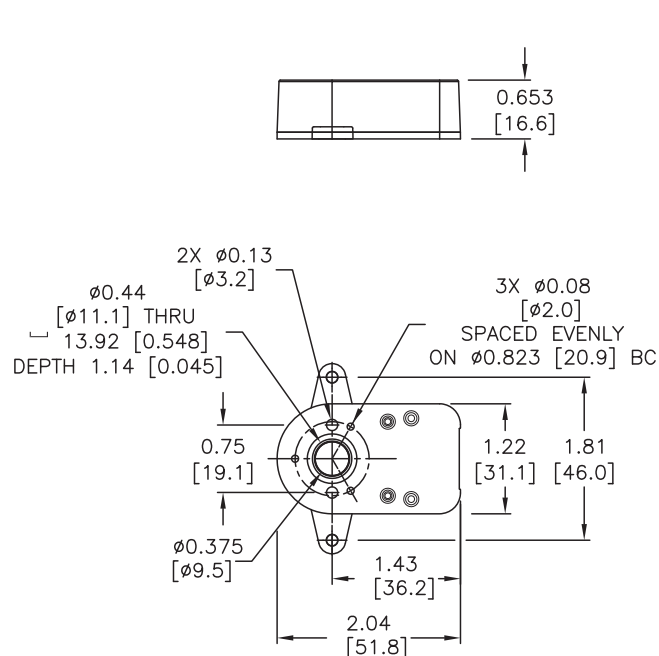
STP-MTRA-ENC2, 4, 6, 8



SureStep® Stepping System Encoders

Dimensions = in [mm]

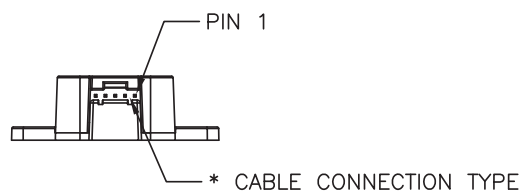
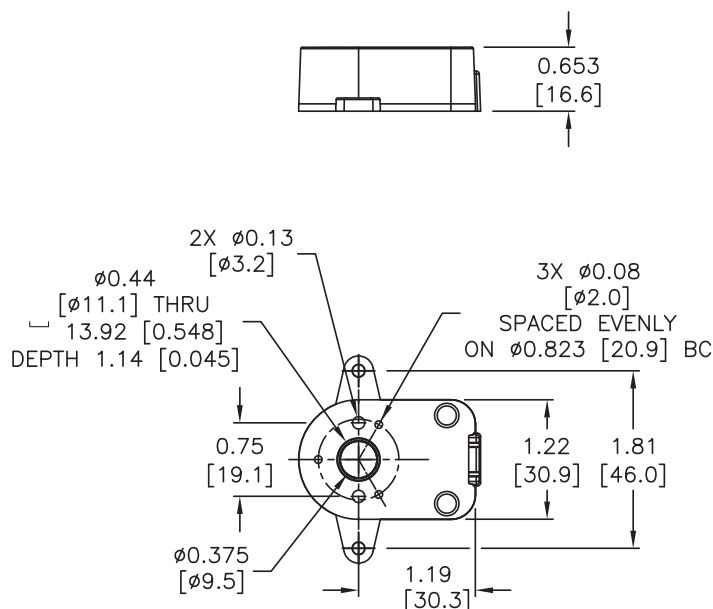
STP-MTRA-ENC11, 13



Bolt Hole Circles for Mounting

Encoder	Holes
ENC11, ENC12, ENC13, ENC14	2 holes @ 19.05mm (.75") 3 holes @ 20.9mm (.823") 2 holes @ 46.02mm (1.812")

STP-MTRA-ENC12, 14



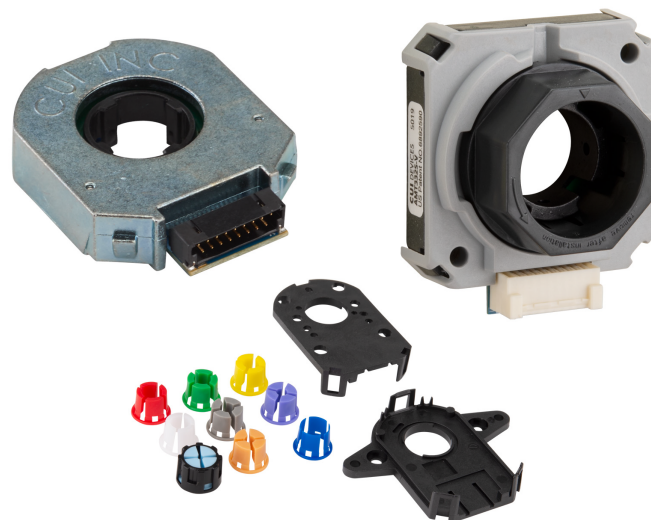


Stepping System Accessories

AMT Series Stepping System Encoders

CUI Devices' AMT series encoders are award-winning technologically advanced capacitive encoders with a variety of uses. Small, configurable, robust, and inexpensive, AMT encoders have won Product of the Year from Electronic's Weekly and from Electronic Products magazines.

AMT series encoders are typically mounted to the back of a stepper motor, but they can be used in many other applications. Instead of manufacturing many different encoders with different resolutions, CUI Devices offers the AMT series encoders with configurable pulses per revolution (PPR). The PPR can be set for most models using the free AMT Viewpoint software (available at <https://www.automationdirect.com/support/software-downloads?itemcode=AMT%20ViewPoint>). The AMT10 family of encoders are configured using DIP switches.



Encoder Model Overview

AMT series encoders include six distinct model lines (families) designed to meet specific needs.

- AMT10 – DIP switch configurable incremental quadrature encoders. Good for NEMA 14, NEMA 17, and NEMA 23/24 size motors.
- AMT11 – SW configurable resolution incremental quadrature encoders. Good for NEMA 14, NEMA 17, and NEMA 23/24 size motors (motor shaft sizes 2mm, 3mm, 1/8", 4mm, 3/16", 5mm, 6mm, 1/4", 8mm).
- AMT13 – Similar to AMT11, but these are larger sized and good for NEMA 34 and NEMA 42 motors (motor shaft sizes 9mm, 3/8", 10mm, 11mm, 12mm, 1/2", 13mm, 14mm, 5/8").
- AMT31 – A modified version of AMT11 with additional Hall-effect sensor outputs for commutation. This is needed for motors that don't have Hall-effect sensors mounted inside the motor. Typically "commutation encoders" are used with brushless DC (BLDC) motors and drives. Good for NEMA 14, NEMA 17, and NEMA 23/24 size motors.
- AMT33 – Same encoder + commutation features as the AMT31 family, but larger size for use with NEMA 34 and NEMA 42 motors.

CUI Devices AMT Series Encoders

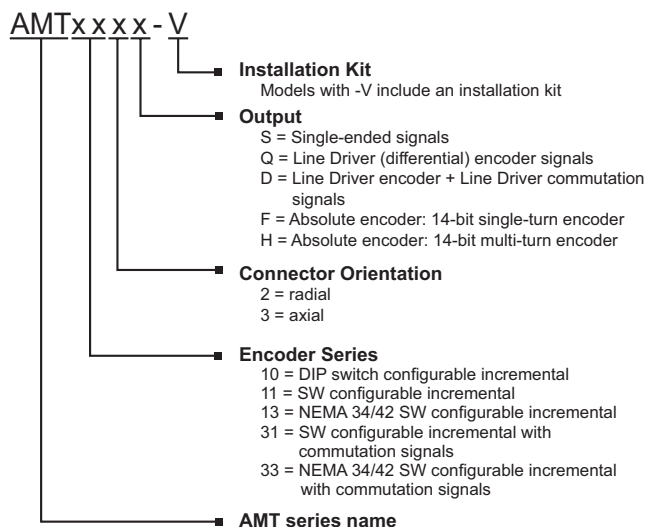
Capacitive Encoders

A capacitive encoder is comprised of three main components: a rotor, a stationary transmitter, and a stationary receiver. The rotor contains a sinusoidal pattern and, as it rotates, the high frequency reference signal of the transmitter is modulated in a predictable way. The encoder detects the changes in capacitance-reactance on the receiver board and translates them, using a demodulation algorithm, into increments of rotary motion.

Advantages of Capacitive Encoders

Derived from the same principles used in digital calipers, capacitive encoders have an excellent track record. The AMT series has proven to be both highly reliable and accurate. A capacitive encoder is more rugged than an optical encoder, tolerating a range of environmental contaminants such as dust, dirt, and oil. Capacitive encoders also hold-up much better to vibration and temperature extremes. Further, with no LED, it has a longer lifetime, a smaller footprint, and lower current consumption (6 to 18 mA) than an optical encoder. Immune to magnetic interference and electrical noise, it is as rugged as a magnetic encoder, but delivers greater accuracy and higher resolution.

Given their digital nature, capacitive encoders also offer increased flexibility, allowing users to change the encoder's resolution while a typical optical or magnetic encoder must be swapped out each time a different resolution is needed.



The programmable resolutions available in capacitive encoders are not only useful for system optimization, particularly when designing the PID control loop, but can reduce inventory holding, as one model can be used across multiple applications. Capacitive technology also allows the ability to digitally set the index pulse and alignment of the encoder for BLDC commutation, while its built-in diagnostic capabilities provide designers access to valuable system data for quick troubleshooting in the field.



Stepping System Accessories

AMT Series Stepping System Encoders

Replacement Encoders

The [AMT112Q-V](#) is a replacement for the encoder that comes pre-mounted on the STP-MTR(x)-xxxxE step motors. Step motor part numbers that end in "E" have encoders pre-mounted on the rear shaft. Models that end in "D" are the same motors, without the pre-mounted encoders. If you would like a different encoder then should purchase the "D" model motor and the encoder separately.

Installation tools and mounting hardware are included with all CUI Devices brand AMT series replacement encoders. For more information and details on how to wire the replacement encoders, please see the SureStep User Manual.

PPR

CUI Devices defines PPR, pulses per revolution, as the number of high pulses per channel per revolution. CPR, the number of counts that a controller could determine from a quadrature encoder (both channels have a rising and a falling edge), is 4 x PPR.

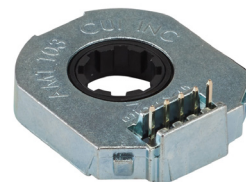
For more information regarding PPR, CPR, or LPR (Lines Per Revolution) view <https://www.cuidevices.com/blog/what-is-encoder-ppr-cpr-and-lpr>.

Optional Encoders

Optional encoders can be purchased separately for standard integrated motor/drives and standalone dual-shaft motors in all NEMA 14, 17, 23, 34, and 42 motors. All "D" model (dual-shaft) step motors come with pre-drilled holes in the rear end cap for easy modular encoder mounting. Pre-installed encoders on standalone dual-shaft motors and standard integrated motor/drives can be retrofitted with an appropriate optional encoder if desired. Please see the chart on the following page for encoder compatibility.



AMT102-V



AMT103-V

AMT Series Encoders			
Part Number	listprice	Description	Drawing
AMT102-V	\$25.00	CUI Devices incremental (quadrature) modular encoder, 5 VDC, radial, push-pull (totem) output, DIP switch configurable up to 2048 ppr. For use with NEMA 14, 17, and 23 dual shaft motors.	PDF
AMT103-V	\$25.00	CUI Devices incremental (quadrature) modular encoder, 5 VDC, axial, push-pull (totem) output, DIP switch configurable up to 2048 ppr. For use with NEMA 14, 17, and 23 dual shaft motors.	PDF
AMT112S-V	\$41.50	CUI Devices incremental (quadrature) modular encoder, 5 VDC, radial, push-pull (totem) output, configurable up to 4096 ppr. For use with NEMA 14, 17, and 23 dual shaft motors.	PDF
AMT112Q-V	\$46.50	CUI Devices incremental (quadrature) modular encoder, 5 VDC, radial, line driver (differential) output, configurable up to 4096 ppr. For use with NEMA 14, 17, and 23 dual shaft motors.	PDF
AMT312D-V	\$54.00	CUI Devices incremental (quadrature)/commutation modular encoder, 5 VDC, radial, line driver (differential) encoder output, configurable up to 4096 ppr, line driver (differential) commutation output. For use with NEMA 14, 17, and 23 dual shaft motors.	PDF
AMT312S-V	\$44.00	CUI Devices incremental (quadrature)/commutation modular encoder, 5 VDC, radial, push-pull (totem) encoder output, configurable up to 4096 ppr, push-pull (totem) commutation output. For use with NEMA 14, 17, and 23 dual shaft motors.	PDF



AMT112S-V



AMT312D-V

See Accessories section for configuration and signal cables.

CUI Devices Datasheets provide detailed encoder specifications. These datasheets can be found on each encoder's web page at www.automationdirect.com.



Stepping System Accessories

AMT Series Stepping System Encoders

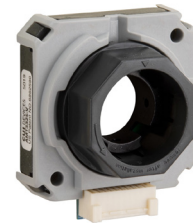
AMT Series Encoders, continued			
Part Number	Price	Description	Drawing
<u>AMT132S-V</u>	\$44.00	CUI Devices incremental (quadrature) modular encoder, 5 VDC, radial, push-pull (totem) output, configurable up to 4096 ppr. For use with NEMA 34 and 42 dual shaft motors.	<u>PDF</u>
<u>AMT132Q-V</u>	\$47.00	CUI Devices incremental (quadrature) modular encoder, 5 VDC, radial, line driver (differential) output, configurable up to 4096 ppr. For use with NEMA 34 and 42 dual shaft motors.	<u>PDF</u>
<u>AMT332S-V</u>	\$48.50	CUI Devices incremental (quadrature)/commutation modular encoder, 5 VDC, radial, push-pull (totem) encoder output, configurable up to 4096 ppr, push-pull (totem) commutation output. For use with NEMA 34 and 42 dual shaft motors.	<u>PDF</u>
<u>AMT332D-V</u>	\$52.00	CUI Devices incremental (quadrature)/commutation modular encoder, 5 VDC, radial, line driver (differential) encoder output, configurable up to 4096 ppr, line driver (differential) commutation output. For use with NEMA 34 and 42 dual shaft motors.	<u>PDF</u>

See Accessories section for configuration and signal cables.

CUI Devices Datasheets provide detailed encoder specifications. These datasheets can be found on each encoder's web page at www.automationdirect.com.



AMT132S-V



AMT332S-V

AMT Series Encoder Accessories		
Part Number	Price	Description
<u>CUI-KIT-1</u>	\$6.50	CUI Devices encoder accessory kit, replacement. For use with CUI Devices AMT102 encoders. Includes (1) AMT102 base, (1) AMT102 wide base, and (1) AMT10 sleeve kit (9 sleeves sized from 2-8mm).
<u>CUI-KIT-2</u>	\$6.50	CUI Devices encoder accessory kit, replacement. For use with CUI Devices AMT103 encoders. Includes (1) AMT standard base, (1) AMT standard wide base, and (1) AMT10 sleeve kit (9 sleeves sized from 2-8mm).
<u>CUI-KIT-3</u>	\$6.50	CUI Devices encoder accessory kit, replacement. For use with CUI Devices AMT11, AMT21, and AMT31 encoders. Includes (1) AMT standard base, (1) AMT standard wide base, and (1) AMT standard sleeve kit (9 sleeves sized from 2-8mm).
<u>CUI-KIT-4</u>	\$6.50	CUI Devices encoder sleeve kit, replacement. For use with CUI Devices AMT13 and AMT33 encoders. Includes (8) sleeves sized from 9-14mm.
<u>STP-MTRA-SCRWKT-1</u>	\$5.50	SureStep encoder mounting screw kit, for use with all stepper encoders.



CUI-KIT-1



CUI-KIT-2



CUI-KIT-3



CUI-KIT-4



STP-MTRA-SCRWKT-1

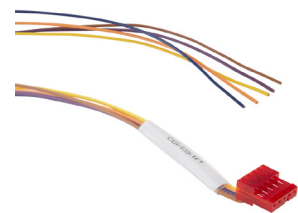


Stepping System Accessories

AMT Series Stepping System Encoders

AMT Series Encoder Compatibility							
Part Number	Max PPR	Bore Diameter	Output Type	PLC Compatibility	Encoder Cable	Configuration Cable	Motor Compatibility
AMT102-V	2048	2mm, 3mm, 1/8", 4mm, 3/16", 5mm, 6mm, 1/4", 8mm	push-pull (totem) (radial connector)	BRX ¹ , CLICK C0-1xDxE-D2	CUI-3131-x CUI-3132-1FT	n/a	NEMA 14, 17, 23 dual-shaft
AMT103-V²	2048		push-pull (totem) (axial connector)		CUI-435-x CUI-3934-6FT		
AMT112S-V	4096		push-pull (totem)		AMT-17C-1-x		
AMT112Q-V	4096		line driver (differential)	P2-HSI, P3-HSI, BRX ¹ , CLICK C0-1xDxE-D2	AMT-17C-1-x	AMT-PGRM-17C	
AMT312D-V	4096		line driver (differential) encoder+commutation	P2-HSI, P3-HSI, BRX ¹ , CLICK C0-1xDxE-D2	AMT-17C-1-x	AMT-PGRM-17C	
AMT312S-V	4096		push-pull (totem) encoder+commutation	BRX ¹ , CLICK C0-1xDxE-D2	AMT-17C-1-x		
AMT132S-V	4096	push-pull (totem)	AMT-18C-3-x				
AMT132Q-V	4096	9mm, 3/8", 10mm, 11mm, 12mm, 1/2", 13mm, 14mm, 5/8"	line driver (differential)	P2-HSI, P3-HSI, BRX ¹ , CLICK C0-1xDxE-D2	AMT-18C-3-x	AMT-PGRM-18C	NEMA 34 and 42 ³ dual-shaft (Does not fit STP-MTRAC-34 motors)
AMT332S-V	4096		push-pull (totem) encoder+commutation	BRX ¹ , CLICK C0-1xDxE-D2	AMT-18C-3-x		
AMT332D-V	4096		line driver (differential) encoder+commutation	P2-HSI, P3-HSI, BRX ¹ , CLICK C0-1xDxE-D2	AMT-18C-3-x		
<p><i>Note: For specific AutomationDirect PLC and step motor model compatibility, please see Appendix A in the SureStep User Manual.</i></p> <p>1 - Requires FC-ISO-C (see wiring diagrams for DIP switch settings).</p> <p>2 - For AMT103-V to maintain NEMA23 compatibility, CUI-KIT-2 must be purchased to use the standard wide base for mounting.</p> <p>3 - For STP-MTRAC(H)-42 series motors, encoder mounting kit STP-MTRA-42ENC is required.</p>							

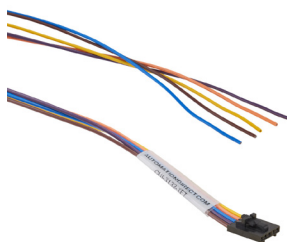
AMT Series Encoder Signal Cables			
Part Number	Price	Description	Drawing
CUI-3132-1FT	\$5.00	CUI Devices encoder cable, 5-pin connector to pigtail, 1ft cable length. For use with CUI Devices AMT102 encoders.	PDF
CUI-3131-6FT	\$10.50	CUI Devices encoder cable, 5-pin connector to pigtail, shielded, twisted pair, 6ft cable length. For use with CUI Devices AMT102 encoders.	PDF
CUI-3131-10FT	\$30.00	CUI Devices encoder cable, 5-pin connector to pigtail, shielded, twisted pair, 10ft cable length. For use with CUI Devices AMT102 encoders.	PDF
CUI-3131-20FT	\$49.00	CUI Devices encoder cable, 5-pin connector to pigtail, shielded, twisted pair, 20ft cable length. For use with CUI Devices AMT102 encoders.	PDF
CUI-435-1FT	\$5.50	CUI Devices encoder cable, 5-pin connector to pigtail, 1ft cable length. For use with CUI Devices AMT103 encoders.	PDF
CUI-3934-6FT	\$26.50	CUI Devices encoder cable, 5-pin connector to pigtail, shielded, twisted pair, 6ft cable length. For use with CUI Devices AMT103 encoders.	PDF
CUI-435-10FT	\$22.00	CUI Devices encoder cable, 5-pin connector to pigtail, 10ft cable length. For use with CUI Devices AMT103 encoders.	PDF
CUI-435-20FT	\$30.00	CUI Devices encoder cable, 5-pin connector to pigtail, 20ft cable length. For use with CUI Devices AMT103 encoders.	PDF



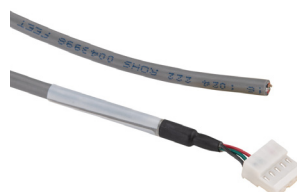
CUI-435-1FT
CUI-435-10FT
CUI-435-20FT



CUI-3131-6FT
CUI-3131-10FT
CUI-3131-20FT



CUI-3132-1FT



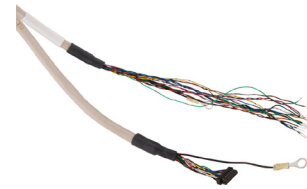
CUI-3934-6FT



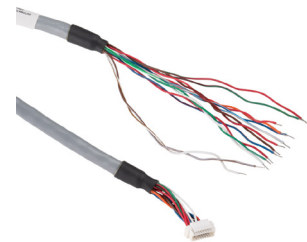
Stepping System Accessories

AMT Series Stepping System Encoders

AMT Series Encoder Signal Cables			
Part Number	Price	Description	Drawing
<u>AMT-17C-1-036</u>	\$40.00	CUI Devices encoder cable, 17-pin connector to pigtail, shielded, twisted pair, 3ft cable length. For use with CUI Devices AMT112 and AMT312 encoders.	<u>PDF</u>
<u>AMT-17C-1-072</u>	\$81.00	CUI Devices encoder cable, 17-pin connector to pigtail, shielded, twisted pair, 6ft cable length. For use with CUI Devices AMT112 and AMT312 encoders.	<u>PDF</u>
<u>AMT-17C-1-120</u>	\$121.00	CUI Devices encoder cable, 17-pin connector to pigtail, shielded, twisted pair, 10ft cable length. For use with CUI Devices AMT112 and AMT312 encoders.	<u>PDF</u>
<u>AMT-18C-3-036</u>	\$27.50	CUI Devices encoder cable, 18-pin connector to pigtail, shielded, twisted pair, 3ft cable length. For use with AMT13 and AMT33 encoders.	<u>PDF</u>
<u>AMT-18C-3-072</u>	\$67.00	CUI Devices encoder cable, 18-pin connector to pigtail, shielded, twisted pair, 6ft cable length. For use with AMT13 and AMT33 encoders.	<u>PDF</u>
<u>AMT-18C-3-120</u>	\$105.00	CUI Devices encoder cable, 18-pin connector to pigtail, shielded, twisted pair, 10ft cable length. For use with AMT13 and AMT33 encoders.	<u>PDF</u>



**AMT-17C-1-036
AMT-17C-1-072
AMT-17C-1-120**



**AMT-18C-3-036
AMT-18C-3-072
AMT-18C-3-120**

AMT Series Encoders Programming Cables		
Part Number	Price	Description
<u>AMT-PGRM-17C</u>	\$27.00	CUI Devices programming cable, miniB-USB to 17-pin connector, 1ft cable length. For use with CUI Devices AMT112 and AMT312 encoders.
<u>AMT-PGRM-18C</u>	\$24.50	CUI Devices programming cable, miniB-USB to 18-pin connector, 1ft cable length. For use with CUI Devices AMT13 and AMT33 encoders.



AMT-PGRM-17C



AMT-PGRM-18C



Stepping System Accessories

AMT Series Stepping System Encoders

Line Driver Encoder Wiring Colors				
Encoder	AMT112Q-V AMT312D-V		AMT132Q-V AMT332D-V	
Pin Function	Pin #	STP-CLB-EBx AMT-17C-1-xxx Wire Color	Pin #	AMT-18C-3-xxx Wire Color
+5V	6	RED/BLK	6	RED/GRN
GND	4	BLK/RED	4	GRN/RED
A	10	WHT/BLK	8	BRN/WHT
\bar{A}	11	BLK/WHT	9	WHT/BRN
B	8	GRN/BLK	10	GRN/WHT
\bar{B}	9	BLK/GRN	11	WHT/GRN
Z	12	BLU/BLK	12	BLU/WHT
\bar{Z}	13	BLK/BLU	13	WHT/BLU

Single Ended (Push-pull/Totem) Encoder Wiring Colors										
Encoder	AMT112S-V AMT312S-V		AMT132S-V AMT332S-V		AMT102-V			AMT103-V		
Pin Function	Pin #	STP-CLB-EBx AMT-17C-1-xxx Wire Color	Pin #	AMT-18C-3-xxx Wire Color	Pin #	CUI-3131-xxx Wire Color	CUI-3132-1FT Wire Color	Pin #	CUI-435-xxx Wire Color	CUI-3934-6FT Wire Color
+5V	6	RED/BLK	6	RED/GRN	5V	RED	ORG	5V	ORG	RED
GND	4	BLK/RED	4	GRN/RED	G	BLACK	BRN	G	BRN	BLACK
A+	10	WHT/BLK	8	BRN/WHT	A	WHT	BLU	A	BLU	WHT
B+	8	GRN/BLK	10	GRN/WHT	B	BRN	YEL	B	YEL	BRN
Z+	12	BLU/BLK	12	BLU/WHT	X	GRN	PUR	X	PUR	GRN

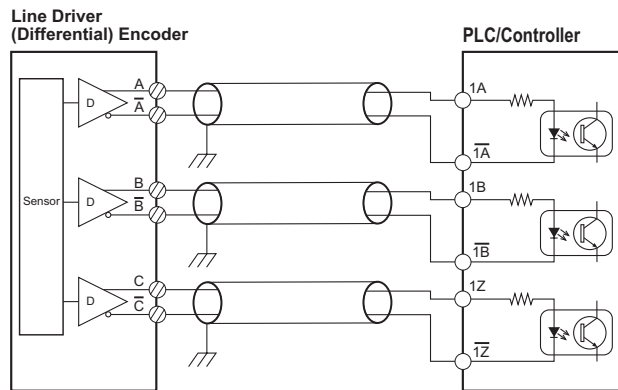
Single Ended (Push-pull/Totem) Commutation Wiring Colors				
Encoder	AMT312S-V		AMT332S-V	
Pin Function	Pin #	AMT-17C-1-xxx Wire Color	Pin #	AMT-18C-3-xxx Wire Color
+5V	6	RED/BLK	6	RED/GRN
GND	4	BLK/RED	4	GRN/RED
U+	3	BRN/BLK	3	BRN/RED
W+	5	ORG/BLK	5	ORG/RED
V+	7	RED/WHT	7	BLU/RED



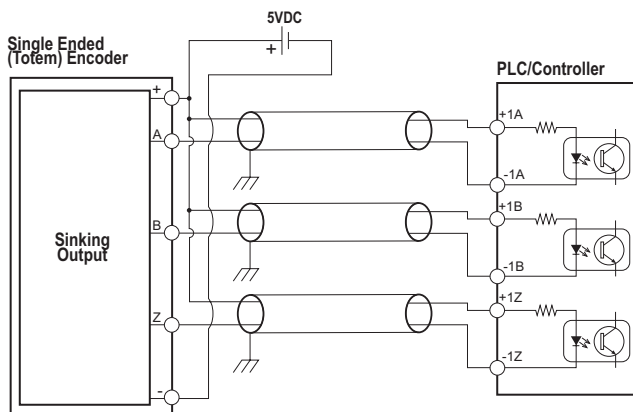
Stepping System Accessories

AMT Series Encoders – PLC Connectivity

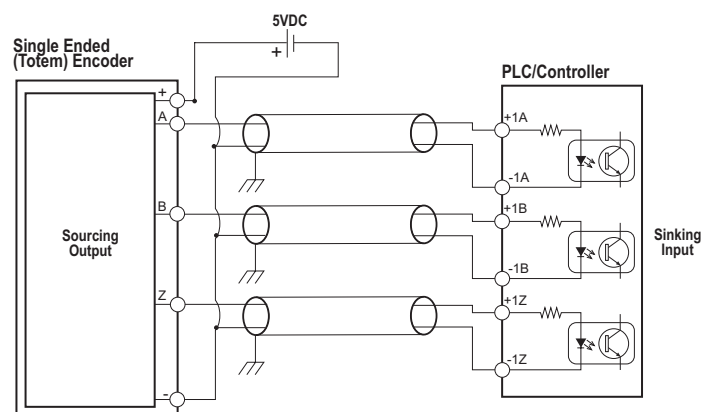
Line Driver Encoder to Line Driver PLC Input



Single Ended (Push-pull/Totem) Encoder to Sourcing PLC



Single Ended (Push-pull/Totem) Encoder to Sinking PLC





Stepping System Accessories

SureStep® Microstepping Drives Accessories

SureMotion Pro Drive Configuration Software - for Advanced Stepper Drives and Advanced Integrated Motor/Drives

Free Download

SureMotion Pro configuration software is available as a free download from our website for SureStep advanced components (STP-DRV-4850, -80100, & STP-MTRD-xxxxxR).

- Completely replaces SureStep Pro. Required for integrated motor/drives.
- Used for easy configuration and setup of the drive, including drive, motion control mode, I/O, motor.
- Open, Save, Upload, Download configuration files to Advanced Drives and Drive/Motors.
- Status Monitor screen aids in troubleshooting alarms and faults.
- Self Test Mode verifies motor wiring and functionality.
- SCL Terminal window allows testing/verification of SCL (serial ASCII) commands before PLC programming begins.
- Help files include technical data, application information, advanced setup, serial command instructions.
- Runs on 32-bit/64-bit Windows operating systems.



SureStep Drive Configuration Software - for Advanced Stepper Drives

Part Number	Price	Description
SM-PRO	\$10.50	SureMotion Pro Windows configuration software, USB drive or free download. For use with SureStep stepper drives with serial port. Requires PC serial port, USB-RS232 or STP-USB485-4W serial adapters.

* Available for purchase on USB or can be [downloaded for free from the AutomationDirect Web site \(www.AutomationDirect.com\)](http://www.AutomationDirect.com).



Stepping System Cables

SureStep® Cables

SureStep Series – Stepping System Cables						
Cable	Price	Purpose	Length	Use With	Cable End Connectors	Drawing
STP-EXT-006	\$16.00	motor to drive extension	6 ft	STP-MTR-xxxxx(x)	pigtail / Molex 43020-0401 connector	PDF
STP-EXT-010	\$18.00		10 ft			PDF
STP-EXT-020	\$25.00		20 ft			PDF
STP-EXTH-006	\$31.00		6 ft	STP-MTRH-xxxxx(x)	pigtail / Molex 39-01-2041 connector	PDF
STP-EXTH-010	\$36.00		10 ft			PDF
STP-EXTH-020	\$45.50		20 ft			PDF
STP-EXTHW-006	\$62.00		6 ft	STP-MTRHW-xxxxx(x)	Bulgin # PXP4011/06P/6065	PDF
STP-EXTHW-010	\$78.00		10 ft			PDF
STP-EXTHW-020	\$113.00		20 ft			PDF
STP-EXTL-006	\$13.00		6 ft	STP-MTRL-xxxxx(x)	pigtail / Molex 105308-22004 connector	PDF
STP-EXTL-010	\$16.50		10 ft			PDF
STP-EXTL-020	\$21.00		20 ft			PDF
STP-EXTW-006	\$61.00	motor to drive extension	6 ft	STP-MTRW-xxxxx(x)	Bulgin # PXP4011/06P/6065	PDF
STP-EXTW-010	\$76.00		10 ft			PDF
STP-EXTW-020	\$107.00		20 ft			PDF
STP-EXT42-006	\$28.50		6 ft	STP-MTRAC-42xxxx	10-pin / pigtail	PDF
STP-EXT42-010	\$34.00		10 ft			PDF
STP-EXT42-020	\$50.00		20 ft			PDF
STP-EXT42H-006	\$28.50		6 ft	STP-MTRACH-42xxxxx		PDF
STP-EXT42H-010	\$34.00		10 ft			PDF
STP-EXT42H-020	\$50.00		20 ft			PDF
STP-232RJ11-CBL*	\$19.00	programming/ communication	10 ft	STP-DRV-4850, STP-DRV-80100	DB9 female / RJ11(6P4C)	PDF
STP-232HD15-CBL-2**	\$19.00	communication	6.6 ft	STP-DRV-4850, STP-DRV-80100 DL06, D2-250-1, D2-260	HD 15-pin male / RJ12 6-pin plug	n/a
STP-232RJ12-CBL-2**	\$12.00	communication	6.6 ft	STP-DRV-4850, STP-DRV-80100 DL05, CLICK	RJ11 (6P4C) plug / RJ12 6-pin plug	n/a
STP-CBL-CA6	\$42.00	control cable	6 ft	STP-MTRD-17038 STP-MTRD-17038E	11-pin / pigtail	PDF
STP-CBL-CA10	\$60.00	control cable	10 ft		11-pin / pigtail	PDF
STP-CBL-CA20	\$108.00	control cable	20 ft		11-pin / pigtail	PDF
STP-CBL-EA6	\$39.00	encoder cable	6 ft	STP-MTRD-xxxxxE STP-MTRA-ENC1, STP-MTRA-ENC3 STP-MTRA-ENC5, STP-MTRA-ENC7 STP-MTRA-ENC11, STP-MTRA-ENC13 (for line driver encoders)	10-pin / pigtail	PDF
STP-CBL-EA10	\$40.00	encoder cable	10 ft		10-pin / pigtail	PDF
STP-CBL-EA20	\$69.00	encoder cable	20 ft		10-pin / pigtail	PDF
STP-CBL-EB3	\$67.00	encoder cable	3 ft	AMT112Q-V AMT112S-V (for both line driver and push-pull (totem) encoders)	17-pin / pigtail	PDF
STP-CBL-EB6	\$94.00	encoder cable	6 ft		17-pin / pigtail	PDF
STP-CBL-EB10	\$131.00	encoder cable	10 ft		17-pin / pigtail	PDF
STP-CBL-EB20	\$221.00	encoder cable	20 ft		17-pin / pigtail	PDF
STP-CBL-ED6	\$42.00	encoder cable	6 ft	STP-MTRA-ENC2, STP-MTRA-ENC4 STP-MTRA-ENC6, STP-MTRA-ENC8 STP-MTRA-ENC12, STP-MTRA-ENC14 (for push-pull (totem) encoders)	5-pin / pigtail	PDF
STP-CBL-ED10	\$57.00	encoder cable	10 ft		5-pin / pigtail	PDF
STP-CBL-ED20	\$68.00	encoder cable	20 ft		5-pin / pigtail	PDF
STP-CON-1	\$37.00	replacement connector kit	n/a	STP-DRV-4845 & -6575	-	n/a
STP-CON-2	\$37.00	replacement connector kit	n/a	STP-DRV-4850 & 80100	-	n/a

* Programming/communication cable STP-232RJ11-CBL is available for spare or replacement purposes.
(One cable is included with each software programmable drive.)

** Refer to the ZIPLinks Wiring Solutions section for complete information regarding cables STP-232HD15-CBL-2 and STP-232RJ12-CBL-2.

SureStep® Cables, *continued*

SureStep Series – Stepping System Cables						
Cable	Price	Purpose	Length	Use With	Cable End Connectors	Drawing
<u>STP-CON-3</u>	\$62.00	replacement connector kit	n/a	STP-MTRD-xxxxR	-	n/a
<u>STP-CON-4</u>	\$35.00	replacement connector kit	n/a	STP-DRVA-RC-050A	-	n/a
<u>STP-CON-5</u>	\$35.00	replacement connector kit	n/a	STP-DRV-4830	-	<u>PDF</u>
<u>STP-CON-6</u>	\$38.00	replacement connector kit	n/a	STP-DRVAC-24025	-	n/a
<u>STP-485DB9-CBL-2</u>	\$64.00	4-wire programming cable	6.5 ft	STP-MTRD-xxxxR	DB9 / Phoenix 5-conductor plug	<u>PDF</u>

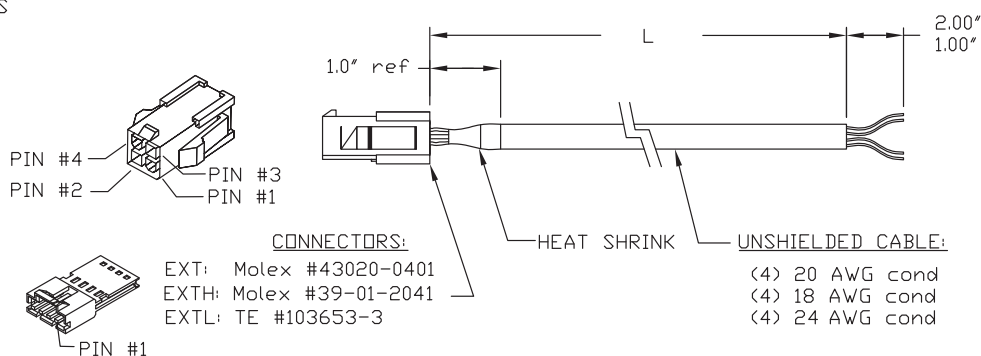
STP-EXT(x)-0xx Extension Cable Wiring Diagram

EXT & EXTH CABLES

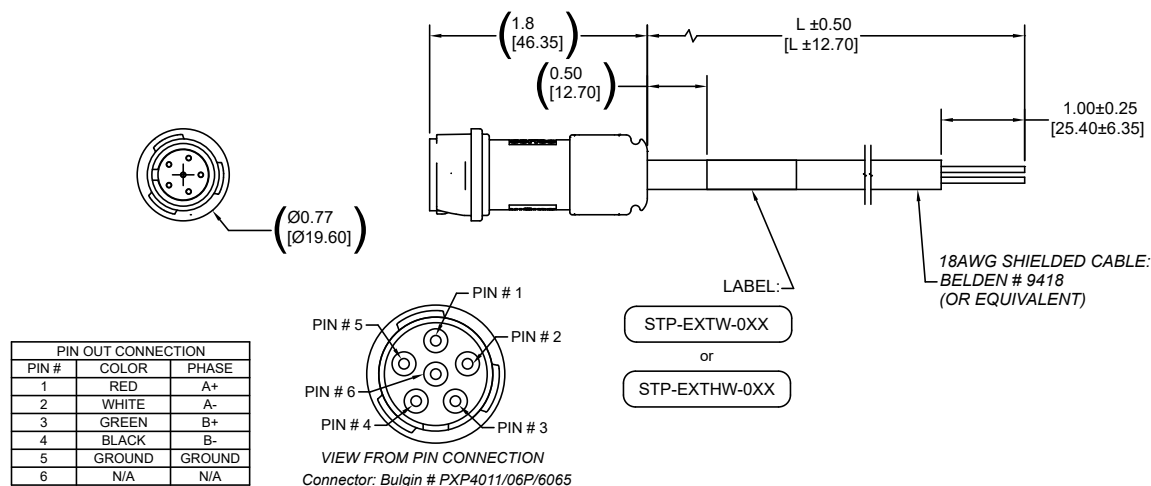
PIN#	COLOR
1	RED
2	WHITE
3	GREEN
4	BLACK

EXTL CABLES

PIN#	COLOR
1	RED
2	WHITE
3	GREEN
4	BLACK



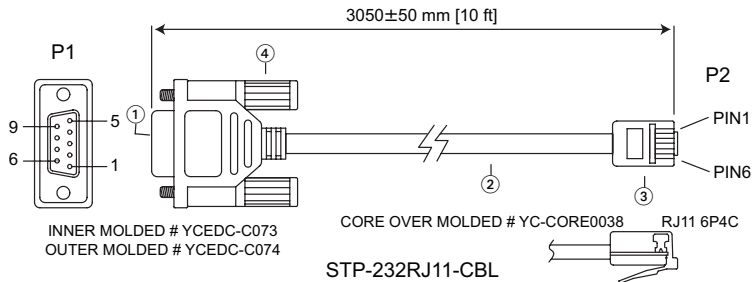
STP-EXTW-0xx and STP-EXTHW-0xx Extension Cable Wiring Diagram



Stepping System Cables

SureStep® Cables, continued

STP-232RJ11-CBL Programming Cable Wiring Diagram

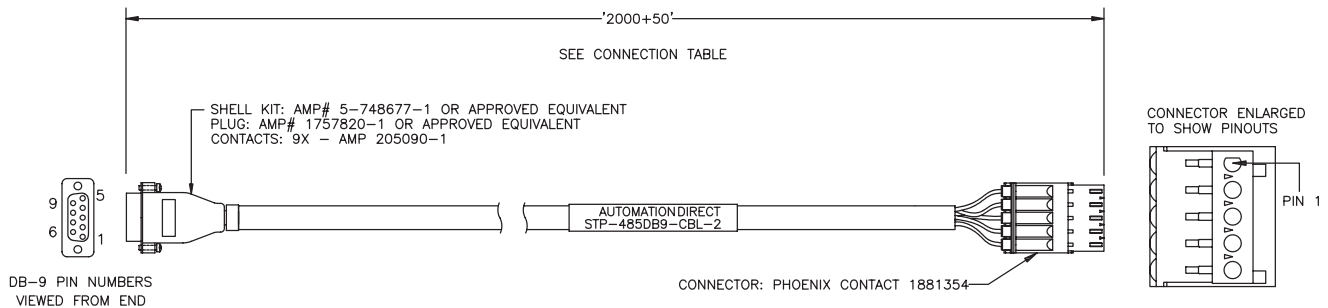


WIRE CONNECTION			
(DB9) P1			P2 (RJ11 6P4C)
2	RX	TX	3
3	TX	RX	5
4	nc	nc	4
5	GND	GND	2

①	DB 9P FEMALE CONNECTOR SHELL: FRONT NICKEL BACK TIN INSULATOR COLOR: BLACK
②	CABLE: CAT-5 UTP 24AWG (7/0.203BA*2PR) 100MHz COLOR: BLACK OD: 4.5mm
③	RJ11 6P4C PLATED GOLD 3U"
④	SCREW: #4-40UNC PD40*175TNP COLOR: BLACK

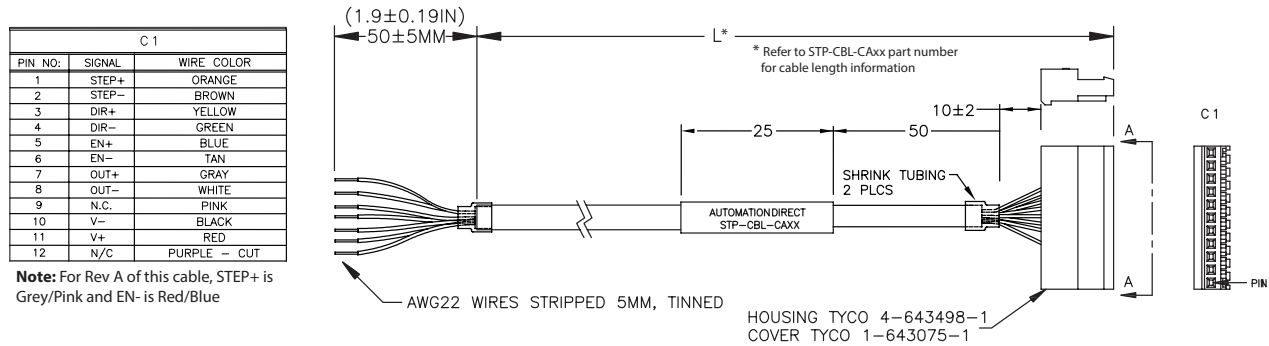
STP-485DB9-CBL-2 4-wire Programming Cable Wiring Diagram

CONNECTION CHART				
DB-9 CONN PIN	DB9 SIGNAL	WIRE COLOR	PHOENIX PIN	PHOENIX SIGNAL
2	TX+	RED	5	RX+
1	TX-	ORANGE	4	RX-
3	RX+	BLACK	3	TX+
4	RX-	BROWN	2	TX-
5	GND	YELLOW	1	GND
METAL HOUSING	SHIELD	SHIELD	N/C	N/C

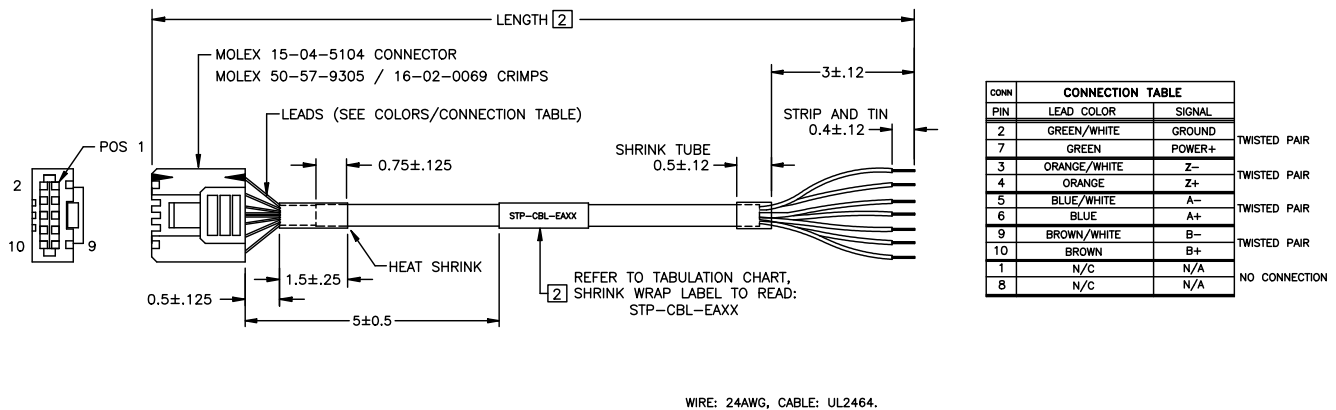


SureStep® Cables, continued

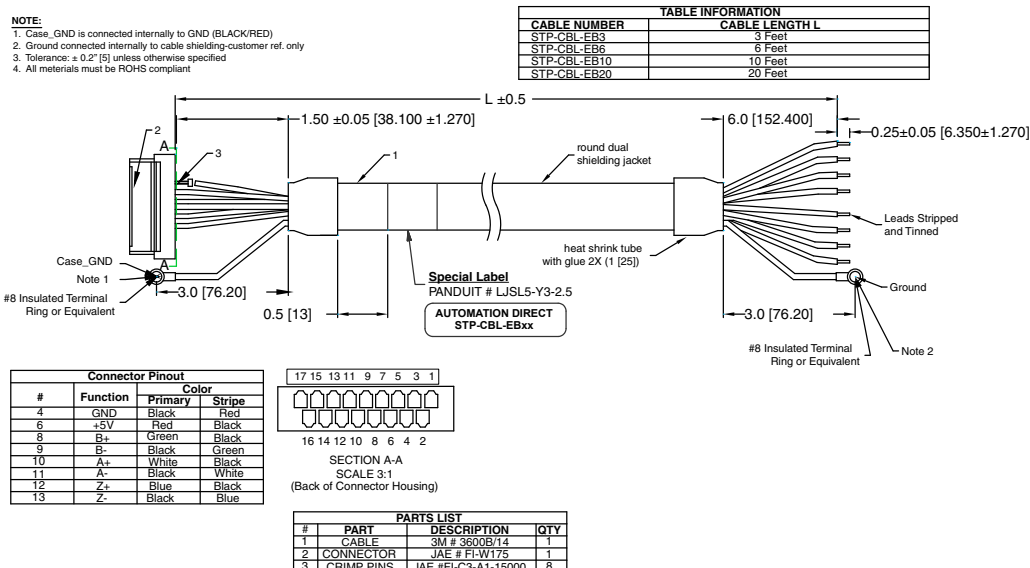
STP-CBL-CAxx Control Cable Wiring Diagram



STP-CBL-EAxx Encoder Cable Wiring Diagram



STP-CBL-EBxx Encoder Cable Wiring Diagram





Stepping System Cables

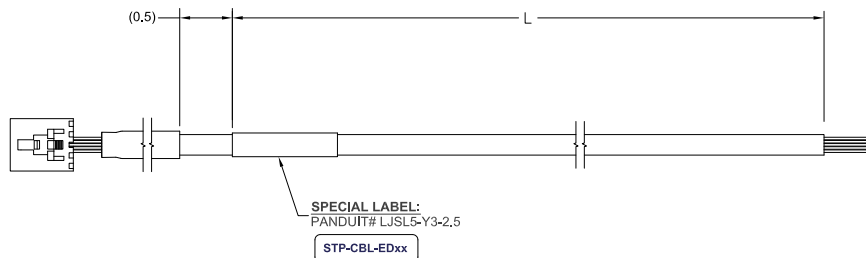
SureStep® Cables, continued

STP-CBL-EDxx Encoder Cable Wiring Diagram

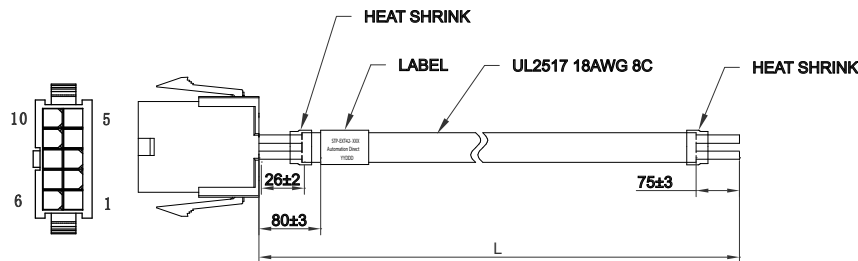
STP-EDxx CABLES

PIN#	Function	Color
1	Ground	Black
2	Index	Green
3	A Channel	White
4	+5VDC Power	Red
5	B Channel	Brown

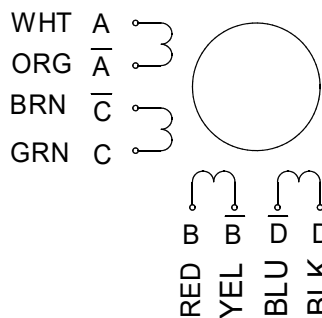
TABLE INFORMATION	
CABLE NUMBER	CABLE LENGTH L
STP-CBL-ED6	6 Feet
STP-CBL-ED10	10 Feet
STP-CBL-ED20	20 Feet



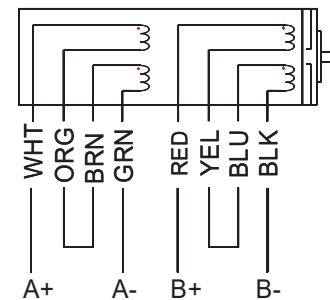
STP-EXT42(H)-xxx Cable Wiring Diagram



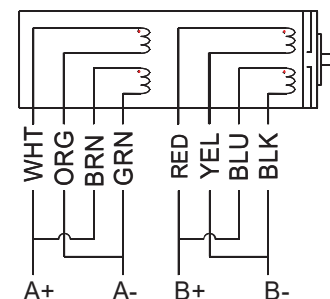
Pin	Wire Description
1	A - White
2	\bar{A} - Orange
3	C - Green
4	\bar{C} - Brown
5	B - Red
6	\bar{B} - Yellow
7	D - Black
8	\bar{D} - Blue
9	GND - Drain wire



Bi-polar series



Bi-polar parallel





Stepping Systems with PLCs

Controller Compatibility

High Speed Pulse Motion Control with AutomationDirect PLCs* and SureStep® Stepping Systems			
PLC Series	Starting at \$213.00	Starting at \$329.00	Starting at \$391.00
	BX-DM1x-10	BX-DM1x-18	BX-DM1x-36
Maximum Number of Axes	2	3	3
Output Signal Type	Sink/Source		
Maximum Pulse Rate (pulses/sec)	250,000		
Position Control	Trapezoidal Profiles (linear and S-curve ramps)		
Velocity Control	Dynamic Velocity (controlled accel/decel)		

High Speed Pulse Motion Control with AutomationDirect PLCs* and SureStep™ Stepping Systems			
1–16 axis control depending on base size and power supply budget **			
PLC Series	CPUs starting at \$365.00		CPUs starting at \$735.00
	P2000		P3000
I/O Modules Pulse Outputs	P2-HSO		P3-HSO
Maximum Number of Axes	2 per module, 22 per PLC rack, 44 per PLC system		
Output Signal Type	Line Driver	Sink/Source	Line Driver Sink/Source
Maximum Pulse Rate (pulses/sec)	1,000,000	500,000	1,000,000 500,000
Position Control	Trapezoidal Profiles (linear and S-curve ramps)		
Velocity Control	Dynamic Velocity (controlled accel/decel)		
Maximum Number of Modules	11 per PLC rack, 22 per PLC system		

High Speed Pulse Motion Control with AutomationDirect PLCs* and SureStep® Stepping Systems			
PLC Series	Starting at Retired	Starting at \$252.00	Starting at \$476.00
	DL105	DL05	DL06
Built-In PLC Pulse Outputs	1 axis pulse output included with the PLC base unit		
Maximum Number of Axes	1 axis control**	1-2 axis control***	1-5 axis control***
Maximum Pulse Rate (pulses/sec)	7,000		10,000
Position Control	Trapezoidal Profiles (linear only)		
Velocity Control	Velocity Levels (no ramps available when changing velocity)		
I/O Modules Pulse Outputs	Not Applicable for DL105	H0-CTRIO2 (1 axis per module)	
Maximum Pulse Rate (pulses/sec)		65,000	
Position Control		Trapezoidal Profiles (linear & S-curve ramps)	
Velocity Control		Dynamic Velocity (controlled accel/decel)	
Maximum Number of Modules		1	4

* Any PLC capable of RS-232 ASCII communication can write serial commands to the STP-DRV-4850, -80100 Drives. Any PLC capable of RS-485 ASCII communication can write serial commands to the Advanced Integrated drives. Most AutomationDirect PLCs will communicate using either RS-232 or RS-485 communications, however we recommend using either Click, Productivity, or BRX (DoMore) as they are modern PLCs. DirectLogic will also work but is older technology.

** When using DC output models only. *** When using either DC output model or H0-CTRIO option module.



Stepping Systems with PLCs

Controller Compatibility (continued)

High Speed Pulse Motion Control with AutomationDirect PLCs* and SureStep™ Stepping Systems				
<i>1–16 axis control depending on base size and power supply budget **</i>				
PLC Series	CPUs starting at Retired		CPUs starting at \$437.00	
	DL205		Do-more	
I/O Modules Pulse Outputs	D2-CTRINT (1 axis per module)	H2-CTRIO2 (2 axes)	T1H-CTRIO (2 axes per module)	H2-CTRIO2 (2 axes)
Maximum Pulse Rate (pulses/sec)	5,000	65,000	25,000	250,000
Position Control	Trapezoidal Profiles (linear and S-curve ramps)			
Velocity Control	Dynamic Velocity (controlled accel/decel)			
Maximum Number of Modules	1	1-8		

* Any PLC capable of RS-232 ASCII communication can write serial commands to the STP-DRV-4850, -80100 Drives. Any PLC capable of RS-485 ASCII communication can write serial commands to the Advanced Integrated drives. Most AutomationDirect PLCs will communicate using either RS-232 or RS-485 communications, however we recommend using either Click, Productivity, or BRX (DoMore) as they are modern PLCs. DirectLogic will also work but is older technology.

** using D2-CITRANT or Hx-CTRIO modules.



Stepping Drives

Leadshine 2-phase Digital Stepper Drives

Leadshine has been an industry leading motion control supplier since 1997, and is one of the largest stepper drive manufacturers in the world. Leadshine steppers offer high quality products (Leadshine factories are ISO9001 certified) at very affordable prices. Leadshine steppers are simple, easy to use, long-lasting, and reliable.

AutomationDirect sells a wide range of linear and switching power supplies, stepper motors, cables, and PLCs with hi-speed outputs that are compatible with Leadshine stepper drives.

Features

- 2-phase digital stepper drives
- Anti-resonance for optimal torque, extra smooth motion, low motor heating and noise
- Motor auto-config on power up
- All drives support step and direction control, some models support CW/CCW as well
- Micro-stepping for smooth motor movement
- DIP switch configurable
- Wide range of input voltages supported (12-110 VDC, 18-80 VAC)
- Pulse input frequency up to 200kHz
- Soft-start with no "jump" when powered on
- Automatic idle-current reduction
- Protections for over-voltage and over-current
- NEMA 11, 14, 17, 23, 24, 34 and 42 frame size step motors supported



Leadshine Series – Drives Features Comparison¹

Drive Model	DM322E	DM542E	DM556E	DM860E	DMA860E	DM805-AI	EM542S	EM556S
Price	\$32.50	\$45.50	\$50.00	\$67.00	\$87.00	\$129.00	\$59.00	\$72.00
Drawing	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF
Drive Type	2-phase digital stepper drive							
Supply Voltage	12–30 VDC (24 VDC typical)	20–50 VDC (24–48 VDC typical)		24–74 VDC (48–68 VDC typical)	24–110 VDC (48–90 VDC typical) or 18–80 VAC (36–70 VAC typical)	20–80 VDC (30–60 VDC typical)	20–50 VDC (24–48 VDC typical)	
Pulse Input Type	Single-ended2	Differential, Single-ended				Single-ended2	Differential, Single-ended	
Step Input Modes	Step & Direction			Step & Direction, CW & CCW		Step & Direction, Analog input	Step & Direction, CW & CCW	
Digital Input Voltage	5V (add a 1K resistor to accept +12V input, or a 2K resistor to accept +24V input)						DIP switch selectable for 5V or 24V	
PPR Range	400–12800	400–25600		400–51200		200-12800	200–25600	
Motor Output Current Range	0.3–2.2 A peak (0.2–1.6 RMS)	1.0–4.2 A peak (0.7–3.0 RMS)	1.8–5.6 A peak (1.3–4.0 RMS)	2.4–7.2 A peak (1.7–5.1 RMS)		2.6–7.0 A peak (0.3–5.0 RMS)	0.5-4.2A peak (0.4-2.9 RMS)	0.5-5.6A peak (0.4-3.9 RMS)
Digital Output	No						+24VDC (Brake and Fault Detection)	
Self-test Capable	No	No	No	No	No	Yes	Yes	Yes
Special Features	Soft-start, motor auto-config				Accepts a DC or an AC power supply, soft-start, motor auto-config	Built-in pulse generator, command source	Auto-tuning, soft-start, fault and brake outputs, shaft lock	

¹ - Refer to Specifications Tables for detailed specifications.

