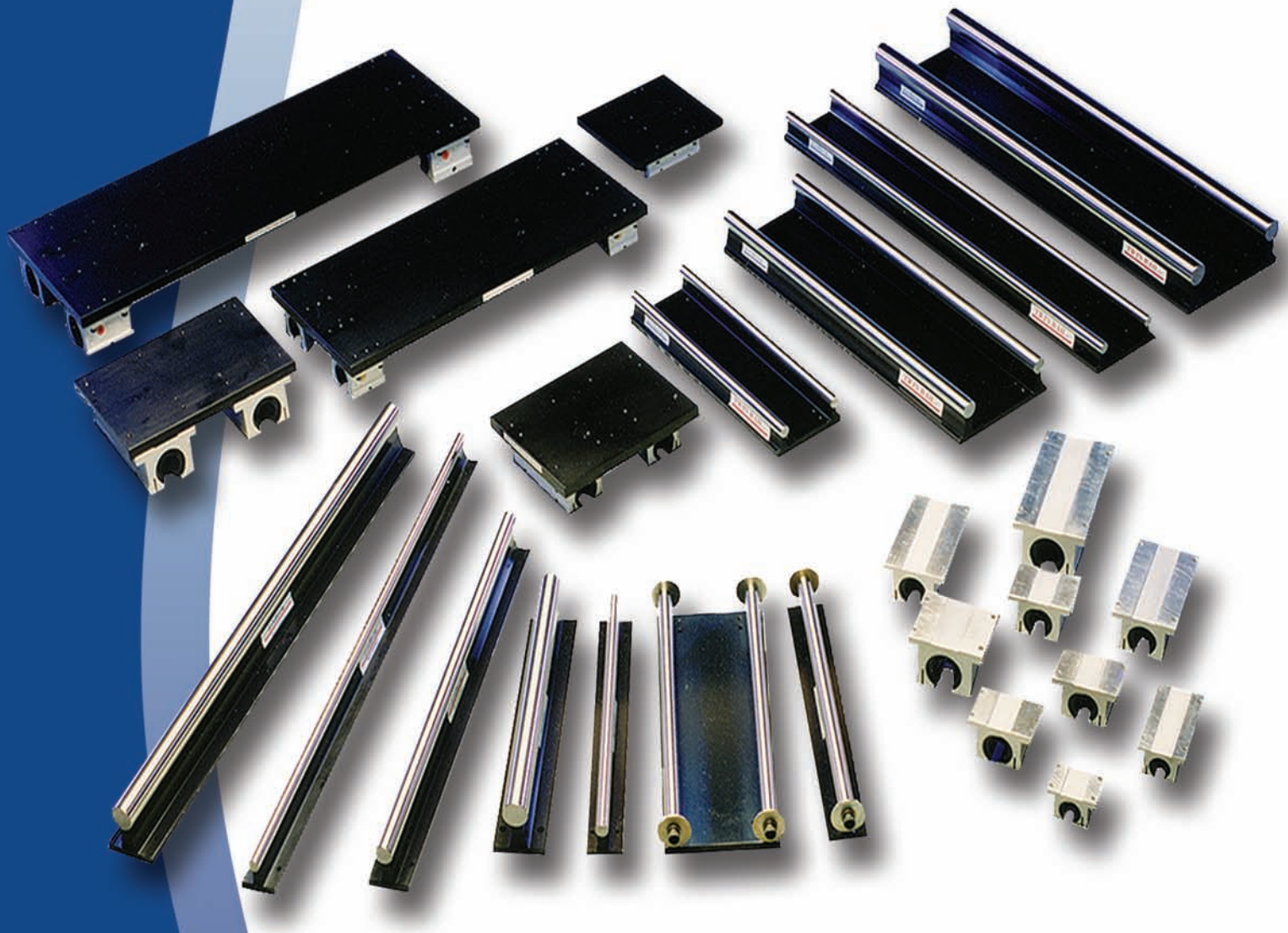
LinTech®

Positioning Components



Welcome to *LINTECH*

For over 37 years *LINTECH* has designed, engineered, and manufactured linear positioning components for use in a wide range of applications. Whether it is a standard positioning component or a custom positioning assembly, *LINTECH* takes great pride in manufacturing a quality product.

At *LINTECH* we are proud to provide the motion control user with this product guide. It was developed to assist you with the design, selection, and implementation of mechanical positioning components.

Depending on the requirements, standard positioning components can often be assembled and shipped in less than 2 weeks. Custom positioning assemblies require a different approach. We evaluate your special application, use our many years of experience to guide you, and then manufacture a quality product designed to meet your performance specifications.

LINTECH's technical support consists of a well trained inside customer service department, an experienced application engineering staff, and a versatile machining facility that is ISO 9001:2000 certified.

Our local technical support group consists of Automation Specialists located throughout the World. These Automation Specialists are experienced in the use of electronic and mechanical motion control products. They are well trained on the performance capabilities of *LINTECH* positioning components.

LINTECH is constantly designing new products and improving upon the many options available with our standard products. Whether it is a standard or custom positioning system required, please write, call, or e-mail us. We look forward to hearing from you.

Visit our website, or call for the nearest Automation Specialist in your area:

LINTECH ®

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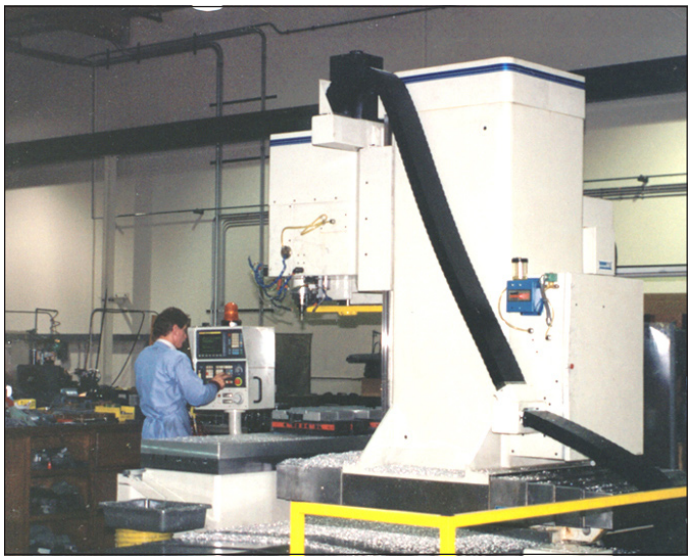
Registered by UL to ISO 9001:2000

Certificate No. A6916



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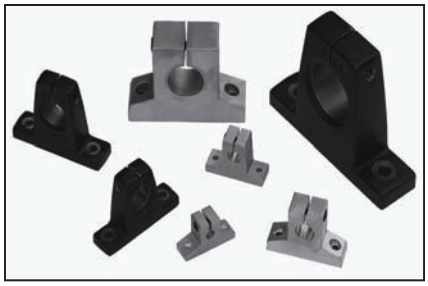
Shafting - English or Metric

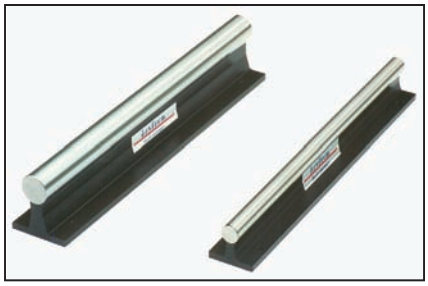
LINTECH offers "Cut to length" steel and stainless steel shafting. English shafting is available in "class" L, S and N diameter tolerances. 1060 Carbon steel shafting is available from 0.25 to 2.00 inches. Metric diameter size range is 8 to 50 mm. 440C stainless steel shafting is available from 0.25 to 2.00 inch diameters. Any length is available within .001 inch increments, up to the standard maximum stocked lengths. There is a SL-PD (pre-drilled) option which offers ready to mount shafts to the ARS or LSRS component supports. Any shaft can also be machined per drawings which are supplied by the customer (i.e. radial and coaxial holes, dowel joints, butt joints, reduced diameters, threaded ends, machined mounting holes, keyways, special chamfers, etc.).

ES, ARS, LSRS Shaft Support Components



LINTECH's aluminum and steel end support housings (ES series) provide a simple means to fixing the ends of a shaft. The housings are manufactured from 1045 steel (ES-S series), and 6061-T6 aluminum (ES-A series). The assembly support (ARS series) is manufactured from 6061-T6 aluminum. The low profile support (LSRS series) is manufactured from C-1018 steel. The LSRS series functions the same as the ARS series, but has a lower overall height.

SA Shaft Assemblies



LINTECH's single Shaft Assembly (SA series) is a complete assembly which simplifies the use of a linear bearing in a mechanical positioning application. Each assembly has a steel shaft mounted to a black anodized, precision machined, aluminum support. The pre-drilled base mounting holes in the 6, 12, 18, and 24 inch supports allow for easy customer mounting. The SA assemblies come in standard lengths from 6 to 192 inches, and with shaft diameters from 0.50 to 2.00 inches.

TRSA Shaft Assemblies

LINTECH's *TWIN RAIL*® Shaft Assembly is a complete assembly which simplifies the use of a linear bearing in a mechanical positioning application. Two steel shafts are mounted and aligned on the common base, therefore eliminating the alignment process required for two separate shafts. The pre-drilled base mounting holes in the support allow for easy customer mounting. Each 6, 12, 18, and 24 inch aluminum support has two threaded holes at one end to assist in leveling the assembly. The TRSA comes in standard lengths from 6 to 192 inches, and with shaft diameters from 0.50 to 2.00 inches.

Options

LINTECH can provide many options which allow the user to "customize" the products for the application requirements. These include: metric shaft diameters, tubular shafting, special finishes, custom *TWIN RAIL*® widths and lengths, etc.. Contact the factory if a desired option is not shown in this catalog.

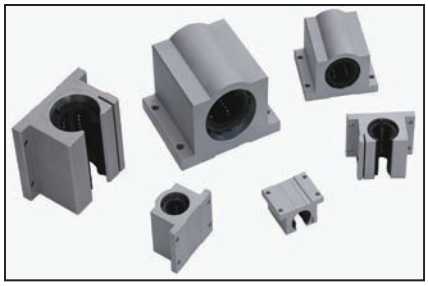
LBCA & LBOA Precision Linear Bearings

LINTECH's LBCA & LBOA offer an "all steel" design. This provides for operation in high temperature environments (up to + 600° F). These bearings have a working bore diameter that corresponds to **LINTECH**'s SS shafting (class S). This bearing style can offer a smoother operation as compared to the LBC & LBO style for some applications.

LBC, LBO, LBCM Linear Bearings

LINTECH's linear bearings have a ball conforming outer race coupled with a self-aligning feature which allows for zero bearing clearance while maintaining smooth operation. The independently self-aligning outer bearing races insure smooth operation by allowing miss-alignment up to 1/2 degree in all directions. These linear bearings are available in "open" or "closed" styles. The closed style is available in 0.25 to 2.00 inch nominal diameters, and the open style is available in 0.50 to 2.00 inch nominal diameters. Metric closed style diameters are available from 16 mm to 40 mm.

SLBO, SLBC, DLBC & DLBO Pillow Blocks



LINTECH's SLBO and SLBC series have one linear bearing and two wiper seals per pillow block, and are self-aligning in all directions. The SLBO and DLBO series have a screw for pre-load adjustment to reduce the shaft and bearing clearance. **LINTECH**'s DLBO and DLBC series have two linear bearings in one aluminum pillow block, separated by a wick that serves as an oil reservoir. Each pillow block housing provides a flat top surface for load mounting and alignment.