² - See the User Manual or Quick Start Guide for instructions on wiring Single-Ended drives to a Differential (Line Driver) controller.



Stepping Drives



DM542E



DMA860E

DM542E, DM556E, DM860E, DMA860E

The DM542E and DM556E drives are capable of pulse and direction operation, with auto-motor config on power up.

The DM860E and DMA860E drives possess the same capabilities but can also do CW and CCW pulse operation. The main difference between these models are output current range to the motor and supply voltage.

Leadshine DM542E, DM556E, DM860E, DMA860E Specifications				
Drive Model	DM542E	DM556E	DM860E	DMA860E
Output Current	1.0–4.2 A peak (0.7–3.0 RMS)	1.8–5.6 A peak (1.3–4.0 RMS)	2.4–7.2 A peak (1.7–5.1 RMS)	2.4–7.2 A peak (1.7–5.1 RMS)
Input Voltage	20–50 VDC (24–48 VDC typical)		24–74 VDC (48–68 VDC typical)	24–110 VDC (48–90 VDC typical) or 18–80 VAC (36–70 VAC typical)
Logic Signal Current	7–16 mA (10mA typical)			
Pulse Input Frequency	0–200 kHz			
Minimal Pulse Width	2.5 μs			
Minimal Direction Setup	5.0 μs			
Isolation Resistance	500mΩ			
Connector P1 Functions	PUL+	Pulse signal: 5V signal, differential input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 μs. Add a 1kΩ resistor for +12V signals, 2kΩ for +24V signals.		
	PUL-			
	DIR+	Direction signal: 5V signal, differential input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 μs. Add a 1kΩ resistor for +12V signals, 2kΩ for +24V signals. Direction Function: requires 5μs setup time. CW/CCW Function (DM860E and DMA860E only): see DIP switch SW14.		
	DIR-			
	ENA+	Enable signal: 5V signal, differential input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 μs. Add a 1kΩ resistor for +12V signals, 2kΩ for +24V signals. Enable Function: Close (pull low) to disable the drive.		
	ENA-			
Replacement Connectors	Power = DN-6PLUG, I/O = DN-4PLUG, Enable = DN-2PLUG			
Cooling	Natural cooling or forced cooling			
Ambient Temperature	0°C to 65°C (32°F to 149°F)			
Humidity	40–90% relative humidity			
Operating Temperature	0°C to 50°C (32°F to 122°F)			
Vibration	10–50 Hz / 0.15 mm			
Storage Temperature	-20°C to 65°C (-4°F to 149°F)			
Self Test	No			
Weight	227g (8 oz)	300g (10.6 oz)	510g (1.13 lbs)	510g (1.13 lbs)

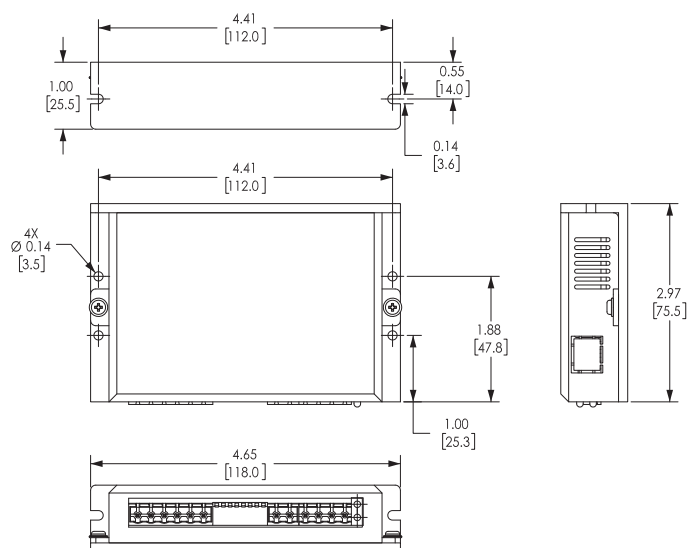


Stepping Drives

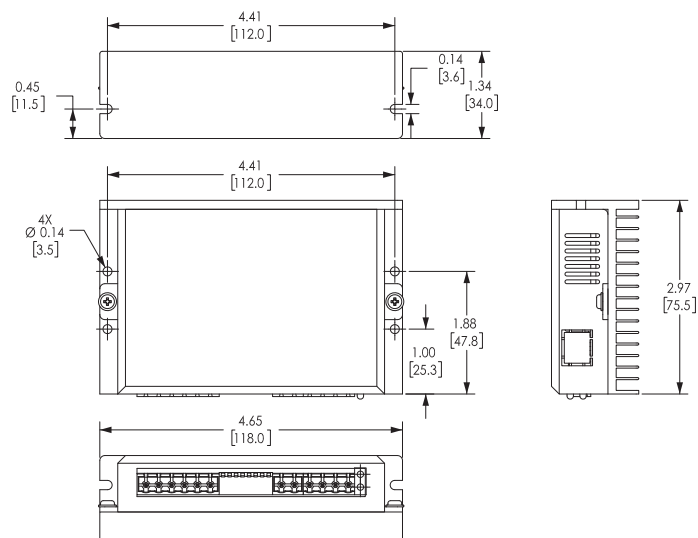
Leadshine Drive Dimensions

Dimensions = in [mm]

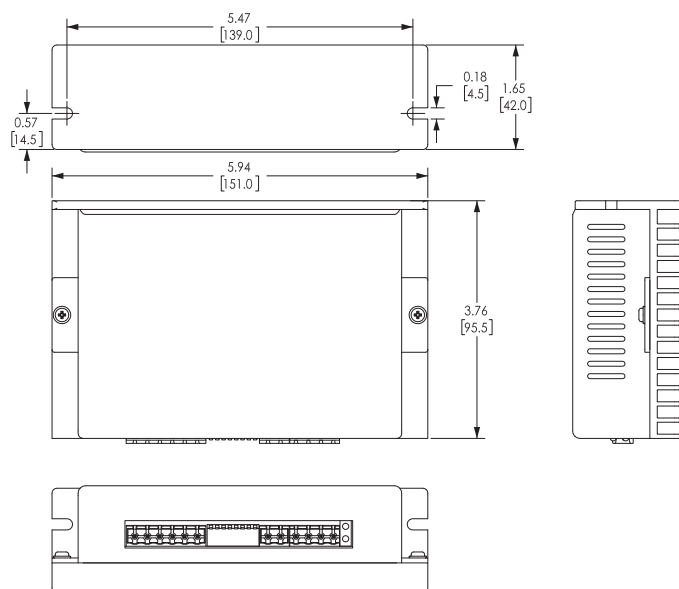
DM542E



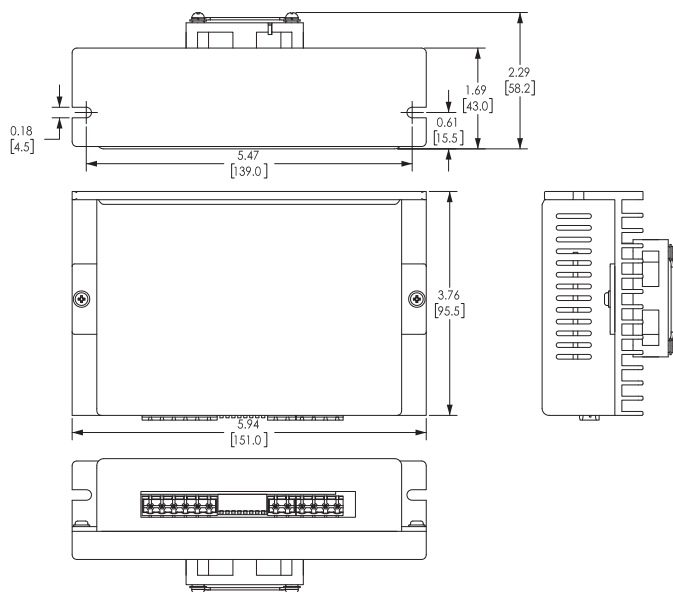
DM556E



DM860E



DMA860E

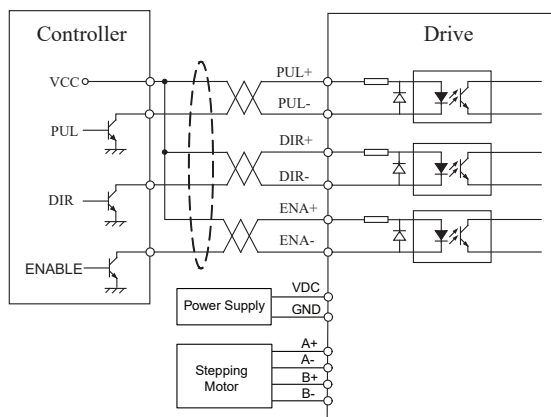




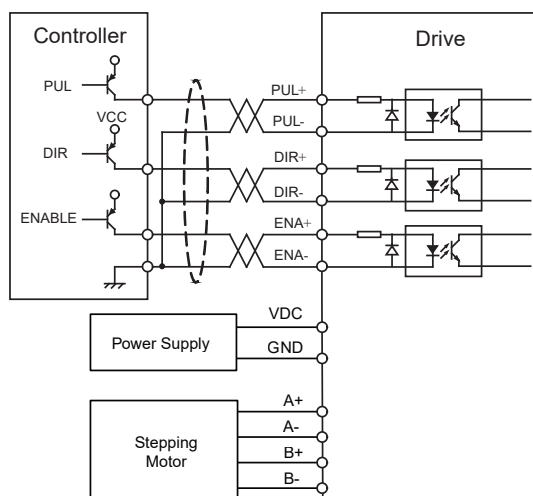
Stepping Drives

Leadshine Drive Wiring

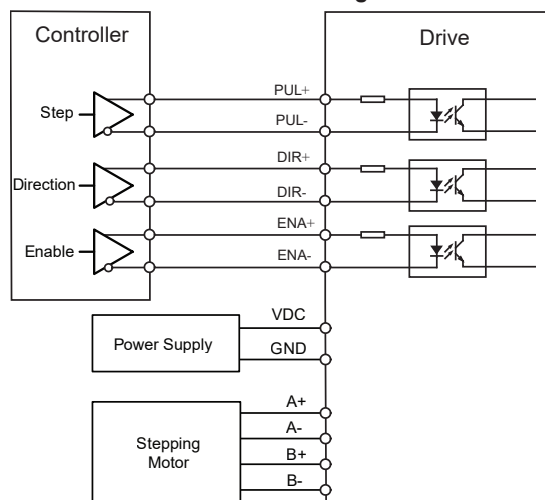
DM542E, DM556E, DM860E, DMA860E
Connection to Open Collector Signal



DM542E, DM556E, DM860E, DMA860E
Connection to PNP Signal



DM542E, DM556E, DM860E, DMA860E
Connection to Differential Signal





Stepping Drives

DM322E

The DM322E is a compact drive capable of pulse and direction operation, with motor auto-configuration on power up.



DM322E

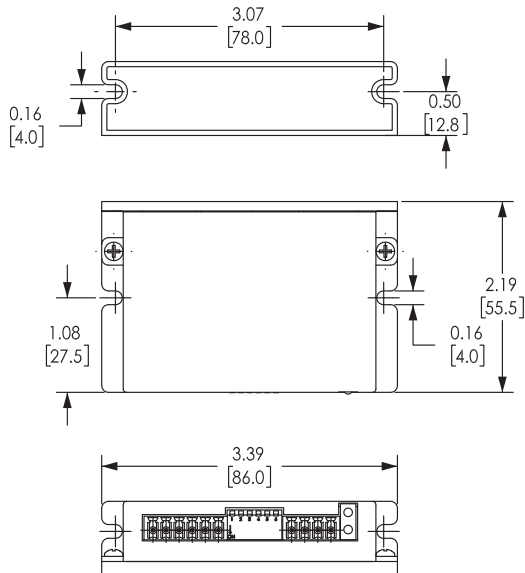
Leadshine DM322E Specifications		
Drive Model	DM322E	
Output Current	0.3–2.2 A peak (0.2–1.6 RMS)	
Input Voltage	12–30 VDC (24 VDC typical)	
Logic Signal Current	7–16 mA (10mA typical)	
Pulse Input Frequency	0–70 kHz	
Minimal Pulse Width	7.5 μ s	
Minimal Direction Setup	7.5 μ s	
Isolation Resistance	100m Ω	
Connector P1 Functions	PUL	Pulse signal: 5V signal, single-ended input. High input is 4–5V, Low input is 0–0.5 V. Minimum pulse width = 2.5 μ s. Add a 1k Ω resistor for +12V signals, 2k Ω for +24V signals.
	DIR	DIR signal: 5V signal, single-ended input. High input is 4–5V, Low input is 0–0.5 V. Minimum pulse width = 2.5 μ s. Add a 1k Ω resistor for +12V signals, 2k Ω for +24V signals. Direction Function: requires 5 μ s setup time. CW/CCW Function: see DIP switch SW14.
	OPTO	This input is the voltage supply for the Pulse, Direction, and Enable opto-couplers. Connect 5VDC (or +12V, +24V with appropriate resistors on Pulse, Direction, and Enable inputs).
	ENA	Enable signal: 5V signal, single-ended input. High input is 4–5V, Low input is 0–0.5 V. Minimum pulse width = 2.5 μ s. Add a 1k Ω resistor for +12V signals, 2k Ω for +24V signals. Enable Function: Close (pull low) to disable the drive.
Replacement Connectors	Power = 6-pin from STP-CON-4; I/O = 4-pin from STP-CON-5	
Cooling	Natural cooling or forced cooling	
Ambient Temperature	0°C to 65°C (32°F to 149°F)	
Humidity	40–90% relative humidity	
Operating Temperature	0°C to 50°C (32°F to 122°F)	
Vibration	10–50 Hz / 0.15 mm	
Storage Temperature	-20°C to 65°C (-4°F to 149°F)	
Self Test	No	
Weight	90g (3.5 oz)	



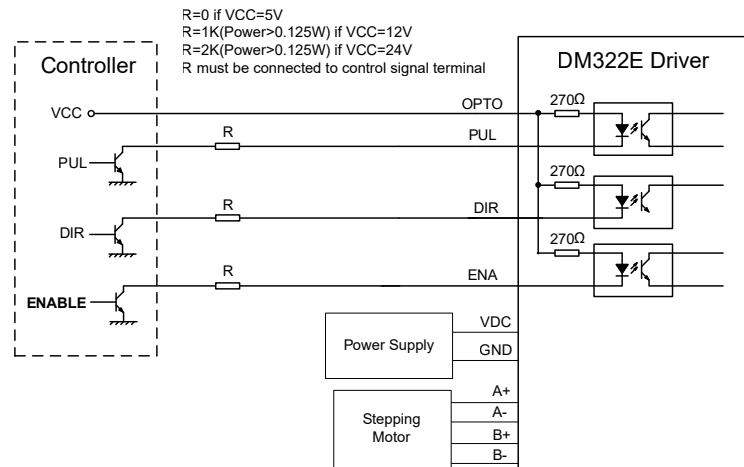
Stepping Drives

DM322E Dimensions and Wiring

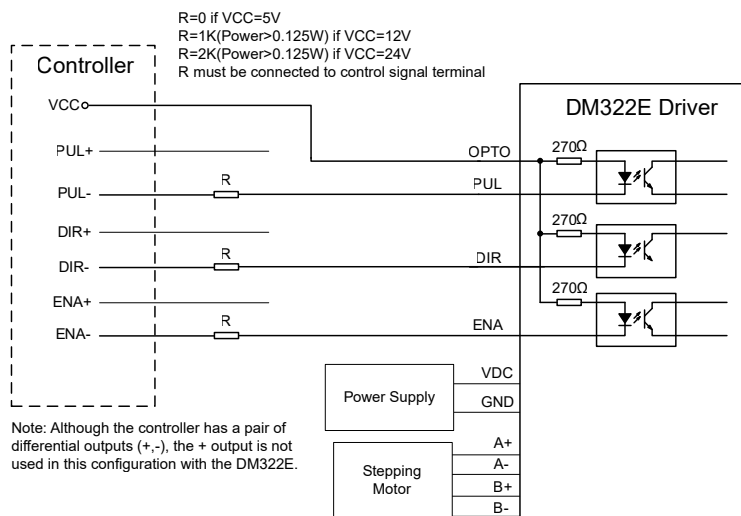
Dimensions = in [mm]



DM322E Connection to Open Collector Signal



DM322E Connection to Differential Control Signal

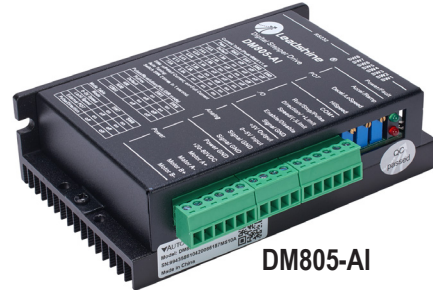




Stepping Drives

DM805-AI

The DM805-AI is capable of pulse and direction as well as analog input and speed control, with motor auto-configuration on power up and motor self-test capability. Comes with built in potentiometers for adjusting accel and decel rates and can be controlled via an external potentiometer.



DM805-AI

Leadshine DM805-AI Specifications		
Drive Model	DM805-AI	
Output Current	2.6–7.0 A peak (0.3–5.0 RMS)	
Input Voltage	20–80 VDC (60VDC typical)	
Logic Signal Current	7–16 mA (10mA typical)	
Pulse Input Frequency	0–200 kHz	
Minimal Pulse Width	2.5 μ s	
Minimal Direction Setup	5.0 μ s	
Isolation Resistance	500m Ω	
Pin Functions	Run/Stop or Pulse	Pulse signal: 5V signal, single-ended input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 μ s. Add a 1k Ω resistor for +12V signals, 2k Ω for +24V signals. Run/Stop Function: Close (pull low) to enable the motor.
	Direction or +Limit	DIR signal: 5V signal, single-ended input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 μ s. Add a 1k Ω resistor for +12V signals, 2k Ω for +24V signals. Direction Function: requires 5 μ s setup time. (+)Limit Function: Close (pull low) to stop motor movement in the positive direction.
	Speed or (-)Limit	Speed: 5V signal, single-ended input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 μ s. Add a 1k Ω resistor for +12V signals, 2k Ω for +24V signals. Speed Function (Low Speed/High Speed Mode): Close (pull low) to select Lo Speed pot setpoint. Open (float high) to enable Hi Speed pot setpoint. (-)Limit Function: Close (pull low) to stop motor movement in the negative direction.
	Enable/Disable	Enable signal: 5V signal, single-ended input. High input is 4-5V, Low input is 0-0.5 V. Minimum pulse width = 2.5 μ s. Add a 1k Ω resistor for +12V signals, 2k Ω for +24V signals. Enable Function: Close (pull low) to disable the drive.
Replacement Connectors	Power = 6-pin from STP-CON-4; I/O = 6-pin from STP-CON-4; Analog = 4-pin from STP-CON-4	
Cooling	Natural cooling or forced cooling	
Ambient Temperature	0°C to 50°C (32°F to 122°F)	
Humidity	40–90% relative humidity	
Operating Temperature	70°C (158°F) max	
Vibration	4.9 m/s ² max	
Storage Temperature	-20°C to 65°C (-4°F to 149°F)	
Self Test	Yes	
Configuration Cable	1.4.4-0609505-B3	
Weight	264g (9.3 oz)	

Leadshine Series Drive Cables		
Optional Configuration Cable	Compatible With	Price
1.4.4-0609505-B3	DM805-AI	\$6.50

Note: Configuration cable only required if using optional configuration software. Software configuration not necessary unless DIP switch settings and auto-tuning aren't sufficient for your application. Requires an RS232 port on your PC, or a USB to RS232 converter, like USB-RS232.



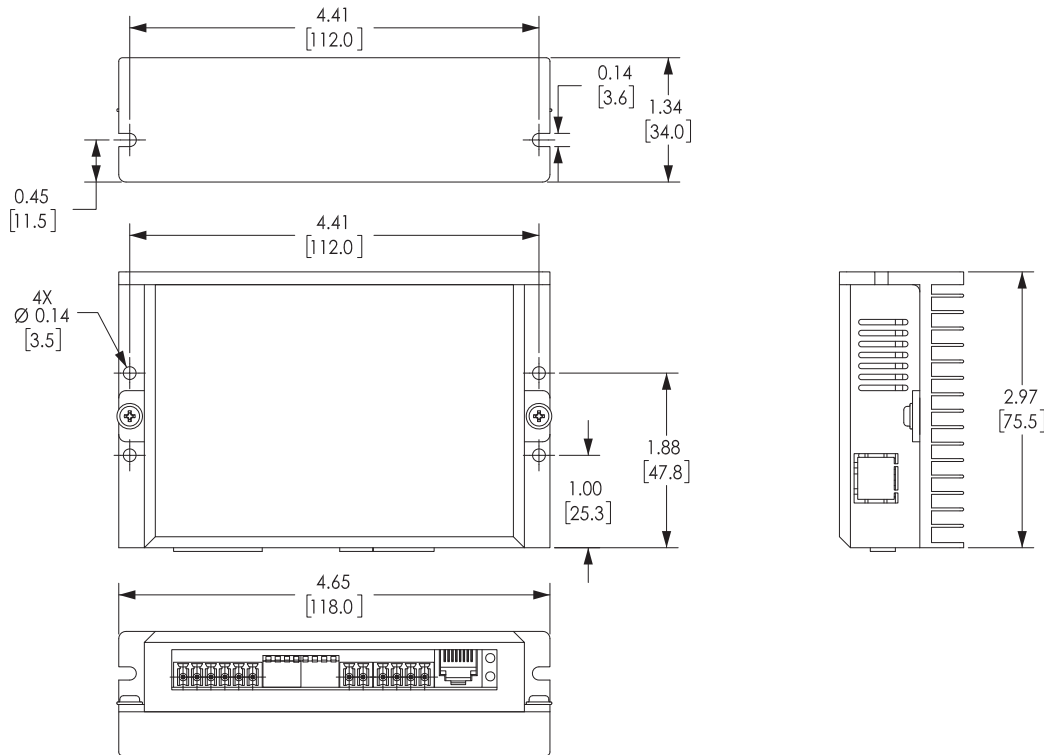
1.4.4-0609505-B3

Note: ProTuner for DM805-AI is not officially supported by the manufacturer for Operating Systems newer than Windows 7. Some Win10 and Win11 PCs will still run the software, but there is no guarantee from the manufacturer. See a potential solution for newer OS compatibility in our Community Forum: <https://community.automationdirect.com/s/question/0D5Dp00000WPRm8KAH/fix-for-dm805ai-protune>

Stepping Drives

DM805-AI Dimensions

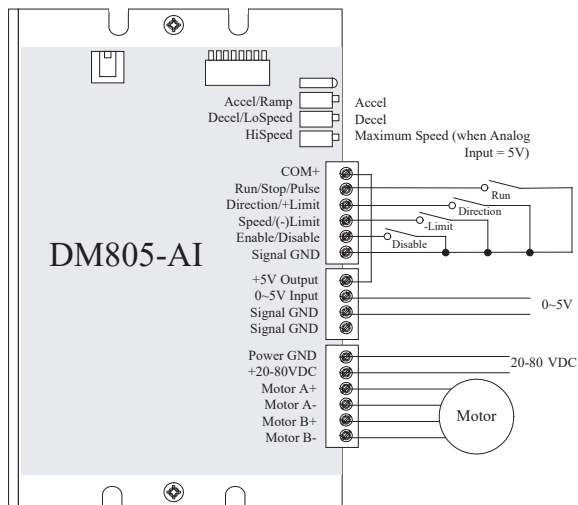
Dimensions = in [mm]



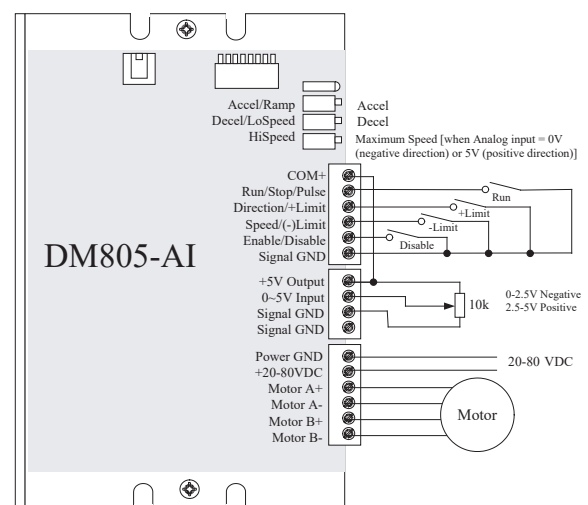
DM805-AI Wiring

The DM805-AI has four different operation modes that can be selected through DIP SW7 and SW8, and can also be wired to a differential controller.

DM805-AI Wiring for Analog Speed Mode

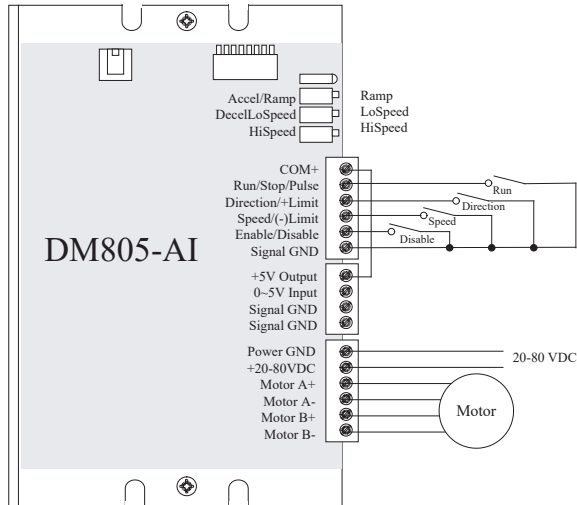


DM805-AI Wiring for External Pot Mode

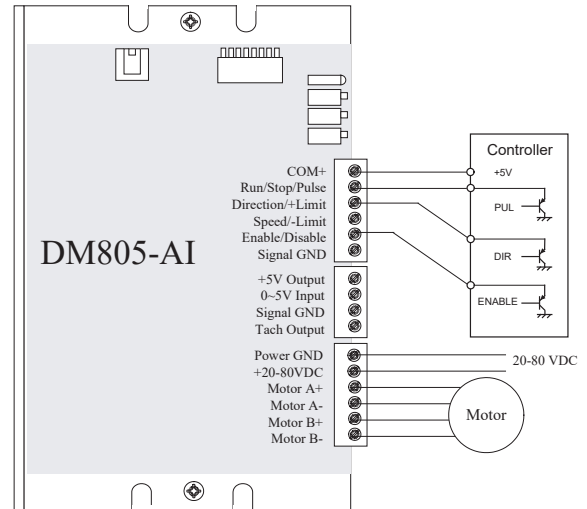


Stepping Drives

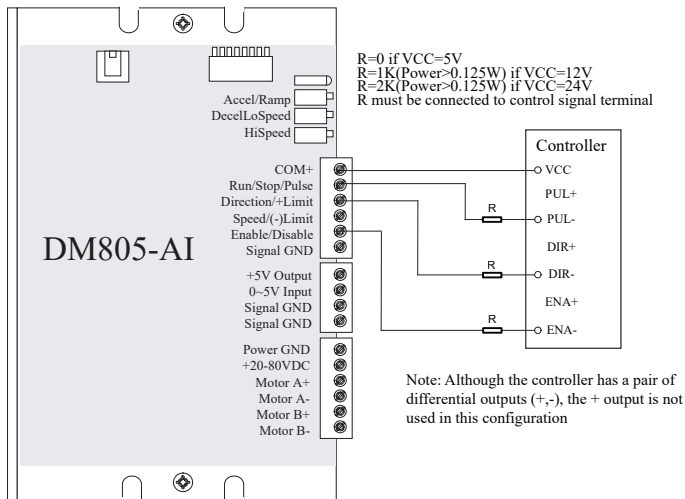
DM805-AI Wiring for Low/High Speed Mode



DM805-AI Wiring for Pulse/Direction Mode



DM805-AI Wiring for Differential Control Signal





Stepping Drives

EM542S, EM556S

The EM542S and EM556S are digital stepper drives capable of pulse and direction as well as CW and CCW operation, with motor auto-configuration on power up and self-test capability. EM542S and EM556S have a built-in current-limiting resistor (on a switch) to allow either 5V or 24V input pulses. They also include a fault and a brake output, and a shaft lock feature. The brake output can be used with an external holding brake to hold the motor in place if power fails or the drive is disabled - you lose power, the brake engages. The shaft lock is set via DIP switch and will lock the motor into position using phase current, but only works when the drive has power.



EM542S

Leadshine EM542S, EM556S Specifications		
Drive Model	EM542S	EM556S
Output Current ¹	0.5-4.2A peak (0.4-2.9 RMS)	0.5-5.6A peak (0.4-3.9 RMS)
Input Voltage	20–50 VDC (24–48 VDC typical)	
Logic Signal Current	7–16 mA (10mA typical)	
Pulse Input Frequency	0–200 kHz	
Minimal Pulse Width	2.5 μs	
Minimal Direction Setup	5.0 μs	
Isolation Resistance	500mΩ	
Connector P1 Functions	PUL+	Pulse signal: 5V or 24V signal (Switch S3 determines voltage), differential input. High input is 4-5V or 22-24V, Low input is 0-0.5 V. Minimum pulse width = 2.5 μs. Switch S3 factory default = 24V position. WARNING! If switch S3 is in the 5V position and 24V is applied, the drive will be damaged. DIR signal: 5V or 24V signal (Switch S3 determines voltage), differential input. High input is 4-5V or 22-24V, Low input is 0-0.5 V. Minimum pulse width = 2.5 μs. Direction Function: requires 5μs setup time. CW/CCW Function: see DIP switch SW14. WARNING! If switch S3 is in the 5V position and 24V is applied, the drive will be damaged. Enable signal: 5V or 24V signal (Switch S3 determines voltage), differential input. High input is 4-5V or 22-24V, Low input is 0-0.5 V. Minimum pulse width = 2.5 μs. Enable Function: Close (pull low) to disable the drive. WARNING! If switch S3 is in the 5V position and 24V is applied, the drive will be damaged.
	PUL-	
	DIR+	
	DIR-	
	ENA+	
	ENA-	
Fault and Brake Output Connector	ALM	Optional output connection. Maximum of 30V/100mA output, sinking or sourcing.
	BR	
	COM-	
Replacement Connectors	Incoming Power = DN-2PLUG; Motor Power = DN-4PLUG; I/O = 6-pin from STP-CON-4	
Cooling	Natural cooling or forced cooling	
Ambient Temperature	0°C to 65°C (32°F to 149°F)	
Humidity	40–90% relative humidity	
Operating Temperature	0°C to 50°C (32°F to 122°F)	
Vibration	10–50 Hz / 0.15 mm	
Storage Temperature	-20°C to 65°C (-4°F to 149°F)	
Self Test	Yes	
Configuration Cable	1.4.4-0409505-B3	
Weight	250g (8.8 oz)	250g (8.8 oz)
1 - Output current ranges are for software settings which allow for a wider current range than DIP switches.		

1 - Output current ranges are for software settings which allow for a wider current range than DIP switches.

Leadshine Series Drive Cables		
Optional Configuration Cable	Compatible With	Price
1.4.4-0409505-B3	EM542S, EM556S	\$6.50

Note: Configuration cable only required if using optional configuration software. Software configuration not necessary unless DIP switch settings and auto-tuning aren't sufficient for your application. Requires an RS232 port on your PC, or a USB to RS232 converter, like USB-RS232.



1.4.4-0409505-B3

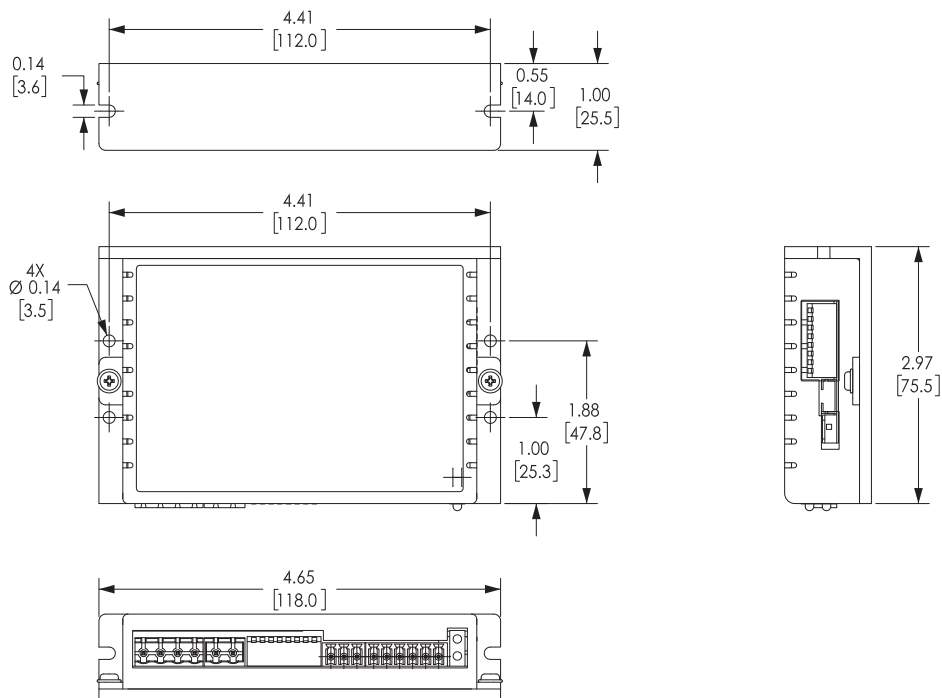


Stepping Drives

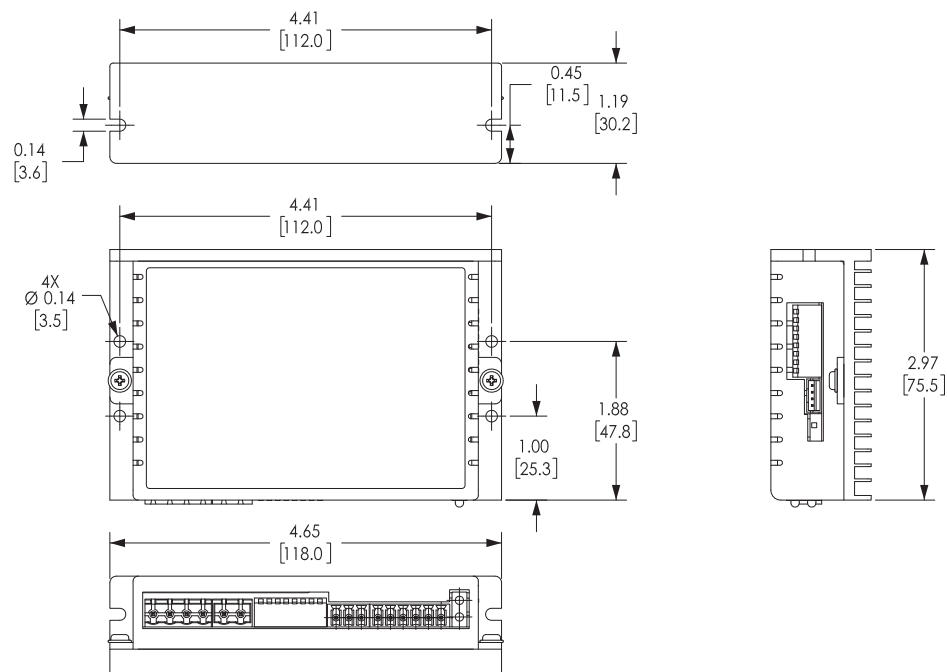
EM542S, EM556S Dimensions

Dimensions = in [mm]

EM542S



EM556S



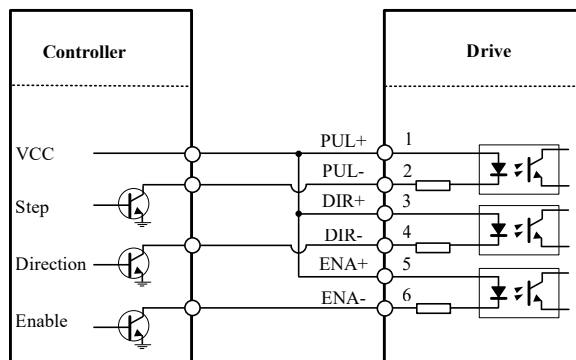


Stepping Drives

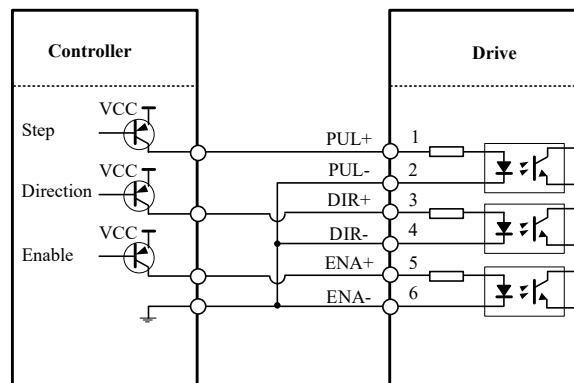
EM542S, EM556S Wiring

Note: These drives can accept Vcc of 24V or 5V. Set switch S3 before applying power.

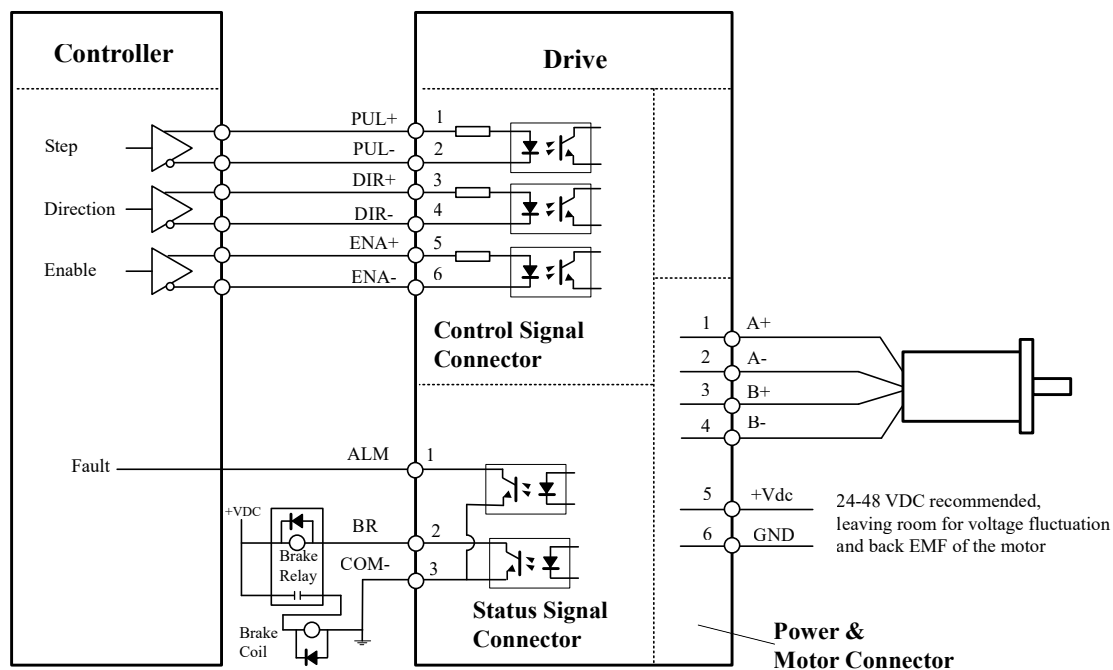
EM542S, EM556S Connection to Open-Collector Signal



EM542S, EM556S Connection to PNP Signal



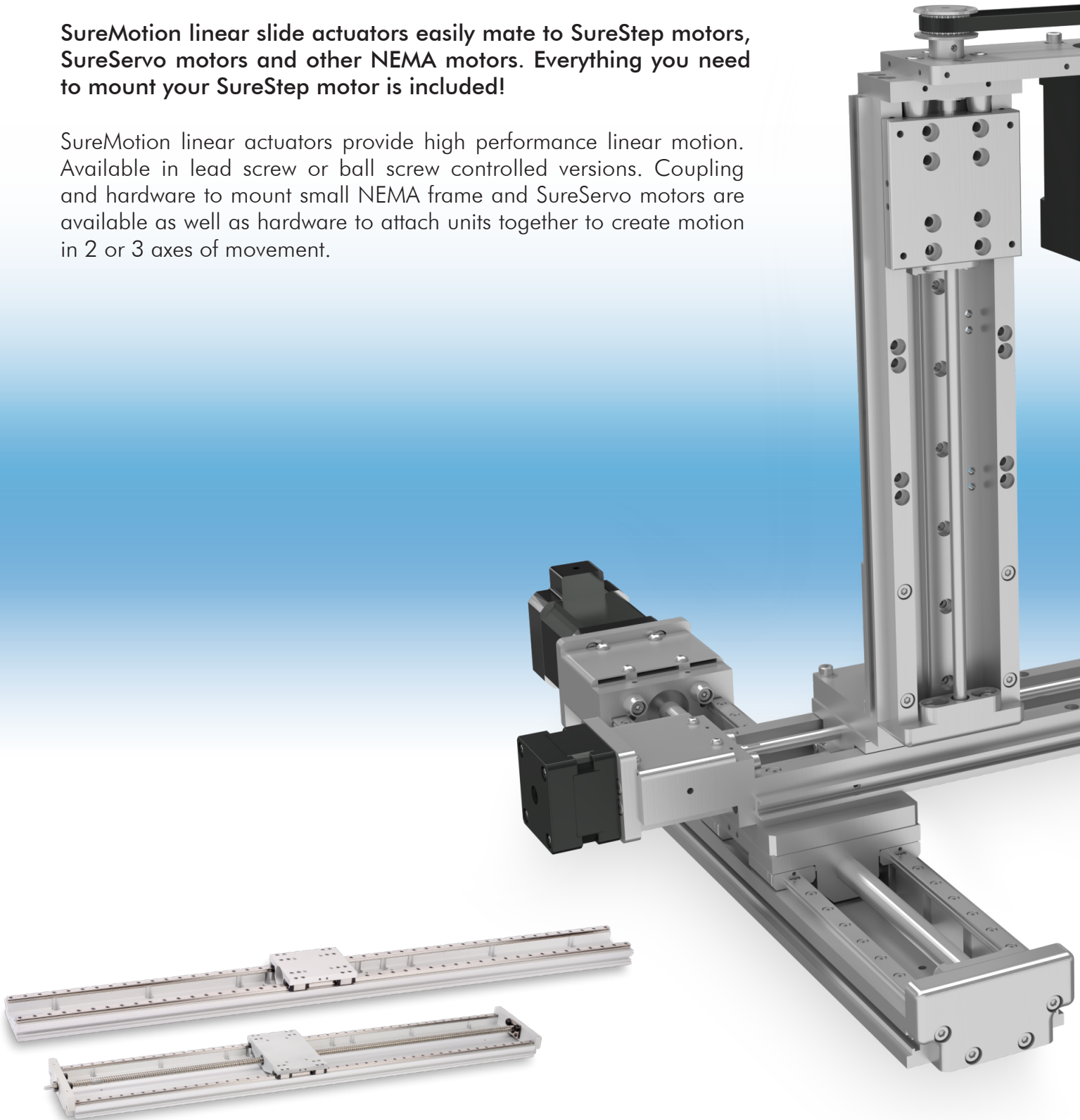
EM542S, EM556S Connection to Differential Signal; Typical Connection with Brake and Fault Outputs



Linear Motion Slides and Components to Create up to 3 Axes of Motion

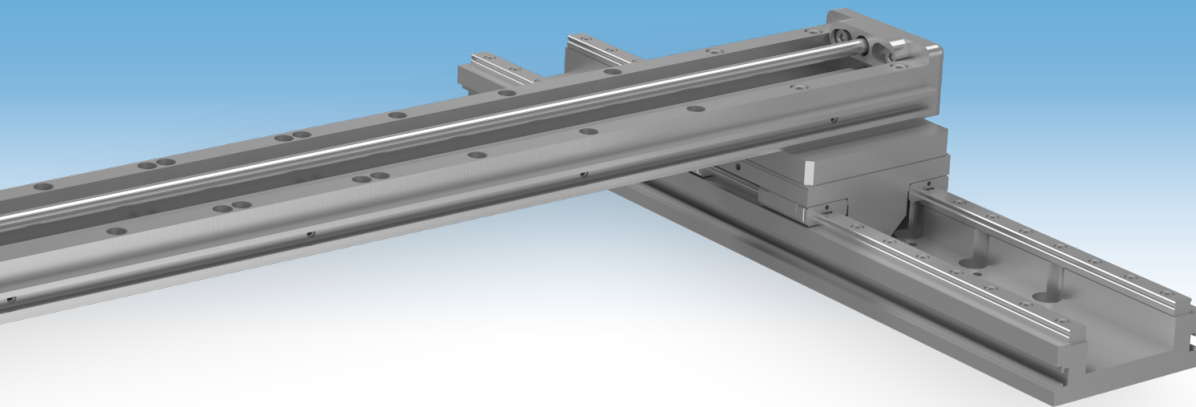
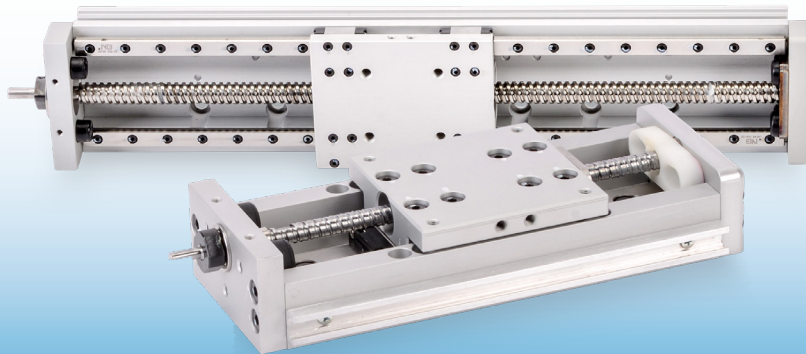
SureMotion linear slide actuators easily mate to SureStep motors, SureServo motors and other NEMA motors. Everything you need to mount your SureStep motor is included!

SureMotion linear actuators provide high performance linear motion. Available in lead screw or ball screw controlled versions. Coupling and hardware to mount small NEMA frame and SureServo motors are available as well as hardware to attach units together to create motion in 2 or 3 axes of movement.



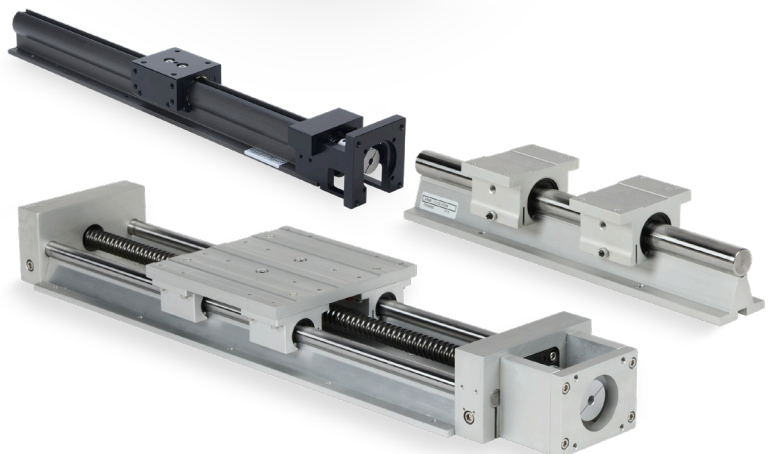
Suremotion

LAHP units can be attached to each other to provide up to 3 axes of motion and from 52mm to 910mm of travel.



18 models, with travels from 6 to 36 inches

Ready to mount NEMA 17, 23 or 34 motors

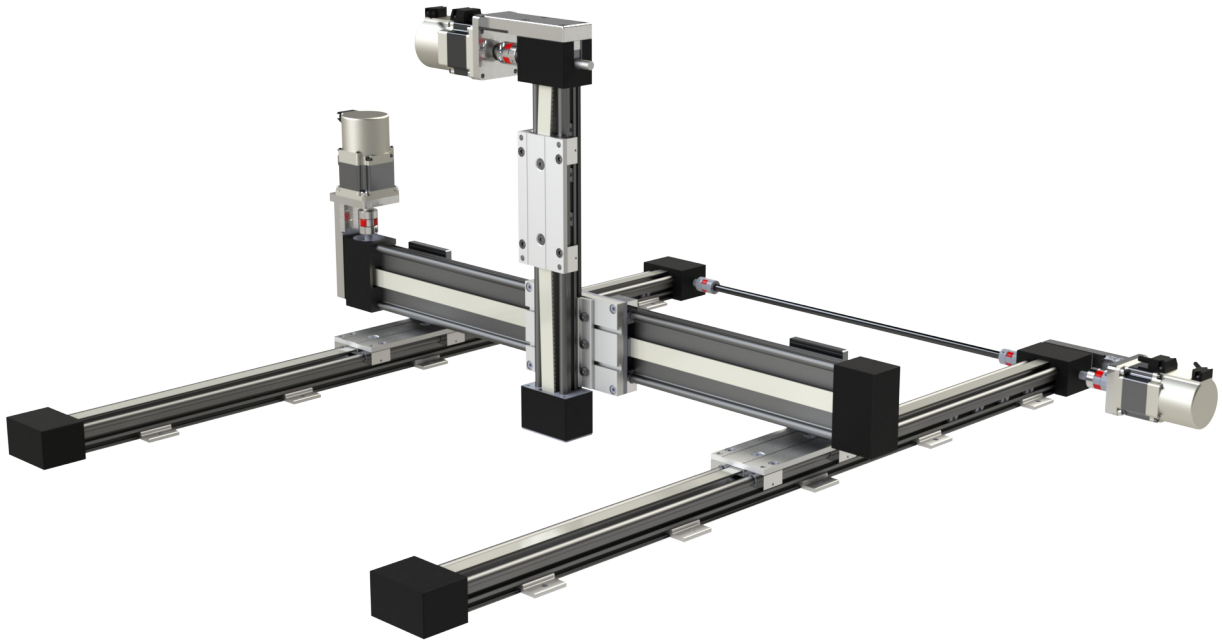




igus XYZ Gantries Overview

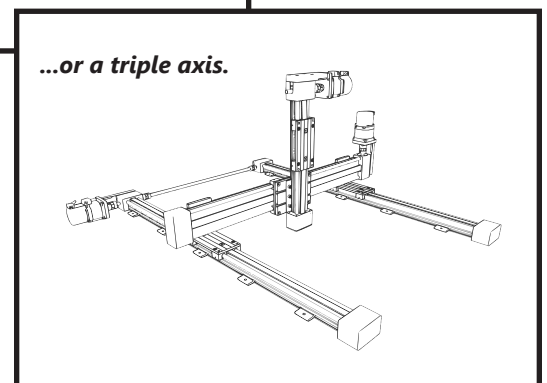
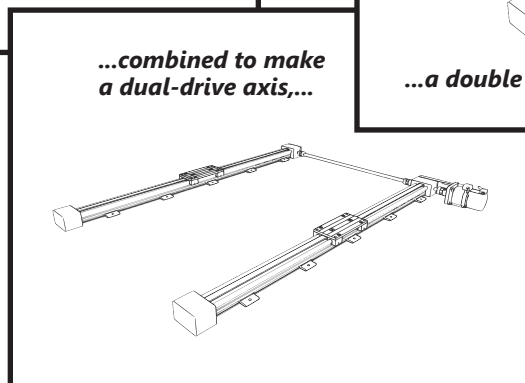
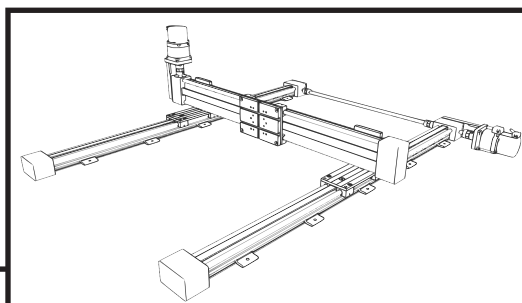
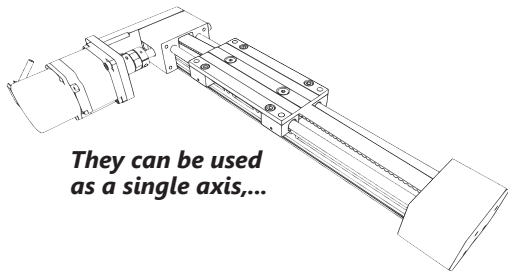
Features:

- Maintenance and Lubrication free
- Base/Rail material: 6061-T6 Aluminum with hard anodize finish
- Carriage Block Bushing Material: Drylin® iglide®-J
- Drive Type: Belt Drive or Lead Screw
- Adjustable Carriage Block Clearance
- Stackable and easy to assemble
- T-slots enable limit switches to be positioned anywhere
- Up to 1,000 mm Stroke
- Motor mounts for SureServo servo motors and SureStep stepper motors



Configurations

igus linear actuators can be mounted in any orientation. However, overhead provides the best protection against contamination.

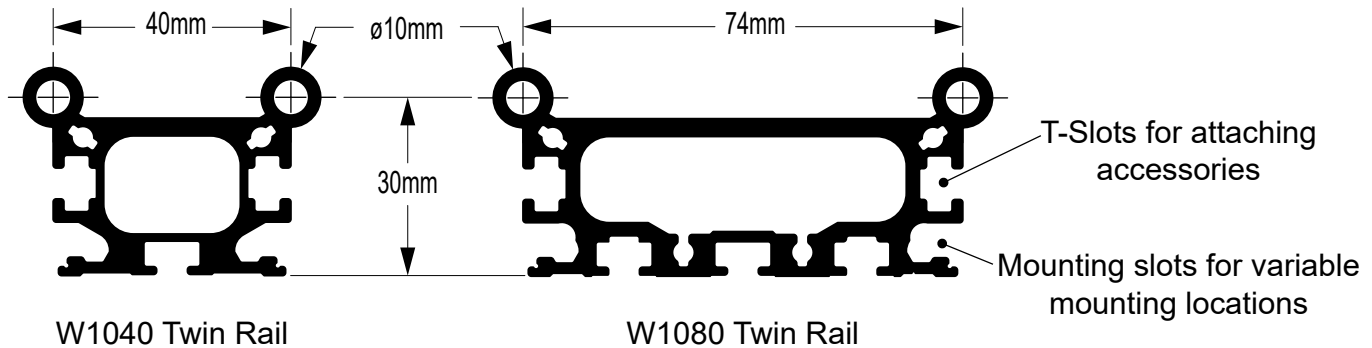




igus XYZ Gantries Overview

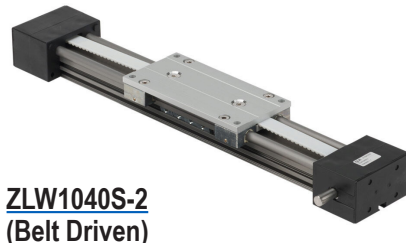
Rail Sizes

igus linear actuators are available in 2 rail sizes: W1040 and W1080.



Drive Types

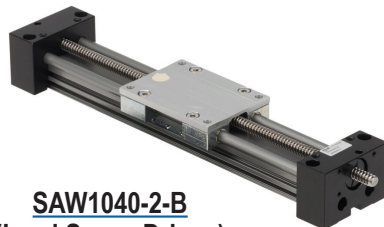
igus linear actuators are available in 2 drive types: ZLW (Belt Driven) and SAW (Lead Screw Driven).



ZLW1040S-2
(Belt Driven)

ZLW1040 & ZLW1080

- Belt Drive
- Max Linear Speed: 1.5 m/s [4.92 ft/s]
- Max Stroke: 1000mm
- Available Accessories
 - Servo Motor Brackets
 - Stepper Motor Brackets
 - XY Plate
 - YZ Plate
 - Dual X connecting Drive Shaft
 - Sensor Bracket
 - Replacement Carriage Block Liners



SAW1040-2-B
(Lead Screw Driven)

SAW1040 & SAW1080

- Lead Screw Drive
- Max Linear Speed: 0.15 m/s [0.49 ft/s]
- Max Stroke: 750mm
- Available Accessories
 - Servo Motor Brackets
 - Stepper Motor Brackets
 - XY Plate
 - YZ Plate
 - Sensor Bracket
 - Replacement Carriage Block Liners
 - Replacement Lead Nut

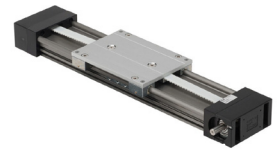
igus XYZ Gantries

ZLW Series (Belt Driven)

- Rail Material: 6061-T6 Aluminum, with Hard Anodize coating
- Carriage Block Bearing Material: iglide® J
- Belt Material: Polyurethane with steel cords, AT5 x 16mm wide
- ZLW1040 has Dual Input shafts, Ø10 mm
- ZLW1080 has Single Input shaft, Ø10 mm
- Adjustable clearance carriage blocks
- 8 T-slot nuts pre-installed, M5-0.8
- Mounting Clamps included



ZLW1040S-2



ZLW1080S-2

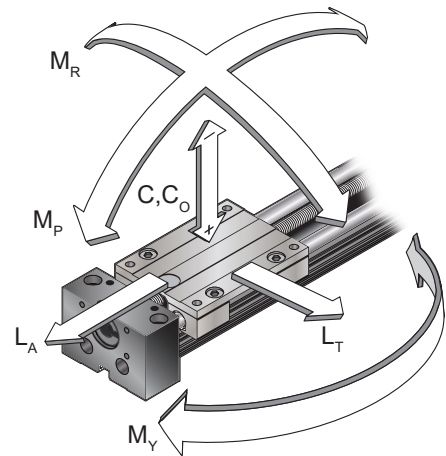
ZLW Series Linear Actuators (Belt Driven)

Part Number	Price	Stroke (mm)	Mass (kg)	Backlash (in [mm])	Efficiency	Pitch (in/rev [mm/rev])	Max Linear Speed (ft/sec [m/sec])	Linear Position Accuracy (in [mm])	Linear Position Repeatability (in [mm])	Idle Torque (Nm)	Drawing Links
ZLW1040S-10	\$500.00	1,000	1.8	0.008 [0.2]	83%	2.76 [70]	4.92 [1.5]	0.008 [0.2]	0.008 [0.2]	0.3	PDF
ZLW1040S-2	\$422.00	200	1.54								PDF
ZLW1040S-3	\$450.00	300	1.68								PDF
ZLW1040S-4	\$476.00	400	1.82								PDF
ZLW1040S-5	\$450.00	500	1.96								PDF
ZLW1040S-6	\$465.00	600	2.24								PDF
ZLW1040S-8	\$480.00	800	2.52								PDF
ZLW1080S-10	\$665.00	1,000	1.05	0.008 [0.2]	85%	2.76 [70]	4.92 [1.5]	0.008 [0.2]	0.008 [0.2]	0.25	PDF
ZLW1080S-2	\$620.00	200	2.01								PDF
ZLW1080S-3	\$630.00	300	2.22								PDF
ZLW1080S-4	\$635.00	400	2.43								PDF
ZLW1080S-5	\$640.00	500	2.64								PDF
ZLW1080S-6	\$650.00	600	3.06								PDF
ZLW1080S-8	\$660.00	800	3.48								PDF

ZLW Series Linear Actuators (Belt Driven) Load Ratings

Part Number	ZLW1040S-xx	ZLW1080S-xx
Dynamic Load Rating, C (lbf [N])	112.41 [500]	
Static Load Rating, C_o (lbf [N])	1079.14 [4800]	
Reverse Static Load Rating, $-C_o$ (lbf [N])	224.82 [1000]	
Lateral Load Rating, L_T (lbf [N])	1079.14 [4800]	
Axial Load Rating, L_A (lbf [N])	16.86 [75]	
Pitch Moment Rating, M_P (lb-ft [N-m])	213.86 [290]	
Yaw Moment Rating, M_Y (lb-ft [N-m])	125.37 [170]	213.86 [290]
Roll Moment Rating, M_R (lb-ft [N-m])	70.8 [96]	131.27 [178]

Note: The end blocks should not be used as a mechanical stop.
A buffer distance of 1 motor shaft revolution is recommended.



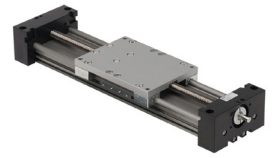
igus XYZ Gantries

SAW Series (Lead Screw Driven)

- Rail Material: 6061-T6 Aluminum, with Hard Anodize coating
- Carriage Block Bearing Material: iglide® J
- Lead Screw Material: 300 series Stainless Steel
- Lead Nut Material: iglide® J
- Adjustable clearance carriage blocks
- 8 T-slot nuts pre-installed, M5-0.8
- Mounting Clamps included



SAW1040-2-B



SAW1080-2-A

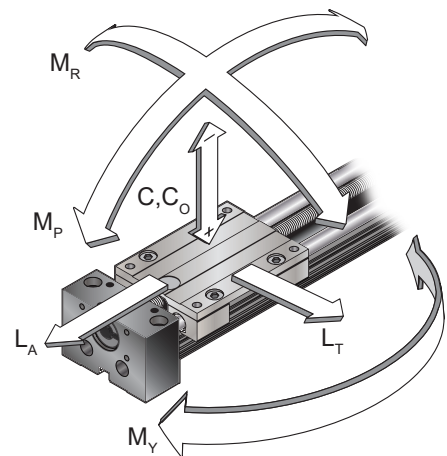
SAW Series Linear Actuators (Lead Screw Driven)

Part Number	Price	Stroke (mm)	Mass (kg)	Backlash (in [mm])	Efficiency	Pitch (in/rev [mm/rev])	Max Linear Speed (ft/sec [m/sec])	Linear Position Accuracy (in [mm])	Linear Position Repeatability (in [mm])	Idle Torque (Nm)	Drawing Links
SAW1040-05-B	\$355.00	50	1.1	0.004 [0.1]	67%	0.98 [25]	1.15 [0.35]	0.004 [0.1]	0.004 [0.1]	0.2	PDF
SAW1040-1.5-B	\$370.00	150	1.2				1.31 [0.4]				PDF
SAW1040-1-B	\$360.00	100	1.15								PDF
SAW1040-2-B	\$375.00	200	1.3								PDF
SAW1040-3-B	\$385.00	300	2.9				0.49 [0.15]				PDF
SAW1080-1.5-A	\$638.00	150	3.1	0.004 [0.1]	67%	0.98 [25]	0.49 [0.15]	0.004 [0.1]	0.004 [0.1]	0.3	PDF
SAW1080-1-A	\$630.00	100	3								PDF
SAW1080-2-A	\$637.00	200	3.3								PDF
SAW1080-3-A	\$651.00	300	3.5								PDF
SAW1080-4-A	\$675.00	400	3.7								PDF
SAW1080-5-A	\$700.00	500	3.9								PDF
SAW1080-6-A	\$725.00	600	4.1								PDF
SAW1080-7.5-A	\$750.00	750	4.5								PDF

SAW Series Linear Actuators (Lead Screw Driven) Load Ratings

Part Number	SAW1080-xx	SAW1040-xx
Dynamic Load Rating, C (lbf [N])	168.62 [750]	
Static Load Rating, C_o (lbf [N])	1079.14 [4800]	
Reverse Static Load Rating, $-C_o$ (lbf [N])	224.82 [1000]	
Lateral Load Rating, L_T (lbf [N])	1079.14 [4800]	
Axial Load Rating, L_A (lbf [N])	44.96 [200]	56.21 [250]
Pitch Moment Rating, M_P (lb-ft [N-m])	213.86 [290]	125.37 [170]
Yaw Moment Rating, M_Y (lb-ft [N-m])	213.86 [290]	125.37 [170]
Roll Moment Rating, M_R (lb-ft [N-m])	131.27 [178]	70.8 [96]

Note: The end blocks should not be used as a mechanical stop.
A buffer distance of 1 motor shaft revolution is recommended.



igus XYZ Gantries

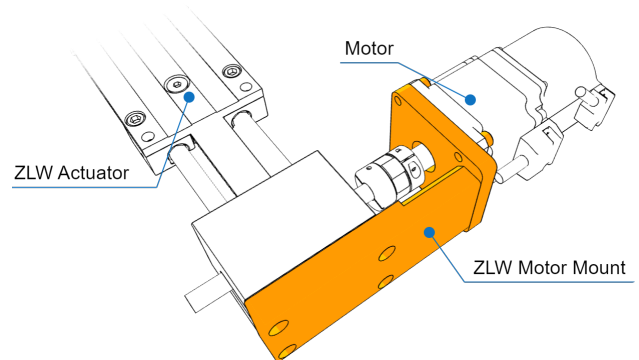
Motor Brackets

- Material: Aluminum
- Open frame for ease of assembly
- Available sizes for Stepper and Server motors

igus ZLW Motor Brackets					
Part Number	Price	Fits Motor	Recommended ADC Coupling Parts*		Drawing Links
			1040	1080	
<u>STP17-ZLW</u>	\$145.00	NEMA 17 stepper motors	<u>SJCA-30C-5</u> <u>SJCA-30C-10</u> <u>SJC-30-RD-SLEEVE</u>		<u>PDF</u>
<u>STP23-ZLW</u>	\$145.00	NEMA 23 stepper motors	<u>SJCA-30C-6.35</u> <u>SJCA-30C-10</u> <u>SJC-30-RD-SLEEVE</u>		<u>PDF</u>
<u>SVL201-ZLW</u>	\$175.00	<u>SVL-201</u> <u>SVL-201B</u> <u>SV2L-201B</u> <u>SV2L-201N</u>	<u>SJCA-30C-8</u> <u>SJCA-30C-10</u> <u>SJC-30-RD-SLEEVE</u>		<u>PDF</u>
<u>SVL202-ZLW</u>	\$250.00	<u>SVL-202</u> <u>SVL-202B</u> <u>SV2L-202B</u> <u>SV2L-202N</u>	<u>SJCA-30C-14</u> <u>SJCA-30C-10</u> <u>SJC-30-RD-SLEEVE</u>		<u>PDF</u>

Includes Mounting Hardware.

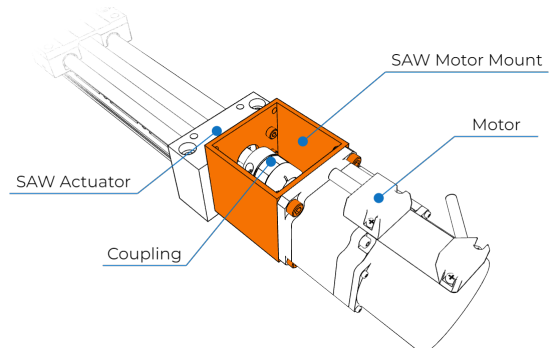
*Drive coupling parts sold separately. 2 coupling jaws and 1 spider required for complete coupling subassembly.

**SVL201-ZLW**

igus SAW Motor Brackets					
Part Number	Price	Fits Motor	Recommended ADC Coupling Parts*		Drawing Links
			1040	1080	
<u>STP17-SAW</u>	\$115.00	NEMA 17 stepper motors	<u>SJCA-30C-5</u> <u>SJCA-30C-10</u> <u>SJC-30-RD-SLEEVE</u>	<u>SJCA-30C-5</u> <u>SJCA-30C-8</u> <u>SJC-30-RD-SLEEVE</u>	<u>PDF</u>
<u>STP23-SAW</u>	\$115.00	NEMA 23 stepper motors	<u>SJCA-30C-6.35</u> <u>SJCA-30C-10</u> <u>SJC-30-RD-SLEEVE</u>	<u>SJCA-30C-6.35</u> <u>SJCA-30C-8</u> <u>SJC-30-RD-SLEEVE</u>	<u>PDF</u>
<u>SVL201-SAW</u>	\$140.00	<u>SVL-201</u> <u>SVL-201B</u> <u>SV2L-201B</u> <u>SV2L-201N</u>	<u>SJCA-30C-8</u> <u>SJCA-30C-10</u> <u>SJC-30-RD-SLEEVE</u>	<u>SJCA-30C-8 (x2)</u> <u>SJC-30-RD-SLEEVE</u>	<u>PDF</u>
<u>SVL202-SAW</u>	\$125.00	<u>SVL-202</u> <u>SVL-202B</u> <u>SV2L-202B</u> <u>SV2L-202N</u>	<u>SJCA-30C-10</u> <u>SJCA-30C-14</u> <u>SJC-30-RD-SLEEVE</u>	<u>SJCA-30C-14</u> <u>SJCA-30C-8</u> <u>SJC-30-RD-SLEEVE</u>	<u>PDF</u>

Includes Mounting Hardware.

*Drive coupling parts sold separately. 2 coupling jaws and 1 spider required for complete coupling subassembly.

**SVL201-SAW**

igus XYZ Gantries

Mounting Brackets

- Material: Aluminum
- Mounts directly to Carriage Plate

igus Mounting Brackets					
Part Number	Price	Description	Holds Linear Actuator	Fits Linear Actuator Carriage Plate	Drawing Links
A-SWY108003150	\$136.00	Y or Z Adapter Plate (Qty. 2)	ZLW1040 and SAW1040	ZLW1080 and SAW1080 series actuators.	PDF
A-AK-0026	\$155.00	Y Mounting Bracket (Qty. 2)	ZLW080 and SAW1080	ZLW1040 and SAW1040 series actuators.	PDF
A-ZSY-104026	\$3.50	Mounting Clamp (Qty. 2)*	All ZLW and SAW series actuators.	All ZLW and SAW series actuators.	PDF

Includes Mounting Hardware.

*Mounts to Y or Z Adapter Plate.



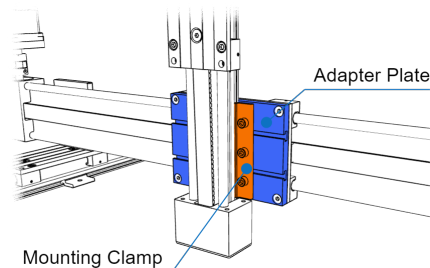
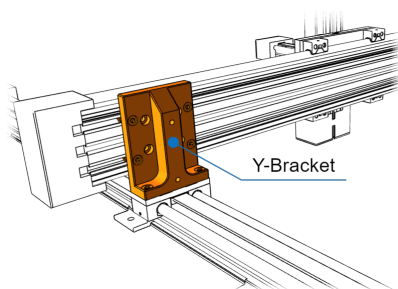
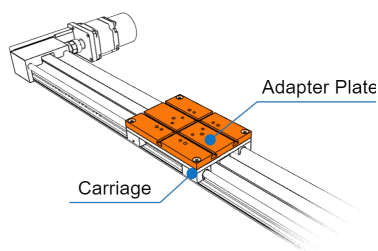
[A-SWY108003150](#)



[A-AK-0026](#)



[A-ZSY-104026](#)

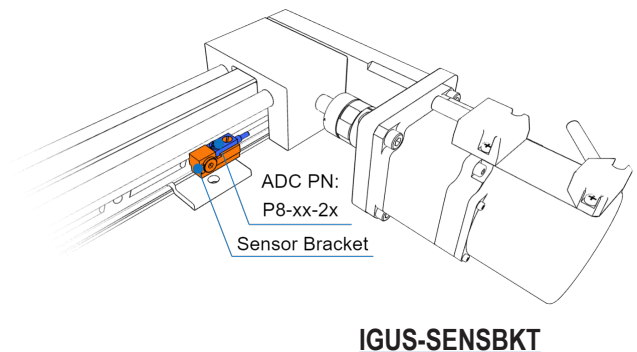
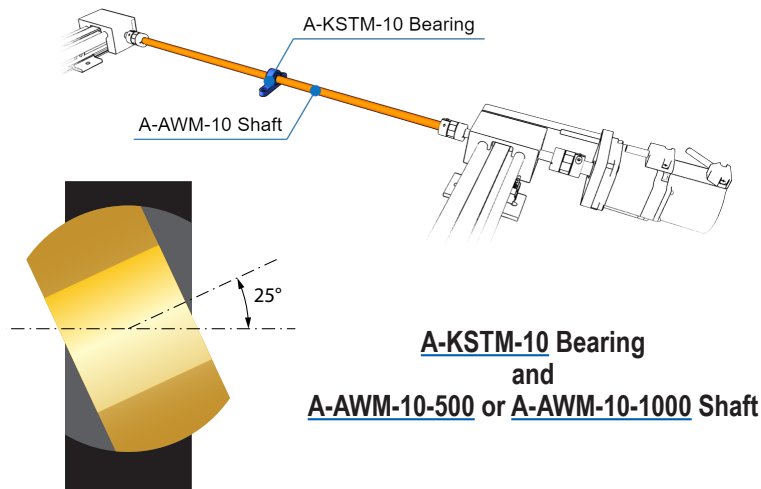


igus XYZ Gantries

Accessories

igus Accessories							
Part Number	Price	Description	Material	For Use With	Qty	Photo	Drawing Links
<u>A-AWM-10-1000</u>	\$33.00	Drylin R Series Shaft: round connecting, 10mm diameter, 1000mm length	6060/6061 aluminum	All ZLW series actuators	1		<u>PDF</u>
<u>A-AWM-10-500</u>	\$15.00	Drylin R Series Shaft: round connecting, 10mm diameter, 500mm length	6060/6061 aluminum	All ZLW series actuators	1		<u>PDF</u>
<u>A-KSTM-10</u>	\$6.00	Igubal K Series Mounted Spherical Bearing: 10mm inside diameter, pillow block	Ball: Type L280 polymer Housing:	Drylin R series 10mm shafts	1		<u>PDF</u>
<u>A-JUME-01-10</u>	\$4.50	Bearing Liner: for ZLW1040 and ZLW1080 series actuators	iglide® J	ZLW1040 and ZLW1080 series actuators	4		N/A
<u>A-NOR-20634</u>	\$2.50	M5 Slot Nut: for all ZLW and SAW series actuators	zinc plated steel	All ZLW and SAW series actuators	8		<u>PDF</u>
<u>IGUS-SENSBKT</u>	\$25.00	Sensor Bracket: for all ZLW and SAW series actuators	anodized aluminum	All ZLW and SAW series actuators Compatible Sensors: <u>P8-AN-2A</u> , <u>P8-AP-2F</u> , <u>P8-CP-2F</u>	1		<u>PDF</u>
<u>NUT1040-25</u>	\$27.00	Lead Nut: for SAW1040 series actuators	iglide® J	SAW1040 series actuators	1		N/A
<u>NUT1080-25</u>	\$65.00	Lead Nut: for SAW1080 series actuators	iglide® J	SAW1080 series actuators	1		N/A

Includes Mounting Hardware.



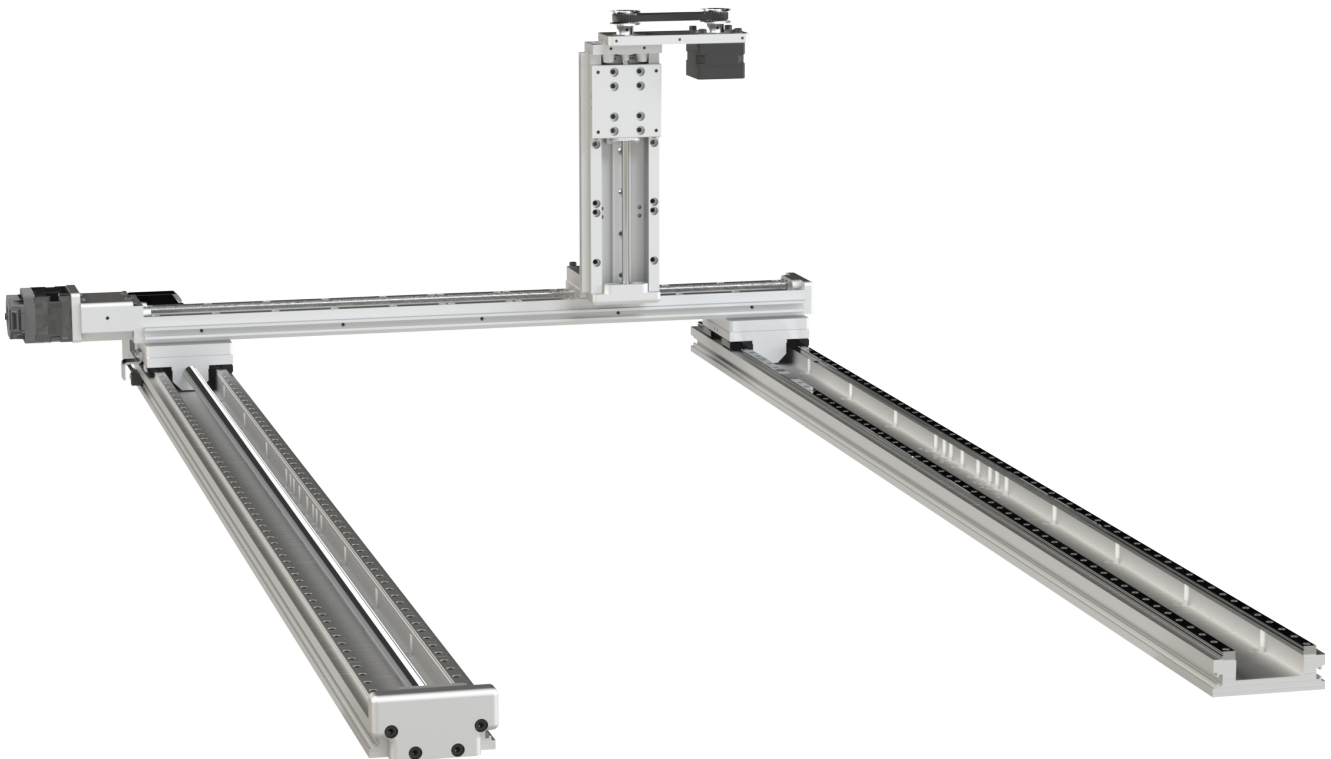


SureMotion[®] XYZ Gantries

SureMotion[®] XYZ Gantry Features

The SureMotion[®] XYZ Gantry offers high-performance linear positioning at an economical price. This system uses recirculating ball linear guides which offer smooth motion and high load capacity. A ball screw version is available for higher speeds and duty cycles.

- Rigid linear bearings
- Lightweight precision aluminum base
- Stackable and easy to assemble
- High-Precision
- Customizable
- Lead or ball screw options
- Wide base available for maximum stiffness
- Up to 910mm stroke
- Anti-backlash leadscrew nut
- Proximity or photoelectric sensor kits available
- Motor mounts available for SureServo[®] servo motors and SureStep[®] stepper motors



LAHP-25 Series Linear Actuators

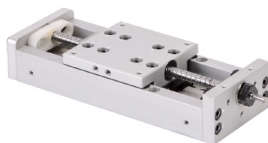
Part Number	Price	Stroke	Type	Efficiency	Pitch	Max Linear Speed	Linear Position Accuracy	Linear Position Repeatability	Drawing Links
LAHP-25TM52B3M	\$1,302.00	52mm	ball screw	90%	3mm	0.150 m/s	±0.039 mm	±0.05 mm	PDF
LAHP-25TM52LP25	\$1,050.00	52mm	lead screw	60%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-25TM102B3M	\$1,416.00	102mm	ball screw	90%	3mm	0.150 m/s	±0.0765 mm	±0.05 mm	PDF
LAHP-25TM102LP25	\$1,164.00	102mm	lead screw	60%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-25TM152B3M	\$1,485.00	152mm	ball screw	90%	3mm	0.150 m/s	±0.114 mm	±0.05 mm	PDF
LAHP-25TM152LP25	\$1,235.00	152mm	lead screw	60%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-25TM220B3M	\$1,524.00	220mm	ball screw	90%	3mm	0.150 m/s	±0.165 mm	±0.05 mm	PDF
LAHP-25TM220LP25	\$1,273.00	220mm	lead screw	60%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-25TM304B3M	\$1,622.00	304mm	ball screw	90%	3mm	0.140 m/s	±0.228 mm	±0.05 mm	PDF
LAHP-25TM304LP25	\$1,374.00	304mm	lead screw	60%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-25TM404B3M	\$1,914.00	404mm	ball screw	90%	3mm	0.085 m/s	±0.303 mm	±0.05 mm	PDF
LAHP-25TM404LP25	\$1,665.00	404mm	lead screw	60%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-25TM504B3M	\$2,041.00	504mm	ball screw	90%	3mm	0.060 m/s	±0.378 mm	±0.05 mm	PDF
LAHP-25TM504LP25	\$1,789.00	504mm	lead screw	60%	0.25in	0.085 m/s		±0.013 mm	PDF

LAHP 25 Series Linear Slides

Part Number	Price	Stroke	Max Linear Speed	Drawing Links
LAHP-25TM52SF	\$652.00	52mm	1.5 m/s	PDF
LAHP-25TM102SF	\$756.00	102mm		PDF
LAHP-25TM152SF	\$802.00	152mm		PDF
LAHP-25TM220SF	\$816.00	220mm		PDF
LAHP-25TM304SF	\$895.00	304mm		PDF
LAHP-25TM404SF	\$1,146.00	404mm		PDF
LAHP-25TM504SF	\$1,239.00	504mm		PDF

LAHP 25 Series Linear Actuators Specifications

Max Lateral Load, L_T	480N	108 lbf
Max Axial Load, L_A	350N	78.7 lbf
Roll Moment Rating, M_R	36N·m	26.6 lb·ft
Pitch Moment Rating, M_P	48N·m	35.4 lb·ft
Yaw Moment Rating, M_Y	20N·m	14.6 lb·ft
Static Radial Load Rating, C_0	5060N	1138 lbf
Reverse Static Radial Load Rating, $-C_0$	5060N	1138 lbf
Dynamic Load Rating, C	3420N	769 lbf

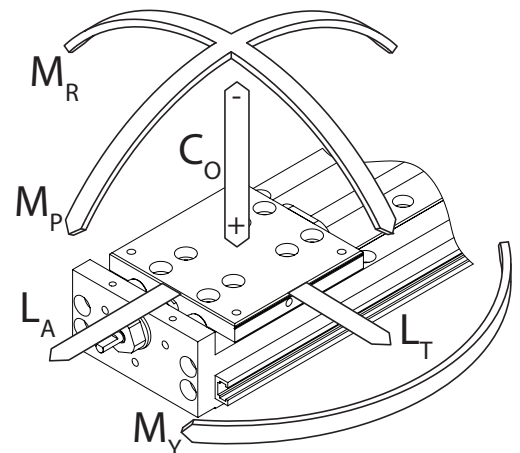


Linear Actuator
[LAHP-25TM52B3M](#)



Linear Slide
[LAHP-25TM52SF](#)

*Same mechanical design as
Linear Actuator, not driven



LAHP 33 Series Linear Actuators

Part Number	Price	Stroke	Type	Efficiency	Pitch	Max Linear Speed	Linear Position Accuracy	Linear Position Repeatability	Drawing Links
LAHP-33TM210B10M	\$1,607.00	210mm	ball screw	90%	10mm	0.500 m/s	±0.158 mm	±0.05 mm	PDF
LAHP-33TM210LP25	\$1,427.00	210mm	lead screw	58%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-33TM310B10M	\$1,815.00	310mm	ball screw	90%	10mm	0.500 m/s	±0.233 mm	±0.05 mm	PDF
LAHP-33TM310LP25	\$1,634.00	310mm	lead screw	58%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-33TM410B10M	\$2,049.00	410mm	ball screw	90%	10mm	0.467 m/s	±0.308 mm	±0.05 mm	PDF
LAHP-33TM410LP25	\$1,869.00	410mm	lead screw	58%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-33TM510B10M	\$2,297.00	510mm	ball screw	90%	10mm	0.333 m/s	±0.383 mm	±0.05 mm	PDF
LAHP-33TM510LP25	\$2,116.00	510mm	lead screw	58%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-33TM610B10M	\$2,726.00	610mm	ball screw	90%	10mm	0.250 m/s	±0.458 mm	±0.05 mm	PDF
LAHP-33TM610LP25	\$2,547.00	610mm	lead screw	58%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-33TM810B10M	\$3,154.00	810mm	ball screw	90%	10mm	0.133 m/s	±0.608 mm	±0.05 mm	PDF
LAHP-33TM810LP25	\$2,974.00	810mm	lead screw	58%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-33TM910B10M	\$3,403.00	910mm	ball screw	90%	10mm	0.122 m/s	±0.683 mm	±0.05 mm	PDF
LAHP-33TM910LP25	\$3,224.00	910mm	lead screw	58%	0.25in	0.077 m/s		±0.013 mm	PDF

LAHP 33 Series Linear Slides

Part Number	Price	Stroke	Max Linear Speed	Drawing Links
LAHP-33TM210SF	\$979.00	210mm	1.5 m/s	PDF
LAHP-33TM310SF	\$1,159.00	310mm		PDF
LAHP-33TM410SF	\$1,359.00	410mm		PDF
LAHP-33TM510SF	\$1,588.00	510mm		PDF
LAHP-33TM610SF	\$1,987.00	610mm		PDF
LAHP-33TM810SF	\$2,366.00	810mm		PDF
LAHP-33TM910SF	\$2,567.00	910mm		PDF

LAHP 33 Series Linear Actuators Specifications

Max Lateral Load, L_T	480N	108 lbf
Max Axial Load, L_A	890N	200 lbf
Roll Moment Rating, M_R	109N-m	80.4 lb-ft
Pitch Moment Rating, M_P	133N-m	98.1 lb-ft
Yaw Moment Rating, M_Y	25N-m	18.4 lb-ft
Static Radial Load Rating, C_0	6760N	1520 lbf
Reverse Static Radial Load Rating, $-C_0$	6760N	1520 lbf
Dynamic Load Rating, C	5120N	1151 lbf

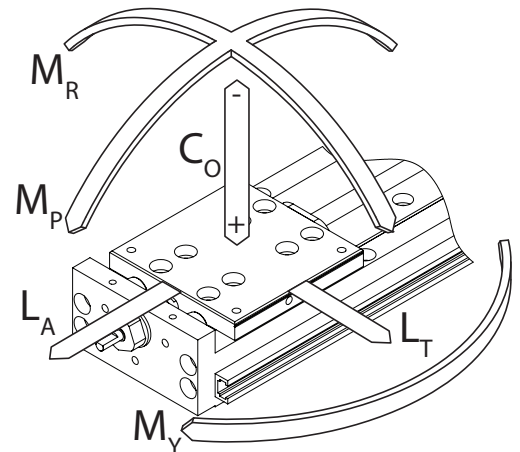


Linear Actuator
[LAHP-33TM210B10M](#)



Linear Slide*
[LAHP-33TM210SF](#)

*Same mechanical design as
Linear Actuator, not driven

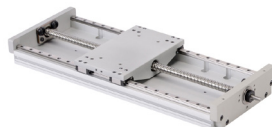
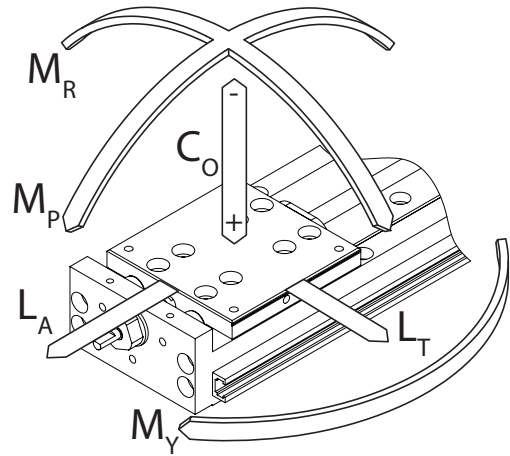


LAHP 33W (Wide) Series Linear Actuators

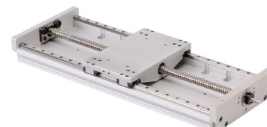
Part Number	Price	Stroke	Type	Efficiency	Pitch	Max Linear Speed	Linear Position Accuracy	Linear Position Repeatability	Drawing Links
LAHP-33WTM210B10M	\$1,843.00	210mm	ball screw	90%	10mm	0.500 m/s	±0.158 mm	±0.05 mm	PDF
LAHP-33WTM210LP25	\$1,664.00	210mm	lead screw	58%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-33WTM310B10M	\$2,072.00	310mm	ball screw	90%	10mm	0.500 m/s	±0.233 mm	±0.05 mm	PDF
LAHP-33WTM310LP25	\$1,893.00	310mm	lead screw	58%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-33WTM410B10M	\$2,261.00	410mm	ball screw	90%	10mm	0.467 m/s	±0.308 mm	±0.05 mm	PDF
LAHP-33WTM410LP25	\$2,081.00	410mm	lead screw	58%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-33WTM510B10M	\$2,795.00	510mm	ball screw	90%	10mm	0.333 m/s	±0.383 mm	±0.05 mm	PDF
LAHP-33WTM510LP25	\$2,616.00	510mm	lead screw	58%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-33WTM610B10M	\$2,985.00	610mm	ball screw	90%	10mm	0.250 m/s	±0.458 mm	±0.05 mm	PDF
LAHP-33WTM610LP25	\$2,805.00	610mm	lead screw	58%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-33WTM810B10M	\$3,567.00	810mm	ball screw	90%	10mm	0.133 m/s	±0.608 mm	±0.05 mm	PDF
LAHP-33WTM810LP25	\$3,389.00	810mm	lead screw	58%	0.25in	0.085 m/s		±0.013 mm	PDF
LAHP-33WTM910B10M	\$3,835.00	910mm	ball screw	90%	10mm	0.122 m/s	±0.683 mm	±0.05 mm	PDF
LAHP-33WTM910LP25	\$3,655.00	910mm	lead screw	58%	0.25in	0.077 m/s		±0.013 mm	PDF

LAHP 33W Series Linear Actuators Specifications

Max Lateral Load, L_T	480N	108 lbf
Max Axial Load, L_A	890N	200 lbf
Roll Moment Rating, M_R	218N·m	160.8 lb·ft
Pitch Moment Rating, M_P	133N·m	98.1 lb·ft
Yaw Moment Rating, M_Y	25N·m	18.4 lb·ft
Static Radial Load Rating, C_0	6760N	1520 lbf
Reverse Static Radial Load Rating, $-C_0$	6760N	1520 lbf
Dynamic Load Rating, C	5120N	1151 lbf



Linear Actuator (Wide)
[LAHP-33WTM210B10M](#)



Lead Screw Actuator (Wide)
[LAHP-33WTM210LP25](#)

LAHP Series Motor Brackets

Part Number	Price	Bracket Type	Actuator Compatibility	Motor Compatibility	Drawing Links
LAHP-201-25MTRBKT	\$286.00	axial	LAHP-25	SureServo [®] SV2L-201B and SV2L-201N	PDF
LAHP-201-33MTRBKT	\$287.00	axial	LAHP-33/33W	SureServo [®] SV2L-201B and SV2L-201N	PDF
LAHP-202-33MTRBKT	\$339.00	axial	LAHP-33/33W	SureServo [®] SV2L-202B , SV2L-202N , SV2L-204B , and SV2L-204N	PDF
LAHP-N14-25MTRBKT	\$216.00	axial	LAHP-25	SureStep [®] NEMA 14 stepper motors	PDF
LAHP-N14-25WRPBKT	\$233.00	parallel	LAHP-25	SureStep [®] NEMA 14 stepper motors	PDF
LAHP-N17-25MTRBKT	\$218.00	axial	LAHP-25	SureStep [®] NEMA 17 stepper motors	PDF
LAHP-N17-25WRPBKT	\$310.00	parallel	LAHP-25	SureStep [®] NEMA 17 stepper motors	PDF
LAHP-N17-33MTRBKT	\$244.00	axial	LAHP-33/33W	SureStep [®] NEMA 17 stepper motors	PDF
LAHP-N17-33WRPBKT	\$188.00	parallel	LAHP-33/33W	SureStep [®] NEMA 17 stepper motors	PDF
LAHP-N23-33MTRBKT	\$244.00	axial	LAHP-33/33W	SureStep [®] NEMA 23 stepper motors	PDF
LAHP-N23-33WRPBKT	\$248.00	parallel	LAHP-33/33W	SureStep [®] NEMA 23 stepper motors	PDF

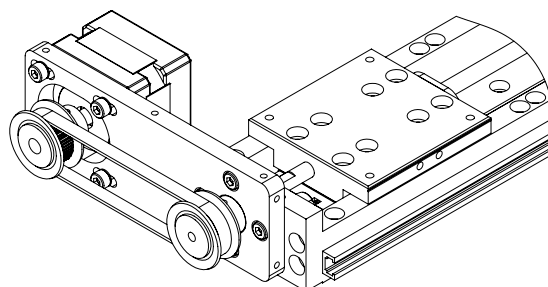
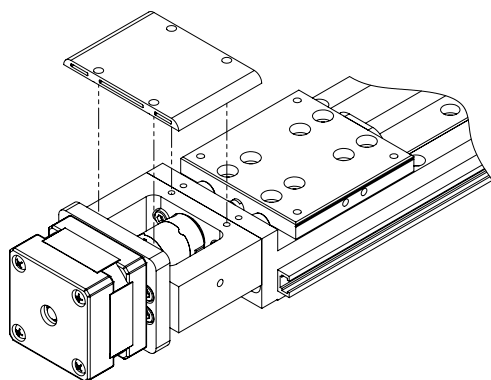


NEMA 14 Axial Motor Bracket*
[LAHP-N14-25MTRBKT](#)

*Coupling Sold Separately



NEMA 14 Parallel Motor Bracket
[LAHP-N14-25WRPBKT](#)





SureMotion[®] XYZ Gantries

LAHP Series Drive Couplings

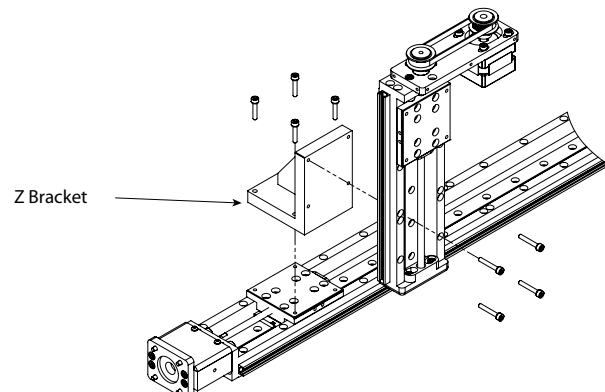
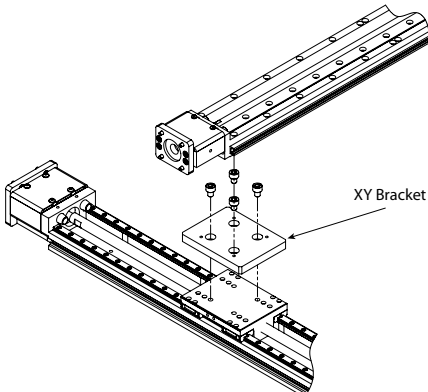
Part Number	Price	Actuator Side Bore	Motor Side Bore	Actuator Compatibility	Motor Compatibility	Drawing Links
LAHP-25-CPL-201	\$44.50	3mm	8mm	LAHP-25	SureServo [®] SV2L-201B and SV2L-201N	PDF
LAHP-25-CPL-N1417	\$62.00	3mm	5mm	LAHP-25	SureStep [®] NEMA 14/17	PDF
LAHP-33-CPL-201	\$89.00	5mm	8mm	LAHP-33/33W	SureServo [®] SV2L-201B and SV2L-201N	PDF
LAHP-33-CPL-202	\$66.00	5mm	14mm	LAHP-33/33W	SureServo [®] SV2L-202B, SV2L-202N, SV2L-204B, and SV2L-204N	PDF
LAHP-33-CPL-N17	\$67.00	5mm	5mm	LAHP-33/33W	SureStep [®] NEMA 17	PDF
LAHP-33CPL-N23	\$89.00	5mm	1/4in	LAHP-33/33W	SureStep [®] NEMA 23	PDF



Stepper Motor Coupling (NEMA 14 & 17)
[LAHP-25-CPL-N1417](#)

LAHP Series XY and Z Brackets

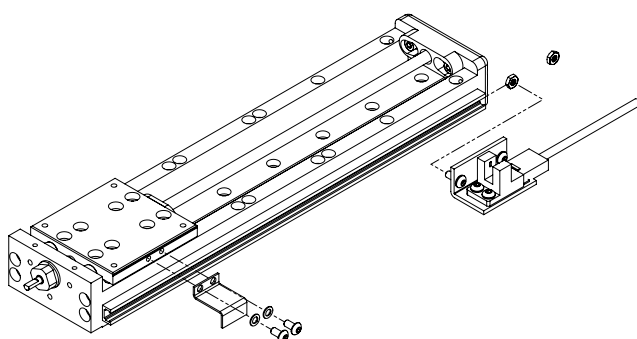
Part Number	Price	Bracket Type	Description	Drawing Links
LAHP-XYB-25-33	\$108.00	XY bracket	SureMotion [®] mounting bracket, anodized aluminum, XY bracket. For use with LAHP-25 to LAHP-33 series actuators.	PDF
LAHP-XYB-25-33W	\$125.00	XY bracket	SureMotion [®] mounting bracket, anodized aluminum, XY bracket. For use with LAHP-25 to LAHP-33W series actuators.	PDF
LAHP-XYB-33-33W	\$125.00	XY bracket	SureMotion [®] mounting bracket, anodized aluminum, XY bracket. For use with LAHP-33 to LAHP-33W series actuators.	PDF
LAHP-ZB-25-25	\$436.00	Z bracket	SureMotion [®] mounting bracket, anodized aluminum, Z bracket. For use with LAHP-25 to LAHP-25 series actuators.	PDF
LAHP-ZB-25-33	\$436.00	Z bracket	SureMotion [®] mounting bracket, anodized aluminum, Z bracket. For use with LAHP-25 to LAHP-33 series actuators.	PDF
LAHP-ZB-25-33W	\$433.00	Z bracket	SureMotion [®] mounting bracket, anodized aluminum, Z bracket. For use with LAHP-25 to LAHP-33W series actuators.	PDF
LAHP-ZB-33-33	\$491.00	Z bracket	SureMotion [®] mounting bracket, anodized aluminum, Z bracket. For use with LAHP-33 to LAHP-33 series actuators.	PDF
LAHP-ZB-33-33W	\$510.00	Z bracket	SureMotion [®] mounting bracket, anodized aluminum, Z bracket. For use with LAHP-33 to LAHP-33W series actuators.	PDF



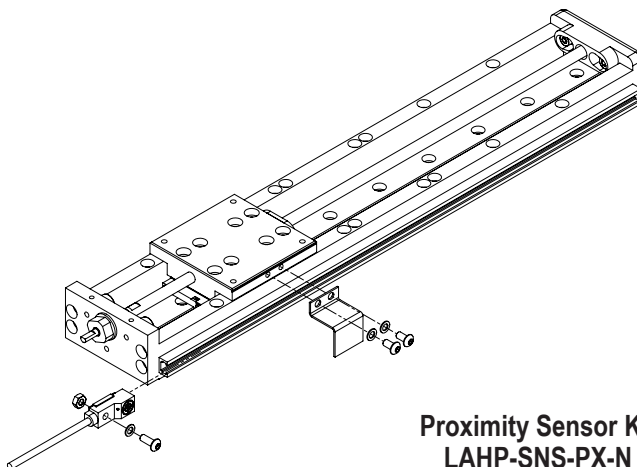
SureMotion[®] XYZ Gantries

LAHP Series Sensors				
Part Number	Price	Sensor Type	Output	Drawing Links
<u>LAHP-SNS-PH-N</u>	\$351.00	photoelectric sensor	NPN	<u>PDF</u>
<u>LAHP-SNS-PH-P</u>	\$351.00	photoelectric sensor	PNP	<u>PDF</u>
<u>LAHP-SNS-PX-N</u>	\$401.00	proximity sensor	NPN	<u>PDF</u>
<u>LAHP-SNS-PX-P</u>	\$401.00	proximity sensor	PNP	<u>PDF</u>

NOTE: 3 Sensors included in each kit



Photoelectric Sensor Kit
[LAHP-SNS-PH-N](#)



Proximity Sensor Kit
[LAHP-SNS-PX-N](#)

LAHP Lead Nut Replacement Kit		
Part Number	Price	Description
<u>LAHP-25-NUT-LP25</u>	\$150.00	SureMotion [®] lead nut, replacement, 0.25in pitch. For use with LAHP-25 series actuators.
<u>LAHP-33-NUT-LP25</u>	\$167.00	SureMotion [®] lead nut, replacement, 0.25in pitch. For use with LAHP-33 series actuators.



Linear Motion Products

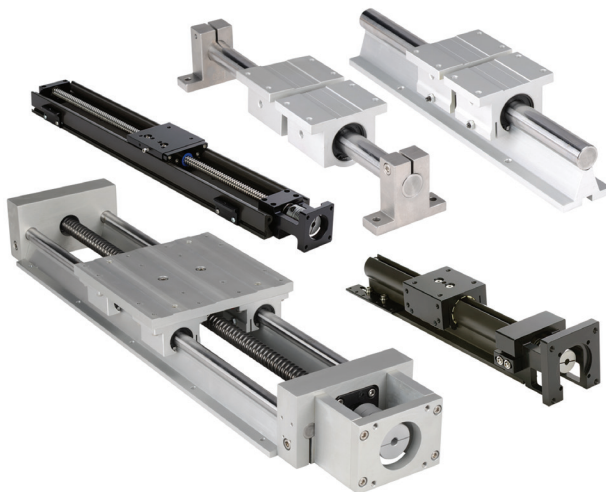
Product Overview

Actuator Overview

SureMotion linear motion offers both motor-ready actuator assemblies, and a versatile assortment of sliding components and accessories to provide a wide variety of motion control solutions.

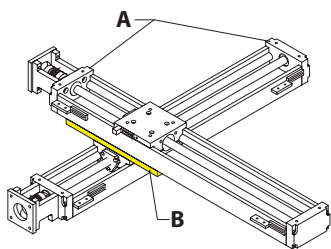
Linear Slide Actuator Comparisons

Actuator Series Comparisons						
Actuator Series	Actuator Type	Drive Type	Max Load Capacity (lb)	Max Speed (in/s)	Travel (in)	Relative Price
LARSD2	Twin Round Shaft	Ball Screw	920	6	12, 24	\$\$\$\$
LACP2	Compact Slide	Lead Screw	125	20	6, 12, 24, 36	\$\$
LAVL2	Value Slide	Lead Screw	110	15	6, 12, 18, 24	\$

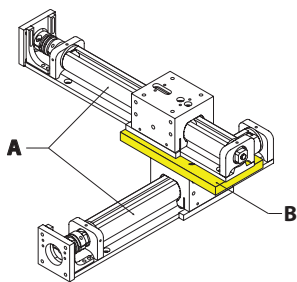


Available Multi-Axis Configurations

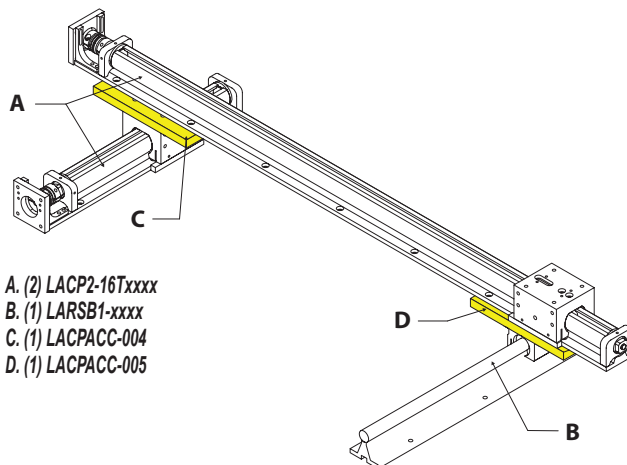
X-Y Axis Configurations



A. (2) LAVL2-60Txxxx
B. (1) LAVLACC-004



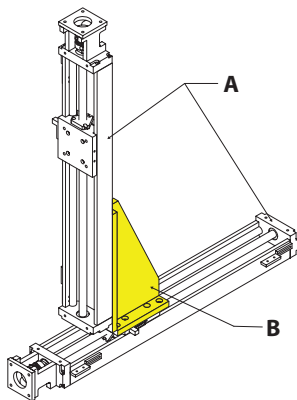
A. (2) LACP2-16Txxxx
B. (1) LACPACC-004



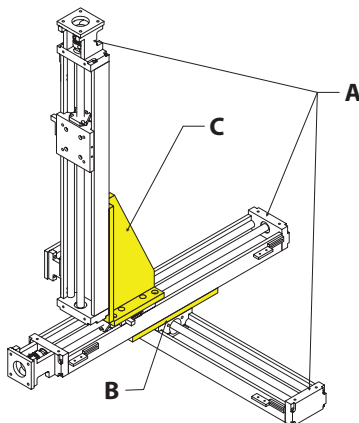
A. (2) LACP2-16Txxxx
B. (1) LARSB1-xxxx
C. (1) LACPACC-004
D. (1) LACPACC-005

X-Z Axis Configuration

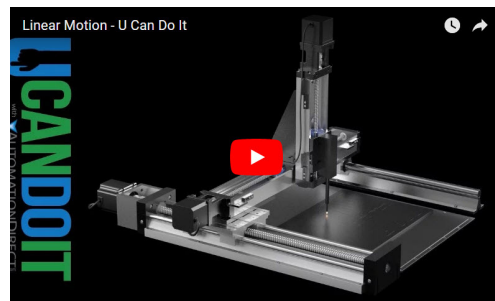
X-Y-Z Axis Configuration



A. (2) LAVL2-60Txxxx
B. (1) LAVLACC-005



A. (3) LAVL2-60Txxxx
B. (1) LAVLACC-004
C. (1) LAVLACC-005

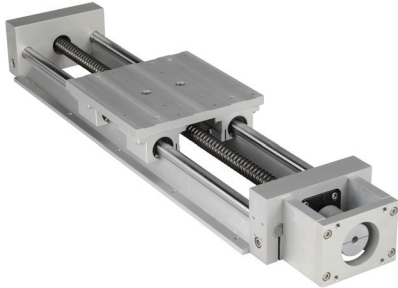


Click on the above video link for a short visual example of how our products can be used.



Linear Motion Products

Twin Round Shaft Slide Actuators



LARSD2-08T12BP2C

Description

Continuously-supported round rail slide with ball screw actuation provides a very robust precision linear motion. Units are complete except for a drive motor.

Features

- High-accuracy ball screw
- Continuously-supported guide rails
- Replacement components available
- Ready for NEMA 23 motor
- AISI 1566 Carbon Steel, 60 RC Round Shafts
- AISI 1045 Carbon Steel, 56 RC Ball Screw

Applications

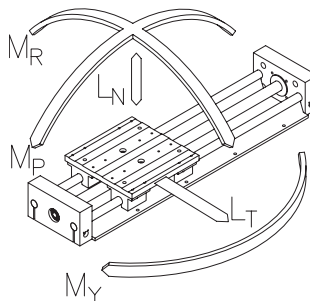
- Positioning systems
- Heavy loads

Twin Round Shaft Slide Actuator Specifications

Part Number	Price	Drive Type	Drive Pitch	Drive Screw Efficiency (%)	Payload Inertia Factor (in ²)	Constant System Inertia (lbm-in ²)	Travel	Weight (lb)	Fits Motor
<u>LARSD2-08T12BP2C</u>	\$3,157.00	Ball screw	0.2 in	83	0.001	0.11	12in	10.5	NEMA 23
<u>LARSD2-08T24BP2C</u>	\$3,409.00					0.16	24in	14.0	

System Inertia Calculation:

- To calculate the inertia reflected to the motor in a particular actuator, multiply the carriage payload by the payload inertia factor and then add the constant system inertia value for that actuator. The constant system inertia value for each system includes the inertia of the shaft coupler, carriage, and lead/ball screw.
- The payload must be in units of lb_m.



Load rating diagram

Twin Round Shaft Slide Actuator Load/Moment Ratings

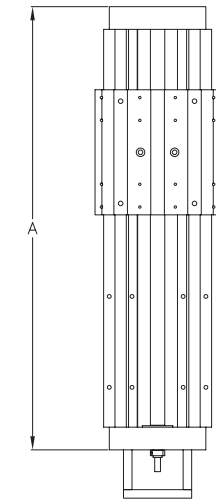
Part Number	Load (lb)				Moment (lb-in)		
	Actuator Thrust	Normal – LN		Transverse LT	Roll MR	Pitch MP	Yaw MY
		Down	Up				
LARSD2-08TxxBP2C	200	920	644	920	1046	1210	1730



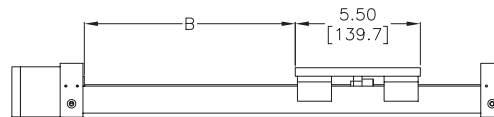
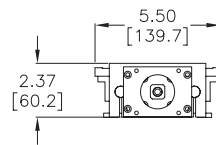
Linear Motion Products

Twin Round Shaft Slide Actuators

Dimensions (in [mm])



PART NUMBER	A	B (TRAVEL)
LARSD2-08T12BP2C	19.50 [495.3]	12.00 [304.9]
LARSD2-08T24BP2C	31.5 [800.1]	24.00 [609.8]



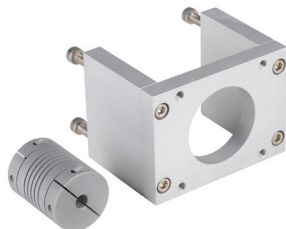
LARSD2-08TxxBP2C

See our website www.AutomationDirect.com for complete Engineering drawings.

Accessories

Twin Round Shaft Slide Actuator Accessories			
Part Number	Price	Description	Weight (lb)
<u>LARSACC-010</u>	\$31.50	SureMotion linear ball bushing, open type, 1/2 inch inside diameter, with seals, self-aligning.	0.5
<u>LARSACC-013*</u>	\$842.00	SureMotion repair kit, for use with LARSD2-08T12BP2C actuators. Ballscrew, ballnut, end bearings and grease tube included.	3.0
<u>LARSACC-014*</u>	\$829.00	SureMotion repair kit, for use with LARSD2-08T24BP2C actuators. Ballscrew, ballnut, end bearings and grease tube included.	5.0
<u>LARSACC-015*</u>	\$316.00	SureMotion motor adapter, NEMA 23 frame. For use with LARSD2-08 series actuators. 1/4 x 1/4 inch coupler included.	1.0
<u>LARSACC-016*</u>	\$380.00	SureMotion motor adapter, NEMA 34 frame. For use with LARSD2-08 series actuators. 1/2 x 1/4 inch coupler included.	1.0

* Repair kits and NEMA 23/34 motor adapter contain replacement components that are the same as the original components in the actuator assemblies.



LARSACC-015(16)



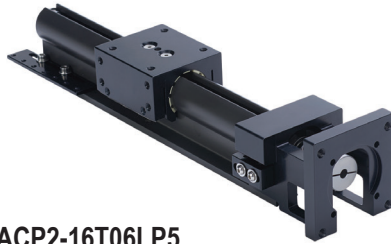
LARSACC-013(014)

Some accessories not shown see www.AutomationDirect.com for additional product photos.



Linear Motion Products

Compact Slide Actuators - Generation 2



LACP2-16T06LP5

Description

Self-contained linear actuator designed for light loads in a very small package. The base is a single piece design with integrated slide surfaces, and is hard anodized all over.

Generation 2 actuators have a reduced part count for more reliable operation, integral wireway through the body and more robust motor mount that fits both NEMA 17 and 23 motors.

Features

- Compact design
- Replacement components available
- Ready for NEMA 17 motor (NEMA 23 motor requires new coupling)
- End-of-travel switch mounts
- AISI 6061-T6 Aluminum Alloy base, Hard Anodized on all surfaces to a depth of 0.0005 to 0.0015"
- AISI 303 Stainless Steel Lead Screw

Applications

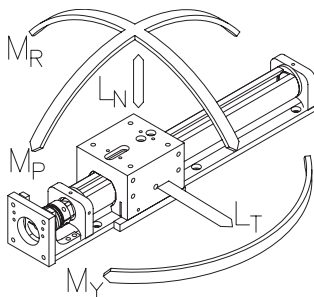
- Space-limiting applications
- Light loads
- Speeds up to 20 inches per second

Compact Slide Actuator Specifications

Part Number	Price	Drive Type	Drive Pitch	Drive Screw Efficiency (%)	Payload Inertia Factor (in ²)	Constant System Inertia (lbm-in ²)	Travel	Weight (lb)	Fits Motor
LACP2-16T06LP5	\$1,485.00	Lead screw	0.5 in	52	0.0063	0.016	6in	1.8	NEMA 17
LACP2-16T12LP5	\$1,566.00					0.017	12in	2.3	
LACP2-16T24LP5	\$2,065.00					0.020	24in	3.5	
LACP2-16T36LP5	\$2,460.00					0.024	36in	4.5	
LACP2-16T06L1	\$1,485.00					0.022	6in	1.8	
LACP2-16T12L1	\$1,566.00	1in	44	0.025	0.025	0.023	12in	2.3	
LACP2-16T24L1	\$2,065.00					0.026	24in	3.5	
LACP2-16T36L1	\$2,460.00					0.030	36in	4.5	

System Inertia Calculation:

- To calculate the inertia reflected to the motor in a particular actuator, multiply the carriage payload by the payload inertia factor and then add the constant system inertia value for that actuator. The constant system inertia value for each system includes the inertia of the shaft coupler, carriage, and lead/ball screw.
- The payload must be in units of lb_m.



Load rating diagram

Compact Slide Actuator Load/Moment Ratings

Part Number	Load (lb)*				Moment (lb-in)**		
	Actuator Thrust	Normal – LN		Transverse	Roll	Pitch	Yaw
		Down	Up	LT	MR	MP	MY
LACP2-16TxxLP5	51	125	60	125	12	15	33
LACP2-16TxxL1	28	125	60	125	12	15	33

* 30lb is the recommended maximum load capacity if the carriage is not externally supported against rolling. The higher load capacities are possible if the carriage is externally supported.

** It is recommended that offset loads be located 5 inches or less from the center of the carriage. When the loads are offset at greater distances, the carriage can vibrate during travel.