TRCA Carriage Assemblies

LINTECH's TRCA series, *TWIN RAIL*® carriage assemblies are pre-engineered assemblies which have either SLBO or DLBO pillow blocks mounted to a 6061-T6 aluminum, black anodized, machined plate. The pillow blocks are pre-aligned and doweled to the carriage plate to match **LINTECH**'s TRSA series, *TWIN RAIL*® shaft assemblies. The use of a TRCA carriage assembly and a TRSA shaft assembly reduces the process of mounting and aligning two shafts and pillow blocks. Each carriage surface is machined which allows for accurate mounting of customer loads, and are available with mounting holes with stainless steel inserts. Carriage assemblies are provided with pillow blocks for shaft diameters from 0.50 to 2.00 inches, and come in lengths from 6 to 30 inches.

Options

LINTECH can provide many options which allow the user to "customize" the products for the application requirements. These include: bearing locks, metric linear bearings, special finishes, custom *TWIN RAIL*® carriage assembly widths and lengths, etc.. Contact the factory if a desired option is not shown in this catalog.

Precision Steel Shafts

LINTECH's shafting, SA and TRSA shaft assemblies use Rockwell 60-65C hardened and ground shafts. These high quality carbon steel shafts are accurately machined and heat treated for uniform hardness. They are also inspected for straightness, roundness, and smoothness. The high hardness and extremely smooth surface of the steel shafts creates an abrasion-resistant surface, which reduces material wear and system friction, while maintaining an optimal surface finish. Shafting is available in diameter tolerance "class" L, S, and N. Metric shaft diameters (SM) are a standard option also.

Stainless Steel Shafts

For corrosion resistant applications, ***LINTECH*** provides 440C stainless steel shafts with the same shaft diameter tolerance, hardness depth, and straightness as our standard steel shafts. Stainless steel shafts are typically used in the chemical and food processing industries, for medical equipment in corrosive environments, or in strong oxidizing atmospheres where no lubricating oil is available.

Chrome Plated Bearings & Carriages

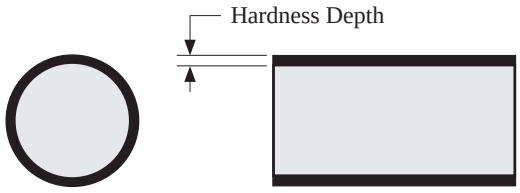
LINTECH can also provide corrosion resistant linear bearings and shafts. All metal hardware is either stainless steel or chrome plated.

Shaft Diameter Tolerance

LINTECH shafts are precision ground to a very close diameter tolerance. This diameter tolerance is an extremely important factor when using ***LINTECH*** linear bearings. It assures a dependable fit, with proper clearance between a shaft and linear bearing.

Shaft Hardness

The hardness of a steel shaft is its ability to prevent nicks, indentations, or grooving. It is an important factor in determining the life of a linear bearing system in an application. The heat treatment process performed on all shafts assures uniform hardness in radial and axial directions.



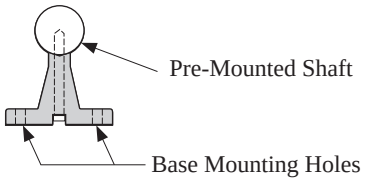
Shaft Straightness

The exceptional straightness of all shafts eliminate system binding when using a TRSA shaft assembly with a TRCA carriage assembly, and helps the alignment process when using two SL shafts, or SA shaft assemblies, in a parallel assembly application.

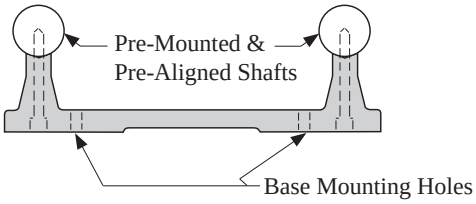
Shaft Assembly Supports

LINTECH shaft assemblies (SA and TRSA series) use 6061-T6 precision machined aluminum supports. These black anodized supports have pre-drilled base mounting holes that come in both single supports for the SA, and *TWIN RAIL*® supports for the TRSA. These precision machined supports come in 6, 12, 18, and 24 inch lengths, and can be combined for nearly unlimited assembly lengths.

SA Series - single rail supported assembly



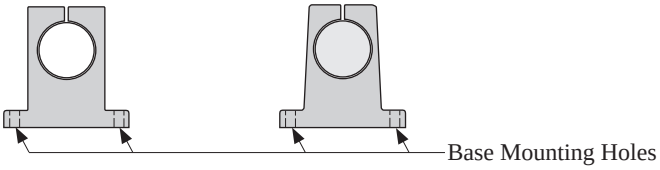
TRSA Series - *TWIN RAIL*® supported assembly



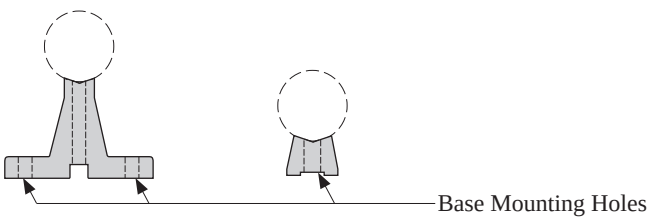
Shaft Component Supports

LINTECH ES end supports use 6061-T6 aluminum (-A), or 1045 steel (-S). These supports slide over the hardened shaft, and have a screw that is adjusted to "clamp" the support onto the shaft. The assembly support (ARS series) is manufactured from aluminum. The low profile support (LSRS series) is manufactured from C-1018 steel and functions the same as the ARS series, but has a smaller overall height. The LSRS is the only support that is mounted from the mounting surface "up".

ES-A Series **ES-S Series**



ARS Series **LSRS Series**



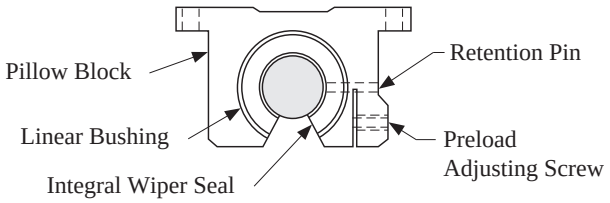
Self-Aligning Linear Bearings

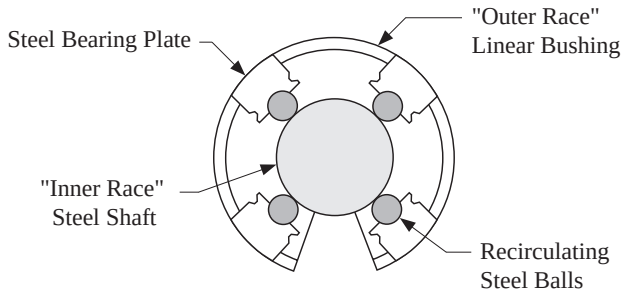
LINTECH's LBO, SLBO, and DLBO series linear bearings use an open type linear bearing for its long life, and high load capacity. The LBC, SLBC, and DLBC series use a closed linear bearing. The linear bearing and wiper seals are available with or without a precision machined 6061-T6 aluminum pillow block housing.

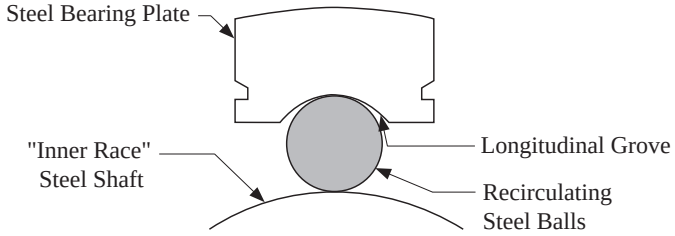
The SLBO and DLBO pillow block models have an adjusting screw to permit adjustment of radial play between the "inner race" steel shaft and the "outer race" linear bearing. A retention pin is used to secure the linear bushing within the aluminum housing. The precision machined pillow block mounting surface allows for accurate and easy mounting to a common carriage plate.

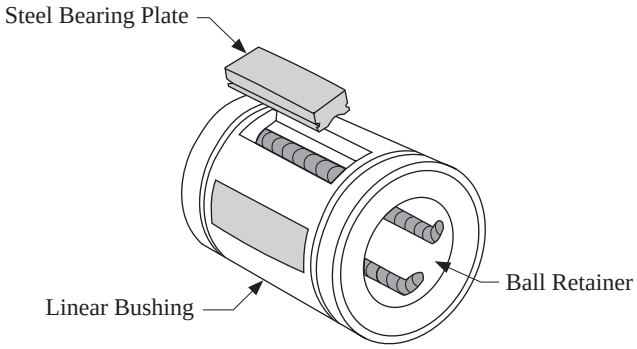
Each linear bearing consists of a wear resistant, low friction, smooth, resilient, plastic ball retainer and plastic outer sleeve. The load carrying components of the linear bearing are precision machined, hardened steel bearing plates, and recirculating steel balls. There are longitudinal grooves along the inner surface of the steel bearing plates which contact the recirculating steel balls.

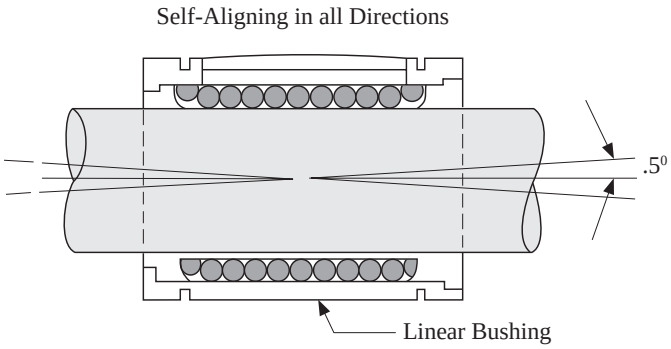
The steel bearing plate is also designed slightly thicker in the middle than at either end. This tapered thickness along the bearing plate length allows the bearing plate to automatically align itself with the "inner race" steel shaft. This assures smooth entry and exit of the recirculating steel balls in and out of the load area, along with a more uniform load distribution within the linear bearing.











Travel Life

The rated life of a linear bearing or carriage assembly is measured in inches (or km) of travel under a specified load. The failure of a linear bearing system occurs when the operating stresses from the rolling balls in the linear bushing cause material fatigue, resulting in flaking of the steel balls or steel shaft and/or grooving in the steel shaft.

Every linear bearing or carriage assembly has a dynamic load rating associated with it based on a L_{10} life of 2 million inches of travel (approximately 50 km). For most applications, knowing the load applied to a bearing and the life required is all that is needed in selecting the proper components for the task at hand.

LINTECH has provided examples, equations, and graphs to determine what the estimated life will be based upon an applied load and application conditions for product series shown in this catalog. This allows quick selection of a linear bearing or carriage assembly for most applications.

For these applications the dynamic load rating along with several other application factors may need to be reviewed. The hardness of the shaft used, operating temperature, direction of the load, additional shock loads, and linear speed of the pillow blocks are all factors that should be considered. This allows for an accurate prediction of the dynamic life of a linear bearing in a specific application.

Load Ratings

The applied load that a linear bearing or carriage assembly will see needs to be compared against the load capacity of that component. The dynamic load rating of a linear bearing or carriage assembly pertains to the component in motion and this load rating is based on the number of inches (or km) traveled.

Required Life

It is important to evaluate the required or expected life from a linear bearing for a given application load. This required life is specified by the user as the desired life prior to a possible failure. This period of time (usually in years) then will need to be converted into a travel distance (typically inches or km) to select the appropriate size linear bearing.

Required Life Examples

Below are two examples which illustrate the importance of a dynamic load rating based upon travel life. These two applications could lead to the selection of different components due to the difference in the number of required inches of travel, even though the the applied load is the same 150 lbs (68 kg).