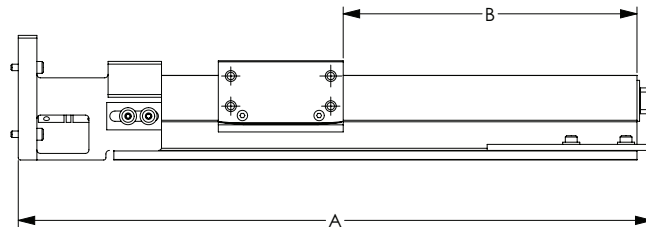
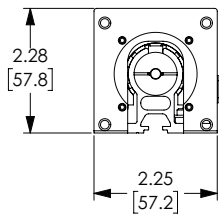
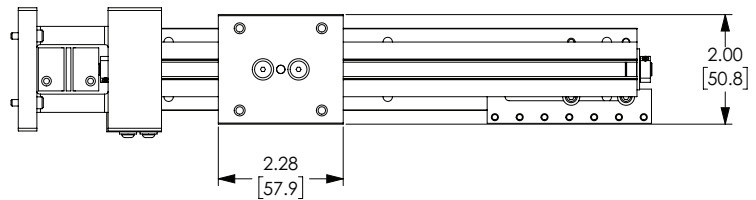


Linear Motion Products

Compact Slide Actuators - Generation 2

Dimensions (in [mm])

PART NUMBER	A	B (TRAVEL)
LACP2-16T06LP5	11.57 [293.8]	6.40 [162.6]
LACP2-16T12LP5	17.57 [446.2]	12.40 [315.0]
LACP2-16T24LP5	29.57 [751.0]	24.40 [619.8]
LACP2-16T36LP5	41.57 [1055.8]	36.40 [924.6]
LACP2-16T06L1	11.57 [293.8]	6.40 [162.6]
LACP2-16T12L1	17.57 [446.2]	12.40 [315.0]
LACP2-16T24L1	29.57 [751.0]	24.40 [619.8]
LACP2-16T36L1	41.57 [1055.8]	36.40 [924.6]



LACP2-16TxxLxx

See our website www.AutomationDirect.com for complete Engineering drawings.

Accessories

Compact Slide Actuator Accessories			
Part Number	Price	Description	Weight (lb)
<u>LAVLACC-003*</u>	\$316.00	SureMotion motor adapter, NEMA 23 frame. For use with LAVL2-60 series actuators. 1/4 inch x 5 mm coupler included.	1.0
<u>LACPACC-0021</u>	\$856.00	SureMotion repair kit, for use with LACP-16TxxLP5 actuators. Nut, bushings, end bearings and oil syringe included.	0.5
<u>LACPACC-0031</u>	\$856.00	SureMotion repair kit, for use with LACP-16TxxL1 actuators. Nut, bushings, end bearings and oil syringe included.	0.5
<u>LACPACC-004</u>	\$96.00	SureMotion mounting plate, XY type. For use with LACP2-16 series actuators.	0.5
<u>LACPACC-005</u>	\$122.00	SureMotion mounting plate, XY type. For use with LACP2-16 and LARSB1 series actuators.	0.5
<u>LACPACC-0062</u>	\$856.00	SureMotion repair kit, for use with LACP2-16TxxLP5 actuators. Nut, bushings, end bearings and oil syringe included.	1.0
<u>LACPACC-0072</u>	\$856.00	SureMotion repair kit, for use with LACP2-16TxxL1 actuators. Nut, bushings, end bearings and oil syringe included.	1.0

* Use the coupling and motor mount screws from this kit to adapt any LACP2 actuator assembly to accept a NEMA 23 motor.

¹ These repair kits contain parts to rebuild Generation 1 (LACP series) actuator assemblies.

² These repair kits contain parts to rebuilt current Generation 2 (LACP2 series) actuator assemblies.



LAVLACC-003



LACPACC-002(003)



LACPACC-004(005)

Some accessories not shown see www.AutomationDirect.com for additional product photos.



Linear Motion Products

Value Linear Slide Actuators - Generation 2



Description

Low-cost linear actuator using the latest in sliding element technology. The base is a single piece design with integrated slide surfaces, and is hard anodized all over. This versatile unit can be mounted horizontally, vertically, or inverted without loss of load capacity.

Generation 2 actuators have a reduced part count for more reliable operation, integral sensor mount grooves on both sides and a more robust motor mount.

Features

LAVL2-60T06LP2

- Maintenance-free Rails and Rail Bushings
- Small footprint
- Adjustable carriage pre-load
- Replacement components available
- Ready for NEMA 17 motor
- T-slots enable limit switches to be positioned anywhere
- AISI 6061-T6 Aluminum Alloy base, hard anodized on all surfaces to a depth of 0.0005 to 0.0015"
- AISI 304 Stainless Steel Lead Screw
- Acetal NTA3 Lead Nut
- Drylin® Rail Bushings

Applications

- Harsh or wet environments
- X-Y-Z positioning systems

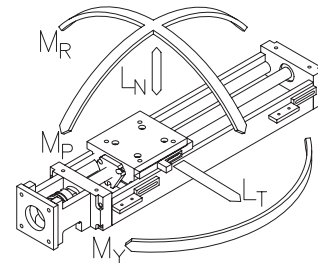
Value Linear Slide Actuator Specifications

Part Number	Price	Drive Type	Drive Pitch	Drive Screw Efficiency (%)	Payload Inertia Factor (in ²)	Constant System Inertia (lbm-in ²)	Travel	Weight (lb)	Fits Motor
<u>LAVL2-60T06LP2</u>	\$1,038.00	Lead screw	0.2 in	47	0.001	0.017	6in	2.0	NEMA 17
<u>LAVL2-60T12LP2</u>	\$1,304.00					0.020	12in	2.8	
<u>LAVL2-60T18LP2</u>	\$1,578.00					0.023	18in	3.5	
<u>LAVL2-60T24LP2</u>	\$1,842.00					0.027	24in	4.2	
<u>LAVL2-60T06LP5</u>	\$1,038.00					0.019	6in	2.0	
<u>LAVL2-60T12LP5</u>	\$1,304.00	Lead screw	0.5 in	57	0.0063	0.022	12in	2.8	
<u>LAVL2-60T18LP5</u>	\$1,578.00					0.025	18in	3.5	
<u>LAVL2-60T24LP5</u>	\$1,842.00					0.028	24in	4.2	

NOTE: The Lead Screw is lubricated at the factory with PTFE oil. It should be re-lubed periodically. Rails and bushing lubrication not required.

System Inertia Calculation:

- To calculate the inertia reflected to the motor in a particular actuator, multiply the carriage payload by the payload inertia factor and then add the constant system inertia value for that actuator. The constant system inertia value for each system includes the inertia of the shaft coupler, carriage, and lead/ball screw.
- The payload must be in units of lb_m.



Load rating diagram

Value Linear Slide Actuator Load/Moment Ratings

Part Number	Load (lb)				Moment (lb-in)*		
	Actuator Thrust	Normal – LN		Transverse LT	Roll MR	Pitch MP	Yaw MY
		Down	Up		MR	MP	MY
<u>LAVL2-60TxxLP2</u>	70	110	110	110	50	32	32
<u>LAVL2-60TxxLP5</u>	50	110	110	110	50	32	32

* It is recommended that offset loads be located 5 inches or less from the center of the carriage. When the loads are offset at greater distances, the carriage can vibrate during travel.

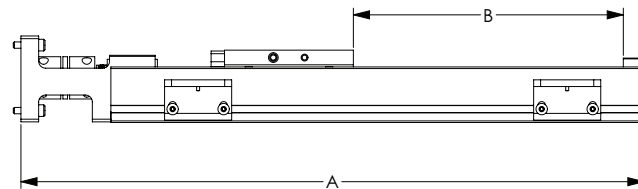
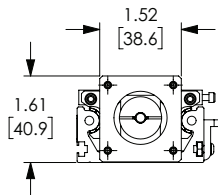
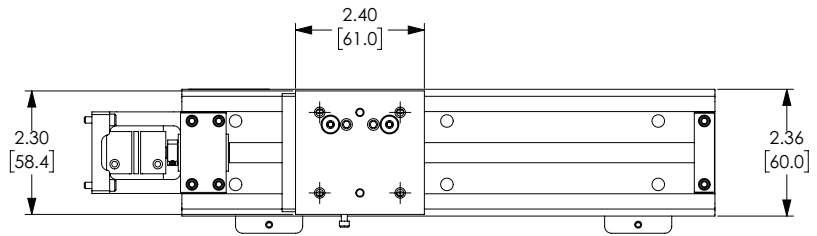


Linear Motion Products

Value Linear Slide Actuators - Generation 2

Dimensions (in [mm])

PART NUMBER	A	B (TRAVEL)
LAVL2-60T06LP2	11.61 [294.8]	6.03 [153.1]
LAVL2-60T12LP2	17.61 [447.2]	12.03 [305.6]
LAVL2-60T18LP2	23.61 [599.6]	18.03 [458.0]
LAVL2-60T24LP2	29.61 [752.0]	24.03 [610.3]
LAVL2-60T06LP5	11.61 [294.8]	6.03 [153.1]
LAVL2-60T12LP5	17.61 [447.2]	12.03 [305.6]
LAVL2-60T18LP5	23.61 [599.6]	18.03 [458.0]
LAVL2-60T24LP5	29.61 [752.0]	24.03 [610.3]



LAVL2-60TxxLPx

See our website www.AutomationDirect.com for complete Engineering drawings.

Accessories

Value Linear Slide Actuator Accessories			
Part Number	Price	Description	Weight (lb)
LAVLACC-001*	\$380.00	SureMotion repair kit, for use with LAVL-60TxxLP2 actuators. Nut, bushings, end bearings and oil syringe included.	0.5
LAVLACC-002*	\$380.00	SureMotion repair kit, for use with LAVL-60TxxLP5 actuators. Nut, bushings, end bearings and oil syringe included.	0.5
LAVLACC-003	\$316.00	SureMotion motor adapter, NEMA 23 frame. For use with LAVL2-60 series actuators. 1/4 inch x 5 mm coupler included.	1.0
LAVLACC-004	\$147.00	SureMotion mounting plate, XY type. For use with LAVL2-60 series actuators.	0.5
LAVLACC-005	\$331.00	SureMotion mounting plate, XZ type. For use with LAVL2-60 series actuators.	1.0
LAVLACC-006*	\$380.00	SureMotion repair kit, for use with LAVL2-60TxxLP2 actuators. Nut, bushings, end bearings and oil syringe included.	1.0
LAVLACC-007*	\$380.00	SureMotion repair kit, for use with LAVL2-60TxxLP5 actuators. Nut, bushings, end bearings and oil syringe included.	1.0

* Repair kits contain replacement components that are the same as the original components in the actuator assemblies.



Some accessories not shown see www.AutomationDirect.com for additional product photos.



Linear Motion Products

Round-Shaft Slide Elements

Description

Round-shaft sliding elements can be combined with other elements to build a huge variety of machine mechanisms. Available in both end- and continuously-supported shafts.

Features

- Linear ball bearings
- High quality clear anodized aluminum blocks
- AISI 1566 Carbon Steel, 60 RC Round Shafts



NOTE: Pillow blocks are shipped without lubrication and should be lubricated prior to use. A lubrication port is available.



LARSACC-001/007



LARSACC-002/008

Slide Rail Systems Load Ratings

Part Number	Normal (lb)		Transverse (lb)
	Down	Up	
Pillow Blocks / Bushings for LARSA1			
LARSACC-001/007	230		
LARSACC-002/008	470		
LARSACC-003/009	850		
LARSA1 Linear Slide Assemblies			
LARSA1-08LxxC	460		
LARSA1-12LxxC	940		
LARSA1-16LxxC	1700		
Pillow Blocks / Bushings for LARSB1			
LARSACC-004/010	230	161	230
LARSACC-005/011	470	268	470
LARSACC-006/012	850	485	850
LARSB1 Linear Slide Assemblies			
LARSB1-08LxxC	460	322	460
LARSB1-12LxxC	940	536	940
LARSB1-16LxxC	1700	970	1700

End-Supported Slide Rail Systems

Part Number	Price	Shaft Diameter	Overall Length (in)	Weight (lb)
LARSA1-08L12C	\$354.00	1/2	12	1.5
LARSA1-08L24C	\$366.00	1/2	24	2.0
LARSA1-08L36C	\$393.00	1/2	36	2.7
LARSA1-12L12C	\$447.00	3/4	12	3.0
LARSA1-12L24C	\$473.00	3/4	24	4.5
LARSA1-12L36C	\$498.00	3/4	36	6.0
LARSA1-16L12C	\$597.00	1	12	6.0
LARSA1-16L24C	\$637.00	1	24	8.5
LARSA1-16L36C	\$671.00	1	36	11.0

(2) single pillow blocks included

* Bushings and pillow blocks are replacement components that are the same as the original components in the slide assemblies.

Closed Type Pillow Blocks and Bushings

Part Number	Price	Fits Shaft Diameter (in)	Weight (lb)	Image
LARSACC-001	\$69.00	1/2	0.3	
LARSACC-002	\$89.00	3/4	0.6	
LARSACC-003	\$125.00	1	1.2	
LARSACC-007	\$27.00	1/2	0.1	
LARSACC-008	\$31.50	3/4	0.2	
LARSACC-009	\$51.00	1	0.3	

Continuously-Supported Slide Rail Systems

Part Number	Price	Shaft Diameter	Overall Length (in)	Weight (lb)
LARSB1-08L12C	\$366.00	1/2	12	2.0
LARSB1-08L24C	\$456.00	1/2	24	3.0
LARSB1-08L36C	\$568.00	1/2	36	4.5
LARSB1-12L12C	\$458.00	3/4	12	4.0
LARSB1-12L24C	\$597.00	3/4	24	6.2
LARSB1-12L36C	\$733.00	3/4	36	9.0
LARSB1-16L12C	\$594.00	1	12	6.5
LARSB1-16L24C	\$768.00	1	24	10.5
LARSB1-16L36C	\$925.00	1	36	14.5

(2) single pillow blocks included

* Bushings and pillow blocks are replacement components that are the same as the original components in the slide assemblies.

Open Type Pillow Blocks and Bushings

Part Number	Price	Fits Shaft Diameter (in)	Weight (lb)	Image
LARSACC-004*	\$76.00	1/2	0.3	
LARSACC-005*	\$97.00	3/4	0.6	
LARSACC-006*	\$138.00	1	1.2	
LARSACC-010	\$31.50	1/2	0.1	
LARSACC-011	\$39.50	3/4	0.2	
LARSACC-012	\$65.00	1	0.3	

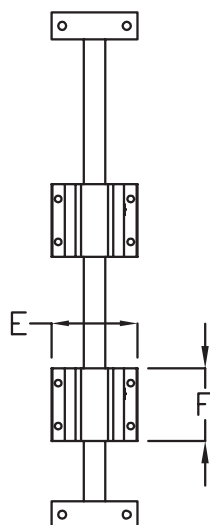
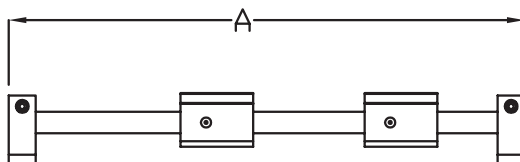
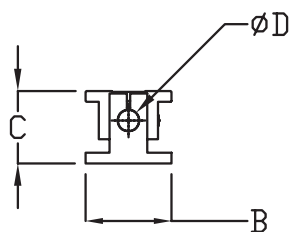
*Preload Adjustment available



Linear Motion Products

Round-Shaft Slide Elements

Dimensions (in [mm])



**LARSA1-xxLxxC
& LARSB1-xxLxxC***

PART #	A	B	C	ØD	E	F
LARSA1-08L12C	12.0 [304.8]	2.00 [50.8]	1.70 [42.9]	0.50 [12.7]	2.00 [50.8]	1.69 [42.9]
LARSA1-08L24C	24.0 [609.6]					
LARSA1-08L36C	36.0 [914.4]					
LARSA1-12L12C	12.0 [304.8]	2.50 [63.5]	2.19 [55.6]	0.75 [19.0]	2.75 [69.9]	2.06 [52.4]
LARSA1-12L24C	24.0 [609.6]					
LARSA1-12L36C	36.0 [914.4]					
LARSA1-16L12C	12.0 [304.8]	3.06 [77.8]	2.69 [68.3]	1.00 [25.4]	3.25 [82.6]	2.81 [71.5]
LARSA1-16L24C	24.0 [609.6]					
LARSA1-16L36C	36.0 [914.4]					
LARSB1-08L12C	12.0 [304.8]	1.50 [38.1]	1.81 [46.0]	0.50 [12.7]	2.00 [50.8]	1.50 [38.1]
LARSB1-08L24C	24.0 [609.6]					
LARSB1-08L36C	36.0 [914.4]					
LARSB1-12L12C	12.0 [304.8]	1.75 [44.5]	2.44 [61.9]	0.75 [19.0]	2.75 [69.9]	1.88 [47.6]
LARSB1-12L24C	24.0 [609.6]					
LARSB1-12L36C	36.0 [914.4]					
LARSB1-16L12C	12.0 [304.8]	2.13 [54.0]	2.94 [74.6]	1.00 [25.4]	3.25 [82.6]	2.63 [66.7]
LARSB1-16L24C	24.0 [609.6]					
LARSB1-16L36C	36.0 [914.4]					

*LARSA1-xxLxxC is shown in drawing. LARSB1-xxLxxC has different appearance, but same dimensions as shown in this table.

See our website www.AutomationDirect.com for complete Engineering drawings.



Precision Ground Linear Shafts

1060 Steel and 440C Stainless Steel



Features

- C1060 steel
- RC60-65 Hardness
- 10RMS Surface Finish
- Tolerance: Class L
 $\pm 1/32"$ length tolerance
 $+ 0.0000" / - 0.0005"$ diameter tolerance



Linear Shafts - 1060 Steel				
Part Number	A	ØB	Price	Weight (lb)
<u>LPCS08-12</u>	12.0	0.50	Retired	0.71
<u>LPCS08-24</u>	24.0	0.50	Retired	2.41
<u>LPCS08-36</u>	36.0	0.50	Retired	3.41
<u>LPCS12-12</u>	12.0	0.75	Retired	1.52
<u>LPCS12-24</u>	24.0	0.75	Retired	4.03
<u>LPCS12-36</u>	36.0	0.75	Retired	5.84
<u>LPCS16-12</u>	12.0	1.0	Retired	2.71
<u>LPCS16-24</u>	24.0	1.0	Retired	6.41
<u>LPCS16-36</u>	36.0	1.0	Retired	9.41

Note: All measurements in inches



Features

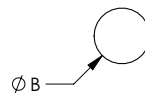
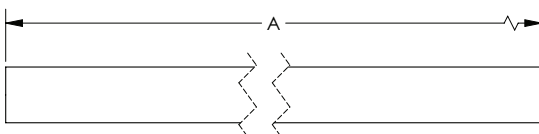
- 440C Stainless steel
- RC50-55 Hardness
- 10RMS Surface Finish
- Tolerance: Class L
 $\pm 1/32"$ length tolerance
 $+ 0.0000" / - 0.0005"$ diameter tolerance



Linear Shafts - 440C Stainless Steel				
Part Number	A	ØB	Price	Weight (lb)
<u>LPSS08-12</u>	12.0	0.50	Retired	0.71
<u>LPSS08-24</u>	24.0	0.50	Retired	2.41
<u>LPSS08-36</u>	36.0	0.50	Retired	3.41
<u>LPSS12-12</u>	12.0	0.75	Retired	1.52
<u>LPSS12-24</u>	24.0	0.75	Retired	4.03
<u>LPSS12-36</u>	36.0	0.75	Retired	5.84
<u>LPSS16-12</u>	12.0	1.0	Retired	2.71
<u>LPSS16-24</u>	24.0	1.0	Retired	6.41
<u>LPSS16-36</u>	36.0	1.0	Retired	9.41

Note: All measurements in inches

Dimensions



See our website www.AutomationDirect.com for complete Engineering drawings.

SureMotion® Linear Guides

LV Series

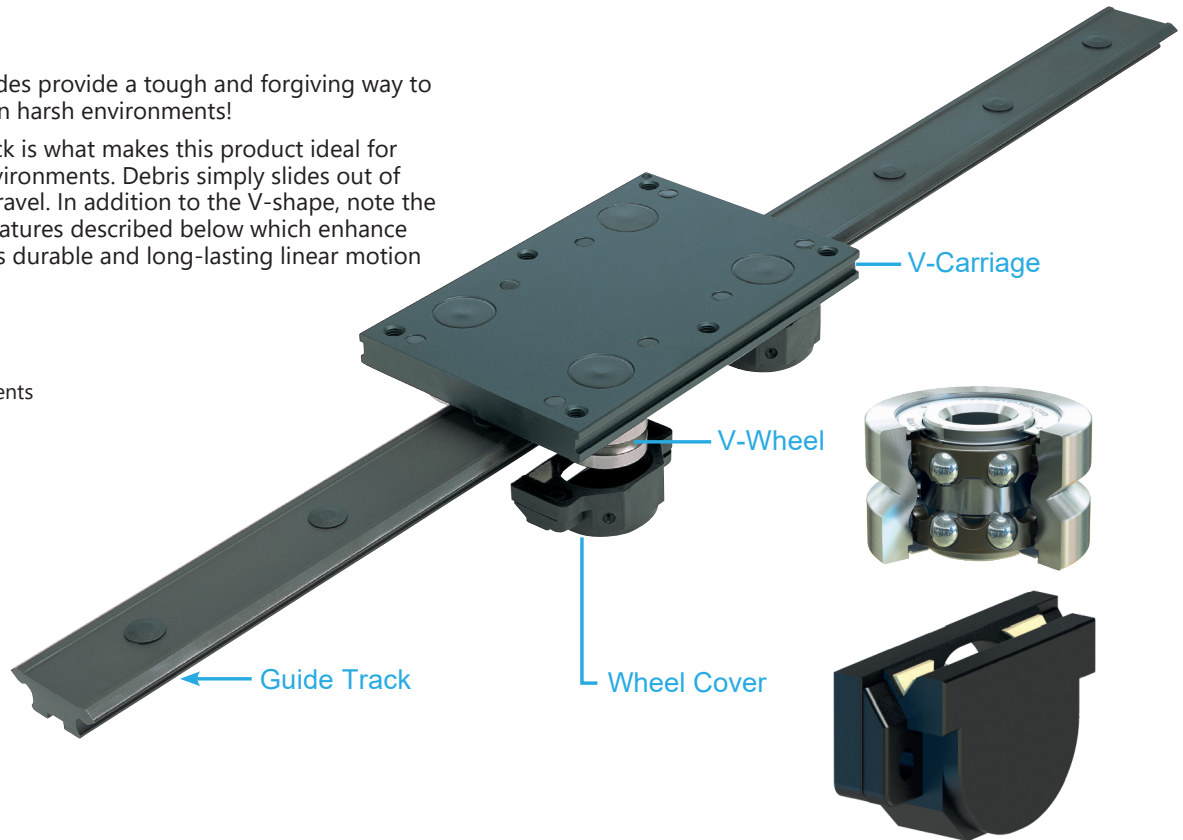
Overview

SureMotion Linear Guides provide a tough and forgiving way to achieve linear motion in harsh environments!

The V-shape guide track is what makes this product ideal for use in heavy debris environments. Debris simply slides out of the way during linear travel. In addition to the V-shape, note the carefully engineered features described below which enhance the effectiveness of this durable and long-lasting linear motion solution.

Applications

- Dirty, dusty environments



V-Carriage

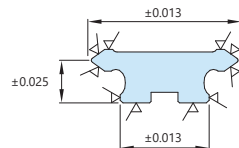
- Three sizes available
- Two concentric V-wheels
- Two adjustable eccentric V-wheels
- Four pre-lubricated wheel covers
- Speed rating: 8m/s
- Material: High-strength aluminum alloy
- Finish: Black anodized
- Plastic hole covers included

V-Wheel

- 70° V groove
- Double-row ball bearings
- Sealed
- V groove & raceways: Carbon-chromium bearing steel AISI 52100, hardened and tempered.
- Balls: Carbon-chromium bearing steel AISI 52100, hardened and tempered.
- Cage: Plastic
- Shield: Nitrile rubber
- Mounting studs: High tensile steel with tensile strength = 695 N/mm².
- Temperature Range: -200°C to +1200°C
- Lifetime lubricated!

Guide Track

- Three sizes available matching the three V-Carriages offered
- Lengths up to 1256mm
- Double 70° V groove
- Precision Ground surfaces
- Material: High-carbon bearing steel AISI 52100
- Hardness: V-surface case hardened to 58-62 Rockwell C scale
- Finish: Chemical black
- Plastic hole covers included



✓ Indicates precision ground surfaces

Wheel Cover

- Provides constant lubrication to the guide track
- End Seals: Felt
- Housing: Thermoplastic elastomer
- Temperature Range: -200°C to +600°C
- Lubrication: Preloaded with NLGI #2 grease

SureMotion® Linear Guides

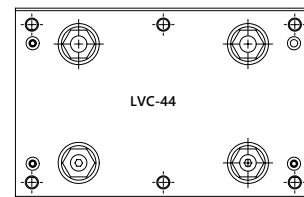
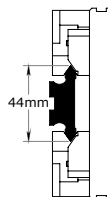
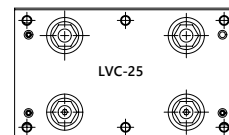
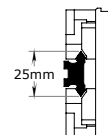
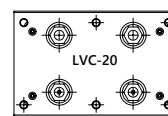
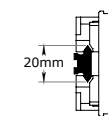
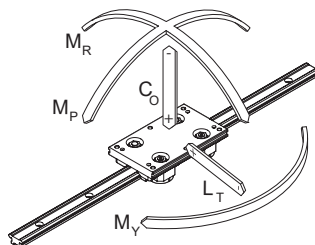
LV Series

LVC Series V-Carriage										
Part Number	Price	Size	Static (Co)	Lateral (Lt)	Pitch Moment (Mp)	Yaw Moment (My)	Roll Moment (Mr)	Required Adjustment Tool	Price	Drawing Link
LVC-20	\$296.00	20	435 N	685 N	12 N·m	19 N·m	4 N·m	LVCACC-1	\$19.00	PDF
LVC-25	\$405.00	25	800 N	1500 N	30 N·m	56 N·m	9 N·m	LVCACC-2	\$32.00	PDF
LVC-44	\$463.00	44	2800 N	4700 N	146 N·m	243 N·m	57 N·m	LVCACC-3	\$42.00	PDF

Note: Eight (8) small and four (4) large plastic caps included.

NOTES:

1. Load ratings are base on lubricated V-contact surfaces.
2. V-Carriages are supplied with LOOSE Eccentric wheels and must be adjusted to design conditions prior to operation. Adjustment Tool LVCACC-x is required for this adjustment



Coefficient of rolling friction = 0.02

Additional friction force from wheel cover wipers:

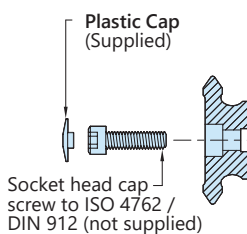
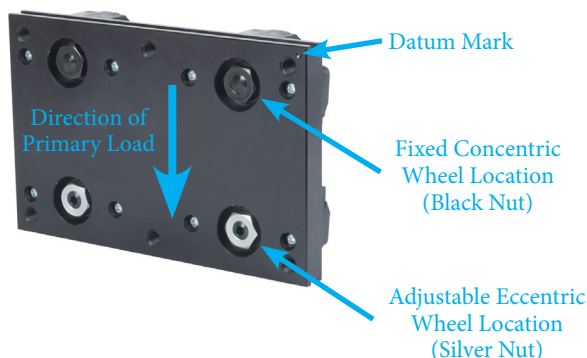
LVC-20 = 4N

LVC-25 = 7N

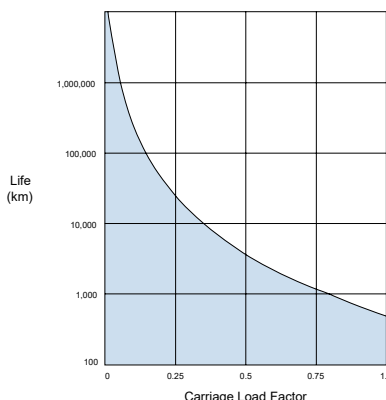
LVC-44 = 15N

LVR Series Guide Track				
Part Number	Price	Size	Length (mm)	Drawing Links
LVR-20-266	\$64.00	20	266	PDF
LVR-20-536	\$131.00		536	PDF
LVR-20-716	\$173.00		716	PDF
LVR-20-1076	\$258.00		1076	PDF
LVR-25-536	\$144.00	25	536	PDF
LVR-25-716	\$191.00		716	PDF
LVR-25-1076	\$287.00		1076	PDF
LVR-25-1256	\$329.00		1256	PDF
LVR-44-536	\$164.00	44	536	PDF
LVR-44-716	\$218.00		716	PDF
LVR-44-1076	\$329.00		1076	PDF
LVR-44-1256	\$383.00		1256	PDF

Note: Mounting screws not included, plastic caps for mounting holes are included.



$$\text{Carriage Load Factor} = \frac{\text{Applied Load}}{\text{Carriage Rating}} = \frac{\text{Applied } C_o}{C_o} + \frac{\text{Applied } L_t}{L_t} + \frac{\text{Applied } M_x}{M_x} + \frac{\text{Applied } M_y}{M_y} + \frac{\text{Applied } M_z}{M_z}$$



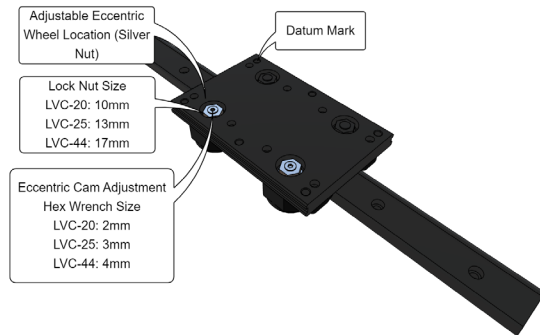
SureMotion® Linear Guides

LV Series

Preloading and Adjustment

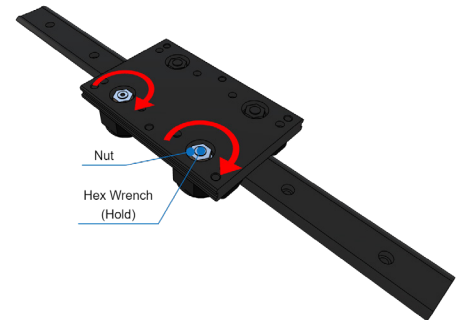
Step 1

Remove the two wheel covers. Using a socket wrench, loosen the two eccentric wheel lock nuts counterclockwise.



Step 4

Hold the adjustment tool in place while rotating the lock nut clockwise until it is snug. Repeat for the second eccentric wheel assembly.

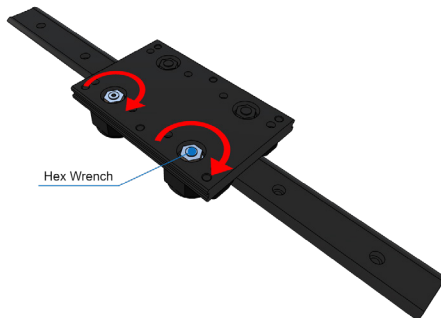


Step 2

Using the adjustment tool, rotate the two eccentric cam assemblies counterclockwise so the guide track will easily slide in. Then slide the carriage onto the guide track.

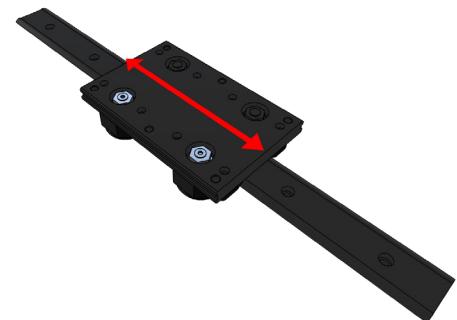
Step 3

Using the adjustment tool, slowly rotate the eccentric cam assembly clockwise until a slight resistance is felt. This indicates that the v wheel is contacting the guide track.



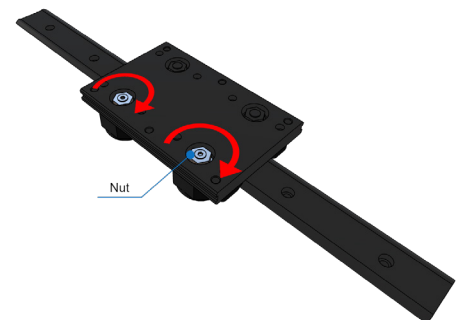
Step 5

Manually slide the carriage along the entire length of the guide track to determine if there are any noticeable rolling resistance variations or undesired carriage wiggle. If so, repeat steps 2-5.



Step 6

Hold the eccentric wheel in position with the adjustment tool while fully tightening the lock nut. Do both eccentric wheels. Remove the carriage from the rail. Reinstall the wheel covers. Reinstall the carriage to the rail.



SureMotion® Linear Guides

LU Series

Overview

Tough, forgiving and CLEAN Linear Motion!

The the crowned or double-V wheel shape feature, along with NO lubrication requirement, makes this product ideal for applications where there is process debris but no foreign mechanism oils are allowed. The Guide Tracks and Carriages come in two styles (LUC & LUV) and are intended to work in tandem with each other for better forgiveness when used in unaligned frames and components. See the full list of engineered features below.

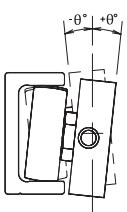
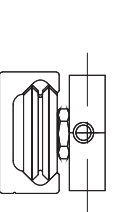
Features

Carriages

- Available in three sizes that match Guide Track sizes
- Available with two wheel shapes: Crown (C) or Double-V (V)
- Available with three, four, or five wheels
- All carriages have one or two adjustable eccentric wheel(s)
- All have felt wiper ends
- Carriage Plate Material: Aluminum with anodize finish
- Wheel Bearings: Single row ball, shielded
- Wheel Bearing Grease: Kluberplex BEM034-132
- Wheel Hub Material: 440C stainless steel
- Wheel Tread: Polymer, over-molded
- Rated Speed: 1 m/s

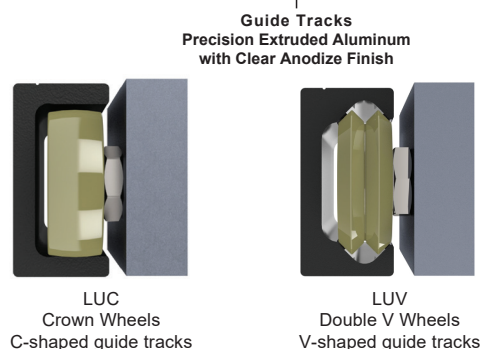
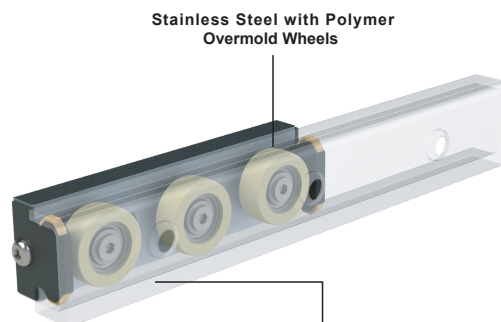
Applications

- Food processing
- Paper processing
- Fabric processing
- Clean room processes

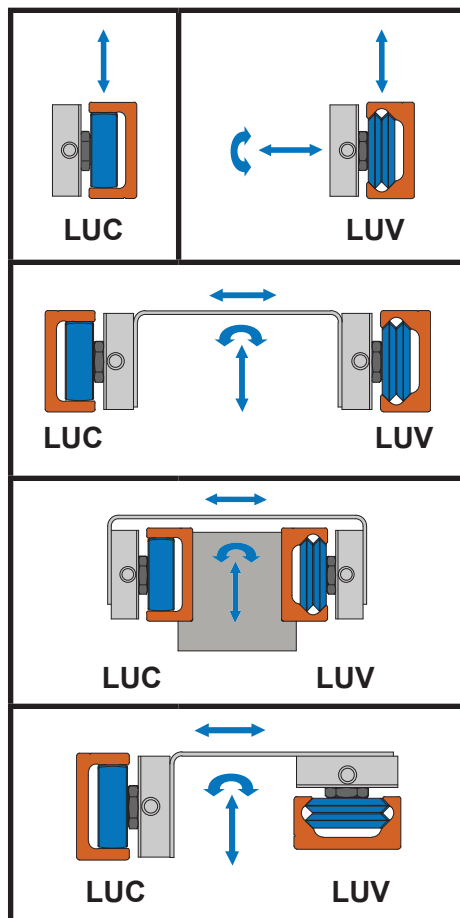
Range of Angular Misalignment		
	LUC	LUV
Series Size		
0	±3°	0°
1	±4°	
2	±6°	

Guide Tracks

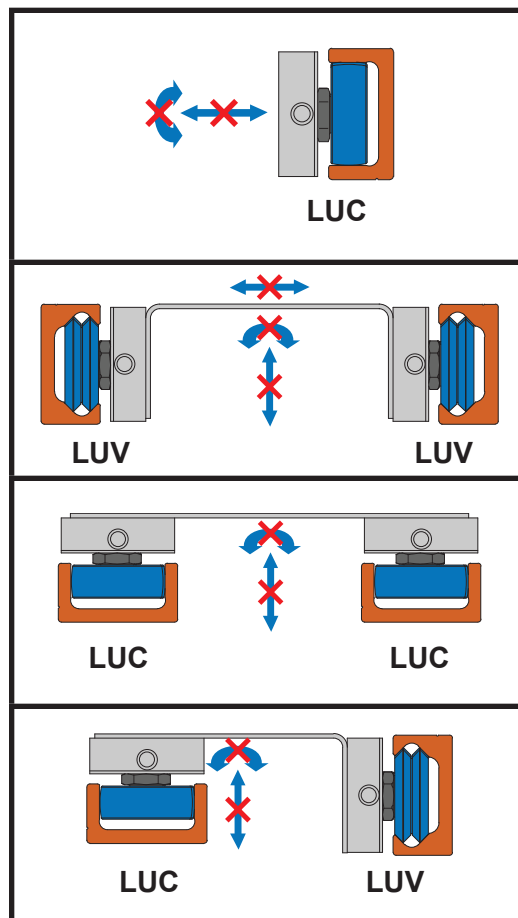
- Available in three sizes that match carriage sizes
- Available in two cross-sectional shapes C or V
- Lengths up to 1520mm
- Can be butted end-to-end for longer travel
- Material: Aluminum with anodized finish



Recommended Applied Load Directions



Not Recommended Applied Load Directions



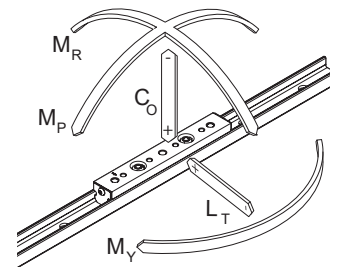
SureMotion® Linear Guides

LUC Series (Crown Wheel)

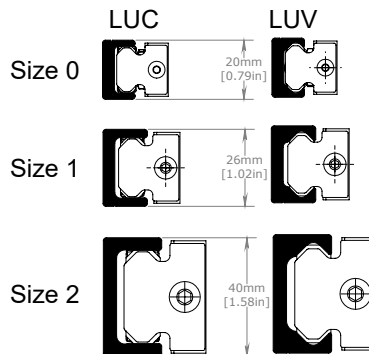
**LUC-0-3W****LUC-0-4W****LUC-0-5W**

LUC Series Crown Carriage

Part Number	Price	Size	Wheel Count	Static (Co)	Lateral (Lt)	Pitch Moment (Mp)	Yaw Moment (My)	Roll Moment (Mr)	Required Adjustment Tool	Price	Drawing Link
LUC-0-3W	\$145.00	0	3	0 N	53 N	0 N·m	0.6 N·m	0 N·m	LUACC-0	\$25.00	PDF
LUC-0-4W	\$218.00		4		53 N		1.8 N·m				PDF
LUC-0-5W	\$236.00		5		63 N		1.8 N·m				PDF
LUC-1-3W	\$154.00	1	3	0 N	107 N	0 N·m	2 N·m	0 N·m	LUACC-1	\$30.00	PDF
LUC-1-4W	\$218.00		4		107 N		5.1 N·m				PDF
LUC-1-5W	\$245.00		5		127 N		5.1 N·m				PDF
LUC-2-3W	\$166.00	2	3	0 N	142 N	0 N·m	3.2 N·m	0 N·m	LUACC-2	\$32.00	PDF
LUC-2-4W	\$252.00		4		142 N		9.3 N·m				PDF
LUC-2-5W	\$271.00		5		169 N		9.3 N·m				PDF



LU Series relative sizes

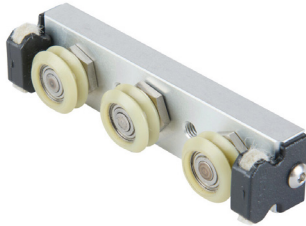

LUC-1-480 Track
LUC-1-4W Carriage


LUC Series Guide Track

Part Number	Price	Size	Length (mm [in])	Drawing Links
LUC-0-480	\$22.00	0	480 [18.9]	PDF
LUC-0-640	\$29.00		640 [25.2]	PDF
LUC-0-800	\$37.00		800 [31.5]	PDF
LUC-0-960	\$44.00		960 [37.8]	PDF
LUC-0-1120	\$51.00		1120 [44.1]	PDF
LUC-0-1280	\$59.00		1280 [50.4]	PDF
LUC-0-1520	\$70.00	1	1520 [59.8]	PDF
LUC-1-480	\$24.00		480 [18.9]	PDF
LUC-1-640	\$32.00		640 [25.2]	PDF
LUC-1-800	\$40.00		800 [31.5]	PDF
LUC-1-960	\$48.00		960 [37.8]	PDF
LUC-1-1120	\$56.00		1120 [44.1]	PDF
LUC-1-1280	\$64.00	2	1280 [50.4]	PDF
LUC-1-1520	\$76.00		1520 [59.8]	PDF
LUC-2-480	\$35.00		480 [18.9]	PDF
LUC-2-640	\$47.00		640 [25.2]	PDF
LUC-2-800	\$59.00		800 [31.5]	PDF
LUC-2-960	\$70.00		960 [37.8]	PDF
LUC-2-1120	\$82.00	2	1120 [44.1]	PDF
LUC-2-1280	\$94.00		1280 [50.4]	PDF
LUC-2-1520	\$111.00		1520 [59.8]	PDF

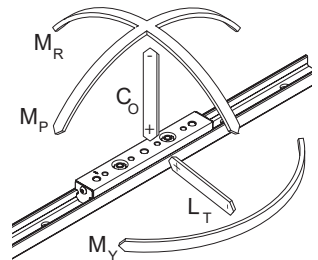
SureMotion® Linear Guides

LUV Series (Double V Wheel)

**LUV-0-3W****LUV-0-4W****LUV-0-5W**

LUV Series V-Carriage

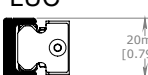

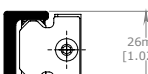

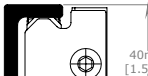

Part Number	Price	Size	Wheel Count	Static (Co)	Lateral (Lt)	Pitch Moment (Mp)	Yaw Moment (My)	Roll Moment (Mr)	Required Adjustment Tool	Price	Drawing Link
LUV-0-3W	\$127.00	0	3	38 N	53 N	0.6 N·m	0.6 N·m	0.2 N·m	LUACC-0	\$25.00	PDF
LUV-0-4W	\$200.00		4	46 N	53 N	21.1 N·m	1.8 N·m	0.4 N·m			PDF
LUV-0-5W	\$227.00		5	54 N	63 N	21.1 N·m	1.8 N·m	0.4 N·m			PDF
LUV-1-3W	\$136.00	1	3	76 N	107 N	2 N·m	2 N·m	0.5 N·m	LUACC-1	\$30.00	PDF
LUV-1-4W	\$209.00		4	91 N	107 N	61.5 N·m	5.1 N·m	1 N·m			PDF
LUV-1-5W	\$227.00		5	107 N	127 N	61.5 N·m	5.1 N·m	1 N·m			PDF
LUV-2-3W	\$164.00	2	3	94 N	142 N	3.6 N·m	3.2 N·m	1.2 N·m	LUACC-2	\$32.00	PDF
LUV-2-4W	\$218.00		4	116 N	142 N	124.9 N·m	9.3 N·m	2.3 N·m			PDF
LUV-2-5W	\$245.00		5	133 N	169 N	124.9 N·m	9.3 N·m	2.3 N·m			PDF



LU Series relative sizes



LUV-1-480 Track
LUV-1-4W Carriage

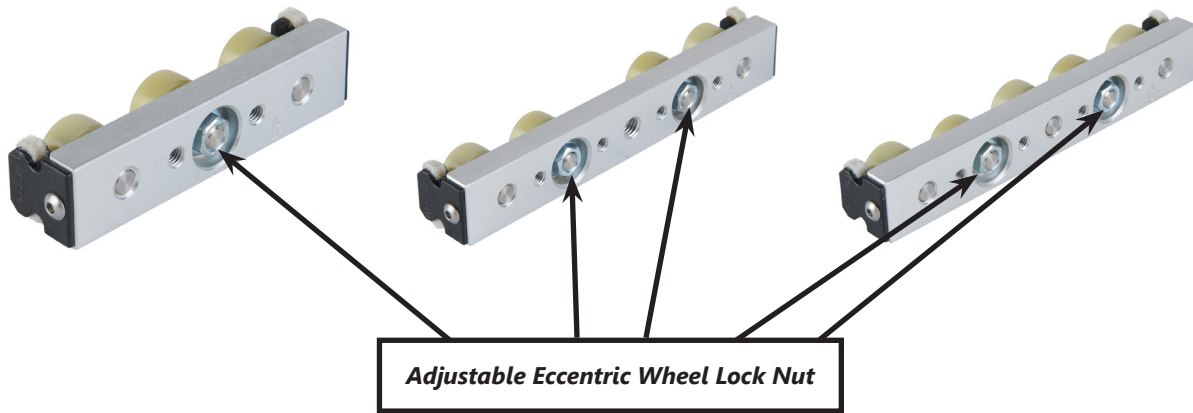
	LUC	LUV
Size 0		
	20mm [0.79in]	
Size 1		
	26mm [1.02in]	
Size 2		
	40mm [1.58in]	

LUV Series Guide Track

Part Number	Price	Size	Length (mm [in])	Drawing Links
LUV-0-480	\$22.00	0	480 [18.9]	PDF
LUV-0-640	\$29.00		640 [25.2]	PDF
LUV-0-800	\$37.00		800 [31.5]	PDF
LUV-0-960	\$44.00		960 [37.8]	PDF
LUV-0-1120	\$51.00		1120 [44.1]	PDF
LUV-0-1280	\$59.00		1280 [50.4]	PDF
LUV-0-1520	\$70.00		1520 [59.8]	PDF
LUV-1-480	\$24.00	1	480 [18.9]	PDF
LUV-1-640	\$32.00		640 [25.2]	PDF
LUV-1-800	\$40.00		800 [31.5]	PDF
LUV-1-960	\$48.00		960 [37.8]	PDF
LUV-1-1120	\$56.00		1120 [44.1]	PDF
LUV-1-1280	\$64.00		1280 [50.4]	PDF
LUV-1-1520	\$76.00		1520 [59.8]	PDF
LUV-2-480	\$35.00	2	480 [18.9]	PDF
LUV-2-640	\$47.00		640 [25.2]	PDF
LUV-2-800	\$59.00		800 [31.5]	PDF
LUV-2-960	\$70.00		960 [37.8]	PDF
LUV-2-1120	\$82.00		1120 [44.1]	PDF
LUV-2-1280	\$94.00		1280 [50.4]	PDF
LUV-2-1520	\$111.00		1520 [59.8]	PDF

SureMotion[®] Linear Guides LUC and LUV Series

Preloading and Adjustment

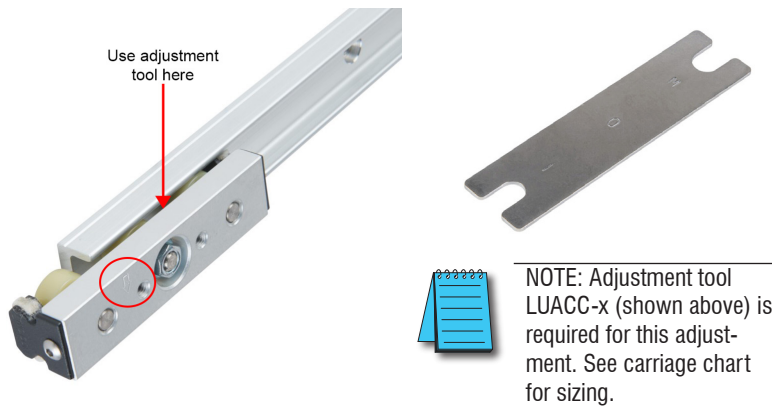


Step 1

Using a socket wrench, loosen the adjustable eccentric wheel lock nut counterclockwise

Step 2

Install the carriage into the guide track with the embossed arrow pointing in the same direction as the primary load. Using the adjusting tool, slowly turn the eccentric cam nut clockwise until a slight resistance is felt. This indicates wheel contact with the track.



Step 3

Using the adjustment tool to hold the eccentric cam nut in place, use the socket wrench to slight tighten the adjustable eccentric wheel lock nut (clockwise).

Step 4

Manually move the carriage along the entire length of the guide track to determine whether there are any noticeable resistance variations. If so, repeat 1-3

Step 5

Using the adjustment tool to hold the eccentric cam nut in place, use the socket wrench to fully tighten the adjustable eccentric wheel lock nut (clockwise).









iglide® Plastic Plain Bearings

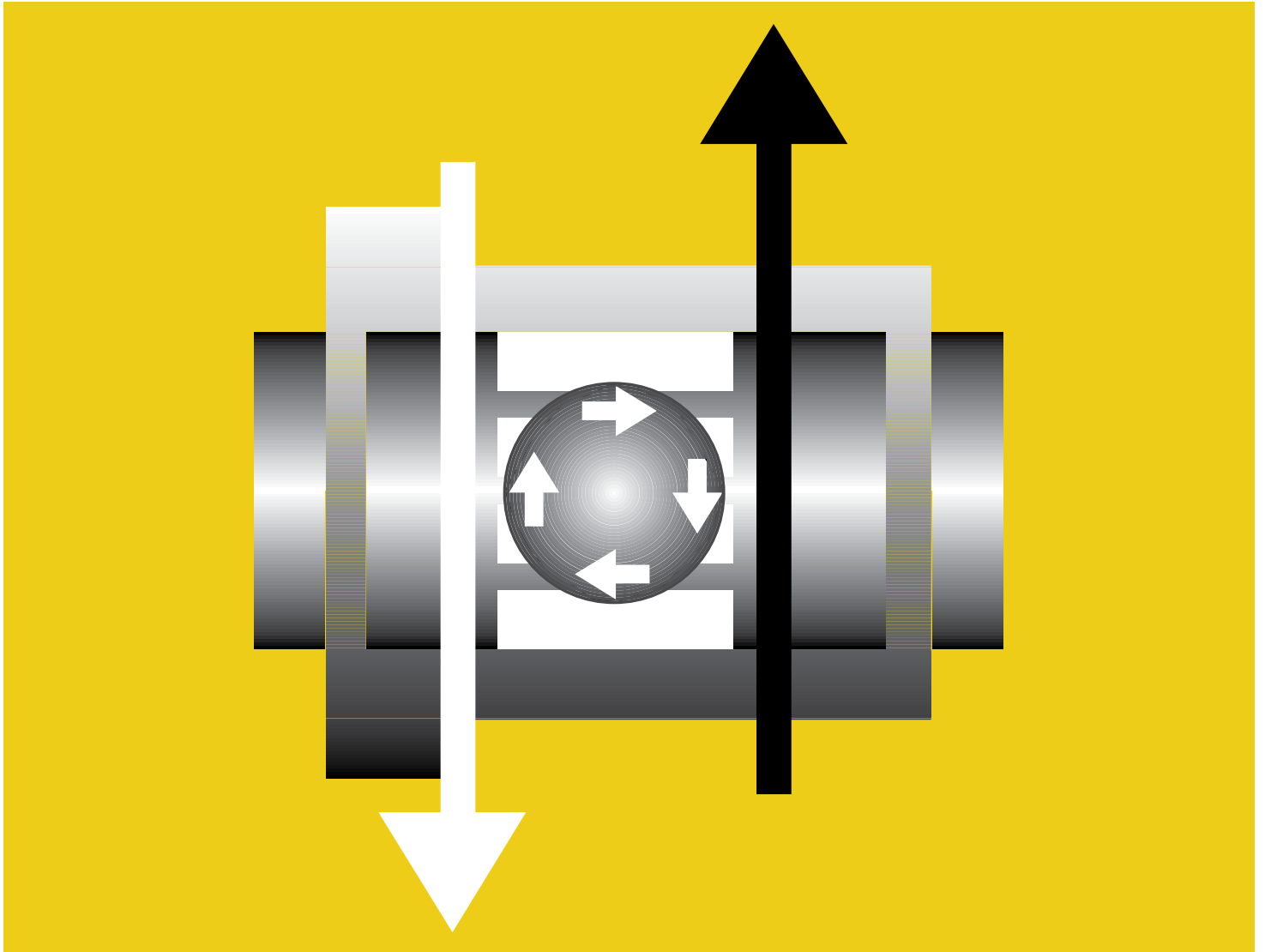
igus® iglide® plastic bearings are economical, dry-running and maintenance-free. Offered in three of the most popular materials with or without flanges, these plain bearings are an excellent choice for a wide range of motion applications.

Features

- 3 popular materials - J (low friction), G300 (general purpose), T500 (high temp)
- Sleeve and flange bearings
- Fits shafts from 1/4" to 1"
- Good chemical resistance
- Link to selection guide materials



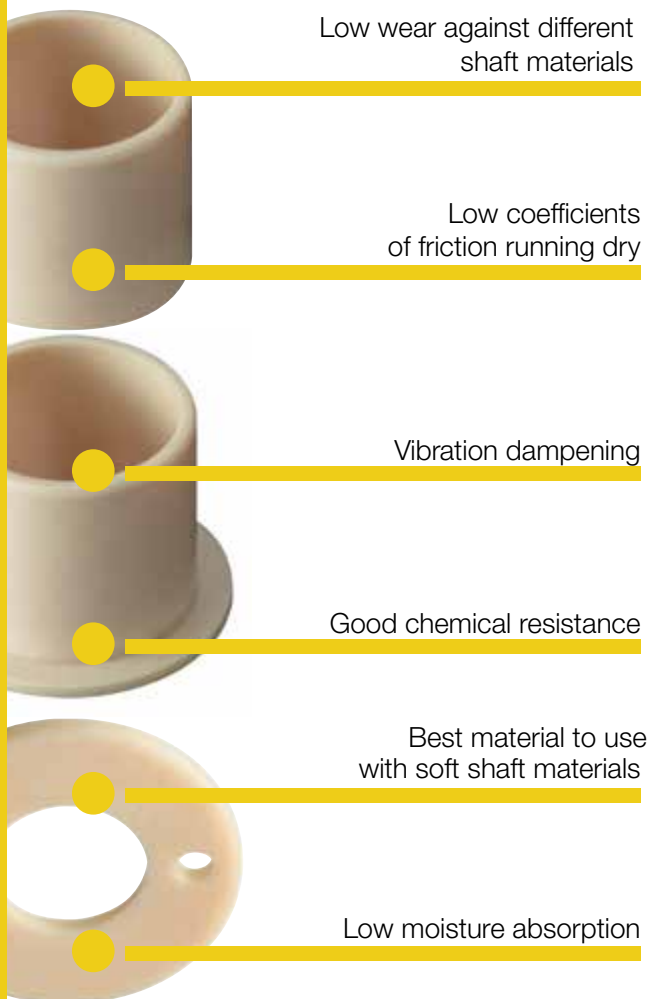
igus® iglide® Plain Bearings									
Item Photo	Part Number	Material	Size I.D. (inch)	Size O.D. (inch)	Flange	Qty. per Package	Weight (lb)	Price	Drawing Link
	A-JSI-0406-04	J	1/4	3/8	No	10	0.19	\$8.50	PDF
	A-JSI-0810-08		1/2	5/8		10	0.04	\$11.00	PDF
	A-JSI-1214-12		3/4	7/8		5	0.03	\$10.00	PDF
	A-JSI-1618-16		1	1-1/8		2	0.44	\$6.50	PDF
	A-JFI-0406-04	J	1/4	3/8	Yes	10	0.02	\$8.75	PDF
	A-JFI-0810-08		1/2	5/8		10	0.49	\$13.50	PDF
	A-JFI-1214-12		3/4	7/8		5	0.49	\$10.50	PDF
	A-JFI-1618-16		1	1-1/8		2	0.04	\$6.50	PDF
	A-GSI-0405-04	G300	1/4	5/16	No	10	0.02	\$8.00	PDF
	A-GSI-0809-08		1/2	9/16		10	0.03	\$8.75	PDF
	A-GSI-1214-12		3/4	7/8		5	0.04	\$10.50	PDF
	A-GSI-1618-16		1	1-1/8		2	0.04	\$7.25	PDF
	A-GFI-0405-04	G300	1/4	5/16	Yes	10	0.02	\$8.00	PDF
	A-GFI-0809-08		1/2	9/16		10	0.04	\$9.50	PDF
	A-GFI-1214-12		3/4	7/8		5	0.05	\$12.00	PDF
	A-GFI-1618-16		1	1-1/8		2	0.03	\$7.25	PDF
	A-TSI-0405-04	T500	1/4	5/16	No	5	0.02	\$15.00	PDF
	A-TSI-0809-08		1/2	9/16		5	0.02	\$16.50	PDF
	A-TSI-1214-12		3/4	7/8		2	0.03	\$19.00	PDF
	A-TSI-1618-16		1	1-1/8		2	0.03	\$25.00	PDF
	A-TFI-0405-04	T500	1/4	5/16	Yes	5	0.01	\$16.00	PDF
	A-TFI-0809-08		1/2	9/16		5	0.02	\$25.50	PDF
	A-TFI-1214-12		3/4	7/8		2	0.02	\$21.00	PDF
	A-TFI-1618-16		1	1-1/8		2	0.04	\$26.50	PDF



iglide® J

- Low wear against different shaft materials
- Low coefficients of friction running dry
- Vibration dampening
- Good chemical resistance
- Low moisture absorption

Low friction, low wear



The iglide® J plain bearings are designed for the lowest coefficients of friction while running dry and their low stick-slip tendency. With a maximum permissible surface pressure of 5,076 psi iglide® J bearings are not suitable for extreme loads.