Example 1:

assembly needs to last 6 years
with
a 10 inch move out, then back 10 inches every 90 seconds
for
8 hours per day
for
5 days per week
and
50 weeks per year

$$\frac{(10 \times 2)\text{ inches}}{90\text{ sec}} \times \frac{60\text{ sec}}{1\text{ min}} \times \frac{60\text{ min}}{1\text{ hr}} \times \frac{8\text{ hr}}{1\text{ day}} \times \frac{5\text{ days}}{1\text{ week}} \times \frac{50\text{ weeks}}{1\text{ yr}} \times 6\text{ years} = \mathbf{9{,}590{,}400}\text{ inches of travel}$$

Example 2:

assembly needs to last 8 years
with
(24) 1 inch moves out, then back 24 inches every 30 seconds
for
12 hours per day
for
7 days per week
and
52 weeks per year

$$\frac{(24 \times 2)\text{ inches}}{30\text{ sec}} \times \frac{60\text{ sec}}{1\text{ min}} \times \frac{60\text{ min}}{1\text{ hr}} \times \frac{12\text{ hr}}{1\text{ day}} \times \frac{7\text{ days}}{1\text{ week}} \times \frac{52\text{ weeks}}{1\text{ yr}} \times 8\text{ years} = \mathbf{201{,}277{,}440}\text{ inches of travel}$$

Safety Factors

As a practice, safety factors should always be used when selecting a linear bearing or carriage assembly for a given application. For most real world applications people do use safety factors. However, sometimes the incorrect safety factor or no safety has been used. This can lead into an unexpected system failure. ***LINTECH*** provides, in a chart form, different safety factor recommendations for linear bearings or carriage assemblies. Keep in mind that these recommendations for safety factors are not hard and fast rules. Safety factors for a specific linear bearing may have to be increased or decreased based upon the application requirements.

Linear Bearing Load Capacities

Linear Bearing Load Capacities are specified with a dynamic value. These values are used to help select the proper linear bearing or carriage assembly size for a given load/life application. The use of adequate safety factors is a key element in the selection process of a linear bearing system for a given application. Selecting a bearing with no safety margin can lead to problems relating to performance and long term life.

Dynamic Loads exert a force upon the linear bearings or carriage assembly while in motion. Every linear bearing or carriage assembly has a load capacity associated with it that is based upon the number of inches (or km) traveled. If the load applied to the carriage is less than the rated value at 2 million inches (or 50 km) of travel, the linear bearings will have a longer life associated with them that is exponential. Therefore, to properly select a linear bearing or carriage assembly that will last the required travel life for an application, the forces acting upon the linear bearings need to be reviewed. Once the force on the heaviest loaded bearing has been determined and a proper safety factor selected, then the life of that bearing or carriage assembly can be determined by using a simple mathematical equation.

Even though the forces acting upon a bearing or carriage assembly can be calculated, other parameters such as changing loads, speeds, acceleration rates, environments, and lack of lubrication produce extra forces (stresses) that are hard to quantify. As a bearing moves, there are additional resultant loads as a by-product. The rate at which the bearing begins to move a load can have a large impact on its life. The linear bearings see this start/stop rate as a shock load each time. These and other variable loads cannot be calculated precisely. Thus, a safety factor should be applied to account for these loads which could fatigue the system and cause premature failure. See the below chart as a guideline.

Recommended Linear Bearing Dynamic Safety Factors

Impacts or Vibration	**Speed** (in/sec)	**Acceleration** (G's)	**Min. Safety Factor - S**
None	< 5	< 0.25	1.0 - 2.0
Small	5 - 10	0.25 - 0.50	2.0 - 3.0
Medium	10 - 20	0.50 - 1.00	3.0 - 4.0
Large	20 - 50	1.00 - 1.50	4.0 - 6.0
Very Large	> 50	> 1.50	6.0 - 8.0

Safety Factor Example

The application calls for moving a part (weight = 150 lbs) that is mounted to a carriage assembly. The carriage assembly will be moved to various positions at a speed of 9 IPS, with an acceleration of 0.75 G's.

From above chart - use a 3.5 factor

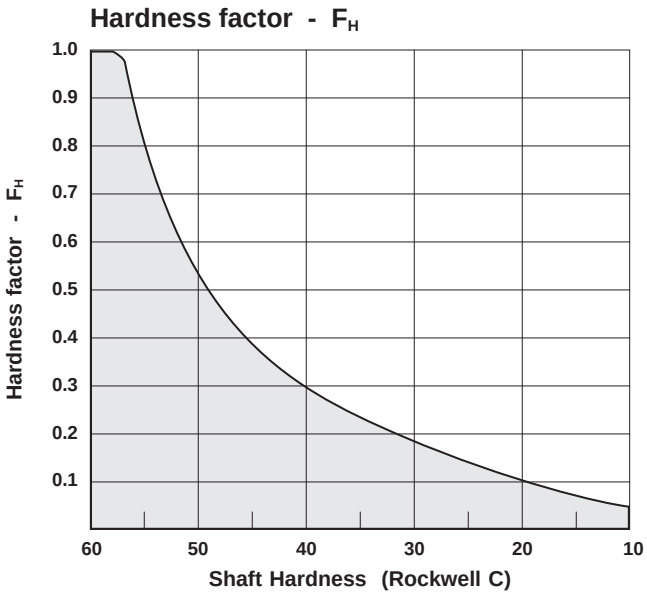
Load		*Safety Factor*		*Select a carriage assembly that has a dynamic capacity greater than this value*
150	x	3.5	=	**525** lbs

Hardness factor - F_H

The maximum travel life of a linear bearing is achieved when the shaft surface has a hardness value greater than (>) Rockwell 60C. This hardness assures that no shaft grooving or flaking will occur under normal operating conditions.