Best Applications

- For high speeds
- For highest wear resistance at low to medium pressures
- When very low coefficients of friction are necessary
- When a cost effective bearing for low pressure loads is needed

Not For Use In Applications

When high pressure loads occur

➤ iglide® G300

When short-term temperatures occur that are greater than 248°F

➤ iglide® G300

When a low-cost bearing for occasional movements is necessary

➤ iglide® G300



Typical application areas

- Automation
- Printing industry
- Cleanroom
- Aerospace engineering
- Beverage technology
- Automation



max. +194°F
min. -58°F



Ø 1/4 to 1 inch
more sizes available from igus



Ø 1.5 to 110 mm
metric sizes available from igus

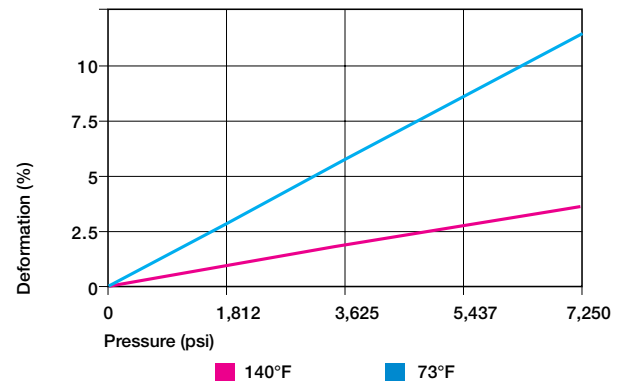


Material Properties Table

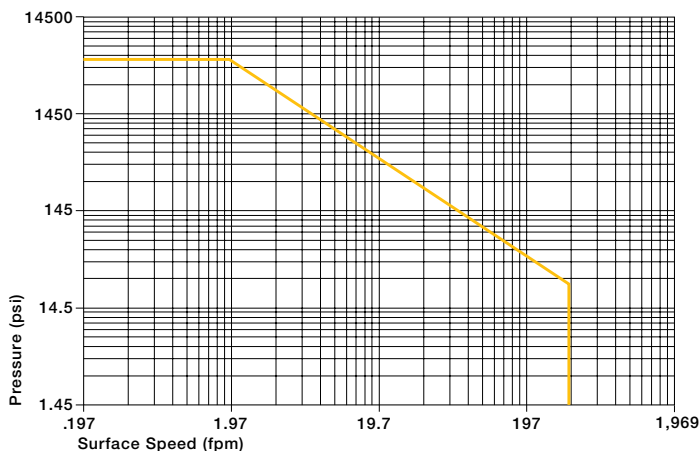
General Properties	Unit	iglide® J	Testing Method
Density	g/cm³	1.49	
Color		yellow	
Max. moisture absorption at 73°F / 50% r.h.	% weight	0.3	DIN 53495
Max. moisture absorption	% weight	1.3	
Coefficient of friction, dynamic against steel	μ	0.06 - 0.18	
pv value, max. (dry)	psi x fpm	9,700	
Mechanical Properties			
Modulus of elasticity	psi	348,100	DIN 53457
Tensile strength at 68°F	psi	10,590	DIN 53452
Compressive strength	psi	8,702	
Permissible static surface pressure (68°F)	psi	5,076	
Shore D-hardness		74	DIN 53505
Physical and Thermal Properties			
Max. long-term application temperature	°F	194	
Max. application temperature, short-term	°F	248	
Min. application temperature	°F	-58	
Thermal conductivity	W/m x K	0.25	ASTM C 177
Coefficient of thermal expansion	K⁻¹ x 10⁻⁵	10	DIN 53752
Electrical Properties			
Specific volume resistance	Ωcm	> 10¹³	DIN IEC 93
Surface resistance	Ω	> 10¹²	DIN 53482

Compressive Strength

With a maximum permissible surface pressure of 5,075 psi, iglide® J plain bearings are not suited for extreme loads. The graph shows the elastic deformation of iglide® J for radial loads. At the maximum permissible load of 5,075 psi, the deformation is less than 2.5%.



Deformation under load and temperature



Permissible pv value for iglide® J running dry against steel shaft, at 68°F

Permissible Surface Speeds

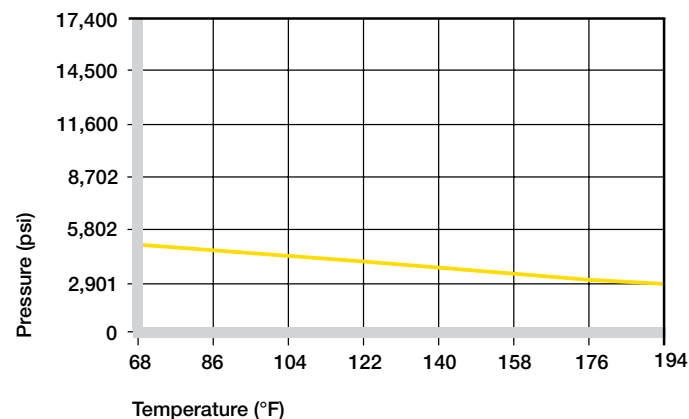
The low coefficient of friction and the extremely low stick-slip tendency of iglide® J plain bearings are especially important at very low speeds. However, iglide® J material can also be used for high speeds of over 197 fpm. In both cases, the static friction is very low and stick-slip does not occur. The maximum values given in the table can only be achieved at the lowest pressure loads. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this temperature level is rarely reached, due to varying application conditions.

	Continuous fpm	Short Term fpm
Rotating	295	590
Oscillating	216	413
Linear	1574	1968

Maximum surface speeds

Temperatures

iglide® J plain bearings can be used between -58°F and 194°F; the short-term maximum permissible temperature is 248°F. The graph shows that the compressive strength of iglide® J plain bearings decreases with increasing temperatures. Also, the wear increases significantly above 176°F



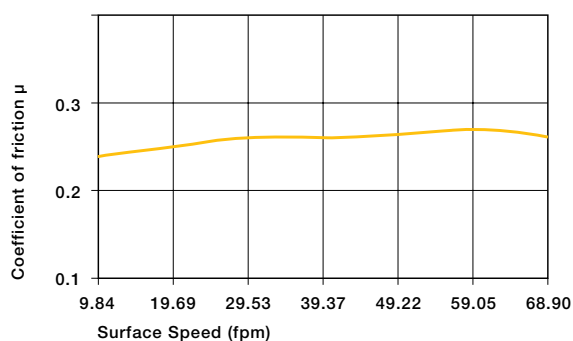
Recommended maximum permissible static surface pressure of iglide® J as a result of the temperature

iglide® J	Application Temperature
Minimum	- 58°F
Max. long-term	+194°F
Max. short-term	+248°F
Additional axial securing	+140°F

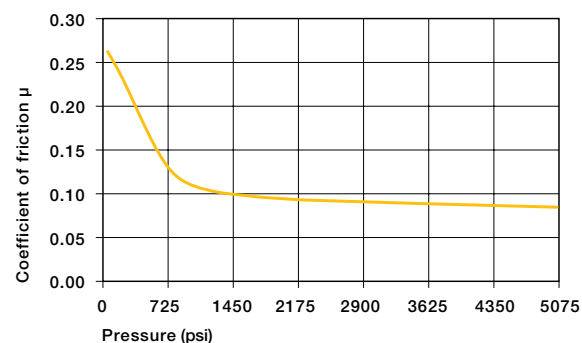
Temperature limits for iglide® J

Friction and Wear

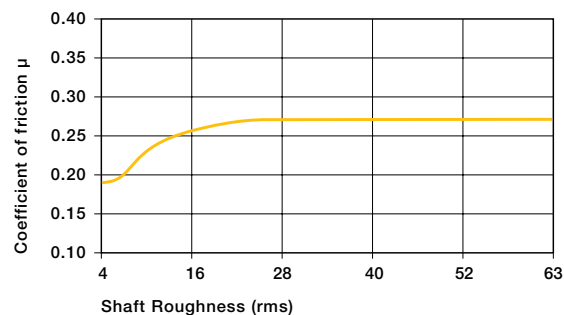
The graph to the right shows the coefficients of friction for different loads. The coefficient of friction level is very good for all loads with iglide® J. Friction and wear are also dependent, to a large extent, on the shafting partner. With increasing shaft roughness, the coefficient of friction also increases. For iglide® J a ground surface with an average roughness range of 4 - 12 rms is recommended for the shaft.



Coefficient of friction of iglide® J as a result of the surface speed; p = 108 psi



Coefficient of friction of iglide® J as a result of the load, v = 1.97 fpm



Coefficient of friction of iglide® J as a result of the shaft surface (1050 hard chromed)

iglide® J	Coefficient of Friction
Dry	0.06 - 0.18
Grease	0.09
Oil	0.04
Water	0.04

Coefficients of friction for iglide® J against steel
(Shaft finish = 40 rms, 50 HRC)

Shaft Materials

The graphs show results of testing different shaft materials with plain bearings made of iglide® J.

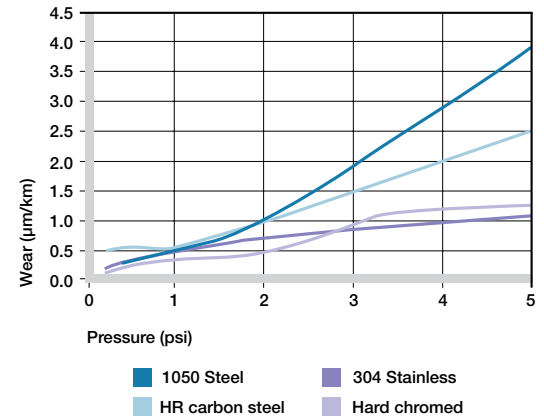
If iglide® J plain bearings are used in rotational applications with loads under 290 psi, several shaft materials are suitable. A Hard Chromed shaft provides the lowest wear in this range. When compared to most iglide® materials, iglide® J has very low wear results at low loads with all shaft materials tested.

Also, for increasing loads up to 725 psi, the wear resistance of iglide® J is excellent. Especially suitable is the combination of 303 stainless steel.

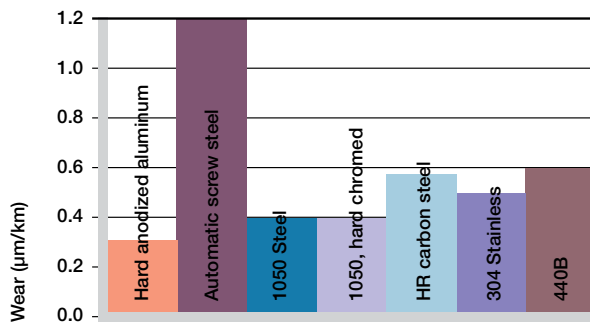
In oscillating operation with Cold Rolled Steel and HR Carbon Steel, the wear of iglide® J is slightly higher than for rotation. For oscillating movements with loads of 290 psi, iglide® J performs best with Cold Rolled Steel shaft.

As shown in the graph, the difference in wear between rotation and oscillating movements is most significant for 303 stainless steel shafts.

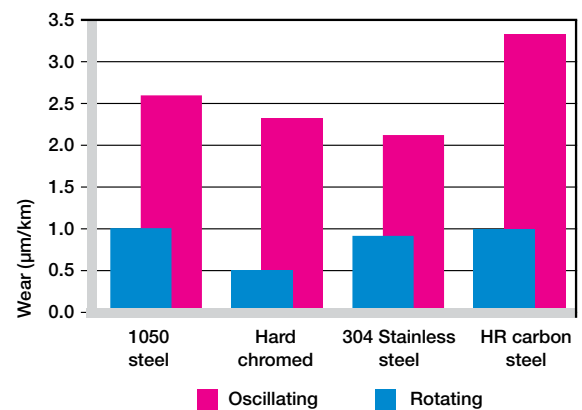
If the shaft material you plan to use is not contained in this list, please contact us.



Wear of iglide® J, rotating application with different shaft materials, depending on load



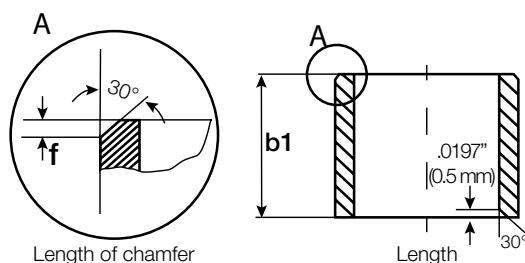
Wear of iglide® J, rotating application with different shaft materials, p = 108 psi, v = 98 fpm



Wear for oscillating and rotating applications with different shaft materials under constant load p = 290 psi

Installation Tolerances

iglide® J plain bearings are oversized before being pressfit. After proper installation into a recommended housing bore, the inner diameter adjusts to meet our specified tolerances. Please adhere to the catalog specifications for housing bore and recommended shaft sizes. This will help to ensure optimal performance of iglide® plain bearings.



For Inch Size Bearings

Length Tolerance (b1)		
Length (inches)	Tolerance (h13) (inches)	Length of Chamfer (f) Based on d1
0.1181 to 0.2362	-0.0000 /-0.0071	f = .012 → d ₁ .040" - .236"
0.2362 to 0.3937	-0.0000 /-0.0087	f = .019 → d ₁ > .236" - .472"
0.3937 to 0.7086	-0.0000 /-0.0106	f = .031 → d ₁ > .472" - 1.18"
0.7086 to 1.1811	-0.0000 /-0.0130	f = .047 → d ₁ > 1.18"
1.1811 to 1.9685	-0.0000 /-0.0154	
1.9685 to 3.1496	-0.0000 /-0.0181	

For Metric Size Bearings

Length Tolerance (b1)		
Length (mm)	Tolerance (h13) (mm)	Length of Chamfer (f) Based on d1
1 to 3	-0 /-140	f = 0.3 → d ₁ 1 - 6 mm
> 3 to 6	-0 /-180	f = 0.5 → d ₁ > 6 - 12 mm
> 6 to 10	-0 /-220	f = 0.8 → d ₁ > 12 - 30 mm
> 10 to 18	-0 /-270	f = 1.2 → d ₁ > 30 mm
> 18 to 30	-0 /-330	
> 30 to 50	-0 /-390	
> 50 to 80	-0 /-460	

Chemical Resistance

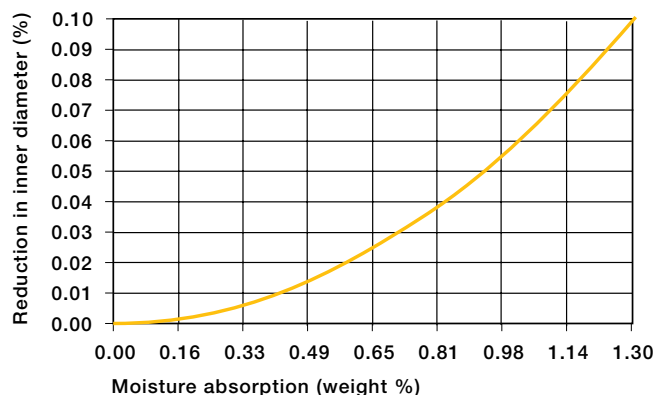
iglide® J plain bearings are resistant to diluted lyes and very weak acids, as well as fuels and all types of lubricants. The low moisture absorption also permits use in wet or damp environments. Plain bearings made of iglide® J are resistant to common cleaning agents used in the food industry. The moisture absorption of iglide® J plain bearings is 0.3% in standard atmosphere. The saturation limit in water is 1.3%. These values are so low that possible design changes due to absorption are only necessary in extreme cases.

Medium	Resistance
Alcohol	+
Hydrocarbon	+
Greases, oils without additives	+
Fuels	+
Weak acids	0 to –
Strong acids	–
Weak alkaline	+
Strong alkaline	+ to 0

+ resistant, 0 conditionally resistant, – not resistant

Chemical resistance of iglide® J

All data given concerns the chemical resistance at room temperature (68°F).



Effect of moisture absorption on iglide® J plain bearings

Radiation Resistance

Plain bearings made from iglide® J are resistant to radiation up to an intensity of 3×10^2 Gy.

UV-Resistance

iglide® J plain bearings become discolored under UV radiation. However, hardness, compressive strength and the wear resistance of the material do not change.

Vacuum

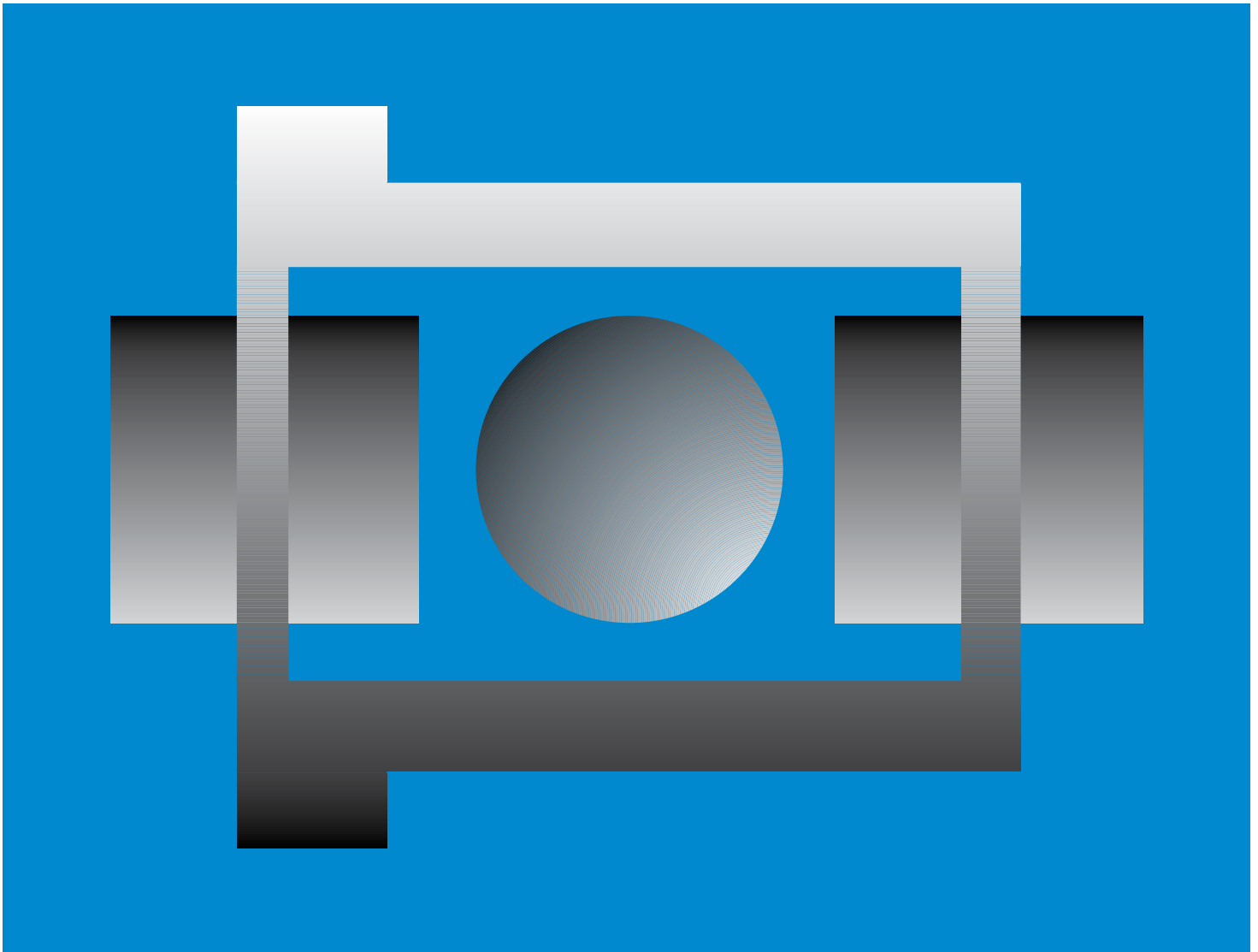
When used in a vacuum environment, the iglide® J plain bearings release moisture as a vapor. Therefore, only dehumidified bearings made of iglide® J are suitable for the vacuum environment.

Electrical Properties

iglide® J plain bearings are electrically insulating.

iglide® J	
Specific volume resistance	$> 10^{13} \Omega \text{cm}$
Surface resistance	$> 10^{12} \Omega$

Electrical properties of iglide® G300

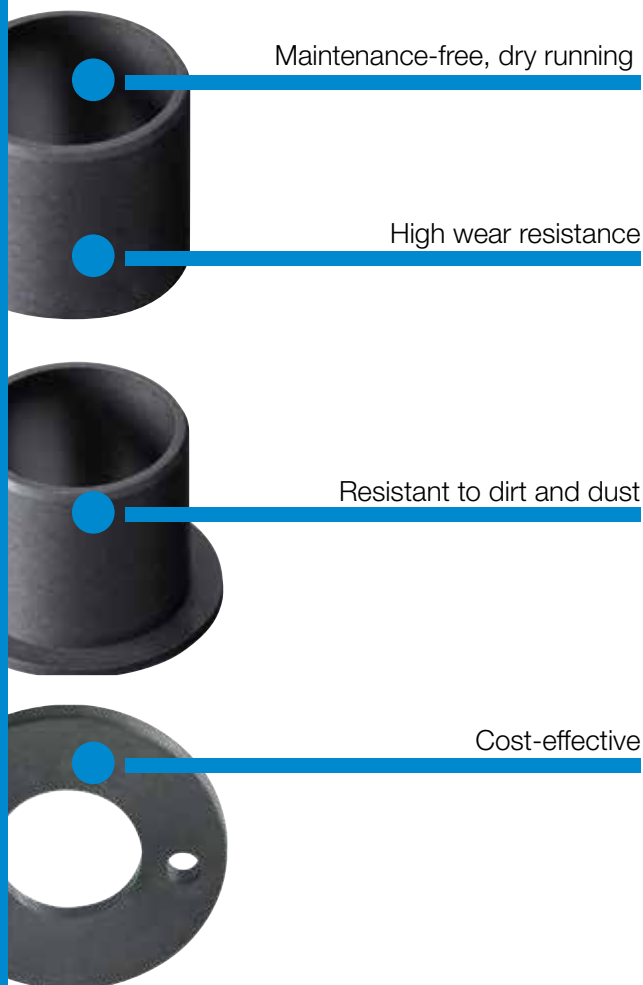


iglide® G300

- High wear resistance
- Resistance to dust and dirt
- Economic
- Self-lubricating and maintenance free

iglide® G300 - General Purpose

Most popular iglide® material worldwide



iglide® G300 bearings cover an extremely wide range of different requirements. Typical applications include medium to high loads, medium sliding speeds and medium temperatures. Typical applications include medium to high loads, medium sliding speeds and medium temperatures.

+ Best Applications

- When you need an economical all-around performance bearing
- For low to average surface speeds
- When the bearing needs to run on different shaft materials
- For oscillating and rotating movements

— Not For Use In Applications

- When mechanical reaming of the wall surface is necessary
- When the highest wear resistance is necessary
- When universal chemical resistance is required
 - iglide® T500
- If temperatures are constantly greater than +266°F
 - iglide® T500
- For underwater use



Typical application areas

- Agricultural machines
- Machine building
- Sports and leisure
- Automotive
- Mechatronics
- Construction machinery



max. +266°F
min. -40°F



Ø 1/4 to 1 inch
more sizes available from igus



Ø 1.5 to 150 mm
metric sizes available from igus

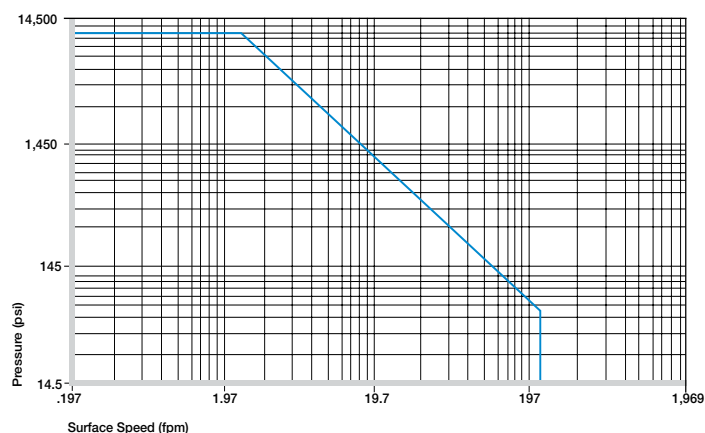
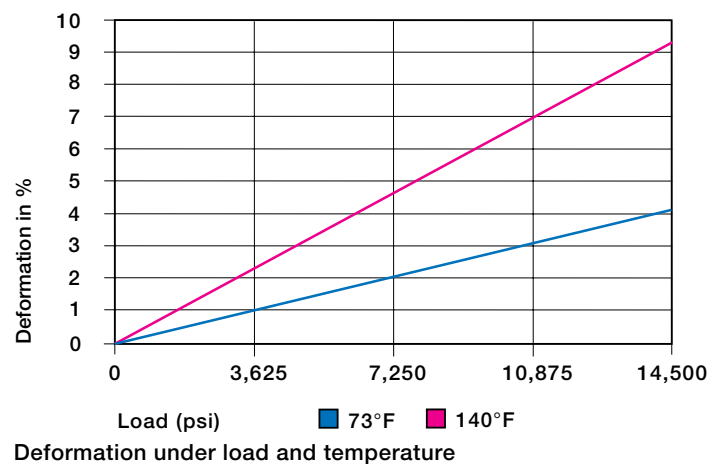


Material Properties Table

General Properties	Unit	iglide® G300	Testing Method
Density	g/cm ³	1.46	
Color		dark gray	
Max. moisture absorption at 73°F / 50% r.h.	% weight	0.7	DIN 53495
Max. moisture absorption	% weight	4.0	
Coefficient of friction, dynamic against steel	μ	0.08 - 0.15	
pv value, max. (dry)	psi x fpm	12,000	
Mechanical Properties			
Modulus of elasticity	psi	1,131,000	DIN 53457
Tensile strength at 68°F	psi	30,460	DIN 53452
Compressive strength	psi	11,310	
Permissible static surface pressure (68°F)	psi	11,600	
Shore D-hardness		81	DIN 53505
Physical and Thermal Properties			
Max. long-term application temperature	°F	266	
Max. application temperature, short-term	°F	428	
Min. application temperature	°F	-40	
Thermal conductivity	W/m x K	0.24	ASTM C 177
Coefficient of thermal expansion	K ⁻¹ x 10 ⁻⁵	9	DIN 53752
Electrical Properties			
Specific volume resistance	Ωcm	> 10 ¹³	DIN IEC 93
Surface resistance	Ω	> 10 ¹¹	DIN 53482

Compressive Strength

The graph shows the elastic deformation of iglide® G300 during radial loading. At the maximum permissible load of 11,600 psi, the deformation is less than 5%. The plastic deformation is minimal up to a pressure of approximately 14,500 psi. However, it is also a result of the cycle time.



Permissible pv value for iglide® G300 running dry against a steel shaft, at 68°F

Permissible Surface Speeds

iglide® G300 has been developed for low to medium surface speeds. The maximum values shown in the table can only be achieved at low pressure loads. At the given speeds, friction can cause a temperature increase to maximum permissible levels. In practice, though, this temperature level is rarely reached, due to varying application conditions.

	Continuous fpm	Short Term fpm
Rotating	196	393
Oscillating	137	275
Linear	787	984

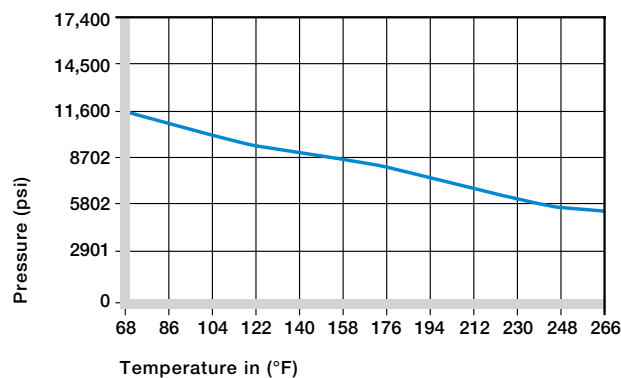
Maximum surface speeds

Temperatures

Application temperatures affect the properties of plain bearings greatly. The short-term maximum temperature is 428°F, this allows the use of iglide® G300 plain bearings in heat treating applications in which the bearings are not subjected to additional loading.

With increasing temperatures, the compressive strength of iglide® G300 plain bearings decreases. The graph shows this inverse relationship. However, at the long-term maximum temperature of 266°F, the permissible surface pressure is still above 5,800 psi.

The ambient temperatures that are prevalent in applications also has an effect on the bearing wear. With increasing temperatures, the wear increases and this effect is notable starting at the temperature of 248°F.



Recommended maximum permissible static surface pressure of iglide® G300 as a result of temperature

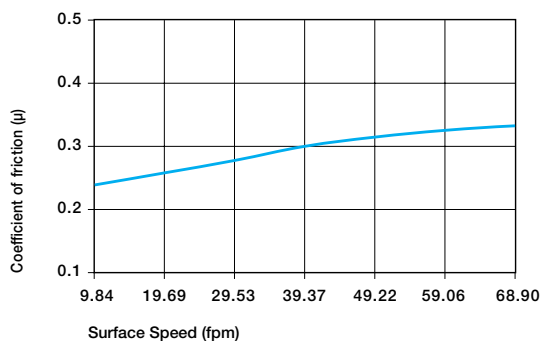
iglide® G300	Application Temperature
Minimum	- 40°F
Max. long-term	+266°F
Max. short-term	+428°F
Additional axial securing	+176°F

Temperature limits for iglide® G300

Friction and Wear

Similar to wear resistance, the coefficient of friction μ also changes with the load. The coefficient of friction decreases with increasing loads, whereas an increase in surface speed causes an increase of the coefficient of friction. This relationship explains the excellent results of iglide® G300 plain bearings for high loads and low speeds.

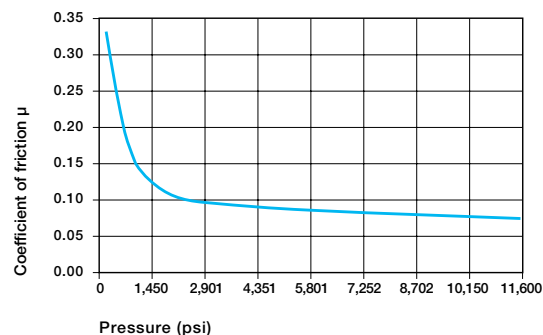
The friction and wear are also dependent, to a large degree, on the shaft partner. Shafts that are too smooth, increase both the coefficient of friction and the wear of the bearing. For iglide® G300, a ground surface with an average roughness $R_a = 32$ rms is recommended.



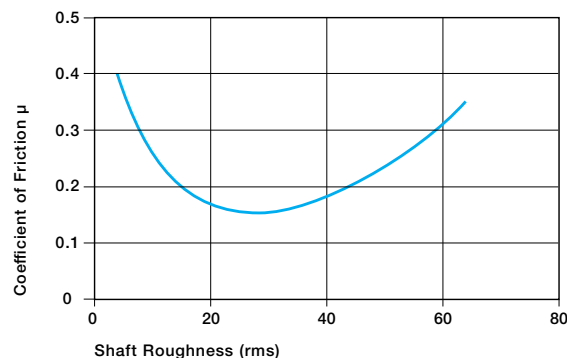
Coefficient of friction of iglide® G300 as a result of the running speed; $p = 108$ psi

iglide® G300	Coefficient of Friction
Dry	0.08 - 0.15
Grease	0.09
Oil	0.04
Water	0.04

Coefficient of friction for iglide® G300 against steel
(Shaft finish = 40 rms, 50 HRC)



Coefficient of friction of iglide® G300 as a result of the load, $v = 1.96$ fpm



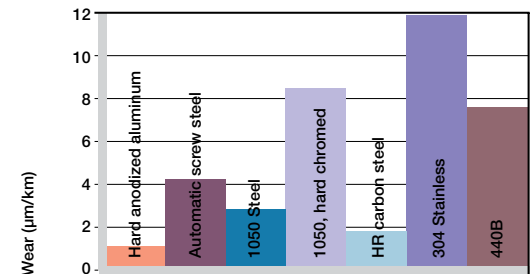
Coefficient of friction as result of the shaft surface
(Shaft - 1050 hard chromed)

Shaft Materials

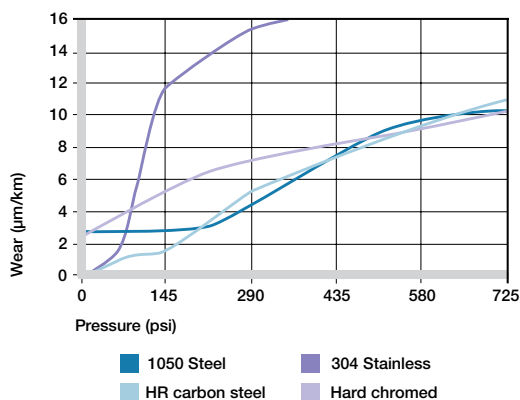
The graphs show results of testing different shaft materials with plain bearings made of iglide® G300. In the graph below it is observed that iglide® G300 can be combined with various shaft materials. The simple shaft materials of free-cutting steel and HR Carbon Steel have proven best at low loads. This helps to design cost-effective systems, since both iglide® G300 and the sliding partner are economically priced.

It is important to note that with increasing loads, the recommended hardness of the shaft increases. The “soft” shafts tend to wear more easily and thus increase the wear of the overall system. If the loads exceed 290 psi, it is important to recognize that the wear rate (the slope of the curves) clearly decreases with the hard shaft materials.

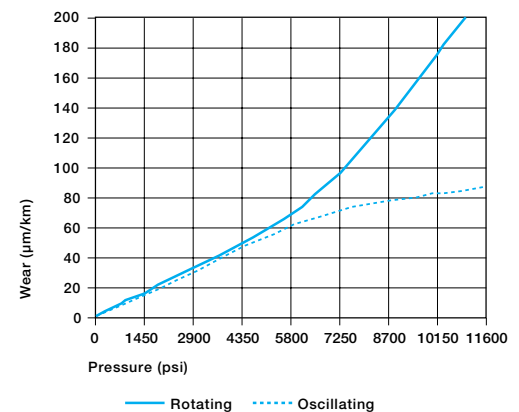
The comparison of rotational movements to oscillating movements shows that iglide® G300 can provide advantages in oscillating movements. The wear of the bearing is smaller for equivalent conditions. The higher the load, the larger the difference. This means that iglide® G300 can be used for oscillating movements that are well above the given maximum load of 11,600 psi. For these loads, the use of hardened shafts is recommended. In addition to the shaft materials presented here, many others have been tested. If the shaft material you plan on using is not contained in the test results presented here, please contact us.



Wear of iglide® G300, rotating with different shaft materials, load p = 145 psi, v = 59 fpm



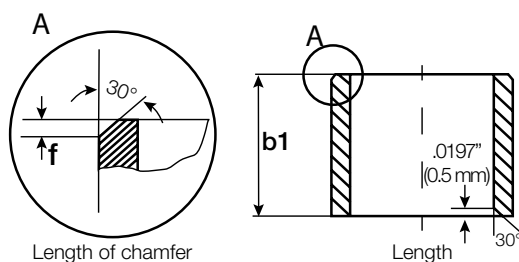
Wear with different shaft materials in rotational operation, as a result of the load



Wear for pivoting and rotating applications with shaft material 1050 hard chromed, as a result of the load

Installation Tolerances

iglide® G300 plain bearings are oversized before being pressfit. After proper installation into a recommended housing bore, the inner diameter adjusts to meet our specified tolerances. Please adhere to the catalog specifications for housing bore and recommended shaft sizes. This will help to ensure optimal performance of iglide® plain bearings.



For Inch Size Bearings

Length Tolerance (b1)		
Length (inches)	Tolerance (h13) (inches)	Length of Chamfer (f) Based on d1
0.1181 to 0.2362	-0.0000 /-0.0071	f = .012 → d ₁ .040" - .236"
0.2362 to 0.3937	-0.0000 /-0.0087	f = .019 → d ₁ > .236" - .472"
0.3937 to 0.7086	-0.0000 /-0.0106	f = .031 → d ₁ > .472" - 1.18"
0.7086 to 1.1811	-0.0000 /-0.0130	f = .047 → d ₁ > 1.18"
1.1811 to 1.9685	-0.0000 /-0.0154	
1.9685 to 3.1496	-0.0000 /-0.0181	

For Metric Size Bearings

Length Tolerance (b1)		
Length (mm)	Tolerance (h13) (mm)	Length of Chamfer (f) Based on d1
1 to 3	-0 /-140	f = 0.3 → d ₁ 1 - 6 mm
> 3 to 6	-0 /-180	f = 0.5 → d ₁ > 6 - 12 mm
> 6 to 10	-0 /-220	f = 0.8 → d ₁ > 12 - 30 mm
>10 to 18	-0 /-270	f = 1.2 → d ₁ > 30 mm
>18 to 30	-0 /-330	
>30 to 50	-0 /-390	
>50 to 80	-0 /-460	

Chemical & Moisture Resistance

iglide® G300 plain bearings have strong resistance to chemicals. They are also resistant to most lubricants.

iglide® G300 plain bearings are not affected by most weak organic and inorganic acids.

The moisture absorption of iglide® G300 plain bearings is approximately 1% in the standard atmosphere. The saturation limit submerged in water is 4%. This must be taken into account for these types of applications.

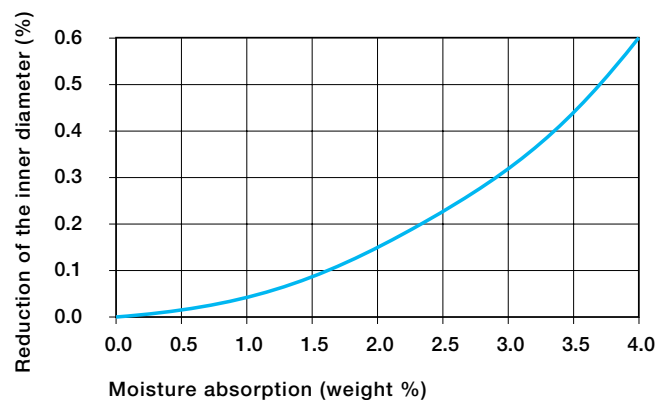
► Chemical table, Page 1364

Medium	Resistance
Alcohol	+ to 0
Hydrocarbon	+
Greases, oils without additives	+
Fuels	+
Weak acids	0 to –
Strong acids	–
Weak alkaline	+
Strong alkaline	0

+ resistant, 0 conditionally resistant, – not resistant

Chemical resistance of iglide® G300

All data given concerns the chemical resistance at room temperature (68°F).



Effect of moisture absorption on iglide® G300 plain bearings

Radiation Resistance

Plain bearings made from iglide® G300 are resistant to radiation up to an intensity of 3×10^2 Gy.

UV-Resistance

iglide® G300 plain bearings are permanently resistant to UV-radiation.

Vacuum

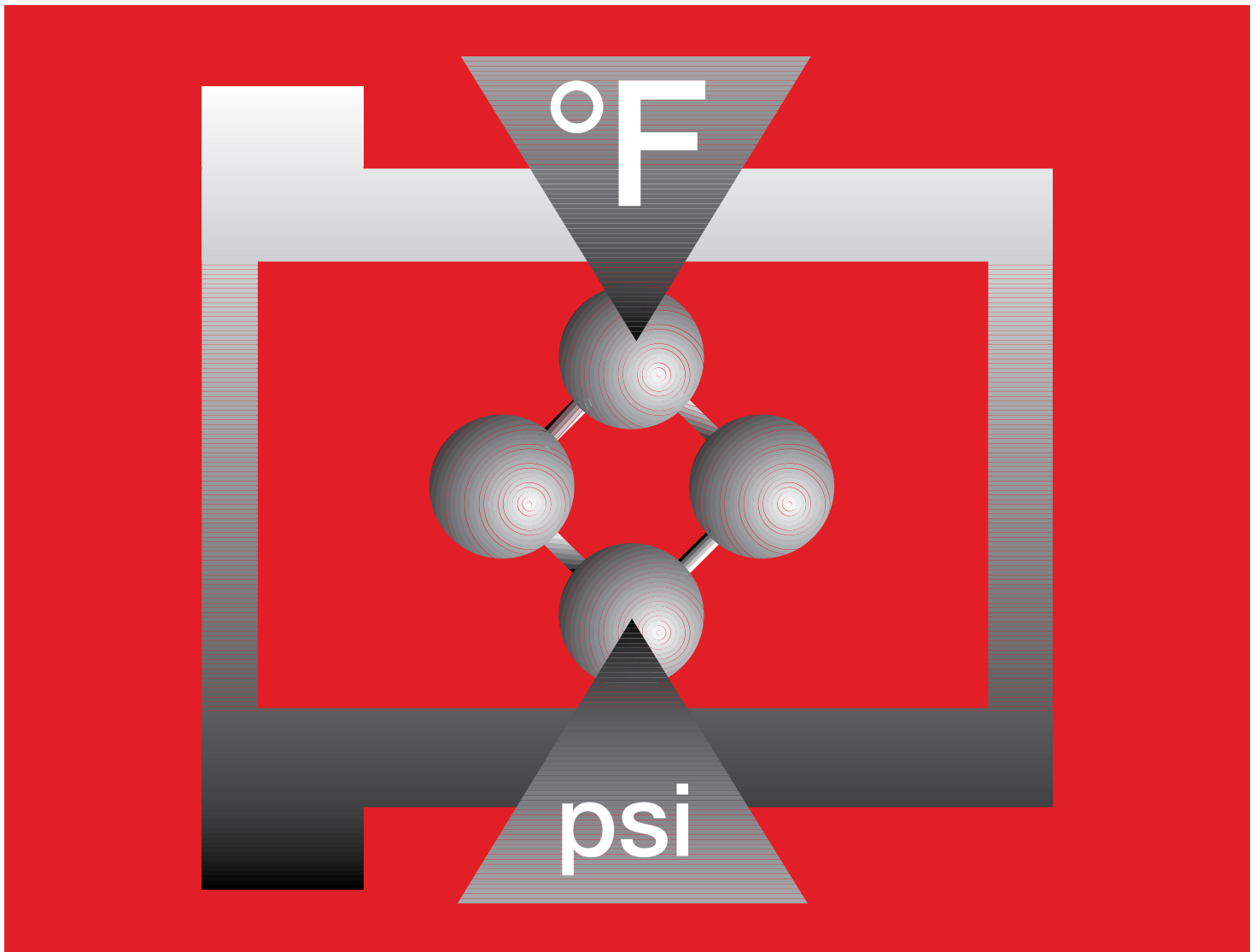
iglide® G300 plain bearings outgas in a vacuum. Use in a vacuum environment is only possible for dehumidified bearings.

Electrical Properties

iglide® G300 plain bearings are electrically insulating.

iglide® G300	
Specific volume resistance	$> 10^{13} \Omega \text{cm}$
Surface resistance	$> 10^{11} \Omega$

Electrical properties of iglide® G300



iglide® T500

- Temperature resistant from -148°F to 482°F in continuous operation
- Universal resistance to chemicals
- High compressive strength
- Very low moisture absorption
- Excellent wear resistance through the entire temperature range

iglide® T500 - High-Tech Problem Solver

High temperature and chemical resistance

Temperature resistant
from -148°F to 482°F in
continuous operation

Universal resistance to chemicals

High compressive strength

Very low moisture absorption

Excellent wear resistance through
the entire temperature range

iglide® T500 is defined by its combination of high temperature resistance with compressive strength, along with high resistance to chemicals. iglide® T500 is designed for higher speeds than other iglide® bearings.

+ Best Applications

- When especially high temperature resistance is necessary
- For pressure loads up to 21,760 psi
- For linear movements with a hard stainless steel
- For linear movements especially at high temperatures
- When universal resistance to chemicals is required
- Very low moisture absorption

— Not For Use In Applications

- For very low wear at high loads
- For economical underwater applications
- For edge compression



Typical application areas

- Beverage technology
- Woodworking
- Aerospace engineering
- Cleanroom
- Plastic processing industry



max. +482°F
min. -148°F



Ø 1/4 to 1 inch
more sizes available from igus



Ø 2 to 75 mm
metric sizes available from igus

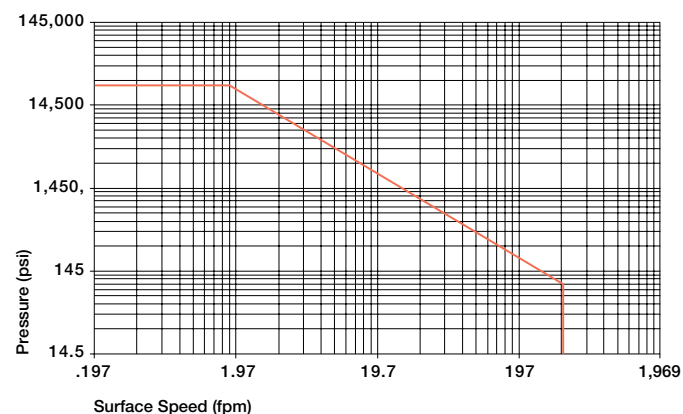
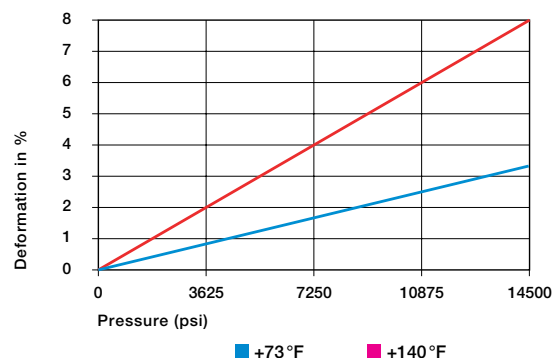


Material Properties Table

General Properties	Unit	iglide® T500	Testing Method
Density	g/cm³	1.44	
Color		black	
Max. moisture absorption at 73°F / 50% r.h.	% weight	0.1	DIN 53495
Max. moisture absorption	% weight	0.5	
Coefficient of friction, dynamic against steel	μ	0.09 - 0.27	
pv value, max. (dry)	psi x fpm	37,700	
Mechanical Properties			
Modulus of elasticity	psi	1,174,800	DIN 53457
Tensile strength at 68°F	psi	24,660	DIN 53452
Compressive strength	psi	14,500	
Permissible static surface pressure (68°F)	psi	21,760	
Shore D-hardness		85	DIN 53505
Physical and Thermal Properties			
Max. long-term application temperature	°F	482	
Max. application temperature, short-term	°F	599	
Min. application temperature	°F	-148	
Thermal conductivity	W/m x K	0.6	ASTM C 177
Coefficient of thermal expansion	K⁻¹ x 10⁻⁵	5	DIN 53752
Electrical Properties			
Specific volume resistance	Ωcm	< 10⁵	DIN IEC 93
Surface resistance	Ω	< 10³	DIN 53482

Compressive Strength

The graph shows the special compression resistance of iglide® T500 also at very high temperatures. Even at the highest long-term application temperature of 482°F, iglide® T500 plain bearings still withstand a static surface pressure of approximately 4350 psi.



Permissible pv values for iglide® T500 running dry against a steel shaft, at 68°F

Permissible Surface Speeds

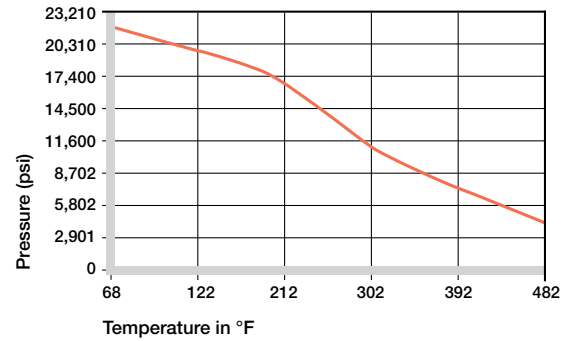
iglide® T500 is designed for higher speeds than other iglide® bearings. This is due to its high temperature resistance and excellent heat conductivity. These benefits are readily apparent in the pv values of max. 37,700 psi x fpm. However, only the smallest radial loads may act on the bearings. At the given speeds, friction can cause a temperature increase to maximum permissible levels.

	Continuous fpm	Short Term fpm
Rotating	295	689
Oscillating	216	492
Linear	984	1968

Temperatures

In terms of temperature resistance, iglide® T500 has taken on a leading position. Having a permissible long-term application temperature of 482°F, iglide® T500 will even withstand 599°F for the short-term.

As in all thermoplastics, the compression resistance of T500 decreases with increased temperature. However, the wear drops considerably when used within the observed temperature range of 73°F to 302°F. In certain cases, relaxation of the bearing can occur at temperatures greater than 275°F. This could lead to the bearing moving out of the housing after re-cooling. At temperatures over 275°F, the axial securing of the bearing in the housing needs to be tested. If necessary, secondary measures must be taken to mechanically secure the bearing. Please contact us if you have questions on bearing use.



Recommended maximum permissible static surface pressure of iglide® T500 as a result of temperature

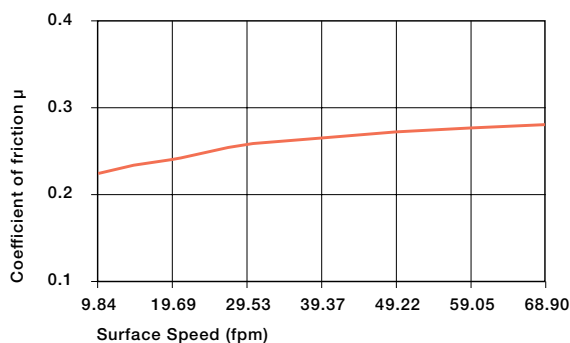
iglide® T500	Application Temperature
Minimum	- 148°F
Max. long-term	+482°F
Max. short-term	+599°F
Additional axial securing	+275°F

Temperature limits for iglide® T500

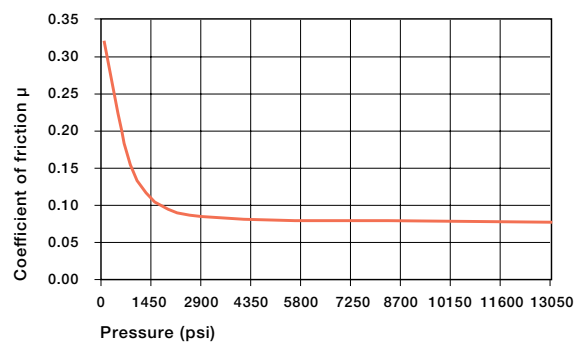
Friction and Wear

Similar to wear resistance, the coefficient of friction μ also changes with the load. The coefficient of friction increases with an increase in surface speed. On the other hand, an increased load has an inverse effect: the coefficient of friction decreases. This explains the excellent performance of iglide® T500 plain bearings for high loads.

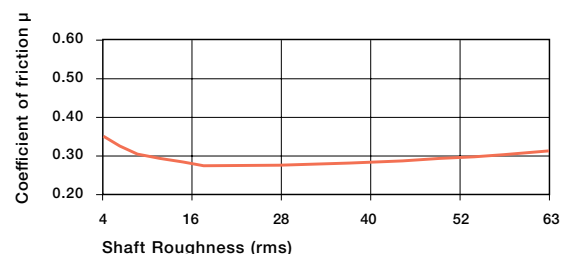
Friction and wear are also dependent to a large degree on the shafting partner. Shafts that are too smooth increase the coefficient of friction of the bearing. For iglide® T500, a ground surface with an average roughness range of 24 - 32 rms is recommended for the shaft.



Coefficient of friction for iglide® T500 as a result of the surface speed; p = 108 psi, 1050 hard chromed



Coefficient of friction for iglide® T500 as a result of the load, v = 1.97 fpm



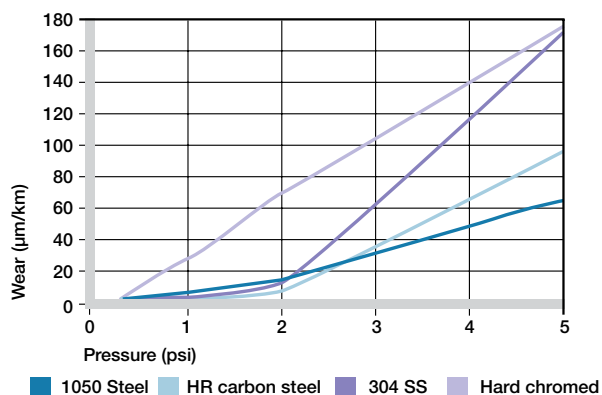
Coefficients of friction as a function of the shaft surface (1050 hard chromed)

iglide® T500	Coefficient of Friction
Dry	0.09 - 0.27
Grease	0.09
Oil	0.04
Water	0.04

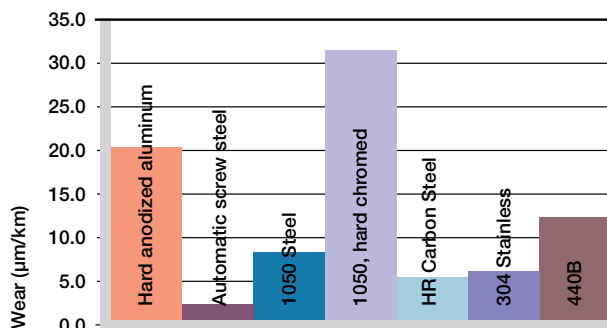
Coefficient of friction for iglide® T500 against steel
(Shaft finish = 40 rms, 50 HRC)

Shaft Materials

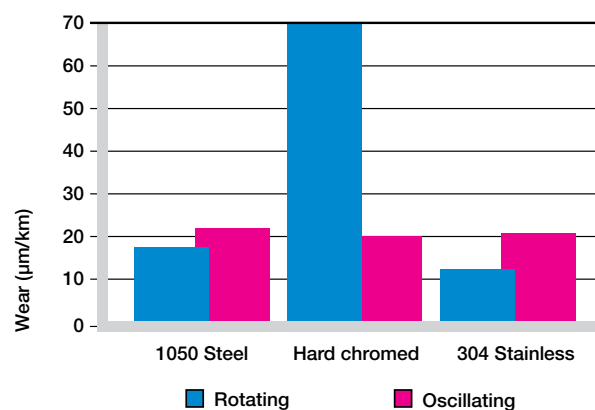
The graphs show results of testing different shaft materials with plain bearings made of iglide® T500. For low loads in rotating operation, the best wear values are found with 303 Stainless and HR Carbon Steel shafts. However, above a load of 290 psi, the bearing wear greatly increases with these two shaft materials. For the higher load range, hard-chromed shafts or Cold Rolled Steel shafts are advantageous. In oscillating operation at low loads, similar wear values for cold rolled steel and 303 stainless steel shafts occur. The wear is somewhat higher than during rotational movements. If the shaft material you plan to use is not contained in this list, please contact us.



Wear of iglide® T500 with different shaft materials in rotational operation



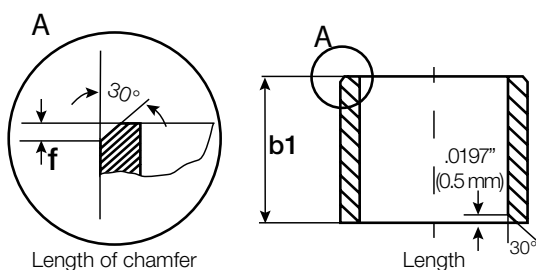
Wear of iglide® T500 with different shaft materials, p = 108 psi, v = 98 fpm



Wear for oscillating and rotating applications with different shaft materials p = 290 psi

Installation Tolerances

iglide® T500 plain bearings are oversized before being pressfit. After proper installation into a recommended housing bore, the inner diameter adjusts to meet our specified tolerances. Please adhere to the catalog specifications for housing bore and recommended shaft sizes. This will help to ensure optimal performance of iglide® plain bearings.