LINTECH SL & SA & TRSA	Rockwell Hardness	F_H factor
standard shafts	60-65C	1.00
stainless steel shafts	50-55C	.52
chrome plated shafts	67-72C	1.00

When using ***LINTECH*** bearings, pillow blocks, or TRCA carriage assemblies with different shafting and hardness ratings, refer to the Shaft Hardness graph below for the correction factor.

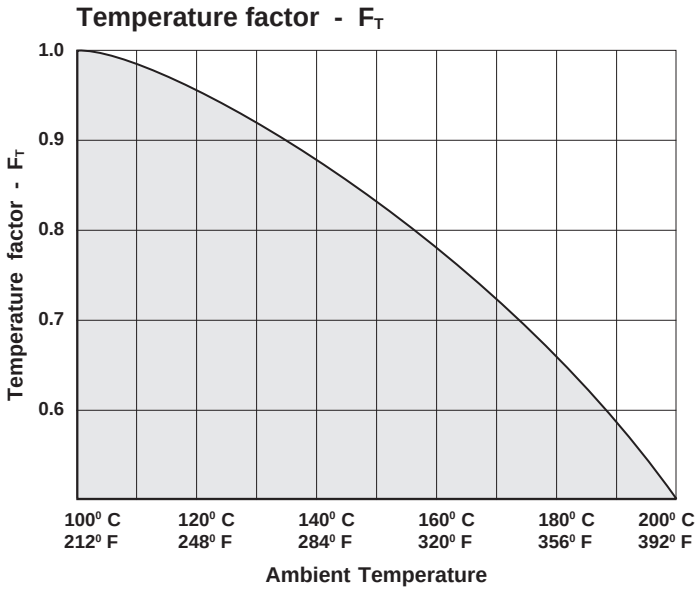


Temperature factor - F_T

Ambient temperatures over 212^0 F (100^0 C) will fatigue the linear bearings, or carriage assembly, and will cause a decrease in travel life. ***LINTECH***'s linear bearings or carriage assemblies have a maximum operating ambient temperature of 185^0 F. Therefore these bearings, or carriage assemblies, should never be used in ambient temperatures above 185^0 F. Custom linear bearings or carriage assemblies, can be provided for higher temperature applications.

LINTECH	Maximum Operating Temp.	F_T factor
Linear Bearings	185^0 F	1
Carriage Assemblies	185^0 F	1

When using ***LINTECH***'s SL shafting, SA, or TRSA shaft assemblies with different linear bearings and temperature ratings, a temperature correction factor may be required if the ambient temperature exceeds 212^0 F (100^0 C). Refer to the Temperature graph below for the correction factor.



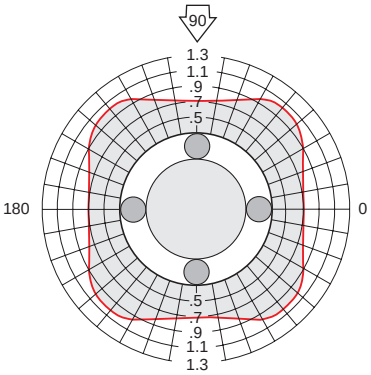
Load direction factor - F_L

The maximum travel life of a linear bearing or carriage assembly may need to be de-rated depending upon the direction of the load as applied to the bearing. The Polar Charts shown for each bearing type indicate the de-rating factor (or multiplier) based upon the direction of the load applied to the linear bearing. Not all bearings will see the same load direction, so you can use the adjacent equation to determine the estimated life based upon the "heaviest" loaded bearing or the one which requires the greatest de-rating factor. This will yield a life value showing the bearing which has the lowest overall travel length or life rating.

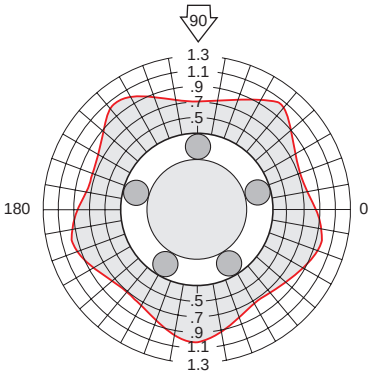
To use the below graphs, simply find the intersecting point based upon the direction of the load (that the bearing sees) and then use the de-rating factor (i.e. 0.9, etc.), if any.

$$L = \left[F_H \times F_T \times F_L \times \frac{R}{F \times S} \right]^3 \times B$$

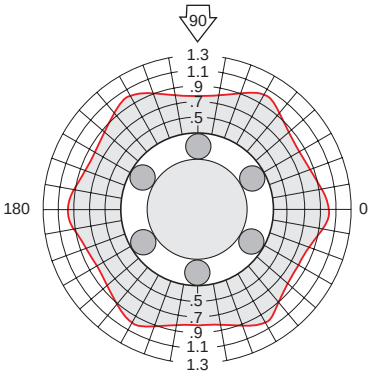
- **L** = normal travel life millions of inches (or Km)
- **R** = rated dynamic load capacity of linear bearing, or carriage at 2 million inches of travel (or 50 Km)
- **F** = user applied load
- **B** = either 2 millions of inches (or 50 Km)
- F_H = shaft hardness factor
- F_T = environment temperature factor
- F_L = load direction factor
- **S** = dynamic safety factor



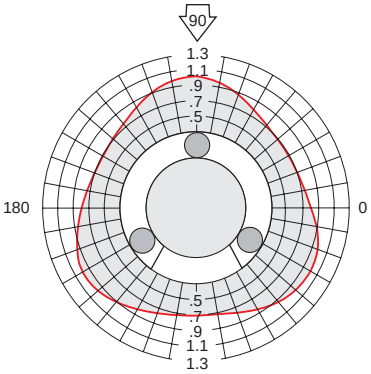
LBC-4, LBCA-4
LBC-6, LBCA-6
LBC-8, LBCA-8, SLBC-8, DLBC-8



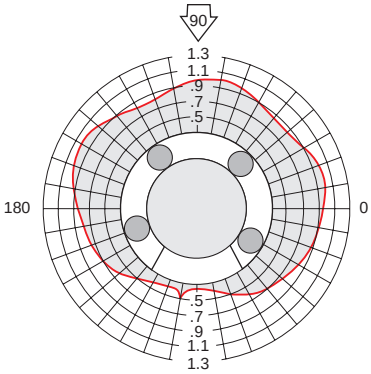
LBC-10, SLBC-10, DLBC-10
LBCA-12, LBCA-16
LBCM-16



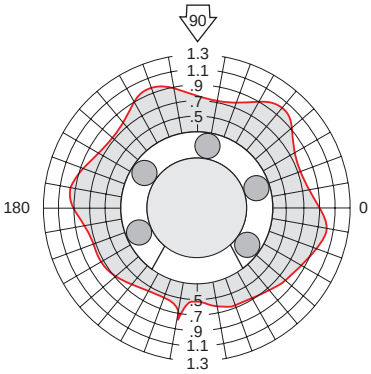
LBC-12, SLBC-12, DLBC-12
LBC-16, SLBC-16, DLBC-16
LBC-20, LBCA-20 SLBC-20, DLBC-20
LBC-24, LBCA-24, SLBC-24, DLBC-24
LBC-32, SLBC-32
LBCM-20, LBCM-25, LBCM-30
LBCM-40, LBCM-50



LBOA-8



LBO-8, SLBO-8, DLBO-8
LBO-10, SLBO-10, DLBO-10
LBOA-12, LBOA-16



LBO-12, SLBO-12, DLBO-12
LBO-16, SLBO-16, DLBO-16
LBO-20, LBOA-20, SLBO-20, DLBO-20
LBO-24, LBOA-24, SLBO-24, DLBO-24
LBO-32, SLBO-32

Lubrication

LINTECH shaft assemblies, linear bearings, or carriage assemblies require a small amount of grease or oil for proper, long term operation. Lubrication will decrease system wear and the potential for rusting of shafts and linear bearing surfaces. For most applications a medium to heavy oil, light grease, or silicone based lubricant is recommended. The many built-in pockets within the linear bearing allows the adhesive properties of these lubricants to be stored for extended periods of time while minimizing sealing problems.

To obtain the estimated travel life for a given application, the linear bearings or carriage assemblies should not run dry for an extended period of time. This lubrication schedule will ultimately need to be determined empirically during operation at the installation site since it can vary depending upon the environment, operation conditions, quantity and type of lube used, and other unforeseen conditions.

All ***LINTECH*** shaft assemblies, linear bearings, and carriage assemblies are shipped lightly coated with a rust preventative oil in the bearings or on the shafts. This will help prevent corrosion during the shipping period of the product. It is highly recommended that all shaft assemblies, linear bearings, and carriage assemblies be lubricated during installation or prior to operation. Also, periodic re-lubrication of the linear bearings, or carriage assembly, and shafts, will help assure that the rated life of the system is obtained.

Additional details on all ***LINTECH*** shaft assemblies, linear bearings, and carriage assemblies are available from the Service Manual. This manual discusses the recommended lubrication and provides additional important guidelines for frequency of lubrication based upon several conditions.

NOTE: Use of WD-40 or other cleaning solvents should strictly be avoided as they can cause damage to the linear bearing and shaft.

Frictional Resistance

The total friction resistance of a ***LINTECH*** linear bearing or carriage assembly can be calculated by using the following equation.

$$R = \left[W \times \mu \right] + F_s$$

R = Frictional resistance (lbs)

W = Load weight (lbs)

μ = coefficient of friction

F_s = Frictional resistance - seal drag (lbs)

Note: ***LINTECH*** recommends using μ = .01 for all linear bearing and carriage assemblies series.

The coefficient of friction (μ) of a ***LINTECH*** linear bearing or carriage assembly consists of the rolling friction, and the static (breakaway) friction. Two main factors affect the coefficient value. The type of lubrication used (i.e. oil, grease, or none) and the ratio between the total load weight and the dynamic load rating of the linear bearing or carriage assembly used.

For most applications, ***LINTECH*** recommends using a value of .01 for the coefficient of friction. This value can be used for all linear bearings or carriage assemblies. The .01 value provides for an adequate safety margin when evaluating system performance. Other frictional resistances of a ***LINTECH*** linear bearing are seal drag and system preload. While wiper seals are used to retain lubricants and prevent entry of foreign particles into the linear bearing, they will increase the frictional resistance of the system. Increasing the preload of a linear bearing will also add extra frictional resistance. The chart below lists the nominal values for the ***LINTECH*** linear bearings or carriage assemblies.

Frictional Resistance - F_s (seal drag)

Bearing size	F_s (lbs)	Carriage Model	F_s (lbs)
Single, 0.50" diameter	0.5	**TRCA-8-xx**	2.0
Single, 0.62" diameter	0.4	**TRCA-10-xx**	1.6
Single, 0.75" diameter	0.4	**TRCA-12-xx**	1.6
Single, 1.00" diameter	0.4	**TRCA-16-xx**	1.6
Single, 1.25" diameter	5.0	**TRCA-20-xx**	20.0
Single, 1.50" diameter	7.0	**TRCA-24-xx**	28.0
Single, 2.00" diameter	8.0	**TRCA-32-xx**	32.0
Double, 0.50" diameter	0.5	**TRCA-8-6**	1.0
Double, 0.62" diameter	0.4	**TRCA-10-6**	0.8
Double, 0.75" diameter	0.4	**TRCA-12-6**	0.8
Double, 1.00" diameter	0.4	**TRCA-16-6**	0.8
Double, 1.25" diameter	5.0	**TRCA-20-8**	10.0
Double, 1.50" diameter	7.0	**TRCA-24-12**	14.0

Rated Load Capacity

The dynamic load capacity of a ***LINTECH*** TRCA carriage assembly is based upon having the load forces centered on the carriage and the combined dynamic load capacity values of the SLBO or DLBO linear bearings used. The rated values are based on a L_{10} life of 2 million inches of travel (or 50 km) and with the load forces applied downward onto the carriage assembly.