For Inch Size Bearings

Length Tolerance (b1)		Length of Chamfer (f) Based on d1
Length (inches)	Tolerance (h13) (inches)	
0.1181 to 0.2362	-0.0000 /-0.0071	f = .012 → d ₁ .040" - .236"
0.2362 to 0.3937	-0.0000 /-0.0087	f = .019 → d ₁ > .236" - .472"
0.3937 to 0.7086	-0.0000 /-0.0106	f = .031 → d ₁ > .472" - 1.18"
0.7086 to 1.1811	-0.0000 /-0.0130	f = .047 → d ₁ > 1.18"
1.1811 to 1.9685	-0.0000 /-0.0154	
1.9685 to 3.1496	-0.0000 /-0.0181	

For Metric Size Bearings

Length Tolerance (b1)		Length of Chamfer (f) Based on d1
Length (mm)	Tolerance (h13) (mm)	
1 to 3	-0 /-140	f = 0.3 → d ₁ 1 - 6 mm
> 3 to 6	-0 /-180	f = 0.5 → d ₁ > 6 - 12 mm
> 6 to 10	-0 /-220	f = 0.8 → d ₁ > 12 - 30 mm
>10 to 18	-0 /-270	f = 1.2 → d ₁ > 30 mm
>18 to 30	-0 /-330	
>30 to 50	-0 /-390	
>50 to 80	-0 /-460	

Chemical Resistance

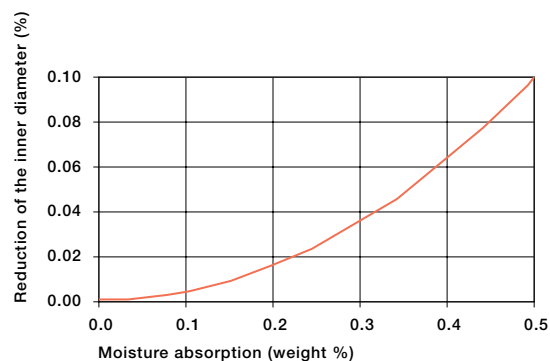
iglide® T500 plain bearings are close to universally resistant to chemicals. They are only attacked by concentrated nitric acid and by sulfuric acid with acidity levels over 65%. The list at the end of this catalog provides more comprehensive detailed information.

Medium	Resistance
Alcohol	+
Hydrocarbon	+
Greases, oils without additives	+
Fuels	+
Weak acids	+
Strong acids	–
Weak alkaline	+
Strong alkaline	+

+ resistant, 0 conditionally resistant, – not resistant

Chemical resistance of iglide® T500

All data given concerns the chemical resistance at room temperature (68°F).



Effect of moisture absorption on iglide® T500 plain bearings

Radiation Resistance

Plain bearings made from iglide® T500 are resistant to radiation up to an intensity of 1×10^5 Gy. iglide® T500 is the most radioactive-resistant material of the iglide® product line. iglide® T500 is extremely resistant to hard gamma radiation and withstands a radiation dose of 1000 Mrad without detectable change in its properties. The material also withstands an alpha or beta radiation of 10,000 Mrad with practically no damage.

UV Resistance

The excellent material properties of iglide® T500 do not change under UV radiation and other weathering effects.

Vacuum

In a vacuum environment, iglide® T500 plain bearings can be used virtually without restrictions. Outgassing takes place to a very limited extent.

Electrical Properties

iglide® T500 plain bearings are electrically conductive.

iglide® T500	
Specific volume resistance	$< 10^5 \Omega \text{cm}$
Surface resistance	$< 10^3 \Omega$

Electrical properties of iglide® T500






igubal® Mounted Spherical Bearings

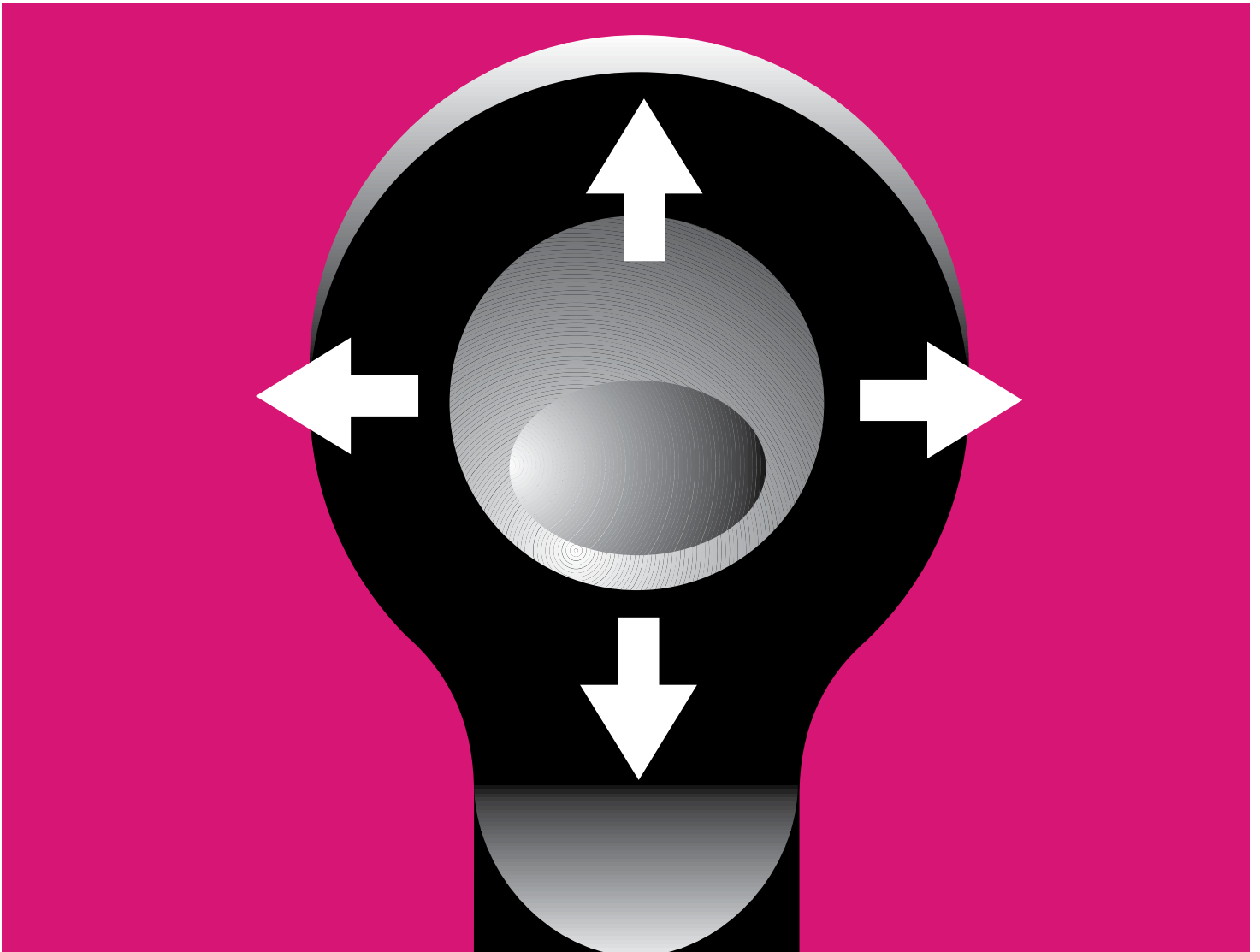
igus® igubal® mounted spherical bearings are made with high quality engineered polymers. They are lubrication-free and maintenance-free. These bearings are lighter and more economical than traditional mounted spherical bearings.

Features

- Five popular mounting configurations
- Four popular shaft sizes
- Maintenance-free
- Excellent wear resistance
- L280 polymer type bearing material



igus® igubal® Mounted Spherical Bearings								
Item Photo	Part Number	Style	Size I.D. (inch)	Thread/Housing Type	Qty. per Package	Weight (lb)	Price	Drawing Link
	A-KBRI-04	K Series, Female Thread, Rod End	1/4	1/4-28 UNF female	4	0.06	\$16.00	PDF
	A-KBRI-08		1/2	1/2-20 UNF female	2	0.12	\$24.00	PDF
	A-KBRI-12		3/4	3/4-16 UNF female	1	0.14	\$18.50	PDF
	A-KBRI-16		1	1-12 UNF female	1	0.46	\$22.50	PDF
	A-KARI-04	K Series, Male Thread, Rod End	1/4	1/4-28 UNF male	4	0.04	\$15.50	PDF
	A-KARI-08		1/2	1/2-20 UNF male	2	0.10	\$15.50	PDF
	A-KARI-12		3/4	3/4-16 UNF male	1	0.10	\$12.50	PDF
	A-KARI-16		1	1-12 UNF male	1	0.34	\$20.00	PDF
	A-KSTI-04	K Series, Pillow Block	1/4	Pillow block	4	0.02	\$12.00	PDF
	A-KSTI-08		1/2		2	0.07	\$16.00	PDF
	A-KSTI-12		3/4		1	0.09	\$10.00	PDF
	A-KSTI-16		1		1	0.20	\$16.50	PDF
	A-EFOI-04	E Series, 2-Bolt Flange	1/4	2-bolt flange	4	0.03	\$15.50	PDF
	A-EFOI-08		1/2		2	0.05	\$16.00	PDF
	A-EFOI-12		3/4		1	0.09	\$14.50	PDF
	A-EFOI-16		1		1	0.14	\$18.00	PDF
	A-EFSI-04	E Series, 4-Bolt Flange	1/4	4-bolt flange	4	0.04	\$22.50	PDF
	A-EFSI-08		1/2		2	0.04	\$17.00	PDF
	A-EFSI-12		3/4		1	0.12	\$13.50	PDF
	A-EFSI-16		1		1	0.17	\$16.00	PDF



igubal® Rod Ends

- Self-lubricating, maintenance-free
- High strength under impact loads
- High tensile strength
- Compensation of misalignment
- Compensation of edge loads
- Very low weight

igubal® rod ends can also be used in rough environments. They are corrosion-resistant in humid environments and resistant to weak acids and bases. The operation temperature is from -40°F up to +176°C. Rod ends are also resistant to dirt and dust.

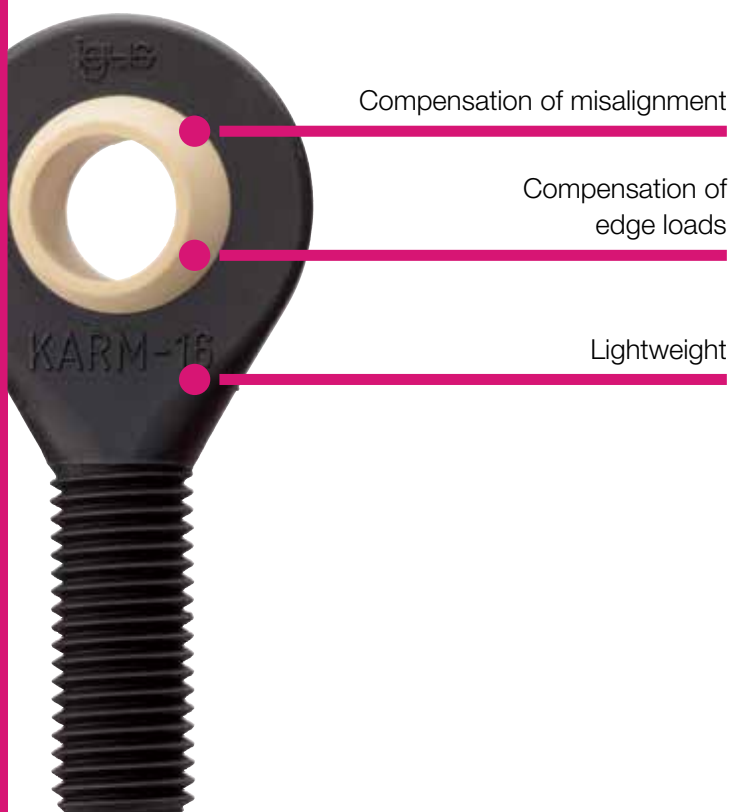



+ Best Applications


- If you want to save weight
- For rotating, oscillating and linear movements
- If high-frequency oscillations/vibrations occur
- If silent operation is required
- If you need an electrically insulating part
- If corrosion resistance is required
- In combination with pneumatic cylinders and gas struts ●
- If chemical resistance is required
- If high rigidity is required


- Not For Use In Applications

- If temperatures are higher than +176 °F
- If rotation speeds higher than 98.4 fpm (0.5 m/s) are required
- If really high tensile and shear loads occur
- With a hydraulic cylinder
- If dimensions above 1 inch or 30 mm are required



 max. +392°F
min. -40°F

 Ø 1/4 to 1 inch
more sizes available from igus

 Ø 2 to 30 mm
metric sizes available from igus

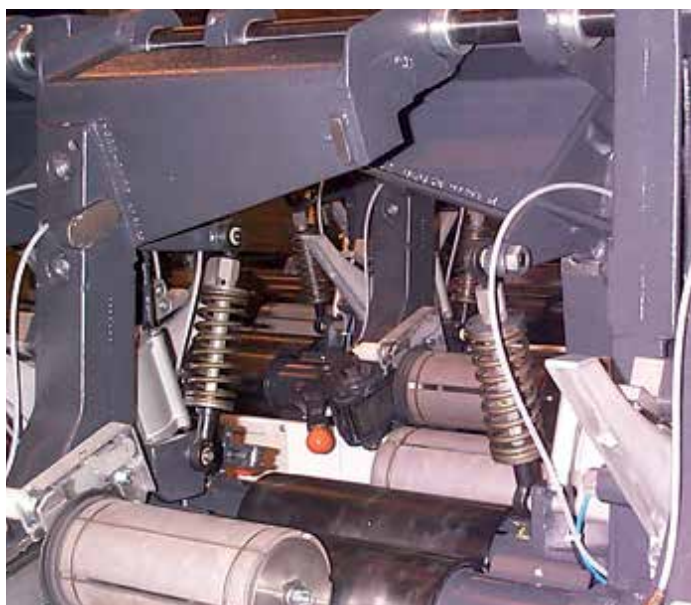


Typical application areas

- Agricultural machines
- Machine building
- Sports and leisure
- Automotive
- Mechatronics
- Construction machinery



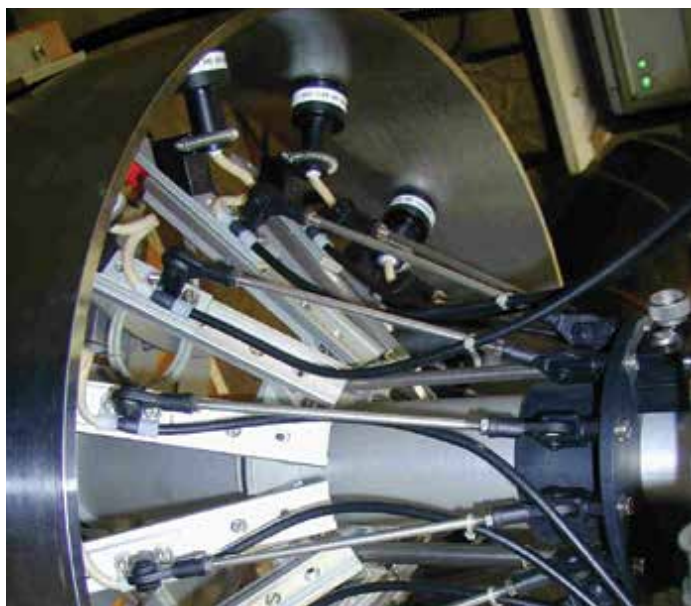
Specialty bikes



Textile industry



Packaging industry



Offshore industry

Advantages

- Maintenance-free
- High strength under impact loads
- Very high tensile strength for varying loads
- Compensation for misalignment
- Compensation for edge loads
- Resistant to dirt, dust and lint
- Resistant to corrosion and chemicals
- High vibration dampening capacity
- Suitable for rotating, oscillating and linear movements
- Lightweight
- Dimensional K series and E series, dimensions according to standard DIN ISO 12240

Product range

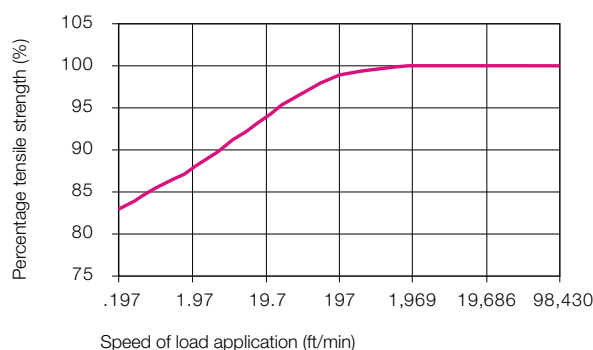
igubal® rod ends are available in the dimensional K series and E series for shaft diameters of 3/16 to 1 inch and 2 to 30 mm.

- Form A – with male thread and
- Form B – with female thread

The dimensional K series and, to a limited extent, E are available in inch dimensions, as well as a special version containing a stainless steel sleeve in the inner race. This allows a significantly higher torque than for the standard plastic race.

Loads

igubal® rod end bearings handle high loads at normal room temperatures, have excellent dampening properties and weigh only a fifth of traditional metallic rod end bearings. In applications with high continuous loads and high temperatures, the loading capacity of igubal® rod end bearings should be tested in an experiment that duplicates the application.



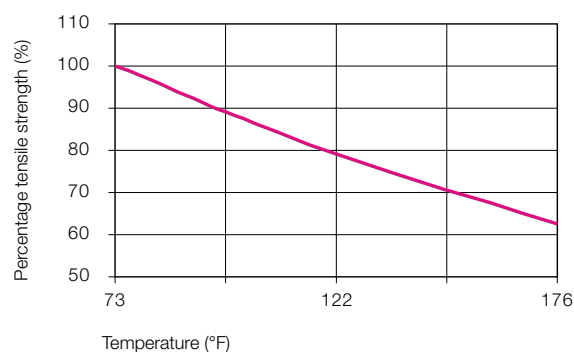
Effect of the speed of load application on the maximum tensile strength of igubal® rod end bearings

Coefficients of Friction and Speed

One important advantage of igubal® spherical bearings is that rapid, rotary movements of a mounted shaft take place directly in the spherical portion. In metallic rod ends, rotary motion takes place between the race and the spherical bearing. High speeds can be achieved with igubal® bearings.

igubal® bearings are used in such a way that the angular movements of the spherical bearings take place at the spherical outer diameter. In contrast, rotations of the shaft are supported directly in the inner diameter of the spherical portion. The advantage, therefore, lies in the plastic vs. steel relationship. Plastic produces lower friction and permits high speeds, even when running dry.

The maintenance-free igubal® bearing system is also suited for linear and oscillating shaft movements.



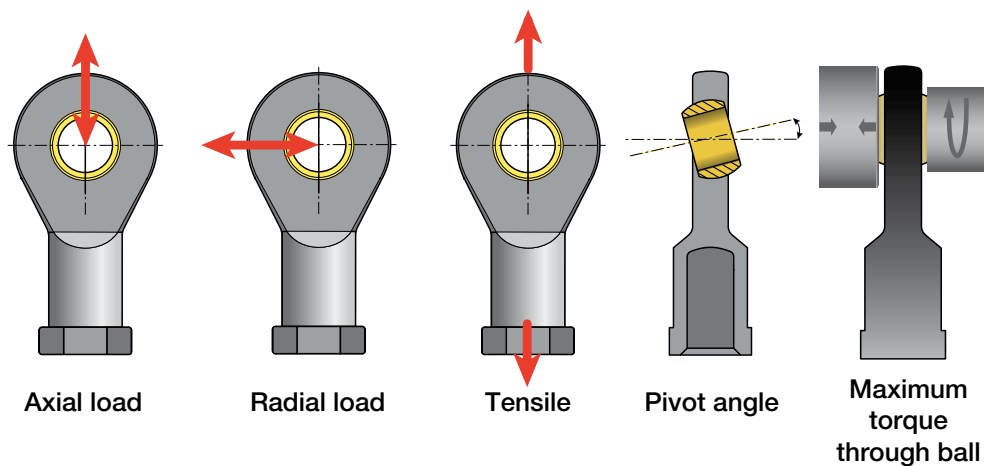
Effect of the temperature on the maximum tensile strength of igubal® rod end bearings

Temperatures

The igubal® rod ends can be used in temperatures from -22 °F up to +176 °F. igubal® rod ends made of HT-Material are suitable for temperatures from -40 °F up to +392 °F (E series, types A and B).

Tolerances

igubal® rod end bearings can be used at different tolerances depending on the individual application. As a standard program, they are designed with a large amount of bearing clearance, which permits secure operation even at high rotational speeds. The bore of the inner race is produced within a standard tolerance range. Shafts should also meet recommended tolerances.

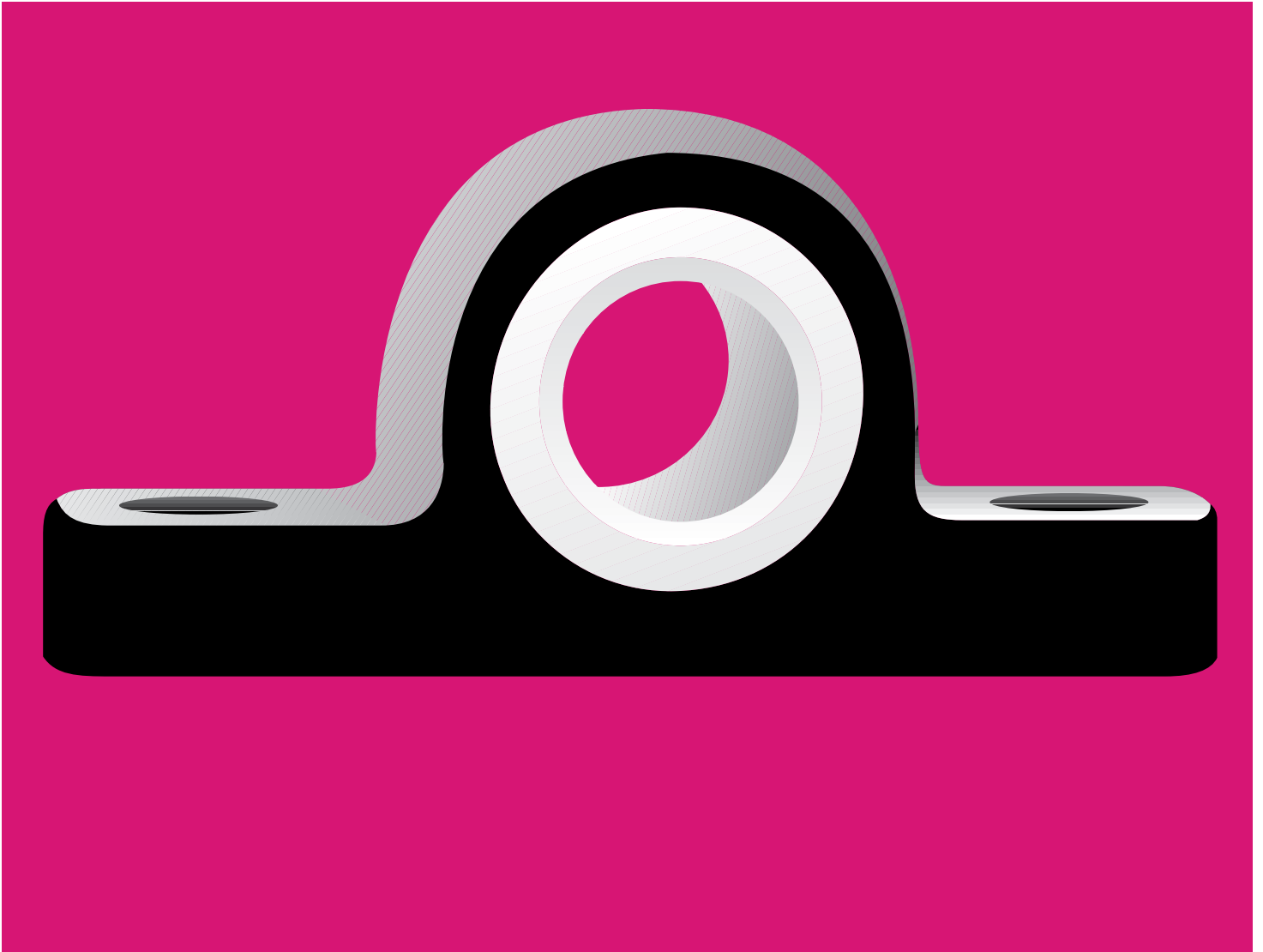


Recommended Shaft Tolerances

Inch	Shaft		Metric	Shaft	
	Min.	Max.		Min.	Max.
3/16	0.1888	0.1900	2mm	1.975	2.000
1/4	0.2485	0.2500	3mm	2.975	3.000
5/16	0.3110	0.3125	5mm	4.970	5.000
3/8	0.3735	0.3750	6mm	5.970	6.000
7/16	0.4358	0.4375	8mm	7.964	8.000
1/2	0.4983	0.5000	10mm	9.964	10.000
5/8	0.6235	0.6250	12mm	11.957	12.000
3/4	0.7479	0.7500	16mm	15.957	16.000
1	0.9980	1.0000	20mm	19.948	20.000

Thread pitches of the igubal® rod end bearings

Thread Name	Pitch (mm)
M 2	0.40
M 3	0.50
M 4	0.70
M 5	0.80
M 6	1.00
M 8	1.25
M 10	1.50
M 10 F	1.25
M 12	1.75
M 12 F	1.25
M 14	2.00
M 16	2.00
M 16 F	1.50
M 18	1.50
M 20	2.50
M 20 M 20	1.50
M 22	1.50
M 24	2.00
M 27	2.00
M 30	2.00

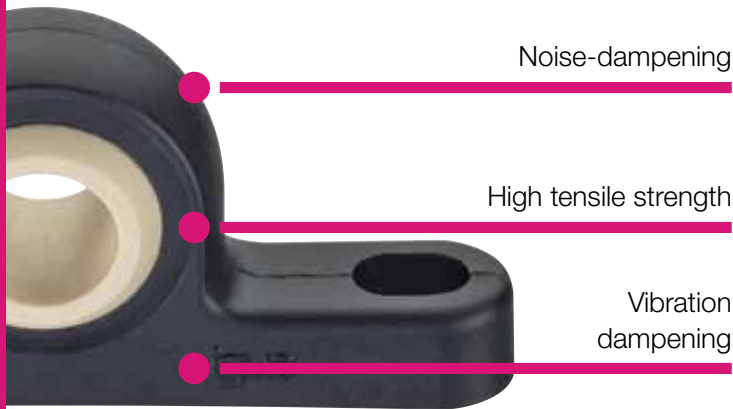


igubal® Pillow Block

- Maintenance-free, dry running
- High tensile strength
- High endurance strength
- Can be used in combination with E series rod ends
- Lightweight

igubal® Pillow Block

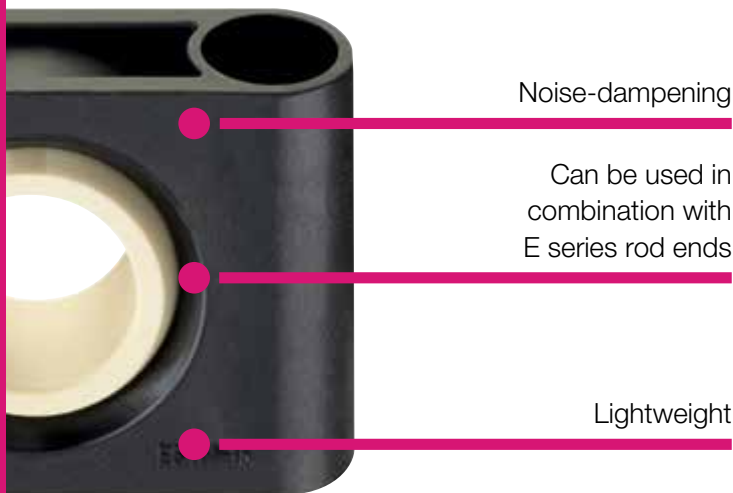
The igubal® pillow block bearings consist of a housing with a bearing insert. igubal® pillow block bearings are especially easy to install, able to compensate for misalignment and prevent edge loads.



Noise-dampening

High tensile strength

Vibration dampening



Noise-dampening

Can be used in combination with E series rod ends

Lightweight

+ Best Applications

- If chemical resistance is required
- If a cost-effective option is requested
- If you need dirt-resistant bearings
- To account for misalignment
- If you need split components

— Not For Use In Applications

- If temperatures are higher than +176°F
- If an integrated fixing collar is required
- If diameters above 1 inch or 50 mm are required
- If rotation speeds higher than 98.4 fpm (0.5 m/s) are required



max. +176°F
min. -22°F



Ø 1/4 to 1 inch
more sizes available from igus



Ø 5 to 50 mm
metric sizes available from igus



Typical application areas

- Plant design
- Machine building
- Packaging etc.



Stone processing



Solar technology



Paper industry



Packaging industry

General information

igubal® pillow blocks are made of igumid G according to DIN 71752. The pillow blocks are available in a variety of configurations. igubal® pillow blocks can be used in difficult circumstances without any problems. The pillow blocks are corrosion resistant in moist or wet environments and the sliding bearings are resistant to weak acids and alkalis. The operating temperatures range from -22°F to +176°F. igubal® pillow blocks are made out of a high-wear resistant material which requires no external lubrication.

Advantages

- Maintenance-free, self-lubricating
- High rigidity
- High strength under impact loads
- Compensation for misalignment
- Compensation for edge loads
- Corrosion-free
- Chemically resistant
- Vibration damping
- Suitable for rotating, oscillating and linear movements
- Lightweight
- High radial loads
- Can be used in liquid media
- Space-saving design
- Easy to install
- Predictable lifetime

Chemical resistance

The ability to pivot allows igubal® pillow block bearings to compensate for misalignment and possible shaft deflection. Applications where these effects cannot be prevented are suited for igubal pillow block bearings.

Tolerances

Maintenance-free igubal® pillow block bearings are designed with inside diameter tolerance of E10. The shaft should be made to tolerance class h6 to h9. These recommended tolerances allow for changes in the bearing due to temperature and moisture absorption.

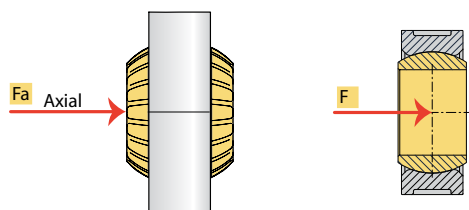
Mounting

igubal® pillow block bearings are designed for mounting with 2 bolts. Precision mounting of the bearing is not necessary, since the spherical ball compensates for misalignment.

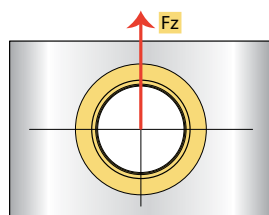
Loads

The load capacity of the maintenance-free igubal® bearing elements is very high at normal ambient temperatures. igubal® bearings absorb high forces and weigh only one fifth of traditional, metal bearing housings. The excellent dampening properties are based on the fact that the polymer material of the two part bearing can absorb vibrations differently than steel.

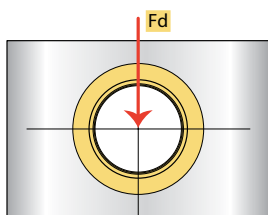
However, plastic specific properties, such as dependence on temperature and behavior under long-term stress, must be taken into consideration when using igubal® bearings. The load capacity of the pillow block should therefore be checked in a practical test, particularly if it will be used under continuous high loads and at elevated temperatures.



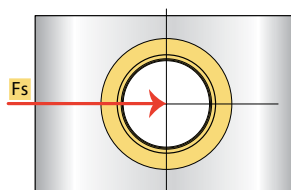
Axial Strength



Radial tensile strength
(upward)

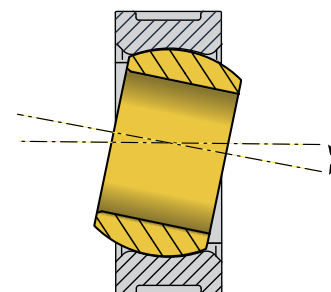


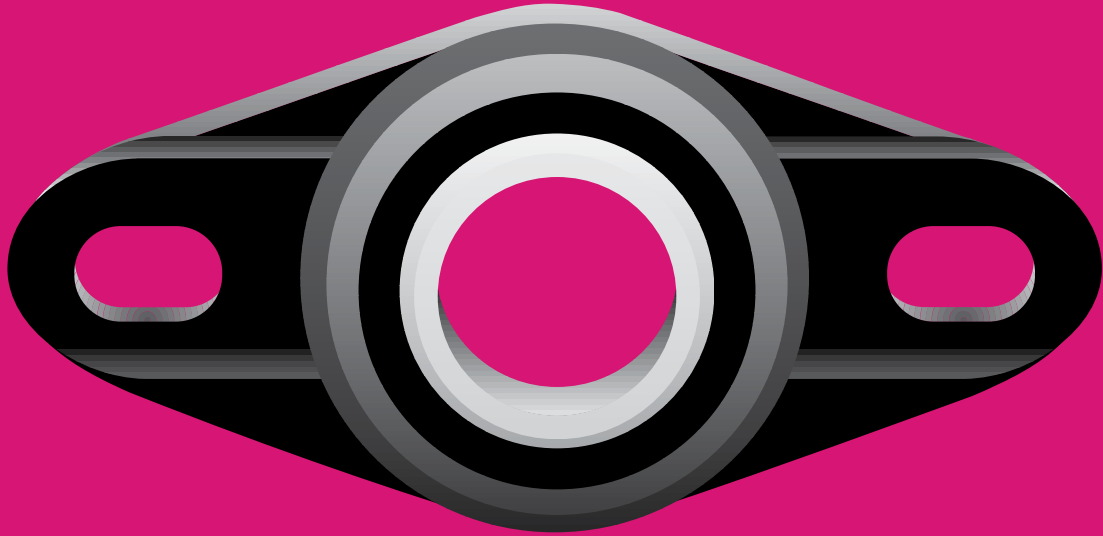
Radial compressive strength
(downward)



Lateral strength
(radial)

Pivot angle



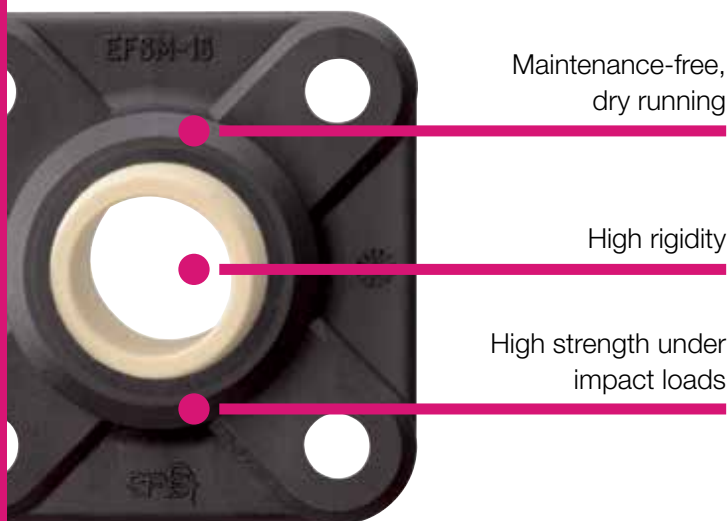


igubal® Flange Bearing

- Maintenance-free, dry running
- High tensile strength
- High endurance strength
- Compensation for alignment errors
- Compensation for edge loads
- Lightweight

igubal® Flange Bearing

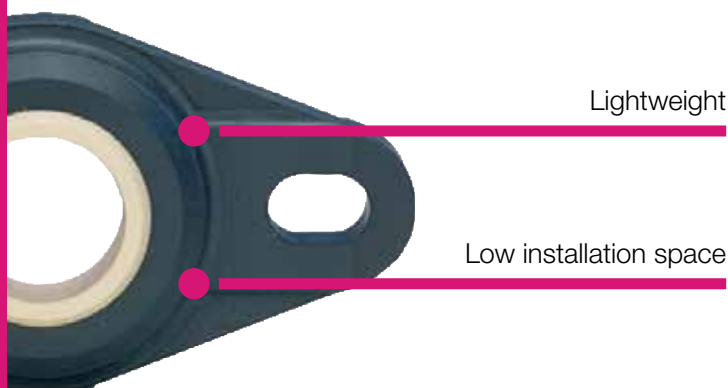
igubal® Flange bearings have been developed for the support of shaft ends or for shafts lead-through. Like all igubal® products, these bearings consist of an igumid G housing and an iglide® L280 spherical ball (with other options available). igubal® Flange bearings are made to the dimensional E series and are offered with two or four mounting holes.



Maintenance-free,
dry running

High rigidity

High strength under
impact loads



Lightweight

Low installation space

+ Best Applications

- If chemical resistance is required
- If a cost-effective option is requested
- If you need dirt-resistant bearings
- To adjust misalignment
- If you need split components

— Not For Use In Applications

- If temperatures are higher than +176 °F
- If an integrated fixing collar is required
- If diameters above 1 inch or 50 mm are required
- If rotation speeds higher than 98.4 fpm (0.5 m/s) are required



max. +176°F
min. -40°F



Ø 3/8 to 1 inch
more sizes available from igus



Ø 4 to 50 mm
metric sizes available from igus

igubal® Flange Bearing - Application examples



Typical application areas

- Plant design
- Automation
- Agricultural machines
- Machine building
- Food industry etc.



Conveyor technique



Solar industry



Rotary sorter

tMNC-158



Food industry

This page contains igus® factory information and was current as of 1/15/18. Information subject to change without notice.

General Properties

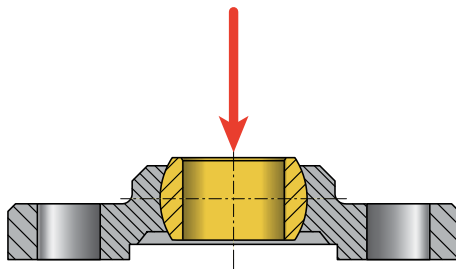
igubal® Flange bearings have been developed for the support of shaft ends or for shafts lead-through. Like all igubal® products, these bearings consist of an igumid G housing and an iglide® L280 spherical ball (with other options available). igubal® Flange bearings are made to the dimensional E series and are offered with two or four mounting holes.

Areas of Application

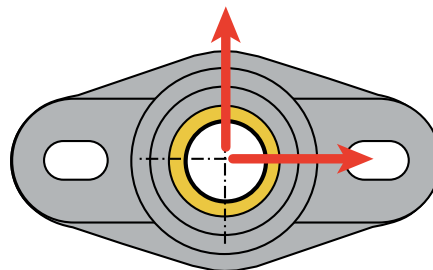
Since igubal® flange bearings are made for maintenance-free use, they are especially suited for applications in which access to the bearing is limited, in moist or wet environments or clean-room environments. Thus, igubal® flange bearings are also found in electric toothbrushes, awnings, conveyor technology, bakery machines and agriculture to name a few.

Installation

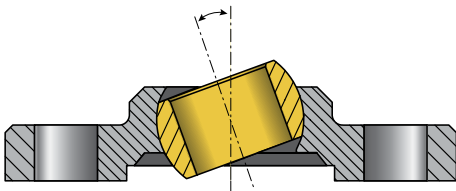
igubal® flange bearings are designed for mounting with 2 or 4 bolts, depending on the design. The 2-hole types are provided with elongated holes, which allow a problem-free adjustment. An exact positioning of the bearing housing is not necessary, since the spherical ball compensates for misalignment.



Static axial load



Static radial load



Pivot Angle










DryLin® R Linear Plain Bearings

igus® DryLin® R linear plain bearings are dimensionally interchangeable with other popular brands, but offer a low cost alternative to recirculating ball bearings. The low friction liner makes DryLin R suitable for wet or dirty environments.

Features

- Dimensionally interchangeable with ball bearings
- Available in four shaft diameters in both fixed and self-aligning housings
- Type J polymer is an excellent all-purpose sliding material
- Ideally suited to work with Drylin R hard-anodized aluminum shafting



igus® DryLin® R Linear Plain Bearings											
Item Photo	Part Number	Housing Fit	Size I.D. (inch)	Length (inch)	Housing Type	Bearing Material	Housing Material	Qty. per Package	Weight (lb)	Price	Drawing Link
	A-RJZI-01-04	Fixed housing	1/4	3/4	Closed	Type J polymer	Anodized aluminum	1	0.00	\$10.50	PDF
	A-RJUI-01-08		1/2	1-1/4				1	0.04	\$12.00	PDF
	A-RJUI-01-12		3/4	1-5/8				1	0.06	\$14.50	PDF
	A-RJUI-01-16		1	2-1/4				1	0.23	\$22.50	PDF
	A-RJI-01-08		1/2	1-1/4			Type J polymer	1	0.03	\$7.25	PDF
	A-RJI-01-12		3/4	1-5/8				1	0.05	\$7.75	PDF
	A-RJI-01-16		1	2-1/4				1	0.11	\$11.00	PDF
	A-OJUI-01-08		1/2	1-1/4	Open		Anodized aluminum	1	0.11	\$16.00	PDF
	A-OJUI-01-12		3/4	1-5/8				1	0.06	\$18.00	PDF
	A-OJUI-01-16		1	2-1/4				1	0.23	\$25.00	PDF
	A-RJUI-03-08	Self-aligning housing	1/2	1-1/4	Closed			1	0.03	\$12.50	PDF
	A-RJUI-03-12		3/4	1-5/8				1	0.06	\$14.50	PDF
	A-RJUI-03-16		1	2-1/4				1	0.11	\$23.50	PDF
	A-OJUI-03-08		1/2	1-1/4	Open			1	0.11	\$12.50	PDF
	A-OJUI-03-12		3/4	1-5/8				1	0.06	\$15.50	PDF
	A-OJUI-03-16		1	2-1/4				1	0.23	\$23.50	PDF
	A-FJUI-11-08	Fixed housing	1/2	1-11/16	4-bolt flange pillow block			1	0.18	\$46.00	PDF
	A-FJUI-11-12		3/4	2-1/16				1	0.46	\$55.00	PDF
	A-FJUI-11-16		1	2-13/16				1	1.21	\$92.00	PDF
	A-FJUI-13-08	Self-aligning housing	1/2	1-11/16				1	0.18	\$46.00	PDF
	A-FJUI-13-12		3/4	2-1/16				1	0.46	\$55.00	PDF
	A-FJUI-13-16		1	2-13/16				1	1.21	\$92.00	PDF



DryLin® R Round Shaft Guide Systems

- Self-lubricating
- Maintenance-free
- Corrosion-free
- Resistant to dirt
- Low weight
- Dimensionally interchangeable with recirculating ball bearings

DryLin® R Round Shaft Guide Systems - Advantages



Hard-anodized aluminum shafts guarantee optimum running properties

Steel, stainless steel, and carbon fiber shafts available

Round shaft and supported round shafts available

Linear adapter and complete housing made from aluminum

DryLin® liner made from dry-tech® high-performance plastics

5 liner material options available

Lightweight, hard anodized aluminum tubes available

Self-lubricating round shaft guide systems – DryLin® R

DryLin® R is dimensionally interchangeable with linear ball bearings, but offers cleaner, more cost-effective results even in harsh environments. The standard RJUI/RJUM bearing consists of an iglide® J liner slip-fit into an aluminum housing. The unique grooved design of the J liner minimizes clearance, is suitable for use in extremely wet and dirty environments, and is easily replaceable. Dimensionally interchangeable 100% plastic parts RJJ/RJM/RJIP/RJMP are also available for cost-savings, weight reduction, and other technical advantages. DryLin® R bearings may also be used with high temperature and chemically resistant iglide® T500 (X)* (TUI/TUM) liners for more demanding applications, and E7 material liners for steel and stainless shafting.

- 100% self-lubricating
- Dimensionally interchangeable with standard recirculating ball bearings
- Large variety of housing options
- Shafts, shaft-end supports and accessories available
- Replaceable bearing liner
- 300 series stainless steel housing available

Typical application areas:

- Packaging
- Lab
- Kiosk
- 3D Printing



max. +482°F (+250°C)
min. -130°F (-90°C)
(depending on material)



8 shaft materials
8 versions
Inner-Ø up to 60 mm



Inch dimensions available



Cleanroom certified
IPA Fraunhofer



Free of toxins
ROHS 2011/65/EU



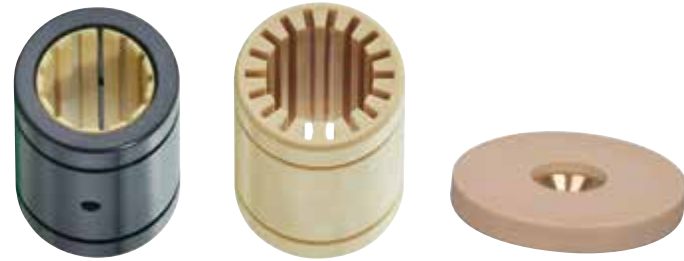
ESD-compatible
(electrostatic discharge)

DryLin® R Round Shaft Guide Systems - Product overview



Liners and pressfit bearings

- Low friction, optimized wear quality
- Space saving, lightweight
- High chemical resistance



Linear plain bearing

- Aluminum or stainless steel adapter with iglide® material liner
- Solid iglide® plastic bearings available, dimensionally interchangeable with recirculating ball bearings
- Closed or open versions available
- Self-aligning
- Sliding discs available



Pillow blocks and floating pillow blocks

- Easy to assemble
- Stands up to high static load
- Replaceable bearing liners
- Split housing for quick liner replacement available



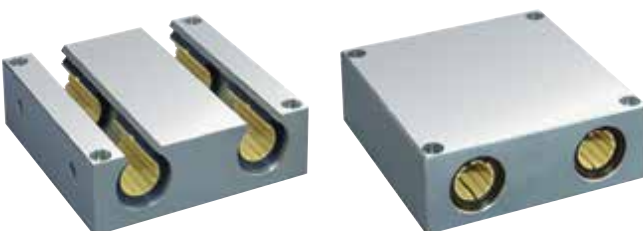
Open linear plain bearings

- For supported loads using supported shafting
- Round or mounted design
- Adjustable options
- Optional floating bearing for quick assembly and design optimization



Flange bearing

- Easy to fit
- Round or square options available
- Standard or twin flange designs



Quad block

- Closed or open design options
- Quad block housing with 4 bearing liners
- Floating bearing available

DryLin® R - Application Examples



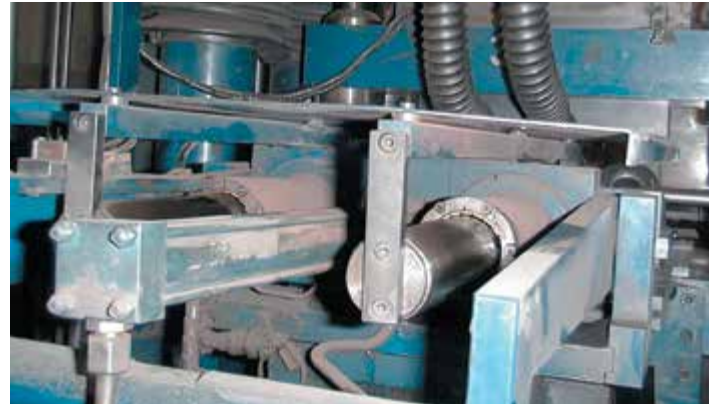
DryLin® R linear plain bearings on supported aluminum shafts are used in the guide for this cutting table. The DryLin® components stand up to the high levels of dust and dirt, and offer accurate, smooth operation.



This saw mill uses a DryLin® linear bearing with iglide® J plastic liner for the angle stops.



This heavy duty application has run reliably for more than three years thanks to DryLin® RJUM-01 linear bearings



Despite the high stresses from abrasive particles and powder particles, this compactor unit can extend maintenance-free uptime by up to two years after switching to DryLin® R linear bearings.



Maintenance-free, precise, compact, and wear resistant bearing liners were mounted directly in the passages of this machine's frame.

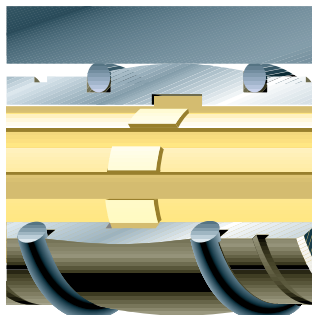


To enable fast, and precise adjustment of a production line without the need for downtime, DryLin® precision linear guides were utilized.

DryLin® R - Technical data

DryLin® R linear plain bearings

The DryLin® standard round bearings consist of a replaceable iglide® J, J200, A180 or T500 (X)* bearing liner, manufactured to fit securely into an anodized aluminum bearing housing, axially secured via a snap ring groove. DryLin® linear bearings are designed as dimensionally interchangeable with standard ball bearings. Made of highly wear resistant iglide® J, J200, A180 or T500 (X)* materials, which offer technical advantages as well as cost savings. Plastic bearings are well suited for applications where machine components are primarily stainless steel, such as in food production and packaging equipment, as well as applications where weight savings are critical. DryLin® R linear plain bearings are designed to fit housings with our recommended tolerances, secured via circlips in the same way as ball bearings.



Dirt, dust, fibers

An important feature of all the linear plain bearings is their tolerance of dirt and other abrasive particles. For most conventional bearing systems, the use of wiper or seals is recommended to prevent the accumulation of dirt. With DryLin®, the patented design of the bearing surface, which uses connected slide pads, provides performance benefits for dirty environments. Dirt, even if it becomes wet on the shaft, is wiped away by the individual slide pads and is wiped to an open area. The running sections of the DryLin® bearings then slide on the shaft that has been cleared of all contaminants.

Split linear bearings

Applications on the edge of technical feasibility or in extreme environments often require frequent replacement of linear bearings. DryLin® linear bearings can provide significant increases in service life, and even when replacement is necessary, the replaceable bearing liners can offer substantial cost savings. Replacing only the bearing's liner can reduce maintenance time by 90%. The range of split bearing housings are easily opened, and the split shell means that the shafts are able to stay in place while a new bearing and liner can be installed around the shaft, keeping installation time to a minimum.



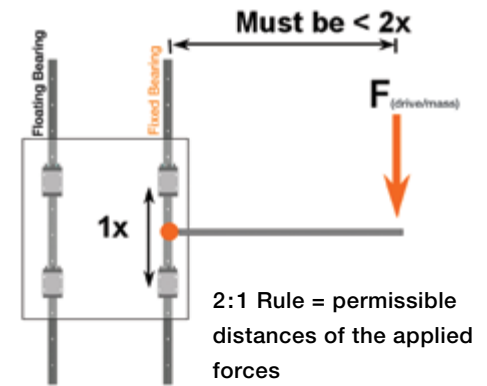
	 The "all-rounder" – iglide® J	 The specialist – iglide® J200	 The extreme – iglide® T500 (X)	 The marathon runner – iglide® E7	 FDA compliant – iglide® A180
Optimal shaft material(s)	all shaft materials	Aluminum, hard anodized	Hardened stainless steel Hard chromed plated steel	Steel stainless steel shaft	all shaft materials
Application temperature	-40°F to +194°F (-40°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	-148°F to +482°F (-100°C to +250°C)	-40°F to +194°F (-40°C to +90°C)	-40°F to +194°F (-40°C to +90°C)
Best coefficient of friction with	Steel shaft	Aluminum, hard anodized	Steel hard chrome-plated	Steel stainless steel shaft	Stainless steel shaft
Maximum life time	Aluminum, hard anodized	Aluminum, hard anodized	Hardened stainless steel	Steel stainless steel shaft	Stainless steel shaft
Permissible stat. surface pressure	35 MPa	23 MPa	150 MPa	18 MPa	28 MPa
Moisture absorption	1.3% weight	0.7% weight	0.5% weight	< 0.1% weight	0.2% weight
Volume resistance	> 10 ¹³ Ωcm	> 10 ⁸ Ωcm	< 10 ⁵ Ωcm	> 10 ⁹ Ωcm	> 10 ¹² Ωcm
Part No.	JUM-...	J200UM-...	TUM-.../XUM-...	E7UM-...	A180UM-...

DryLin® R - Design standards

Eccentric Forces

The 2:1 Rule

When using linear plain bearings it is important to ensure that the acting forces follow the 2:1 Rule (see drawing). If either the load or the drive force (F) is greater than twice the bearing length (1X), then a binding or interrupted motion may occur. If the location of the drive force or load cannot be changed, simply increase the distance between the bearings, or create a counterbalance to move the center-of-gravity back within the 2 to 1 ratio.



Fixed and Floating Bearing Mounting Instructions

When using systems with 2 parallel rails, one side must be designated as the “fixed” rail, and the opposite side as the “floating” rail.

Why use floating bearings?

- Promotes smooth gliding performance and maximizes bearing life
- Prevents binding caused by parallelism and angle errors
- Decreases necessary drive force and wear by minimizing friction-forces
- Enhances the precision of the system over the bearings' lifetime.
- Reduce assembly time and cost

Fixed Bearings

The “fixed” bearing rail should be positioned closest to the drive force. This rail will determine the precision of the system; no system should contain more than two “fixed” bearings.

Floating/Self-Aligning Bearings

The “floating” rail should be the rail located furthest from the drive force. It is to act only as a guide, and will compensate for any misalignments or angle errors in the system ensuring proper functionality.

Mounting Surfaces

The mounting surfaces for rails and bearings should have a very flat surface (e.g milled surface) in order to enhance performance. Variations in these surfaces may be compensated for by using floating bearings.

DryLin® R - Mounting Instructions

DryLin® R linear plain bearings in the 03 Design Series are self-aligning and offer great advantages in applications with parallel shafts. They are able to compensate for alignment and parallelism errors and should be used on the shaft located furthest from the drive mechanism.

The design provides a raised spherical area on the outer diameter of the aluminum adapter for self-alignment. Load capacity is the same as the fixed version.

Even in unfavorable edge-load conditions, the load is supported by the entire projected surface

In order to compensate for parallelism errors between two shafts, the outer diameter is designed to be smaller than the

housing bore diameter by 0.2 - 0.3 mm (depending on the size). With the use of mounted O-rings, these bearings have an elastic bearing seat.

Compensation for angle errors

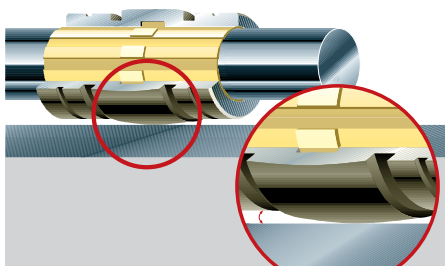
Series RJUI/RJUM/OJUI/OJUM-03 $\pm 0.5^\circ$

Series RJUM-06-LL/OJUM-06-LL $\pm 3.5^\circ$

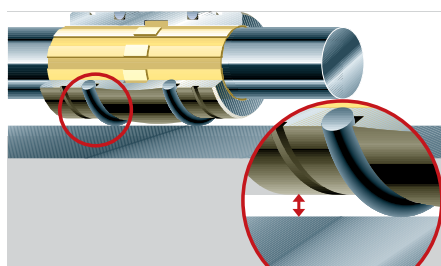
Compensation of parallelism errors

Series RJUI/RJUM/OJUI/OJUM-03 ± 0.1 mm (.004")

Series RJUM-06-LL/OJUM-06-LL ± 3 mm (.12")



The spherical DryLin® adapters can compensate for alignment errors. A hard-anodization protects the aluminum adapter from wear.



With built in clearances and the use of O-rings, the self-aligning DryLin® R bearings of the 03 Design Series can compensate for parallelism errors.



The self-aligning DryLin® R bearings of the 06 LL design series can compensate parallelism errors up to $\pm .12$ " (3mm).

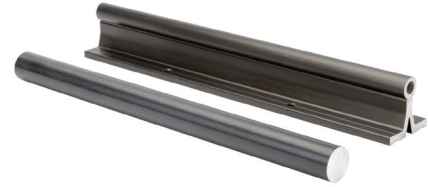


DryLin® R Hard-Anodized Shafts

igus® DryLin® R hard-anodized shafts were specifically developed as the optimal sliding surface for DryLin R linear bearings. Available in four diameters and three lengths of both round shafting and fully supported shafting.

Features

- 6061-T6 aluminum hard-anodized to 450-550 HV surface hardness
- Round and fully supported styles
- Four diameters and three lengths up to 1000mm
- Best choice of shafting to use with DryLin R bearings



igus® DryLin® R Hard-Anodized Shafts										
Item Photo	Part Number	Shaft Type	Diameter (inch)	Length (mm)	Material	Surface Hardness	Qty. per Package	Weight (lb)	Price	Drawing Link
	A-AWUI-08-250	Supported	1/2	250	Hard-anodized aluminum	450-550 HV	1	0.54	\$20.00	PDF
	A-AWUI-08-500			500			1	1.07	\$37.00	PDF
	A-AWUI-08-1000			1000			1	2.13	\$73.00	PDF
	A-AWUI-12-250		3/4	250			1	0.92	\$26.50	PDF
	A-AWUI-12-500			500			1	1.85	\$51.00	PDF
	A-AWUI-12-1000			1000			1	3.67	\$104.00	PDF
	A-AWUI-16-250		1	250			1	1.23	\$31.00	PDF
	A-AWUI-16-500			500			1	2.46	\$61.00	PDF
	A-AWUI-16-1000			1000			1	4.92	\$124.00	PDF
	A-AWI-04-250	Round	1/4	250			1	0.05	\$11.00	PDF
	A-AWI-04-500			500			1	0.10	\$19.00	PDF
	A-AWI-04-1000			1000			1	0.20	\$39.00	PDF
	A-AWI-08-250		1/2	250			1	0.19	\$12.50	PDF
	A-AWI-08-500			500			1	0.39	\$23.00	PDF
	A-AWI-08-1000			1000			1	0.77	\$46.00	PDF
	A-AWI-12-250		3/4	250			1	0.43	\$18.00	PDF
	A-AWI-12-500			500			1	0.87	\$33.50	PDF
	A-AWI-12-1000			1000			1	1.73	\$66.00	PDF
	A-AWI-16-250		1	250			1	0.77	\$24.50	PDF
	A-AWI-16-500			500			1	1.53	\$46.00	PDF
	A-AWI-16-1000			1000			1	3.05	\$93.00	PDF



DryLin® Shafting

- Available in supported versions
- Aluminum for low weight
- Diameters 1/2 - 1 inch

DryLin® Shafts



The "all-rounder" –
iglide® J



The specialist –
iglide® J200



The extreme –
iglide® T500 (X)*



The marathon runner –
iglide® E7



FDA compliant –
iglide® A180

Optimal shaft material(s)	all shaft materials	Aluminum, hard anodized	Hardened stainless steel Hard chrome plated steel	Steel stainless steel shaft	all shaft materials
Application temperature	-40°F to +194°F (-40°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	-148°F to +482°F (-100°C to +250°C)	-40°F to +194°F (-40°C to +90°C)	-40°F to +194°F (-40°C to +90°C)
Best coefficient of friction with	Steel shaft	Aluminum, hard anodized	Steel, hard chrome-plated, SS	Steel stainless steel shaft	Stainless steel shaft
Maximum life time	Aluminum, hard anodized	Aluminum, hard anodized	Hardened stainless steel	Steel stainless steel shaft	Stainless steel shaft
Permissible stat. surface pressure	35 MPa	23 MPa	150 MPa	18 MPa	28 MPa
Moisture absorption	1.3% weight	0.7% weight	0.5% weight	< 0.1% weight	0.2% weight
Volume resistance	> 10 ¹³ Ωcm	> 10 ⁸ Ωcm	< 10 ⁵ Ωcm	> 10 ⁹ Ωcm	> 10 ¹² Ωcm
Part No.	JUM-...	J200UM-...	TUM-.../XUM-...	E7UM-...	A180UM-...

Available shaft materials:

Aluminum

- Ideal in combination with liners made from iglide® J/J200
- Lightweight
- Lower wear
- Corrosion resistant
- Available from stock

Steel

- Ideal with E7 liner
- Low-priced standard
- High load capacity
- Dry area applications
- Hard chrome-plated also available
- Lower coefficient of friction against plastic bearings

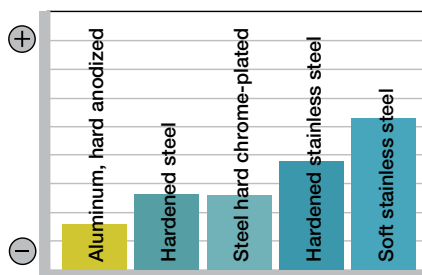
Stainless steel

- Ideal with E7 liner
- High corrosion resistance
- High chemical resistance
- Ideal solution for wet applications
- 300 series for extremely chemical intensive applications



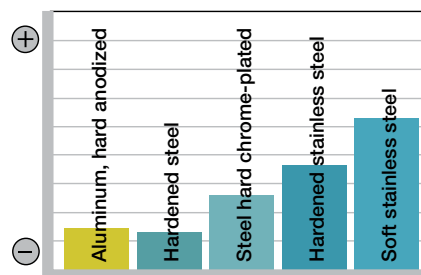
Please remember that this is a technical surface.
Small color variations are possible due to variable coating depths.

Wear



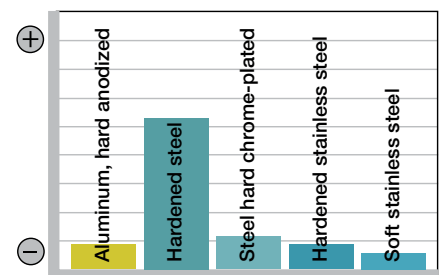
iglide® J against particular shaft materials

Coefficient of friction



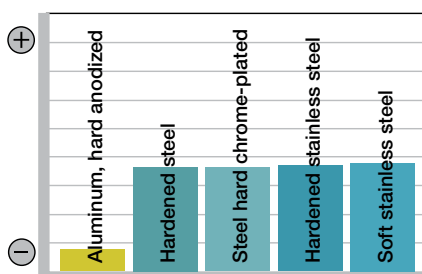
iglide® J against particular shaft materials

Corrosion

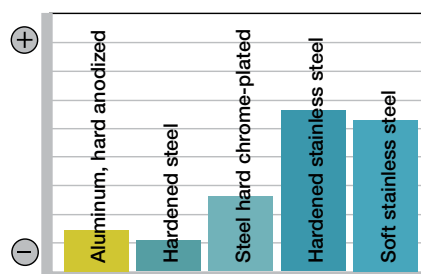


iglide® J against particular shaft materials

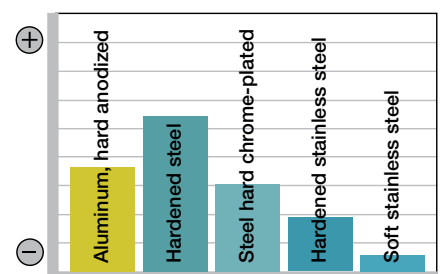
Weight



Costs



Chemical contamination



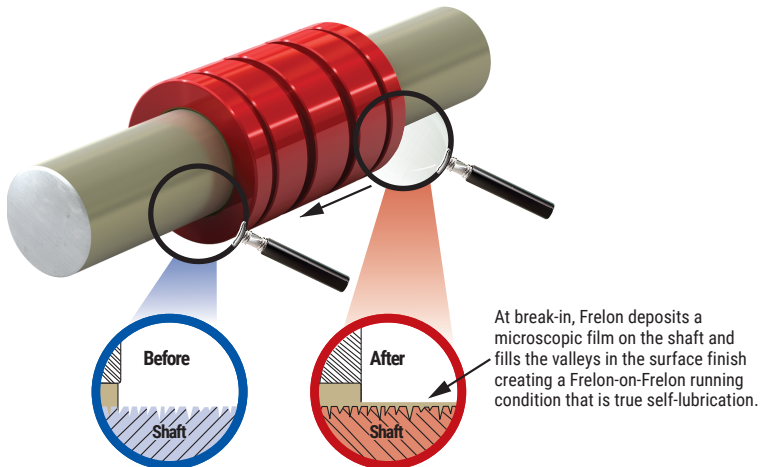
*X is the European equivalent material for iglide® T500

PBC Simplicity® Plain Bearings

Transfer Process of Liner to Shaft

The interaction of the Frelon® material and the shafting creates a natural, microscopic transfer of the Frelon to the running surface. A thin film is deposited on the shaft, and the valleys in the surface finish are filled in with Frelon material during the initial break-in period. This transfer creates the self-lubricating condition of Frelon riding on Frelon. This break-in period varies depending on several criteria:

1. Preparation of the shafting prior to installation – it is best to clean the shafting with a 3-in-1 type oil before installing the bearings. This ensures that the surface will receive a full transfer of material.
2. Speed, load, and length of stroke specific to the application – typically the initial transfer process will take approximately 50-100 strokes of continuous operation. The running clearance on the bearing will increase an average of 0.0002" to 0.0005", depending on the length of the stroke and surface requiring the transfer.
3. How often the shafting is cleaned – if the shafting is cleaned regularly, increased wear will be seen in the bearings. This is due to the transfer process being performed over and over again.



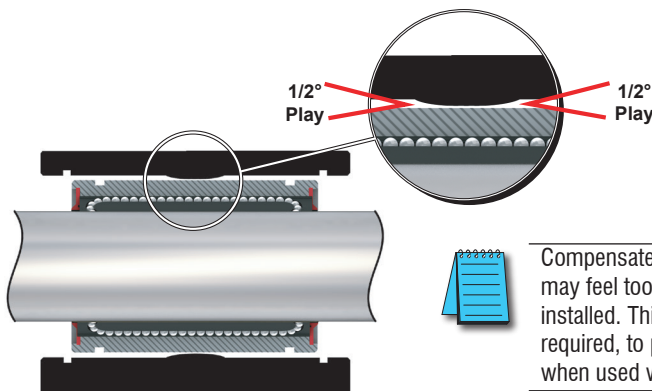
Pillow Blocks and Flange Mounts

- Made of aluminum alloy
- Clear anodized finish (Standard)
- Pillow blocks are interchangeable with industry standard ball bearing pillow blocks
- Critical centerline dimensions hold accuracy within ± 0.001 ".

Self-Alignment

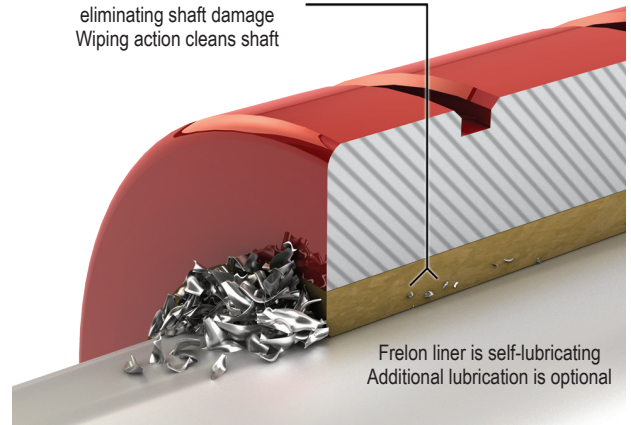
Standard pillow blocks have built-in self-alignment in all directions:

- Standard pillow blocks have $1/2^\circ$ misalignment from centerline
- This feature is built into the housing with a spherical radius at the midpoint of the block
- This self-aligning capability will allow for some shaft deflection and misalignment



Compensated plain bearings may feel too loose when installed. This is normal, and required, to prevent binding when used with dual shafts

Simplicity Plain Bearing
Fines embed in Frelon liner
eliminating shaft damage
Wiping action cleans shaft



Running Clearance

Simplicity bearings are available with two classes of running clearance:

Precision—"FL":

- Performs like a preloaded ball bearing
- Tightest running clearance approximately 0.001" (0.025 mm)
- Used in applications that require high precision

Not recommended for all parallel shaft applications. Any misalignment can cause binding on the shaft.

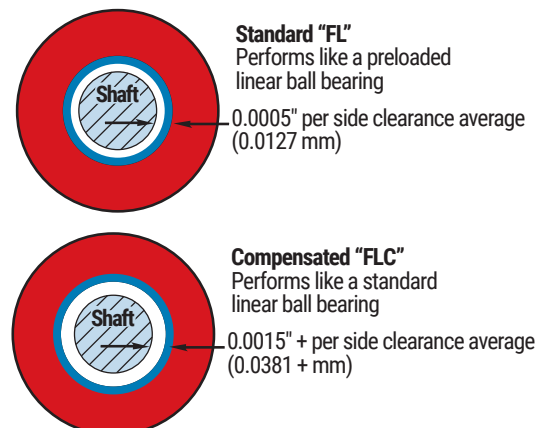
Recommend: Compensated—"FLC" (see below).

Compensated—"FLC":

- Performs like a standard ball bearing
- Additional clearance built into the I.D.—all other dimensions are the same as the precision bearings
- Ideally suited for parallel shaft applications

Many parallel shaft applications will run "FL" precision on one rail and "FLC" compensation on the opposite rail to accommodate slight misalignments.

RUNNING CLEARANCE





PBC Linear Plain Bearing Features

- Class III Plain Bearing
- Self lubricating
- Maintenance free
- Coefficient of friction: 0.125
- Temperature range: $\pm 400^{\circ}\text{F}$
- Bearing Liner Material: FrelonGOLD[®] (PTFE)
- Bearing Shell Material: Aluminum Alloy with anodized finish
- For Linear, oscillating, rotary motion, or combination of all 3

Performance Ratings (for Linear Motion)

Plain bearings are rated by their limiting Pressure Velocity (PV), which is a combination of load over a given surface area and the velocity.

$(-)\text{C}_0$ = Static Load on bearing

A = Bearing effective surface area

V = velocity (speed) in ft/min (m/min.)

P = Pressure on Bearing = C_0/A

PV = Pressure Velocity



Closed Bearing



Open Bearing

PV_{max}	P_{max}	V_{max}		
		No Lube Continuous Motion	No Lube Intermittent Motion	With Lubrication*
20000 (psi x ft./min.)	3000 psi	300 ft/min	825 ft/min	825 ft/min
430 (kgf/cm ² x m/min.)	210.9 kgf/cm ²	1.524 m/sec.	4.19 m/sec.	4.19 m/sec.

*Depending on the lubrication used, loads, and frequency of continuous or intermittent motion, speeds can be in excess of the numbers shown.

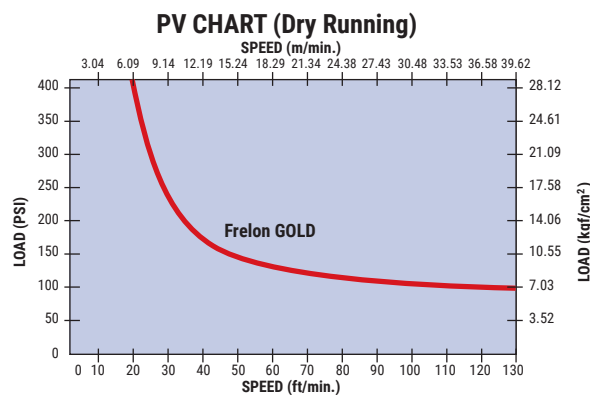
Recommended Lubricants:

- Waylube oil
- Light weight oils
- Petroleum based grease
- 3-in-1 oils

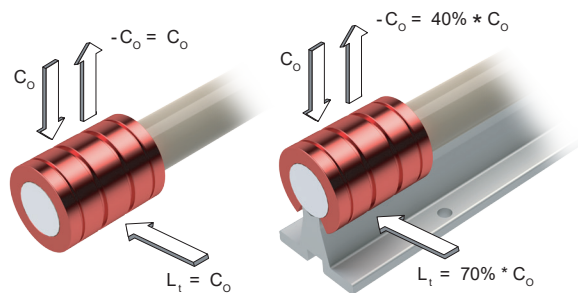
Not Recommended Lubricants:

- WD-40
- PTFE sprays
- Fluorocarbons
- Silicon oils

Simplicity Series Plain Bearings							
Part Number	Price	Nominal ID	Bearing Form Factor	Effective Surface Area (A)	Running Clearance (Both Sides)	Max Static Load Rating (C_0)	Drawing Links
FL04	\$19.50	1/4 in	closed	0.20 in ²	0.0005 in	600 lbs	PDF
FL06	\$21.50	3/8 in		0.34 in ²		1020 lbs	PDF
FL08	\$22.50	1/2 in		0.65 in ²		1950 lbs	PDF
FL10	\$25.50	5/8 in		0.98 in ²		2940 lbs	PDF
FL12	\$26.00	3/4 in		1.27 in ²		3810 lbs	PDF
FL16	\$47.50	1 in		2.35 in ²		7050 lbs	PDF
FL20	\$80.00	1 1/4 in		3.43 in ²		10830 lbs	PDF
FLN08	\$30.00	1/2 in	open	0.65 in ²	0.0005 in	1950 lbs	PDF
FLN10	\$32.00	5/8 in		0.98 in ²		2940 lbs	PDF
FLN12	\$33.50	3/4 in		1.27 in ²		3810 lbs	PDF
FLN16	\$57.00	1 in		2.35 in ²		7050 lbs	PDF
FLN20	\$95.00	1 1/4 in		3.43 in ²		10830 lbs	PDF
FLC04	\$19.50	1/4 in	closed	0.20 in ²	0.0015 in	600 lbs	PDF
FLC06	\$21.50	3/8 in		0.34 in ²		1020 lbs	PDF
FLC08	\$22.50	1/2 in		0.65 in ²		1950 lbs	PDF
FLC10	\$25.50	5/8 in		0.98 in ²		2940 lbs	PDF
FLC12	\$26.00	3/4 in		1.27 in ²		3810 lbs	PDF
FLC16	\$47.50	1 in		2.35 in ²		7050 lbs	PDF
FLC20	\$80.00	1 1/4 in		3.43 in ²		10830 lbs	PDF
FLCN08	\$22.50	1/2 in	open	0.65 in ²	0.0015 in	1950 lbs	PDF
FLCN10	\$25.50	5/8 in		0.98 in ²		2940 lbs	PDF
FLCN12	\$26.00	3/4 in		1.27 in ²		3810 lbs	PDF
FLCN16	\$47.50	1 in		2.35 in ²		7050 lbs	PDF
FLCN20	\$80.00	1 1/4 in		3.43 in ²		10830 lbs	PDF



FrelonGOLD not recommended for use with deionized water and other harsh chemicals. See the chemical reaction chart page tMNC-174

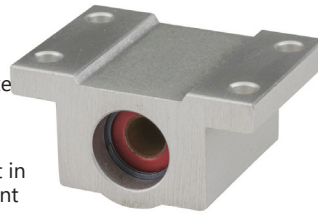




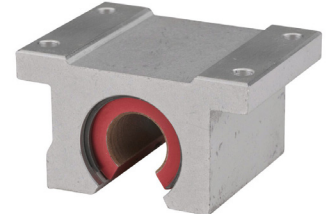
PBC Simplicity® Pillow Blocks

PBC Linear Simplicity Pillow Block Features

- Simplicity Plain Bearing Pre-installed
- Pillow Block Housing Material: Aluminum alloy with clear anodize finish
- Centerline tolerance: $\pm 0.001"$
- Internal self-aligning feature provides $\pm 1/2^\circ$ bearing movement in all directions allowing for some shaft deflection and misalignment

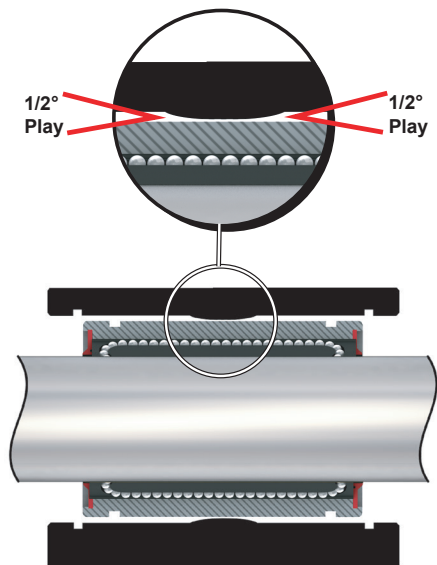


Closed Bearing



Open Bearing

Simplicity Pillow Block								
Part Number	Price	Nominal ID	Installed Bearing	Form Factor	Effective Surface Area (A)	Running Clearance (Both Sides)	Max Static Load Rating (C ₀)	Drawing Links
P04	\$55.00	1/4in	FL04	closed type	0.20 in ²	0.0005 in	600 lbs	PDF
P06	\$57.00	3/8in	FL06		0.34 in ²		1020 lbs	PDF
P08	\$63.00	1/2in	FL08		0.65 in ²		1950 lbs	PDF
P10	\$70.00	5/8in	FL10		0.98 in ²		2940 lbs	PDF
P12	\$73.00	3/4in	FL12		1.27 in ²		3810 lbs	PDF
P16	\$106.00	1in	FL16		2.35 in ²		7050 lbs	PDF
P20	\$160.00	1-1/4in	FL20		3.43 in ²		10830 lbs	PDF
PN08	\$73.00	1/2in	FLN08	open type	0.65 in ²		1950 lbs	PDF
PN10	\$85.00	5/8in	FLN10		0.98 in ²		2940 lbs	PDF
PN12	\$91.00	3/4in	FLN12		1.27 in ²		3810 lbs	PDF
PN16	\$129.00	1in	FLN16		2.35 in ²		7050 lbs	PDF
PN20	\$194.00	1-1/4in	FLN20		3.43 in ²		10830 lbs	PDF
P04C	\$55.00	1/4in	FLC04	closed type	0.20 in ²	0.0015 in	600 lbs	PDF
P06C	\$57.00	3/8in	FLC06		0.34 in ²		1020 lbs	PDF
P08C	\$63.00	1/2in	FLC08		0.65 in ²		1950 lbs	PDF
P10C	\$70.00	5/8in	FLC10		0.98 in ²		2940 lbs	PDF
P12C	\$74.00	3/4in	FLC12		1.27 in ²		3810 lbs	PDF
P16C	\$106.00	1in	FLC16		2.35 in ²		7050 lbs	PDF
P20C	\$160.00	1-1/4in	FLC20		3.43 in ²		10830 lbs	PDF
PN08C	\$73.00	1/2in	FLCN08	open type	0.65 in ²		1950 lbs	PDF
PN10C	\$85.00	5/8in	FLCN10		0.98 in ²		2940 lbs	PDF
PN12C	\$92.00	3/4in	FLCN12		1.27 in ²		3810 lbs	PDF
PN16C	\$129.00	1in	FLCN16		2.35 in ²		7050 lbs	PDF
PN20C	\$192.00	1-1/4in	FLCN20		3.43 in ²		10830 lbs	PDF



Internal Self-aligning Feature



FrelonGOLD® not recommended for use with deionized water and other harsh chemicals. See the chemical reaction chart page tMNC-174



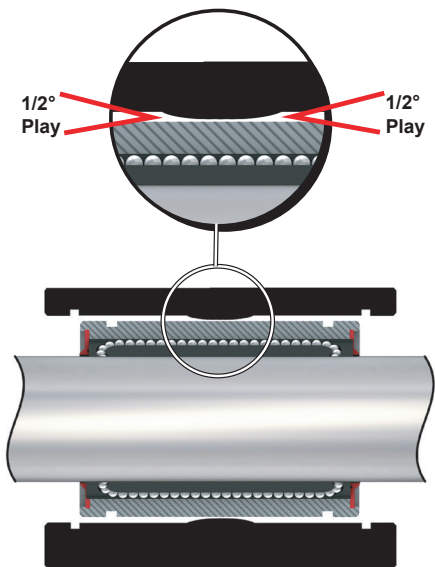
PBC Simplicity[®] Flange Mount Bearings

PBC Linear Simplicity Flange Mount Features

- Simplicity Plain Bearing Pre-installed
- Flange Mount Housing Material: Aluminum alloy with clear anodize finish
- Internal self-aligning feature provides $\pm 1/2^\circ$ bearing movement in all directions allowing for some shaft deflection and misalignment



Simplicity Flange Mount Bearing							
Part Number	Price	Nominal ID	Installed Bearing	Effective Surface Area (A)	Running Clearance (Both Sides)	Max Static Load Rating (C_0)	Drawing Links
SFP06	\$108.00	3/8 in	SFP06	0.34 in ²	0.0005 in	1020 lbs	PDF
SFP08	\$86.00	1/2 in	SFP08	0.65 in ²		1950 lbs	PDF
SFP12	\$94.00	3/4 in	SFP12	1.27 in ²		3810 lbs	PDF
SFP16	\$134.00	1 in	SFP16	2.35 in ²		7050 lbs	PDF
SFP20	\$212.00	1 1/4 in	SFP20	3.43 in ²		10830 lbs	PDF
SFP06C	\$108.00	3/8 in	SFP06C	0.34 in ²	0.0015 in	1020 lbs	PDF
SFP08C	\$86.00	1/2 in	SFP08C	0.65 in ²		1950 lbs	PDF
SFP12C	\$95.00	3/4 in	SFP12C	1.27 in ²		3810 lbs	PDF
SFP16C	\$134.00	1 in	SFP16C	2.35 in ²		7050 lbs	PDF
SFP20C	\$212.00	1 1/4 in	SFP20C	3.43 in ²		10830 lbs	PDF



Internal Self-aligning Feature



FrelonGOLD[®] not recommended for use with deionized water and other harsh chemicals. See the chemical reaction chart page tMNC-174



Chemical Reaction Chart for Simplicity® Bearings

The FrelonGOLD® material is a composite of PTFE and a bearing filler. The PTFE is chemically inert. The chemical resistance shown in the chart below is defined by the compatibility of the filler with the various chemicals.

Other data in the chart below applies to the bearing shell and pillow block materials. The table is provided as a reference only. The data given will be affected by factors such as temperature, PV, degree of contact, strength of solution, etc. In each specific application, it is always advisable to conduct specific testing to determine suitability of use. This table only addresses general corrosion, NOT galvanic, SCC, or other types of corrosion. Corrosion rates are at room temperature unless otherwise noted.

Standard and hard coat data only apply when the coating is intact. If the coating is worn through or damaged, an area of galvanic and pitting corrosion will be created. Then use the bare aluminum data.

Standard Simplicity products use aluminum alloy, which is known to have the best corrosion resistance of the high strength aluminum alloys. The sulfuric bath anodizing and nickel acetate sealing provide the best corrosion resistance available in anodized coatings. They can withstand a rigorous 14-day exposure in a 5% salt spray solution at 96°F per military specifications without significant damage. With the coating intact, it is considered to be inert in most fluids with a pH value between 5 and 8. Hard coat anodizing provides the same chemical resistance but is applied to a 0.002" thickness, providing a more durable surface that will stand up to greater abuse. However, if the coating is penetrated, the resistance is reduced.

Special stainless steel bearings use AISI 316 stainless, which has superior resistance over 303, 304, 420, 440, 17-4PH, and most other common stainless grades. 316 is generally considered to be the most corrosion resistant of conventional stainless steels.



This information was compiled for Pacific Bearing® Company by Materials Engineering, Inc. of Virgil, IL. This specification information is believed to be accurate and reliable, however, no liability is assumed. Information is for reference only. User must test specific applications.

Performance	Wear
E = Excellent	< 0.002" per year
G = Good	< 0.020" per year
S = Satisfactory	< 0.050" per year
U = Unsatisfactory	> 0.040" per year

Chemical	Frelon GOLD	Bare Aluminum	Standard & Hard Coat Anodized Aluminum	316 Stainless Steel
Acetic Acid, 20%	U	G	G	E
Acetone	G	E	E	E
Ammonia, Anhydrous	G	E	E	E
Ammonium Hydroxide, 10%	U	U	U	E
Ammonium Chloride, 10%	U	U	U	G
Ammyl Acetate (122°F / 50°C)	G	E	E	E
Barium Hydroxide	U	U	U	G
Beer	G	E	E	E
Boric Acid Solutions	G	E	E	G
Butane	G	G	G	G
Calcium Chloride, 20%	G	G	G	G
Calcium Hydroxide, 10%	G	G	G	G
Carbon Dioxide	G	E	E	G
Carbon Monoxide	G	E	E	E
Chlorine Gas, Dry	G	G	G	G
Chlorine Gas, Wet	U	U	U	U
Chromic Acid, 10%	U	G	E	E
Citric Acid, 5%	G	E	E	E
Ethyl Acetate	G	E	E	G
Ethyl Alcohol	G	E	E	G
Ethylene Glycol	G	E	E	G
Ferric Chloride, 50%	U	U	U	U
Formic Acid - Anhydrous	U	E	E	E
Gasoline, Unleaded	G	G	G	G
Hydrochloric Acid, 20%	U	U	U	U
Hydrochloric Acid, 35%	U	U	U	U
Hydrocyanic Acid, 10%	U	G	G	G
Hydrofluoric Acid - Dilute	U	U	U	U
Hydrofluoric Acid, 48%	U	U	U	U
Hydrogen	G	E	E	E
Hydrogen Peroxide - Dilute	U	E	E	G

Chemical	Frelon GOLD	Bare Aluminum	Standard & Hard Coat Anodized Aluminum	316 Stainless Steel
Hydrogen Sulfide, Dry	U	G	E	E
JP-4	G	G	G	G
Kerosene	G	G	G	G
Lactic Acid, 10%	G	G	G	E
Magnesium Chloride, 50%	G	U	U	G
Mercury	U	U	U	E
Methyl Alcohol	G	G	G	G
Methyl Ethyl Ketone	G	G	G	G
Methylene Chloride	G	E	E	G
Mineral Oil	G	G	G	G
Naptha	G	G	G	G
Nitric Acid, 70%	U	U	U	E
Phosphoric Acid, 10%	U	U	U	E
Sodium Chloride	G	U	U	E
Sodium Hydroxide, 20%	G	U	U	G
Sodium Hypochlorite, 20%	U	G	G	U
Sodium Peroxide, 10%	U	G	G	G
Steam (see water)	-	-	-	-
Sulfur Dioxide, Wet	U	U	U	G
Sulfur Dioxide, Dry	G	G	G	G
Sulfur Trioxide	U	G	G	G
Sulfuric Acid, 50%	U	U	U	U
Sulfurous Acid	U	G	G	E
Toluene (122°F / 50°C)	G	E	E	E
Turpentine	G	G	E	E
Water, Demineralized	U	G	E	E
Water, Distilled	G	U	S	G
Sea Water	G	G	E	G
Water, Sewage	G	U	S	G
Xylene	G	G	G	G
Zinc Chloride Solutions	U	U	U	G



High Precision and Rigidity

The ball bearing is produced from a solid steel outer cylinder and incorporates an industrial strength polymer retainer.

Ease of Assembly

The standard type of linear ball bearing can be loaded from any direction. Precision control is possible using only the shaft supporter, and the mounting surface can be machined easily.

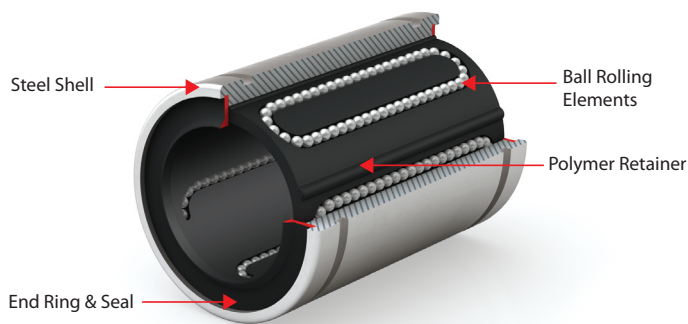
Ease of Replacement

Linear ball bearings of each type are completely interchangeable because of their standardized dimensions and strict precision control. Replacement because of wear or damage is therefore easy and accurate.

Materials

Ball bearings consist of an outer cylinder, ball retainer, balls, double seals, and two end rings. The ball retainer which holds the balls in the recirculating tracks is held inside the outer cylinder by end rings.

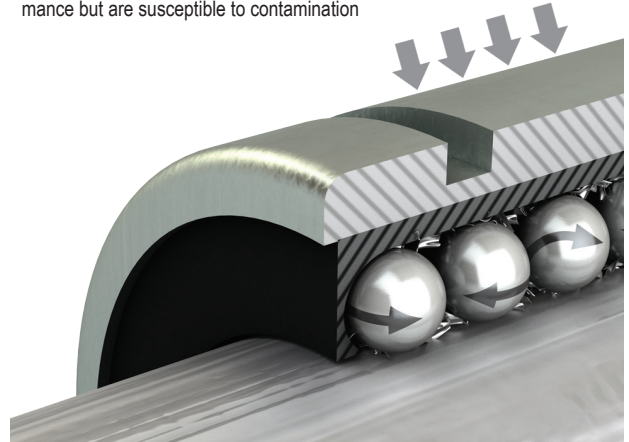
- Parts are assembled to optimize their required functions.
- The outer shell is heat treated to ensure long life.
- The ball retainer is molded from a durable polymer to ensure smooth and quiet motion.
- Double seals are standard.



PBC Linear Ball Bearings

Ball Bearing

Better performance for moment loading
Balls provide precise, low-friction performance but are susceptible to contamination



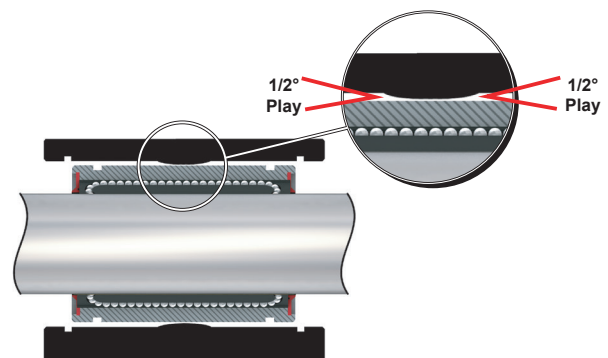
Pillow Blocks and Flange Mounts

- Made of aluminum alloy
- Clear anodized finish (Standard)
- Pillow blocks are interchangeable with industry standard ball bearing pillow blocks
- Critical centerline dimensions hold accuracy within ± 0.001 ".

Self-Alignment

Standard pillow blocks have built-in self-alignment in all directions:

- Standard pillow blocks have $1/2^\circ$ misalignment from centerline
- This feature is built into the housing with a spherical radius at the midpoint of the block
- This self-aligning capability will allow for some shaft deflection and misalignment





PBC Linear Ball Bearings

PBC Linear Ball Bearing Features

- For Linear, oscillating, rotary motion, or combination of all 3
- End Seals included
- Bearing Shell Material: GCr15 Steel, heat treated
- Bearing Material: GCr15 Steel
- Bearing Retainer Material: Polyoxymethylene polymer
- Lubrication required

Performance Ratings (for Linear Motion)

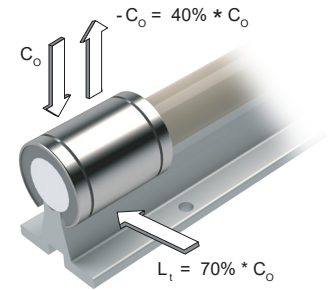
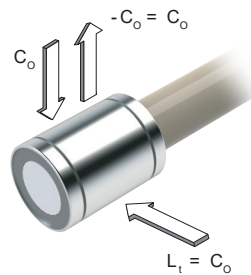
- Coefficient of friction: 0.05
- Maximum Speed (V_{max}): 590 ft/min
- IP04G-xx thru IP16G-xx ID tolerance: 0/-0.0005"
- IP20G-xx ID tolerance: 0/-0.0006"



Closed Bearing



Open Bearing



PBC Linear Ball Bearing								
Part Number	Price	Nominal ID	Bearing Form Factor	OD	Overall Length	Static Load Rating (C_o)	Dynamic Load Rating (C)	Drawing Links
IP04G	\$16.00	1/4 in	closed	1/2 in	3/4 in	59 lbs	46 lbs	PDF
IP06G	\$17.00	3/8 in		5/8 in	7/8 in	70 lbs	50 lbs	PDF
IP08G	\$17.50	1/2 in		7/8 in	1 1/4 in	178 lbs	114 lbs	PDF
IP10G	\$19.50	5/8 in		1 1/8 in	1 1/2 in	265 lbs	174 lbs	PDF
IP12G	\$21.50	3/4 in		1 1/4 in	1 5/8 in	307 lbs	193 lbs	PDF
IP16G	\$39.00	1 in		1 9/16 in	2 1/4 in	352 lbs	220 lbs	PDF
IP20G	\$66.00	1 1/4 in		2 in	2 5/8 in	615 lbs	352 lbs	PDF
IP08G-OP	\$25.50	1/2 in	open	7/8 in	1 1/4 in	178 lbs	114 lbs	PDF
IP10G-OP	\$26.50	5/8 in		1 1/8 in	1 1/2 in	265 lbs	174 lbs	PDF
IP12G-OP	\$28.50	3/4 in		1 1/4 in	1 5/8 in	307 lbs	193 lbs	PDF
IP16G-OP	\$53.00	1 in		1 9/16 in	2 1/4 in	352 lbs	220 lbs	PDF
IP20G-OP	\$89.00	1 1/4 in		2 in	2 5/8 in	615 lbs	352 lbs	PDF



PBC Linear Ball-Bearing Pillow Blocks

PBC Linear Ball Bearing Pillow Block Features

- PBC Linear Ball Bearing Pre-installed
- Pillow Block Housing Material: Aluminum alloy with clear anodize finish
- Centerline tolerance: $\pm 0.001"$
- Internal self-aligning feature provides $\pm 1/2^\circ$ bearing movement in all directions allowing for some shaft deflection and misalignment
- IPP(x)04G thru IPP(x)16G ID tolerance: $0/-0.0005"$
- IPP(x)20G ID tolerance: $0/-0.0006"$

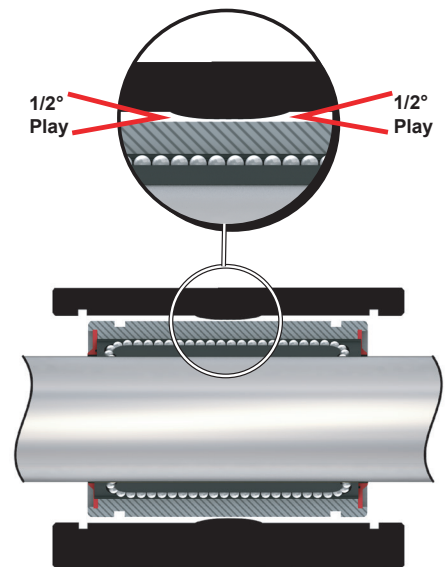


Closed Bearing



Open Bearing

PBC Ball Bearing Pillow Block							
Part Number	Price	Nominal ID	Installed Bearing	Form Factor	Static Load Rating (C_0)	Dynamic Load Rating (C)	Drawing Links
IPP04G	\$28.50	1/4in	IP04G	closed type	59 lbs	48 lbs	PDF
IPP06G	\$53.00	3/8in	IP06G		70 lbs	50 lbs	PDF
IPP08G	\$58.00	1/2in	IP08G		178 lbs	114 lbs	PDF
IPP10G	\$64.00	5/8in	IP10G		265 lbs	174 lbs	PDF
IPP12G	\$68.00	3/4in	IP12G		307 lbs	193 lbs	PDF
IPP16G	\$96.00	1in	IP16G		352 lbs	220 lbs	PDF
IPP20G	\$145.00	1-1/4in	IP20G		615 lbs	352 lbs	PDF
IPPN08G	\$70.00	1/2in	IP08G-OP	open type	178 lbs	114 lbs	PDF
IPPN10G	\$81.00	5/8in	IP10G-OP		265 lbs	174 lbs	PDF
IPPN12G	\$88.00	3/4in	IP12G-OP		307 lbs	193 lbs	PDF
IPPN16G	\$126.00	1in	IP16G-OP		352 lbs	220 lbs	PDF
IPPN20G	\$189.00	1-1/4in	IP20G-OP		615 lbs	352 lbs	PDF



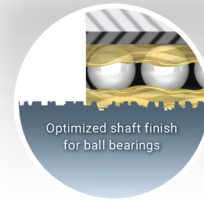
Internal Self-aligning Feature



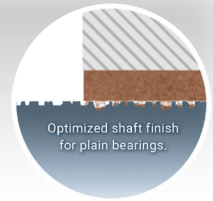
PBC Linear Shafts and Shaft Supports

PBC Linear Simplicity® 60 Plus Linear Shaft Features

- Optimized surface finish for plain and ball bearings
- Straightness: 0.001"–0.002" per ft cumulative
- Length Tolerance: ± 0.030 "
- Surface Finish: 8-12Ra
- Hardness:
 - RC60-65 for 1060 Steel
 - RC50-55 for 440C Stainless Steel



Optimized shaft finish for ball bearings



Optimized shaft finish for plain bearings

In most applications, smoother is not better; in fact it means decreased performance and shortened life. PBC Linear has engineered the surface finish for optimum performance

PBC Linear Shafts (1060 Carbon Steel)					
Part Number	Price	Nominal Diameter	Length	Material	Drawing Links
NIL04-006.000-SL	\$4.75	1/4in	6.0 in	1060 steel	PDF
NIL04-012.000-SL	\$9.25		12.0 in		PDF
NIL06-006.000-SL	\$5.25	3/8in	6.0 in		PDF
NIL06-012.000-SL	\$10.50		12.0 in		PDF
NIL06-018.000-SL	\$15.50	1/2in	18.0 in		PDF
NIL08-012.000-SL	\$11.00		12.0 in		PDF
NIL08-024.000-SL	\$21.50	1/2in	24.0 in		PDF
NIL08-036.000-SL	\$33.00		36.0 in		PDF
NIL10-012.000-SL	\$13.50	5/8in	12.0 in		PDF
NIL10-024.000-SL	\$27.00		24.0 in		PDF
NIL10-036.000-SL	\$40.50	3/4in	36.0 in		PDF
NIL12-012.000-SL	\$17.50		12.0 in		PDF
NIL12-024.000-SL	\$35.00	3/4in	24.0 in		PDF
NIL12-036.000-SL	\$53.00		36.0 in		PDF
NIL16-012.000-SL	\$24.00	1in	12.0 in		PDF
NIL16-024.000-SL	\$47.50		24.0 in		PDF
NIL16-036.000-SL	\$70.00	1-1/4in	36.0 in		PDF
NIL20-012.000-SL	\$30.00		12.0 in		PDF
NIL20-024.000-SL	\$60.00	1-1/4in	24.0 in		PDF
NIL20-036.000-SL	\$91.00		36.0 in		PDF

PBC Linear Shafts (440C Stainless Steel)					
Part Number	Price	Nominal Diameter	Length	Material	Drawing Links
NIL06SS-006.000-SL	\$13.50	3/8in	6.0 in	440C stainless steel	PDF
NIL06SS-012.000-SL	\$27.50		12.0 in		PDF
NIL08SS-012.000-SL	\$26.00	1/2in	12.0 in		PDF
NIL08SS-024.000-SL	\$52.00		24.0 in		PDF
NIL08SS-036.000-SL	\$77.00	5/8in	36.0 in		PDF
NIL10SS-012.000-SL	\$33.00		12.0 in		PDF
NIL10SS-024.000-SL	\$66.00	3/4in	24.0 in		PDF
NIL10SS-036.000-SL	\$100.00		36.0 in		PDF
NIL12SS-012.000-SL	\$36.50	3/4in	12.0 in		PDF
NIL12SS-024.000-SL	\$73.00		24.0 in		PDF
NIL12SS-036.000-SL	\$110.00	1in	36.0 in		PDF
NIL16SS-012.000-SL	\$52.00		12.0 in		PDF
NIL16SS-024.000-SL	\$103.00	1-1/4in	24.0 in		PDF
NIL16SS-036.000-SL	\$155.00		36.0 in		PDF
NIL20SS-012.000-SL	\$57.00	1-1/4in	12.0 in		PDF
NIL20SS-024.000-SL	\$113.00		24.0 in		PDF
NIL20SS-036.000-SL	\$170.00		36.0 in		PDF

PBC Linear Shaft Support Features

- End support blocks can be used for end or intermediate shaft support
- Instant bolt-down installation
- Lightweight and strong.
- Can be used with all shaft types.
- Should be used where deflection between supports is not a problem.
- Material: Aluminum with anodize finish
- Center height tolerance: ± 0.001 "



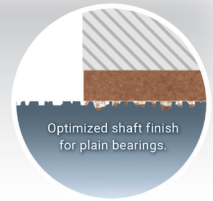
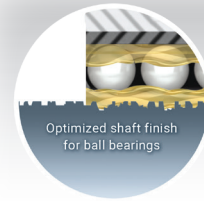
PBC Shaft Support				
Part Number	Price	Nominal Diameter	Center Height	Drawing Links
NSB04	\$21.50	1/4 in	11/16 in	PDF
NSB06	\$22.00	3/8 in	3/4 in	PDF
NSB08	\$30.00	1/2 in	1 in	PDF
NSB10	\$31.50	5/8 in	1 in	PDF
NSB12	\$33.00	3/4 in	1-1/4 in	PDF
NSB16	\$40.50	1 in	1-1/2 in	PDF
NSB20	\$48.50	1-1/4 in	1-3/4 in	PDF



PBC Linear Supported Shafts

PBC Linear Simplicity® 60 Plus Supported Linear Shaft Features

- Optimized surface finish for plain and ball bearings
- Straightness: 0.001"–0.002" per ft cumulative
- Length Tolerance: ± 0.030 "
- Surface Finish: 8-12Ra
- Hardness:
 - RC60-65 for 1060 Steel
 - RC50-55 for 440C Stainless Steel
- Shaft support material: Aluminum
- Centerline tolerance: ± 0.002 "



In most applications, smoother is not better; in fact it means decreased performance and shortened life. PBC Linear has engineered the surface finish for optimum performance

PBC Supported Linear Shafts (1060 Carbon Steel)

Part Number	Price	Nominal Diameter	Length	Material	Drawing Links
SRA08-012.000-SL	\$103.00	1/2in	12.0 in	1060 steel	PDF
SRA08-024.000-SL	\$206.00		24.0 in		PDF
SRA08-036.000-SL	\$311.00		36.0 in		PDF
SRA10-012.000-SL	\$115.00	5/8in	12.0 in		PDF
SRA10-024.000-SL	\$228.00		24.0 in		PDF
SRA10-036.000-SL	\$341.00		36.0 in		PDF
SRA12-012.000-SL	\$124.00	3/4in	12.0 in		PDF
SRA12-024.000-SL	\$246.00		24.0 in		PDF
SRA12-036.000-SL	\$372.00		36.0 in		PDF
SRA16-012.000-SL	\$158.00	1in	12.0 in		PDF
SRA16-024.000-SL	\$315.00		24.0 in		PDF
SRA16-036.000-SL	\$475.00		36.0 in		PDF
SRA20-012.000-SL	\$177.00	1-1/4in	12.0 in		PDF
SRA20-024.000-SL	\$351.00		24.0 in		PDF
SRA20-036.000-SL	\$526.00		36.0 in		PDF

PBC Supported Linear Shafts (440C Stainless Steel)

Part Number	Price	Nominal Diameter	Length	Material	Drawing Links
SRA08SS-012.000-SL	\$160.00	1/2in	12.0 in	440C stainless steel	PDF
SRA08SS-024.000-SL	\$320.00		24.0 in		PDF
SRA08SS-036.000-SL	\$480.00		36.0 in		PDF
SRA10SS-012.000-SL	\$160.00	5/8in	12.0 in		PDF
SRA10SS-024.000-SL	\$320.00		24.0 in		PDF
SRA10SS-036.000-SL	\$480.00		36.0 in		PDF
SRA12SS-012.000-SL	\$191.00	3/4in	12.0 in		PDF
SRA12SS-024.000-SL	\$382.00		24.0 in		PDF
SRA12SS-036.000-SL	\$568.00		36.0 in		PDF
SRA16SS-012.000-SL	\$215.00	1in	12.0 in		PDF
SRA16SS-024.000-SL	\$423.00		24.0 in		PDF
SRA16SS-036.000-SL	\$634.00		36.0 in		PDF
SRA20SS-012.000-SL	\$294.00	1-1/4in	12.0 in		PDF
SRA20SS-024.000-SL	\$589.00		24.0 in		PDF
SRA20SS-036.000-SL	\$878.00		36.0 in		PDF

SureGear High-Precision Inline Strain Wave Gearboxes

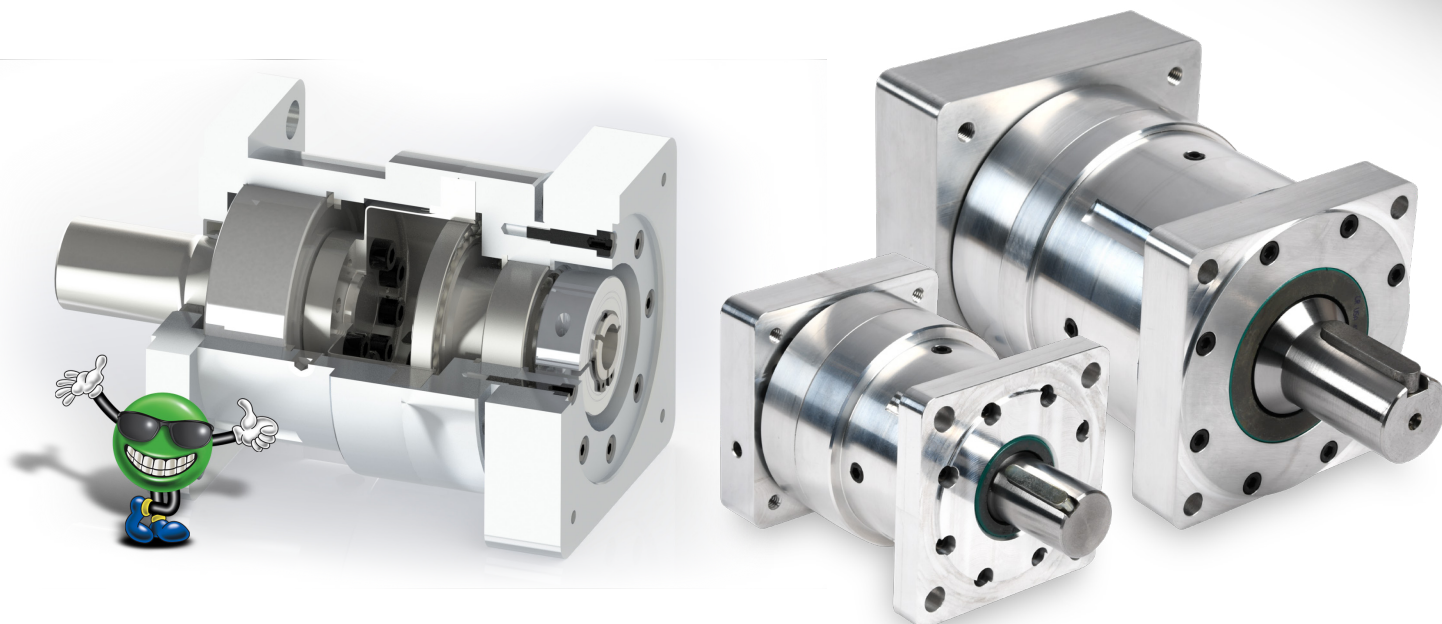
Strain wave gearboxes offer many advantages over planetary and helical gearboxes. Strain wave technology allows for a higher gear ratio and efficiency in an inline form-factor and smaller size. Many different gear ratios and input flange sizes are available and are designed to work with SureServo2 and SureStep motors.

Suregear



Strain wave technology provides:

- High gear ratios compared to similar-sized planetary gearboxes (up to 160:1 for stepper gearboxes and 200:1 for servo gearboxes)
- Low heat and noise generation
- Lifetime zero backlash
- Pre-lubricated for life



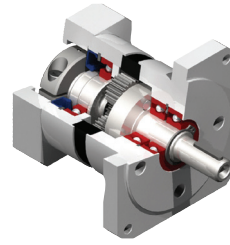
Planetary Gearboxes for NEMA Motors

SureGear® Planetary Gear Reducers for NEMA Motors – Overview

The SureGear PGCN series is a great gearbox (gear reducer) value for servo, stepper, and other motion control applications requiring a NEMA size input/output interface. It offers the best quality available for the price point.

Features

- Wide range of ratios (5, 10, 25, 50, and 100:1)
- Low backlash of 30 arc-min or less
- 20,000 hour service life
- Maintenance free; requires no additional lubrication
- NEMA sizes 17, 23, and 34
- Includes hardware for mounting to SureStep stepper motors
- Optional shaft bushings available for mounting to other motors



Applications

- Material handling
- Pick and place
- Automation
- Packaging
- Other motion control applications requiring a NEMA input/output

SureGear® NEMA Planetary Gearboxes

Part Number	Price	Ratio	NEMA Frame Size	Nominal Output Torque (N·m [lb-in])	Maximum Acceleration Torque (N·m [lb-in])	Emergency Stop Torque (N·m [lb-in])	Standard Output Backlash (arc-min)	Allowable Radial Load (N [lb])	Allowable Axial Load (N [lb])	Torsional Stiffness (N·m/arc-min [lb-in/arc-min])	Mass Moment of Inertia (kg·cm ² [lb-in ²])	Efficiency (%)	Approx Weight (kg [lb])	Fits SureStep Stepper Motor (STP-MTR, STP-MTRH, STP-MTRAC)	Drawing Links
PGCN17-055M	\$411.00	5:1	17	6.5 [58]	13 [115]	26 [230]	<25	361 [81]	298 [67]	0.8 [7.5]	0.0096 [0.003]	94	0.45 [1.0]	STP-MTR(x)-17xxx(x)	PDF
PGCN17-105M	\$411.00	10:1		5.0 [44]	10 [89]	20 [177]	<25			0.5 [4.4]	0.0078 [0.003]	94	0.45 [1.0]		PDF
PGCN17-255M	\$516.00	25:1		16 [142]	20 [177]	32 [283]	<30			0.8 [7.5]	0.0096 [0.003]	92	0.55 [1.2]		PDF
PGCN17-505M	\$516.00	50:1		16 [142]	20 [177]	32 [283]	<30			0.8 [7.5]	0.0078 [0.003]	92	0.55 [1.2]		PDF
PGCN17-1005M	\$516.00	100:1		5.0 [44]	10 [89]	20 [177]	<30			0.5 [4.4]	0.0078 [0.003]	92	0.55 [1.2]		PDF
PGCN23-0525	\$453.00	5:1	23	6.5 [58]	13 [115]	26 [230]	<20	476 [107]	425 [96]	0.9 [8.0]	0.04 [0.014]	94	0.45 [1.0]	STP-MTR(x)-23xxx(x)	PDF
PGCN23-1025	\$453.00	10:1		5.0 [44]	10 [89]	20 [177]	<20			0.6 [5.3]		94	0.45 [1.0]		PDF
PGCN23-2525	\$531.00	25:1		16 [142]	20 [177]	32 [283]	<25			0.9 [8.0]		92	0.55 [1.2]		PDF
PGCN23-5025	\$531.00	50:1		16 [142]	20 [177]	32 [283]	<25			0.9 [8.0]		92	0.55 [1.2]		PDF
PGCN23-10025	\$531.00	100:1		5.0 [44]	10 [89]	20 [177]	<25			0.6 [5.3]		92	0.55 [1.2]		PDF
PGCN34-0550	\$539.00	5:1	34	26 [230]	44 [389]	84 [743]	<15	476 [107]	425 [96]	2.4 [21.2]	0.36 [0.123]	94	1.1 [2.4]	STP-MTR(x)-34xxx(x)*	PDF
PGCN34-1050	\$539.00	10:1		16 [142]	24 [212]	62 [549]	<15			1.3 [11.5]	0.34 [0.116]	94	1.1 [2.4]		PDF
PGCN34-2550	\$731.00	25:1		42 [372]	52 [460]	84 [743]	<20			2.4 [21.2]	0.36 [0.123]	92	1.4 [3.1]		PDF
PGCN34-5050	\$731.00	50:1		42 [372]	52 [460]	84 [743]	<20			2.4 [21.2]	0.34 [0.116]	92	1.4 [3.1]		PDF
PGCN34-10050	\$731.00	100:1		16 [142]	24 [212]	62 [549]	<20			1.3 [11.5]	0.34 [0.116]	92	1.4 [3.1]		PDF

Specifications Applicable to All PGCN Gearboxes

Nominal Speed (rpm)	3500
Maximum Input Speed (rpm)	6000
Mounting Orientation	can be mounted in any orientation
Environmental Rating	IP64
Operating Temperature	-20 to 90 °C [-4 to 194 °F]
Lubrication	Mineral Grease EPO
Service Life (hrs)	>20,000

NOTE: SureGear PGCN gearboxes (gear reducers) are not designed for back driving.

*Does NOT fit STP-MTRAC-34156(D)



Accessories

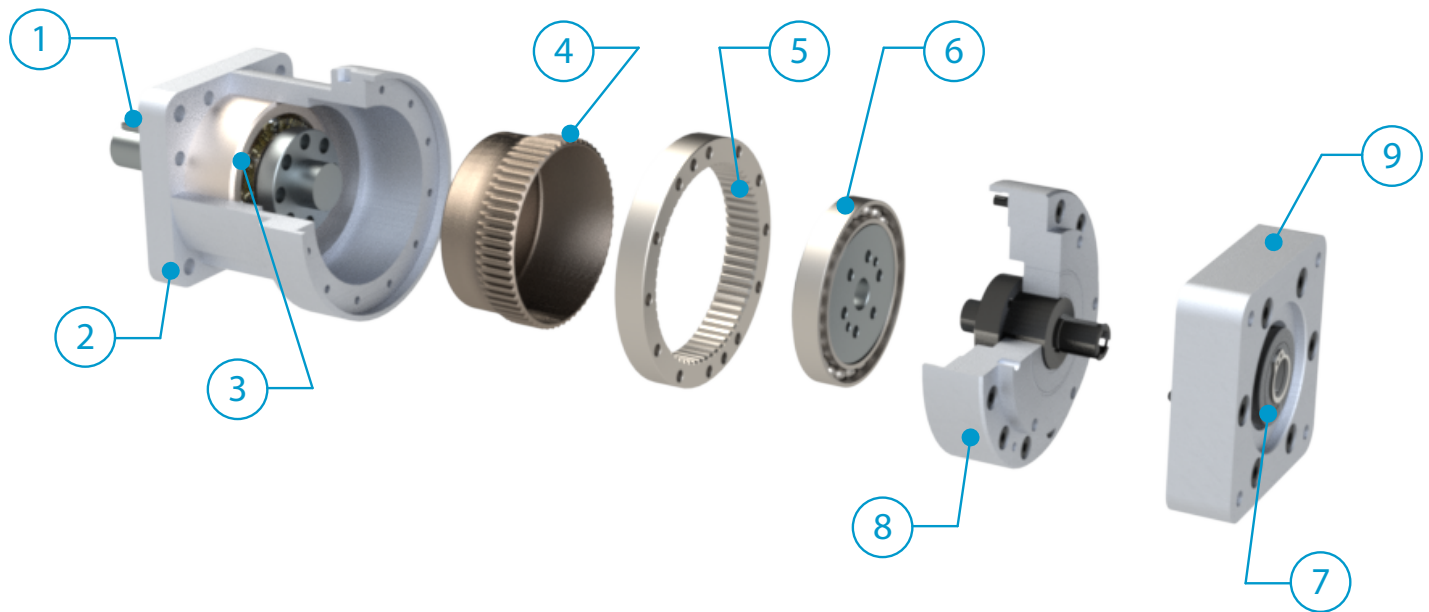
Planetary Gearboxes for NEMA Motors



Typical PGCN Accessory Bushings Typical PGCN Accessory Screws

SureGear® NEMA Planetary Gearbox Accessories			
Part Number	Price	Description	Fits SureGear NEMA Planetary Gearbox
<u>PGCN17-SK</u>	\$3.00	Mounting screws, replacement, for SureGear NEMA size 17 gearboxes (Package of 4)	PGCN17-xxxx
<u>PGCN17-BSH5M</u>	\$26.00	Motor shaft bushing for SureGear NEMA size 17 gearboxes, fits 5mm diameter motor shaft	
<u>PGCN17-BSH8M</u>	\$26.00	Motor shaft bushing for SureGear NEMA size 17 gearboxes, fits 8mm diameter motor shaft	
<u>PGCN17-BSH9M</u>	\$26.00	Motor shaft bushing for SureGear NEMA size 17 gearboxes, fits 9mm diameter motor shaft	
<u>PGCN17-BSH25</u>	\$26.00	Motor shaft bushing for SureGear NEMA size 17 gearboxes, fits 1/4 inch diameter motor shaft	
<u>PGCN23-SK</u>	\$3.00	Mounting screws, replacement, for SureGear NEMA size 23 gearboxes (Package of 4)	PGCN23-xxxx
<u>PGCN23-BSH8M</u>	\$26.00	Motor shaft bushing for SureGear NEMA size 23 gearboxes, fits 8mm diameter motor shaft	
<u>PGCN23-BSH9M</u>	\$26.00	Motor shaft bushing for SureGear NEMA size 23 gearboxes, fits 9mm diameter motor shaft	
<u>PGCN23-BSH25</u>	\$26.00	Motor shaft bushing for SureGear NEMA size 23 gearboxes, fits 1/4 inch diameter motor shaft	
<u>PGCN23-BSH37</u>	\$26.00	Motor shaft bushing for SureGear NEMA size 23 gearboxes, fits 3/8 inch diameter motor shaft	
<u>PGCN34-SK</u>	\$3.00	Mounting screws, replacement, for SureGear NEMA size 34 gearboxes (Package of 4)	PGCN34-xxxx
<u>PGCN34-BSH9M</u>	\$26.00	Motor shaft bushing for SureGear NEMA size 34 gearboxes, fits 9mm diameter motor shaft	
<u>PGCN34-BSH11M</u>	\$26.00	Motor shaft bushing for SureGear NEMA size 34 gearboxes, fits 11mm diameter motor shaft	
<u>PGCN34-BSH37</u>	\$26.00	Motor shaft bushing for SureGear NEMA size 34 gearboxes, fits 3/8 inch diameter motor shaft	
<u>PGCN34-BSH50</u>	\$26.00	Motor shaft bushing for SureGear NEMA size 34 gearboxes, fits 1/2 inch diameter motor shaft	

SureGear® Strain Wave Zero Backlash Gearbox

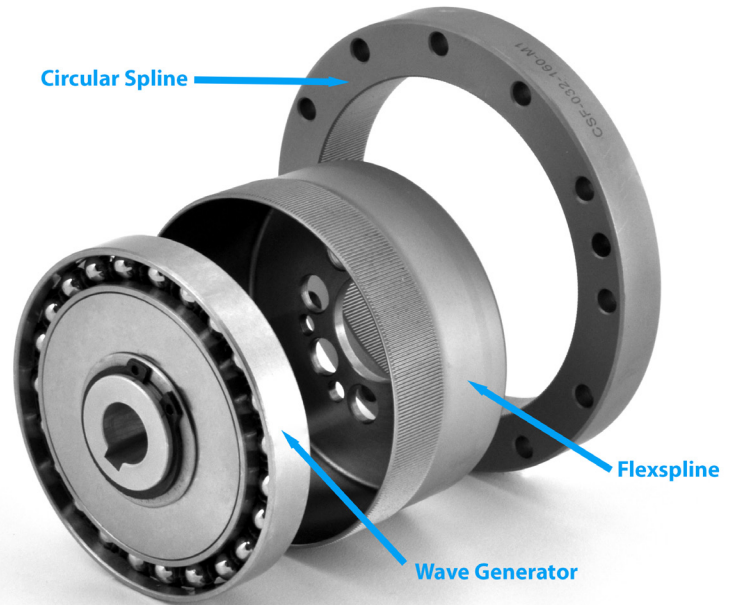


SureGear® Strain Wave Gearboxes – Overview

1. **Stressproof® Output Shaft** – provides a minimum 115,000 psi tensile strength, resistance to fatigue and excellent wearability
2. **Output Flange** – has a precision pilot and is available in metric, NEMA 17, 23, & 34 sizes
3. **Double Row Angular Contact Bearing** – provides a precision output with high stiffness, high radial and axial load capacities
4. **Flexspline** – a thin walled external spline that progressively engages with the Circular Spline with a zero backlash tooth mesh
5. **Circular Spline** – precision shaped internal spline, remains stationary and engages the Flexspline
6. **Wave Generator** – precision elliptical ball bearing that turns with the input motor and causes the rotating elliptical wave form on the Flexspline
7. **Sealed Bearing** – a precision bearing axially fixes the input shaft and wave generator positions
8. **Quick Connection Motor Coupling** – a socket head tightened clamping collar provides a reliable and simple motor connection
9. **Input Flange** – factory machined to match your motor dimensions and available in metric and standard NEMA 17, 23,& 34 sizes
10. **Lubrication** – Mobil Beacon 325 grease. The gearbox is sealed and pre-lubricated for its lifetime and does not require a change of lubricant.

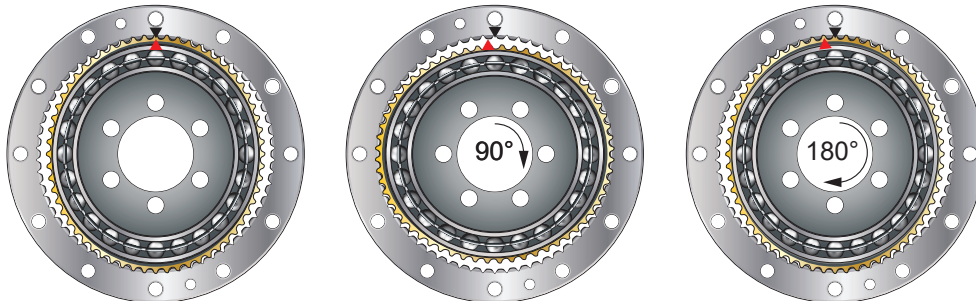
SureGear® Strain Wave Features and Benefits

- Lifetime zero backlash
- Lifetime lubrication
- Lifetime ultra-high repeatability
- Lifetime high positional accuracy
- Single stage, high reduction ratios of 50:1 to 200:1
- Low noise and heat generation
- High efficiency, torsional stiffness and torque-to-weight ratio
- High torque capacity with a large number of teeth sharing load

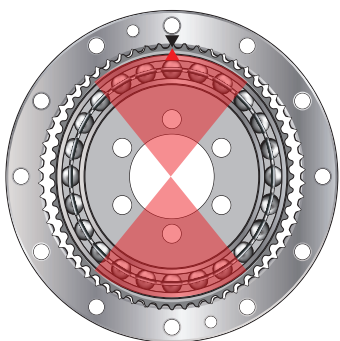


Harmonic Gearing Tooth Engagement

Tooth engagement between the Flexspline and the Circular Spline takes place at two areas located 180° from each other on the ellipse's major axis. The rotation of the wave generator inside the Flexspline generates relative motion between the two splines.

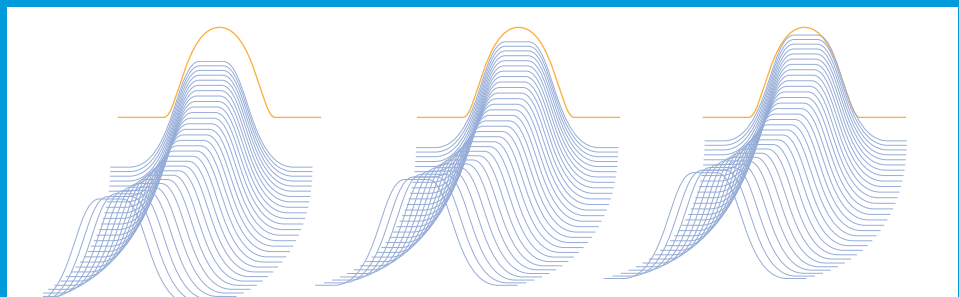


Example: with 100:1 ratio, 100 clockwise input motor rotations results in 1 counterclockwise output rotation.



Tooth Engagement Zones

Characteristically, 30-40 percent of the teeth are engaged dependent upon the ratio, and load is shared amongst many teeth giving the drive its high torque capacity.



SureGear® Strain Wave Zero Backlash Gearbox

Features

- Lifetime zero backlash
- Fits SureServo® SVL-201 and SV2L-201B servo motors and SureStep® NEMA17 stepper motors
- Single stage, high reduction ratios from 50 to 100:1
- High output torque in a compact gearbox
- Low noise and heat generation
- High efficiency, torsional stiffness and torque-to-weight ratio

SureGear® Strain Wave Gearboxes	
Nominal Input Speed ¹	3000 RPM
Maximum Input Speed ²	7300 RPM
Maximum Radial Load ³	1268 N
Maximum Axial Load ⁴	870 N
Service Life ⁵	25000 hr
Repeatability	±10 arc-sec
Positional Accuracy	±90 arc-sec
Backlash	0 arc-sec
Noise Level	<67 dB(A)
Protection Class	IP64
Permitted Housing Temperature	90°C
Permitted Ambient Temperature	-40°C to 90°C
Torsional Rigidity ⁶	2.6 N·m/arc-min
Moment of Inertia	0.047 kgcm ²
Weight ⁷	0.68 kg
Lubrication	Permanent (Mobil Beacon 325 Grease)

1. Input speed at rated output torque for an average life of 25,000 hours
2. The maximum intermittent input speed
3. At key center line, calculated at 100 rpm output speed and nominal output torque
4. At end of output shaft, calculated at 100 rpm output speed and nominal output
5. Average life at nominal load and input speed
6. Torsional rigidity at nominal torque. Typically, stiffness lessens when applied torque reduces.
7. Weight may vary slightly dependent upon adapter options



HPGA063-50A1



HPGCN17-505M

SureGear® Strain Wave Gearboxes						
Part Number	<u>HPGA063-50A1</u>	<u>HPGA063-80A1</u>	<u>HPGA063-100A1</u>	<u>HPGCN17-505M</u>	<u>HPGCN17-805M</u>	<u>HPGCN17-1005M</u>
Price	\$1,051.00	\$1,051.00	\$1,051.00	\$1,051.00	\$1,051.00	\$1,051.00
Ratio (actual)	50:1	80:1	100:1	50:1	80:1	100:1
Nominal Output Torque ¹	12 N·m (106 lb-in)		15 N·m (133 lb-in)	12 N·m (106 lb-in)		15 N·m (133 lb-in)
Maximum Output Torque ²	24 N·m (212 lb-in)		30 N·m (266 lb-in)	24 N·m (212 lb-in)		30 N·m (266 lb-in)
No-Load Starting Torque ³	5.4 N·cm	3.3 N·cm	3 N·cm	5.4 N·cm	3.3 N·cm	3 N·cm
No-Load Back Driving Torque ⁴	2.3 N·m	2.6 N·m	2.7 N·m	2.3 N·m	2.6 N·m	2.7 N·m
Fits	SureServo and SureServo2 SV(2)L-201(B) motors			SureStep NEMA 17 motors		
Drawing Link	PDF	PDF	PDF	PDF	PDF	PDF

1. Rated torque at 3,000 rpm input for an average life of 25,000 hours
2. Exceeding the maximum output torque limit may immediately damage the drive
3. Minimum input torque required to turn the output shaft with no load
4. Minimum torque, if applied to the output shaft, that will cause the unit to back drive

SureGear® Strain Wave Zero Backlash Gearbox

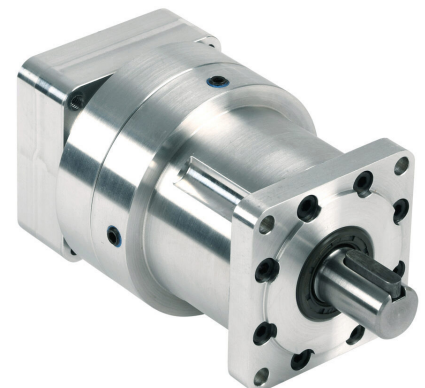
Features

- Lifetime zero backlash
- Fits SureServo® SVL-202, SVL-204, SV2L-202B, and SV2L-204B servo motors and SureStep® NEMA23 stepper motors
- Single stage, high reduction ratios from 50 to 160:1
- High output torque in a compact gearbox
- Low noise and heat generation
- High efficiency, torsional stiffness and torque-to-weight ratio

SureGear® Strain Wave Gearboxes	
Nominal Input Speed ¹	3000 RPM
Maximum Input Speed ²	6500 RPM
Maximum Radial Load ³	2376 N
Maximum Axial Load ⁴	1557 N
Service Life ⁵	25000 hr
Repeatability	±10 arc-sec
Positional Accuracy	±90 arc-sec
Backlash	0 arc-sec
Noise Level	<67 dB(A)
Protection Class	IP64
Permitted Housing Temperature	90°C
Permitted Ambient Temperature	-40°C to 90°C
Torsional Rigidity ⁶	4.5 N·m/arc-min
Moment of Inertia	0.161 kgcm ²
Weight ⁷	1.2 kg
Lubrication	Permanent (Mobil Beacon 325 Grease)



HPGCN23-5025



HPGA073-50A2

1. Input speed at rated output torque for an average life of 25,000 hours
2. The maximum intermittent input speed
3. At key center line, calculated at 100 rpm output speed and nominal output torque
4. At end of output shaft, calculated at 100 rpm output speed and nominal output
5. Average life at nominal load and input speed
6. Torsional rigidity at nominal torque. Typically, stiffness lessens when applied torque reduces.
7. Weight may vary slightly dependent upon adapter options

SureGear® Strain Wave Gearboxes										
Part Number	HPGA073-50A2	HPGA073-80A2	HPGA073-100A2	HPGA073-120A2	HPGA073-160A2	HPGCN23-5025	HPGCN23-8025	HPGCN23-10025	HPGCN23-12025	HPGCN23-16025
Price	\$1,219.00	\$1,219.00	\$1,219.00	\$1,219.00	\$1,219.00	\$1,219.00	\$1,219.00	\$1,219.00	\$1,219.00	\$1,219.00
Ratio (actual)	50:1	80:1	100:1	120:1	160:1	50:1	80:1	100:1	120:1	160:1
Nominal Output Torque ¹	25 N·m (221 lb-in)		30 N·m (266 lb-in)			25 N·m (221 lb-in)		30 N·m (266 lb-in)		
Maximum Output Torque ²	50 N·m (442 lb-in)		60 N·m (532 lb-in)			50 N·m (442 lb-in)		60 N·m (532 lb-in)		
No-Load Starting Torque ³	6.2 N·cm	4.6 N·cm	4.3 N·cm	3.3 N·cm	2.3 N·cm	6.2 N·cm	4.6 N·cm	4.3 N·cm	3.3 N·cm	2.3 N·cm
No-Load Back Driving Torque ⁴	4 N·m	4.2 N·m	4.5 N·m	6.6 N·m	7 N·m	4 N·m	4.2 N·m	4.5 N·m	6.6 N·m	7 N·m
Fits	SureServo and SureServo2 SV(2)L-202(B) and SV(2)L-204(B) motors					SureStep NEMA 23 motors				
Drawing Link	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF

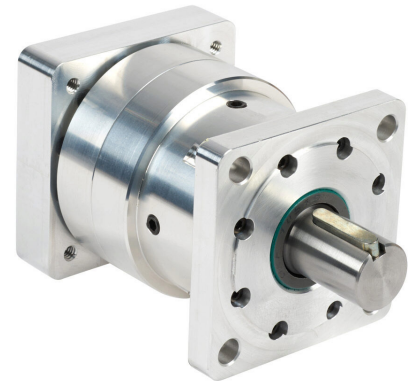
1. Rated torque at 3,000 rpm input for an average life of 25,000 hours
2. Exceeding the maximum output torque limit may immediately damage the drive
3. Minimum input torque required to turn the output shaft with no load
4. Minimum torque, if applied to the output shaft, that will cause the unit to back drive

SureGear® Strain Wave Zero Backlash Gearbox

Features

- Lifetime zero backlash
- Fits SureServo® SVL-207 and SV2L-207B servo motors and SureStep® NEMA34 stepper motors
- Single stage, high reduction ratios from 50 to 160:1
- High output torque in a compact gearbox
- Low noise and heat generation
- High efficiency, torsional stiffness and torque-to-weight ratio

SureGear® Strain Wave Gearboxes	
Nominal Input Speed ¹	3000 RPM
Maximum Input Speed ²	5600 RPM
Maximum Radial Load ³	2230 N
Maximum Axial Load ⁴	3717 N
Service Life ⁵	25000 hr
Repeatability	±10 arc-sec
Positional Accuracy	±90 arc-sec
Backlash	0 arc-sec
Noise Level	<67 dB(A)
Protection Class	IP64
Permitted Housing Temperature	90°C
Permitted Ambient Temperature	-40°C to 90°C
Torsional Rigidity ⁶	24 N·m/arc-min
Moment of Inertia	0.506 kgcm ²
Weight ⁷	2.6 kg
Lubrication	Permanent (Mobil Beacon 325 Grease)



[HPGCN34-5050](#)



[HPGA088-50A3](#)

1. Input speed at rated output torque for an average life of 25,000 hours
2. The maximum intermittent input speed
3. At key center line, calculated at 100 rpm output speed and nominal output torque
4. At end of output shaft, calculated at 100 rpm output speed and nominal output
5. Average life at nominal load and input speed
6. Torsional rigidity at nominal torque. Typically, stiffness lessens when applied torque reduces.
7. Weight may vary slightly dependent upon adapter options

SureGear® Strain Wave Gearboxes										
Part Number	HPGA088-50A3	HPGA088-80A3	HPGA088-100A3	HPGA088-120A3	HPGA088-160A3	HPGCN34-5050	HPGCN34-8050	HPGCN34-10050	HPGCN34-12050	HPGCN34-16050
Price	\$1,385.00	\$1,385.00	\$1,385.00	\$1,385.00	\$1,385.00	\$1,385.00	\$1,385.00	\$1,385.00	\$1,385.00	\$1,385.00
Ratio (actual)	50:1	80:1	100:1	120:1	160:1	50:1	80:1	100:1	120:1	160:1
Nominal Output Torque ¹	40 N·m (354 lb-in)		50 N·m (443 lb-in)			40 N·m (354 lb-in)		50 N·m (443 lb-in)		
Maximum Output Torque ²	80 N·m (708 lb-in)		100 N·m (886 lb-in)			80 N·m (708 lb-in)		100 N·m (886 lb-in)		
No-Load Starting Torque ³	14 N·cm	7 N·cm	7 N·cm	6 N·cm	6 N·cm	14 N·cm	7 N·cm	7 N·cm	6 N·cm	6 N·cm
No-Load Back Driving Torque ⁴	7 N·m	7.2 N·m	8.5 N·m	9 N·m	11.3 N·m	7 N·m	7.2 N·m	8.5 N·m	9 N·m	11.3 N·m
Fits	SureServo and SureServo2 SV(2)L-207(B) motors					SureStep NEMA 34 motors				
Drawing Link	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF

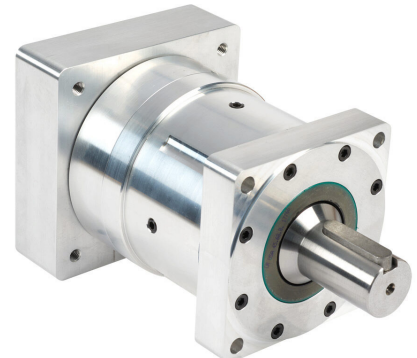
1. Rated torque at 3,000 rpm input for an average life of 25,000 hours
2. Exceeding the maximum output torque limit may immediately damage the drive
3. Minimum input torque required to turn the output shaft with no load
4. Minimum torque, if applied to the output shaft, that will cause the unit to back drive

SureGear® Strain Wave Zero Backlash Gearbox

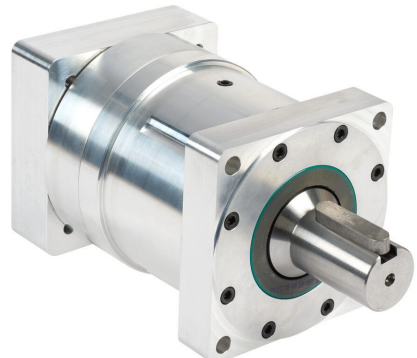
Features

- Lifetime zero backlash
- Fits SureServo® SVL-210, SVM-210, and SV2L-210B servo motors
- Single stage, high reduction ratios from 50 to 200:1
- High output torque in a compact gearbox
- Low noise and heat generation
- High efficiency, torsional stiffness and torque-to-weight ratio

SureGear® Strain Wave Gearboxes	
Nominal Input Speed ¹	3000 RPM
Maximum Input Speed ²	4800 RPM
Maximum Radial Load ³	6012 N
Maximum Axial Load ⁴	3985 N
Service Life ⁵	25000 hr
Repeatability	±10 arc-sec
Positional Accuracy	±90 arc-sec
Backlash	0 arc-sec
Noise Level	<67 dB(A)
Protection Class	IP64
Permitted Housing Temperature	90°C
Permitted Ambient Temperature	-40°C to 90°C
Torsional Rigidity ⁶	32 N·m/arc-min
Moment of Inertia	2.12 kgcm ²
Weight ⁷	6.3 kg
Lubrication	Permanent (Mobil Beacon 325 Grease)



HPGA116-50A5



HPGA116-50A4

1. Input speed at rated output torque for an average life of 25,000 hours
2. The maximum intermittent input speed
3. At key center line, calculated at 100 rpm output speed and nominal output torque
4. At end of output shaft, calculated at 100 rpm output speed and nominal output
5. Average life at nominal load and input speed
6. Torsional rigidity at nominal torque. Typically, stiffness lessens when applied torque reduces.
7. Weight may vary slightly dependent upon adapter options

SureGear® Strain Wave Gearboxes												
Part Number	HPGA116-50A4	HPGA116-80A4	HPGA116-100A4	HPGA116-135A4	HPGA116-160A4	HPGA116-200A4	HPGA116-50A5	HPGA116-80A5	HPGA116-100A5	HPGA116-135A5	HPGA116-160A5	HPGA116-200A5
Price	\$1,654.00	\$1,654.00	\$1,654.00	\$1,654.00	\$1,654.00	\$1,654.00	\$1,654.00	\$1,654.00	\$1,654.00	\$1,654.00	\$1,654.00	\$1,654.00
Ratio (actual)	50:1	80:1	100:1	135:1	160:1	200:1	50:1	80:1	100:1	135:1	160:1	200:1
Nominal Output Torque ¹	100 N·m (885 lb-in)		120 N·m (1062 lb-in)				100 N·m (885 lb-in)		120 N·m (1062 lb-in)			
Maximum Output Torque ²	200 N·m (1770 lb-in)		240 N·m (2124 lb-in)				200 N·m (1770 lb-in)		240 N·m (2124 lb-in)			
No-Load Starting Torque ³	38 N·cm	18 N·cm	16 N·cm	14 N·cm	12 N·cm	11 N·cm	38 N·cm	18 N·cm	16 N·cm	14 N·cm	12 N·cm	11 N·cm
No-Load Back Driving Torque ⁴	11 N·m	14 N·m	15 N·m	20 N·m	21 N·m	22 N·m	11 N·m	14 N·m	15 N·m	20 N·m	21 N·m	22 N·m
Fits	SureServo and SureServo2 SV(2)L-210(B) motors						SureServo SVM-210(B) motors					
Drawing Link	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF	PDF

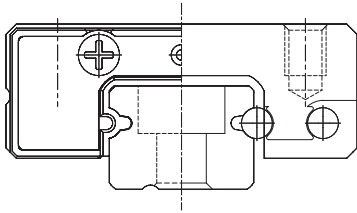
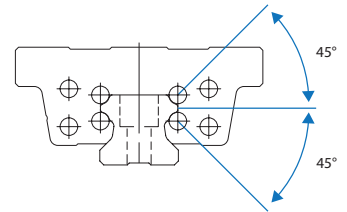
1. Rated torque at 3,000 rpm input for an average life of 25,000 hours
2. Exceeding the maximum output torque limit may immediately damage the drive
3. Minimum input torque required to turn the output shaft with no load
4. Minimum torque, if applied to the output shaft, that will cause the unit to back drive



WON Linear Bearings and Rails

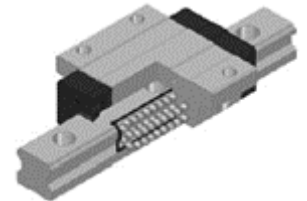
Product Overview

H-Series has 4 rows of ball bearings continuously circulating and making 45° contact with an arc-groove feature in the rail. This unique configuration provides 4-direction equal load sharing in any direction. This translates into lower friction resistance, smooth motion, and long life.



M & MB-Series have 2 rows of ball bearings continuously circulating and making 4 point 45° contact with an gothic-arc-groove feature in the Rail. This unique configuration provides 4-direction equal load sharing in any direction, in a very compact assembly. This translates into lower friction resistance, smooth motion, and long life.

End Seals are included with all products offered to protect against dust and foreign materials which induce premature wear and shorter life. Optional Inside Seals are offered, on the H-Series for additional protection.





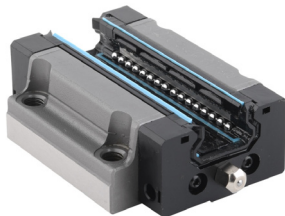
WON Linear Bearings and Rails

H-Series Bearings and Rail Features

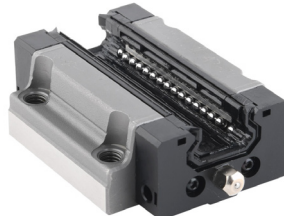
- Bearing Preload: Moderate
- Precision Classification: Moderate (no symbol)
- Radial Clearance Classification: Common Clearance
- Material: Carbon Steel
- Rail Hardness: HRC58-64
- End Seals included with all bearings
- Grease fitting included

H-Series Linear Bearing Ratings

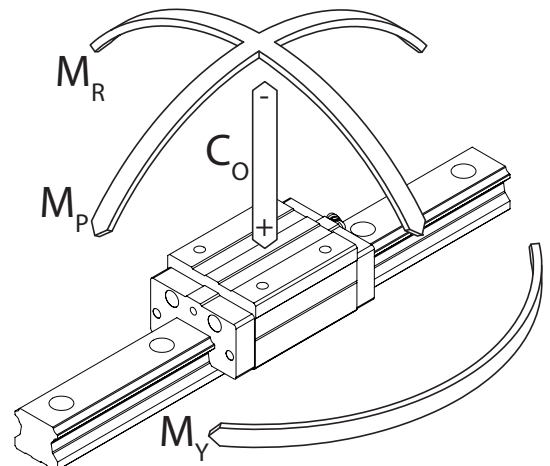
Part Number	Price	Bearing Form Factor	Inside Seal	Series Size	Load Ratings							Drawing Links
					Static (Co)	Dynamic (C)	Pitch Moment (M _P)		Yaw Moment (M _Y)		Roll Moment (M _R)	
							1 Linear Bearing	2 Linear Bearing	1 Linear Bearing	2 Linear Bearing		
H15FSSG0	\$74.00	flanged	yes	H15	16200 N	9900 N	115 N·m	552 N·m	115 N·m	552 N·m	129 N·m	PDF
H15FUUG0	\$66.00		no									PDF
H15RSSG0	\$71.00	rectangular	yes									PDF
H15RUUG0	\$64.00		no									PDF
H20FSSG0	\$80.00	flanged	yes	H20	23900 N	14900 N	221 N·m	1049 N·m	221 N·m	1049 N·m	251 N·m	PDF
H20FUUG0	\$72.00		no									PDF
H20RSSG0	\$75.00	rectangular	yes									PDF
H20RUUG0	\$68.00		no									PDF
H25FSSG0	\$99.00	flanged	yes	H25	33100 N	22100 N	337 N·m	1636 N·m	337 N·m	1636 N·m	398 N·m	PDF
H25FUUG0	\$92.00		no									PDF
H25RSSG0	\$96.00	rectangular	yes									PDF
H25RUUG0	\$88.00		no									PDF
H30FSSG0	\$112.00	flanged	yes	H30	57100 N	38400 N	711 N·m	3384 N·m	711 N·m	3384 N·m	828 N·m	PDF
H30FUUG0	\$105.00		no									PDF
H30RSSG0	\$108.00	rectangular	yes									PDF
H30RUUG0	\$100.00		no									PDF
H35FSSG0	\$158.00	flanged	yes	H35	74600 N	51100 N	1062 N·m	5012 N·m	1062 N·m	5012 N·m	1298 N·m	PDF
H35FUUG0	\$150.00		no									PDF
H35RSSG0	\$151.00	rectangular	yes									PDF
H35RUUG0	\$146.00		no									PDF



With Inside Seal



Without Inside Seal





WON Linear Bearings and Rails

H-Series Linear Rails

Part Number	Price	Series Size	Length	Parallelism	Mass/Length	Drawing Links
H15-400L	\$75.00	H15	400 mm	8 μ m	1300 g/m	PDF
H15-580L	\$107.00		580 mm	11 μ m		PDF
H15-760L	\$141.00		760 mm	12 μ m		PDF
H15-1000L	\$184.00		1000 mm	13 μ m		PDF
H20-400L	\$77.00	H20	400 mm	8 μ m	2200 g/m	PDF
H20-580L	\$110.00		580 mm	11 μ m		PDF
H20-760L	\$146.00		760 mm	12 μ m		PDF
H20-1000L	\$191.00		1000 mm	13 μ m		PDF
H25-400L	\$85.00	H25	400 mm	8 μ m	3000 g/m	PDF
H25-580L	\$124.00		580 mm	11 μ m		PDF
H25-760L	\$164.00		760 mm	12 μ m		PDF
H25-1000L	\$215.00		1000 mm	13 μ m		PDF
H30-360L	\$84.00	H30	360 mm	8 μ m	4850 g/m	PDF
H30-520L	\$119.00		520 mm	11 μ m		PDF
H30-760L	\$173.00		760 mm	12 μ m		PDF
H30-1000L	\$230.00		1000 mm	13 μ m		PDF
H35-360L	\$112.00	H35	360 mm	8 μ m	6580 g/m	PDF
H35-520L	\$161.00		520 mm	11 μ m		PDF
H35-760L	\$234.00		760 mm	12 μ m		PDF
H35-1000L	\$309.00		1000 mm	13 μ m		PDF

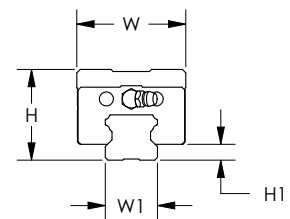


Rails cannot be butted together end-to-end to create longer runs. The lengths offered here have a chamfer feature on both ends.

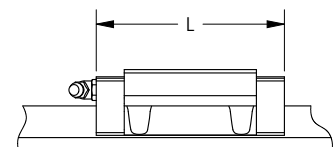
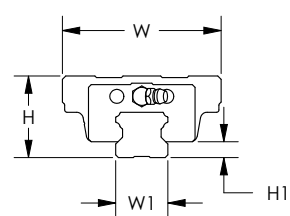
H-Series Dimensions

Bearing with Rail	Bearing Form Factor	Height, H (mm)	Width, W (mm)	Length, L (mm)	Clearance, H1 (mm)	Rail Width, W1 (mm)
H15Rxxxx	rectangular	28	34	57	4.7	15
H15Fxxxx	flanged	24	47			
H20Rxxxx	rectangular	30	44	72.7	6	20
H20Fxxxx	flanged	30	63			
H25Rxxxx	rectangular	40	48	83	7	23
H25Fxxxx	flanged	36	70			
H30Rxxxx	rectangular	45	60	97.8	7.5	28
H30Fxxxx	flanged	42	90			
H35Rxxxx	rectangular	55	70	110	9	34
H35Fxxxx	flanged	48	100			

Rectangular



Flanged





WON Linear Bearings and Rails

M-Series Bearings and Rail Features

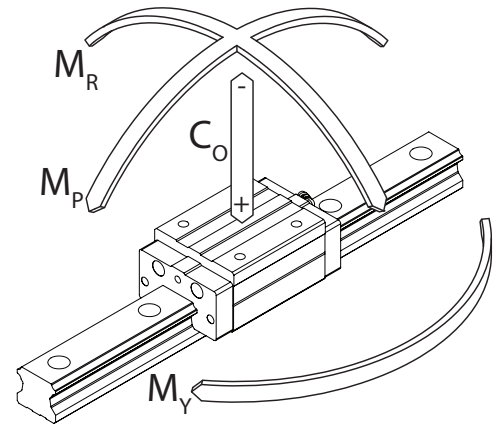
- Low Profile
- Bearing Preload: Moderate
- Precision Classification: Moderate (no symbol)
- Radial Clearance Classification: Common Clearance
- Bearing Block Housing Material: Stainless Steel
- Rail Material: Stainless Steel
- Bearing Material: SUJ2 Bearing Steel
- Rail Hardness: HRC58-64
- End Seals included with all bearings

M-Series Linear Bearing Ratings

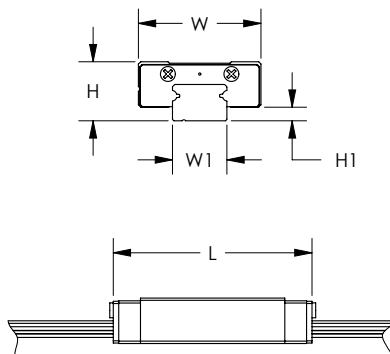
Part Number	Price	Bearing Form Factor	Series Size	Load Ratings							Drawing Links
				Static (Co)	Dynamic (C)	Pitch Moment (MP)		Yaw Moment (My)		Roll Moment (MR)	
						1 Linear Bearing	2 Linear Bearing	1 Linear Bearing	2 Linear Bearing		
M7LUUG0	\$52.00	rectangular long	M7	2650 N	1631 N	10.1 N·m	50 N·m	10.1 N·m	50 N·m	9.67 N·m	PDF
M7NUUG0	\$46.50	rectangular		1703 N	1197 N	4.2 N·m	23.1 N·m	4.2 N·m	23.1 N·m	6.22 N·m	PDF
M9LUUG0	\$58.00	rectangular long	M9	4030 N	2375 N	21.9 N·m	102.8 N·m	21.9 N·m	102.8 N·m	18.74 N·m	PDF
M9NUUG0	\$49.50	rectangular		2545 N	1721 N	9.3 N·m	46.6 N·m	9.3 N·m	46.6 N·m	11.84 N·m	PDF
M12LUUG0	\$63.00	rectangular long	M12	6200 N	4246 N	34.8 N·m	169.1 N·m	34.8 N·m	169.1 N·m	38.44 N·m	PDF
M12NUUG0	\$55.00	rectangular		3816 N	3023 N	14.4 N·m	75.8 N·m	14.4 N·m	75.8 N·m	23.66 N·m	PDF

M-Series Linear Rails

Part Number	Price	Series Size	Length	Parallelism	Mass/Length	Drawing Links
M7-85L	\$16.50	M7	85 mm	11 µm	253 g/m	PDF
M7-190L	\$36.50		190 mm	14 µm		PDF
M7-370L	\$70.00		370 mm	18 µm		PDF
M7-610L	\$114.00		610 mm	22 µm		PDF
M9-95L	\$16.00	M9	95 mm	11 µm	391 g/m	PDF
M9-175L	\$29.00		175 mm	14 µm		PDF
M9-495L	\$81.00		495 mm	21 µm		PDF
M9-695L	\$113.00		695 mm	23 µm		PDF
M12-195L	\$37.50	M12	195 mm	15 µm	679 g/m	PDF
M12-320L	\$60.00		320 mm	18 µm		PDF
M12-470L	\$89.00		470 mm	21 µm		PDF
M12-695L	\$133.00		695 mm	23 µm		PDF



Rails cannot be butted together end-to-end to create longer runs. The lengths offered here have a chamfer feature on both ends.



M-Series Dimensions

Bearing with Rail	Height, H (mm)	Width, W (mm)	Length, L (mm)	Clearance, H1 (mm)	Rail Width, W1 (mm)
M7LUUG0	8	17	31.8	1.5	7
M7NUUG0			24.3		
M9LUUG0	10	20	41.4	2	9
M9NUUG0			31.3		
M12LUUG0	13	27	45.4	3	12
M12NUUG0			34.9		



WON Linear Bearings and Rails

MB-Series Bearings and Rail Features

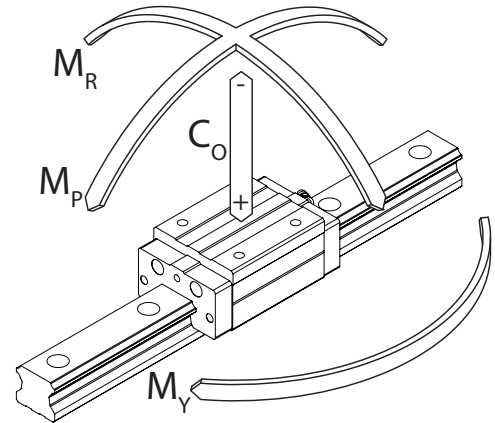
- Wide, Low Profile
- Bearing Preload: Moderate
- Precision Classification: Moderate (no symbol)
- Radial Clearance Classification: Common Clearance
- Bearing Block Housing Material: Stainless Steel
- Rail Material: Stainless Steel
- Bearing Material: SUJ2 Bearing Steel
- Rail Hardness: HRC58-64
- End Seals included with all bearings

MB-Series Linear Bearing Ratings

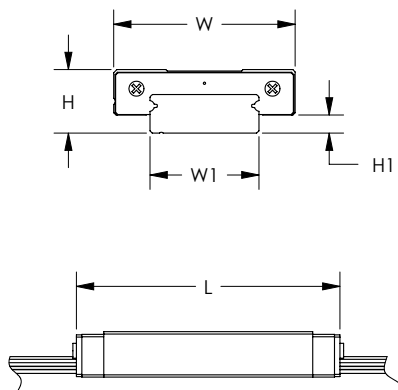
Part Number	Price	Bearing Form Factor	Series Size	Load Ratings							Drawing Links
				Static (Co)	Dynamic (C)	Pitch Moment (MP)		Yaw Moment (My)		Roll Moment (MR)	
						1 Linear Bearing	2 Linear Bearing	1 Linear Bearing	2 Linear Bearing		
MB7LUUG0	\$65.00	rectangular long	MB7	3975 N	2166 N	22.5 N-m	106.1 N-m	22.5 N-m	106.1 N-m	28.42 N-m	PDF
MB7NUUG0	\$59.00	rectangular		2650 N	1631 N	10.1 N-m	51.1 N-m	10.1 N-m	51.1 N-m	18.95 N-m	PDF
MB9LUUG0	\$73.00	rectangular long	MB9	5303 N	2878 N	37.8 N-m	172.9 N-m	37.8 N-m	172.9 N-m	48.52 N-m	PDF
MB9NUUG0	\$66.00	rectangular		3606 N	2197 N	18.2 N-m	87.6 N-m	18.2 N-m	87.6 N-m	33 N-m	PDF
MB12LUUG0	\$76.00	rectangular long	MB12	9062 N	5539 N	73.8 N-m	338.7 N-m	73.8 N-m	338.7 N-m	110.56 N-m	PDF
MB12NUUG0	\$69.00	rectangular		5723 N	4015 N	31.2 N-m	152.2 N-m	31.2 N-m	152.2 N-m	69.83 N-m	PDF

MB-Series Linear Rails

Part Number	Price	Series Size	Length	Parallelism	Mass/Length	Drawing Links
MB7-80L	\$30.00	MB7	80 mm	11 μ m	560 g/m	PDF
MB7-200L	\$75.00		200 mm	15 μ m		PDF
MB7-410L	\$156.00		410 mm	20 μ m		PDF
MB7-690L	\$235.00		690 mm	23 μ m		PDF
MB9-80L	\$39.00	MB9	80 mm	11 μ m	912 g/m	PDF
MB9-200L	\$98.00		200 mm	15 μ m		PDF
MB9-410L	\$199.00		410 mm	20 μ m		PDF
MB9-690L	\$298.00		690 mm	23 μ m		PDF
MB12-110L	\$64.00	MB12	110 mm	12 μ m	1369 g/m	PDF
MB12-270L	\$159.00		270 mm	17 μ m		PDF
MB12-430L	\$254.00		430 mm	20 μ m		PDF
MB12-750L	\$436.00		750 mm	23 μ m		PDF



Rails cannot be butted together end-to-end to create longer runs. The lengths offered here have a chamfer feature on both ends.



MB-Series Dimensions

Bearing with Rail	Height, H (mm)	Width, W (mm)	Length, L (mm)	Clearance, H1 (mm)	Rail Width, W1 (mm)
MB7LUUG0	9	25	43.5	2	14
MB7NUUG0			33		
MB9LUUG0	12	30	52	3	18
MB9NUUG0			40.2		
MB12LUUG0	14	40	59.7	4	24
MB12NUUG0			44.5		

GAM Rack and Pinion

GAM helical rack and pinion components are part of a complete linear motion solution.



- High precision helical rack for smooth, quiet operation available in module sizes of 1.5, 2 and 3 that mate with GAM pinions
- Pinions can be mounted to SureGear® gearboxes, are hardened to work with ISO 10 hardened rack
- Pinions available in module sizes of 1.5, 2 and 3 from 18 to 40 teeth
- Most cost-effective solution for linear motion greater than 2 meters
- Rack installation gauges available for use when installing multiple racks



Rack and Pinion

Rack and Pinions

The GAM Helical Rack and Pinion series, along with our broad gearbox offering, provide a complete linear solution. Simply select the rack and pinion needed then match it with the right gearbox for your application.

- High-precision helical rack for smooth, quiet operation
- Pinions can be mounted to SureGear® gearboxes
- Pinions are hardened and work with ISO 10 hardened rack

What is Rack & Pinion?

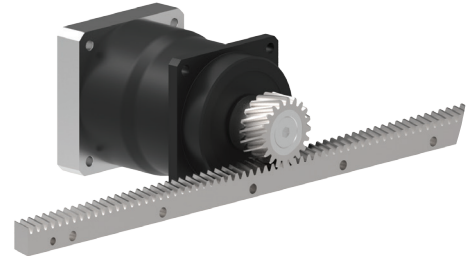
A linear actuator that converts the rotary motion of the (circular) pinion to linear motion at the (linear) rack.

Why use a Rack & Pinion System?

A rack and pinion system is the most cost-effective installation for linear movements greater than 2 meters.

Why use a GAM Rack & Pinion System?

GAM matches their high-quality rack and pinion with the best precision gearboxes for your application.



GAM Pinions										
Part Number	Price	Module	Teeth	Mounting	Pitch Diameter	Travel per Rotation	Max Feed Force	Mounting Distance	Fits	Drawing Links
84010001	\$434.00	1.5	20	set screw	31.831mm	100mm	1.3 kN	31.4mm	SureGear PGCN23 series gearboxes	PDF
84010002	\$434.00	2	18	keyed shaft	38.197mm	120mm	2.8 kN	41.1mm	SureGear PGCN34 series gearboxes	PDF
84010003	\$434.00	2	18	keyed shaft	38.2mm	120mm	12.88 kN	41.1mm	SureGear PGA070 and PGB070 series gearboxes	PDF
84010004	\$440.00	2	20	keyed shaft	42.44mm	133.33mm	13.37 kN	43.22mm	SureGear PGA090 and PGB090 series gearboxes	PDF
84010005	\$558.00	2	30	keyed shaft	63.66mm	200mm	15.02 kN	53.83mm	SureGear PGA120 and PGB120 series gearboxes	PDF
84010006	\$694.00	3	22	keyed shaft	70.03mm	220mm	20.05 kN	61.01mm	SureGear PGA155 and PGB155 series gearboxes	PDF
84010007	\$688.00	2	26	bolt-through	55.174mm	173.334mm	13.4 kN	50.4mm	SureGear PGD064 series gearboxes	PDF
84010008	\$797.00	2	33	bolt-through	70.028mm	220mm	18.4 kN	57.8mm	SureGear PGD090 series gearboxes	PDF
84010009	\$847.00	2	40	bolt-through	84.883mm	266.667mm	14.8 kN	65.2mm	SureGear PGD110 series gearboxes	PDF

NOTE: Shaft Key is not included with Pinions



Set Screw Pinion
[84010001](#)



Keyed Pinion
[84010002](#)



Bolt Through Pinion
[84010007](#)

GAM Pinion General Specifications	
Quality	ISO Q06
Material	4140 carbon steel
Helix Angle	Left Hand 19° 31'42"
Pressure Angle	20 degrees
Induction Hardened	55 - 60 HRC

One inspection pin included for use with rack height adjustments



Rack and Pinion

GAM Racks			
Part Number	Price	Description	Drawing Links
74020012	\$220.00	GAM helical rack, Module 1.5, 200 tooth, 1m length. For use with Module 1.5 pinions.	PDF
74020004	\$220.00	GAM helical rack, Module 2, 150 tooth, 1m length. For use with Module 2.0 pinions.	PDF
74020005	\$247.00	GAM helical rack, Module 3, 100 tooth, 1m length. For use with Module 3.0 pinions.	PDF



Rack
[74020012](#)

GAM Rack General Specifications			
Module	1.5	2.0	3.0
Quality	ISO Q10		
Material	1045 carbon steel		
Helix Angle	Right Hand 19° 31'42"		
Pressure Angle	20 degrees		
Induction Hardened	50 - 55 HRC		
Tooth Thickness Tolerance (μm)	-124	-124	-124
Single Pitch Error (μm)	≤37	≤37	≤39
Total Pitch Error (μm)	≤148	≤148	≤162



Rack and Pinion

Rack Installation

These are the three main steps to installing a GAM rack. Installation of multiple rack pieces end-to-end requires an opposite tooth installation gauge:

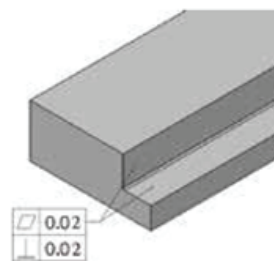
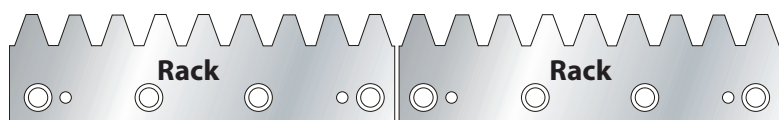
GAM Gauges			
Part Number	Price	Description	Drawing Links
74030010	\$63.00	GAM helical rack installation gauge, for use with Module 1.5 racks.	PDF
74030001	\$63.00	GAM helical rack installation gauge, for use with Module 2.0 racks.	PDF
74030002	\$75.00	GAM helical rack installation gauge, for use with Module 3.0 racks.	PDF

Step 1

Put the racks on the base, end to end, loosely installing the screws

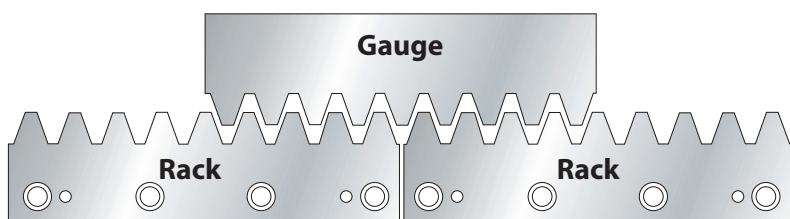


NOTE: Ensure the mounting surface of installation is clean and clear of debris and within tolerance (Perpendicularity and Flatness $\leq 0.02\text{mm}$)



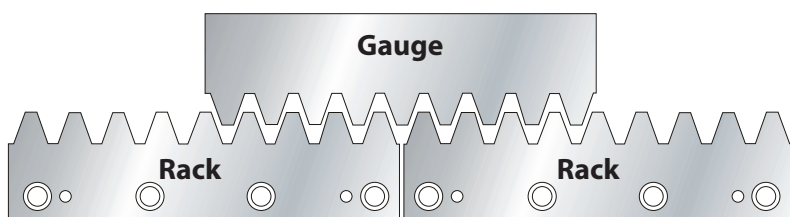
Step 2

Put the Rack Gauge across the ends of the joined racks and adjust the pitch. The ends of the racks each form half a tooth



Step 3

Bolt the racks to the base in sequence. Install dowel pins





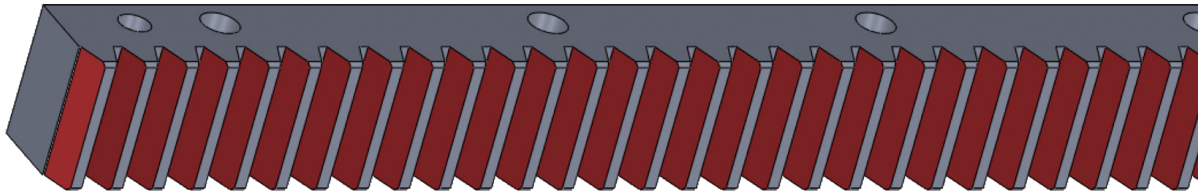
Rack and Pinion

Rack and Pinion Alignment

For best performance, the rack and pinion must be installed with proper tooth engagement. To perform this check, apply the Gear Marking Compound to the Pinion and drive the pinion along the rack UNDER LOAD CONDITIONS.

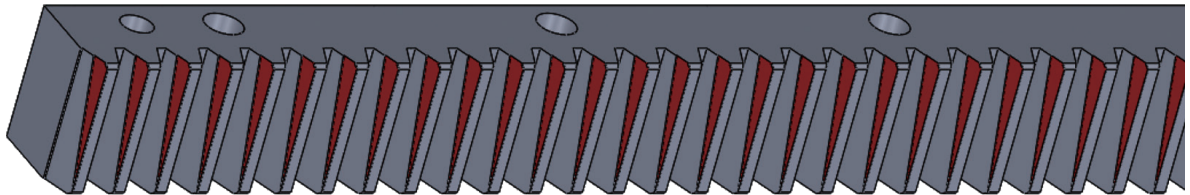
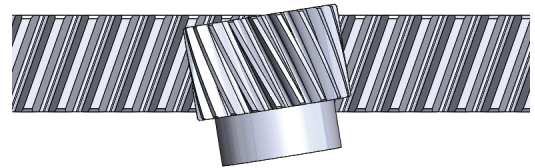
Correct

The Gear Marking Compound is consistently deposited across most the face of the tooth



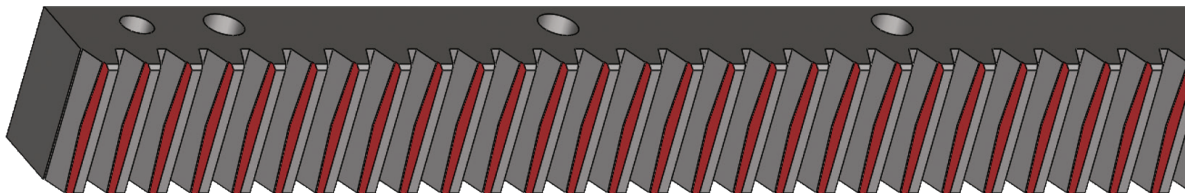
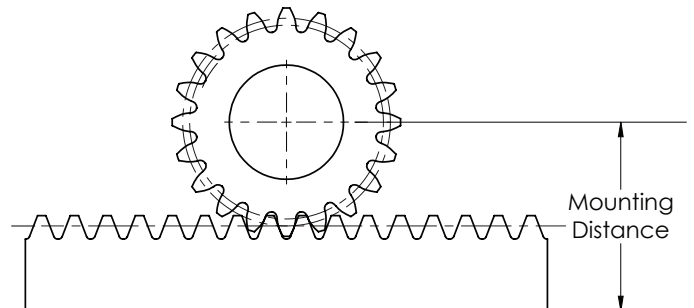
Pinion is Not Parallel to Rack

If the Gear Marking Compound forms a triangular shape across the face of the tooth, then the pinion and rack are not parallel. Adjust the pinion so the face of the pinion and the side of the rack are parallel. the axis of the pinion should be perpendicular to the rack.



Incorrect Mounting Distance

If the Gear Marking Compound appears only on the top half across the face of the tooth, then there is insufficient tooth contact between the rack and pinion. Adjust the center distance between the rack and the pinion. The pinion specification tables include the center distance for each size pinion.





Rack and Pinion

Rack and Pinion Terminology

Module

The module is the relative size of the rack and pinion as described by the pinion. It is the ratio of the diameter of a gear to the number of teeth on the gear. The module and number of teeth give the reference pitch diameter:

$$\text{Module (M)} = \frac{\text{Pitch Diameter}}{\text{Number of Teeth (z)}}$$

Reference Pitch Diameter = Module (M) x Number of Teeth (z)



NOTE: The rack and pinion must have the same module.

ISO Quality Number

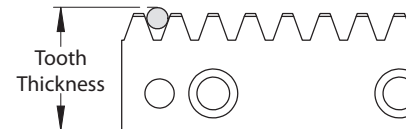
The ISO Quality Number describes the accuracy of the gear including the tooth alignment and profile, spacing variation, and radial runout among other things. AutomationDirect.com stocks Q6 and Q10 racks along with Q6 pinions.

ISO	DIN	AGMA	JIS
6	6	12	2
10	10	8	6

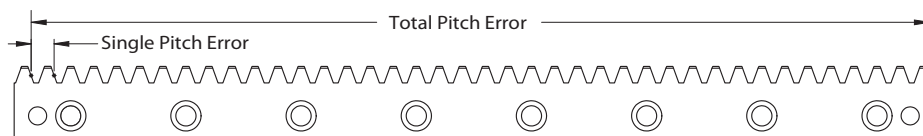
Tooth Thickness Tolerance

Tooth Thickness Tolerance is the relationship between tooth thickness and a measuring pin measurement.

- The tooth thickness of racks is usually measured via the pin measurement as tooth thickness can not be measured directly.
- A measuring pin is put into the teeth and measured to the back of the rack.



Pitch Error



Pitch: Distance between teeth as measured from a point on one rack tooth to the corresponding point on the next gear tooth.

Single Pitch Error: Error in the pitch between two teeth relative to the ideal.

Total Pitch Error: Cumulative pitch error over the length of the rack

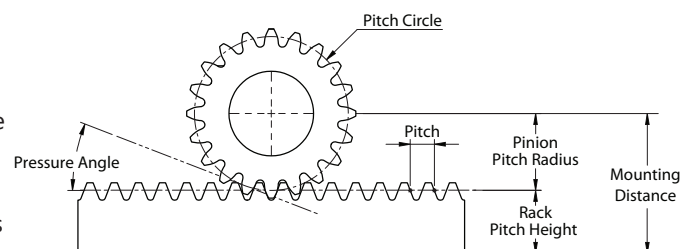
Circular Pitch: The distance from a point on one gear tooth to the corresponding point on the next gear tooth, measured along the pitch circle.

Pitch Circle: A circle transcribing the contact point on the teeth where the rack and pinion mesh correctly

Pitch Diameter: The diameter of the pinion's pitch circle.

Pressure Angle: The angle made by the sides of the tooth as it angles towards the top of the tooth. Mating gears and racks must have the same pressure angle.

Mounting Distance: Distance between the center of the pinion and the bottom of the rack that ensures proper mesh. The Mounting distance should stay consistent for the length of the rack.



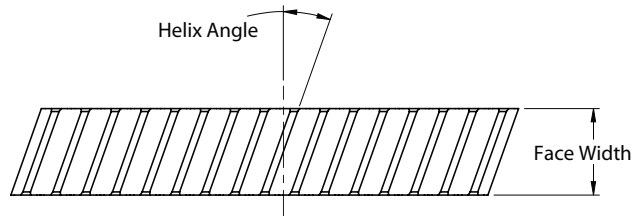
$$\text{Mounting Distance} = \text{Pitch Height of Rack} + \text{Pitch Radius of Pinion}$$



Rack and Pinion

Rack and Pinion Terminology (Cont'd)

Helix Angle: Angle of the rack or gear tooth. GAM racks and pinions use a common helix angle of 19°31'42"



Gear Strength and Durability

Gear strength and durability depends on transmitted forces and power.

$$\text{Power (P}_{kW}\text{)} = \text{Force (F}_N\text{)} \times \text{Linear Velocity (V}_{mm/s}\text{)}$$

$$\text{Force (F}_N\text{)} = \frac{1000 \times \text{Torque (T}_{Nm}\text{)}}{\text{Pitch Radius (r}_{mm}\text{)}}$$

$$\text{Linear Velocity (V}_{mm/s}\text{)} = \frac{\pi r_{mm} \times N_{RPM}}{60}$$

$$\text{Power (P}_{kW}\text{)} = \frac{T_{Nm} \times N_{RPM}}{9550}$$

The feed force required by the application should be less than the feed force capacity of the pinion or gearbox-pinion system as listed in this catalog. The feed force rating should be derated by the Overload Factor (K_a) and the Life Factor (K_L)

$$\text{Application Feed Force (F)} < \frac{K_L}{K_a} \times \text{Rated Feed Force (F)}$$

Overload Factor (K_a)			
Impact from Prime Mover	Impact from Load Side		
	Uniform Load	Medium Impact	Heavy Impact
Uniform Load	1	1.25	1.75
Light Impact	1.25	1.5	2
Medium Impact	1.5	1.75	2.25

Life Factor (K_L)	
Number of Cycles	Hardness (HRC) ≥ 45
Under 10,000	1.5
$\sim 10^5$	1.5
$\sim 10^6$	1.1
$\sim 10^7$	1.0