For a given carriage assembly, as the load force decreases, the life of the carriage assembly will increase exponentially. The life of a carriage assembly, used in an application, can be determined by reviewing the load considerations found on pages A-7 to A-10.

Rated Moment Loads

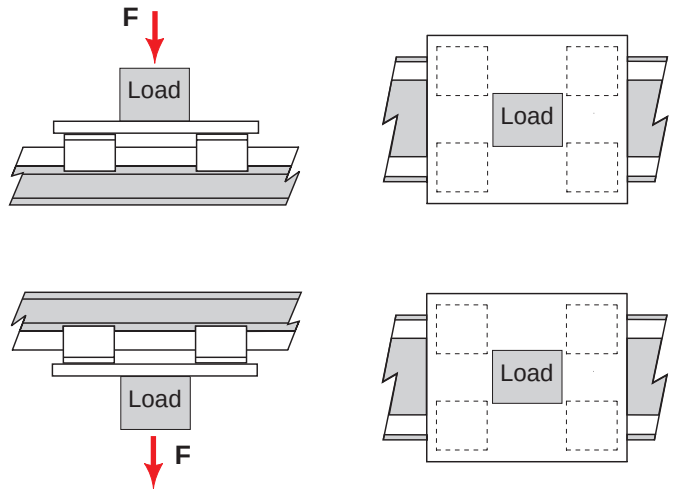
When using a ***LINTECH*** TRCA carriage assembly in an application, a moment load exists when the load center of gravity is located away from the center of the carriage assembly. The life of a carriage assembly is determined by the heaviest loaded linear bearing. Follow the steps below to determine if a specific TRCA carriage assembly will operate sufficiently in a given application.

Step 1: Calculate the forces acting on each of the individual bearings for a given configuration and TRCA carriage assembly by using the equations on page A-15.

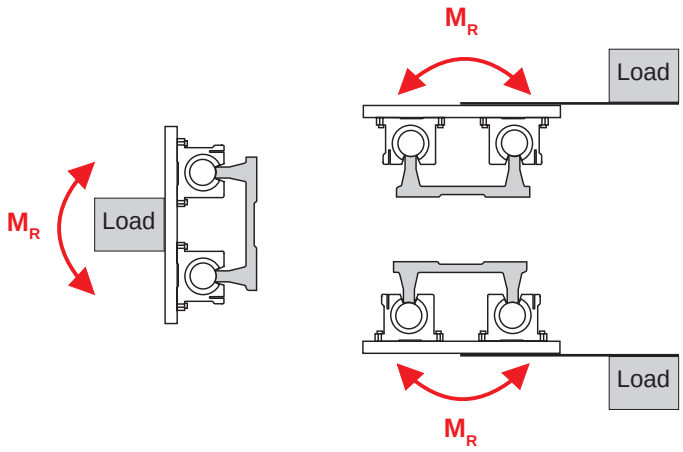
Step 2: Compare the calculated values with the rated dynamic load capacity values for the SLBO or DLBO linear bearings used on the TRCA carriage assembly. Make sure the calculated values are below the rated values. **Note**: If the calculated forces are acting on the open end of a linear bearing, reduce the rated dynamic load capacity of that bearing by as shown on the Polar Charts found on page A-10.

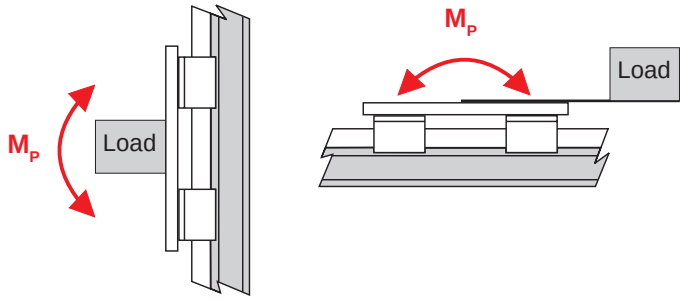
Step 3: Follow the information on pages A-7 through A-10 to determine the theoretical travel life of the selected carriage assembly in inches (or km) of travel.

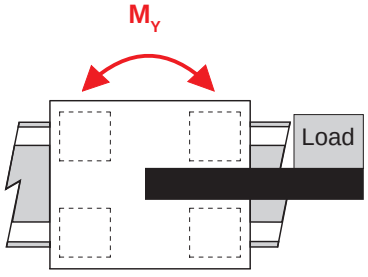
Load Centered on Carriage



Load Center away from Carriage Center





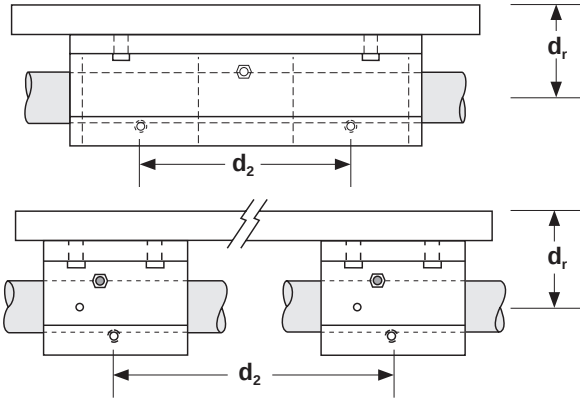


Specifications subject to change without notice

TRCA Rated Load Capacity

The ***LINTECH*** TRCA series, *TWIN RAIL®* carriage assembly consists of (2) DLBO or (4) SLBO series mounted to a precision machined aluminum plate. The bearing pillow blocks are mounted, aligned, and then doweled in-place. They are designed to mate directly with the ***LINTECH*** TRSA series; *TWIN RAIL®* shaft assemblies. Using these series in combination will eliminate the requirement to align and set-up the assemblies to be parallel and operate smoothly.

Typical TRCA Carriage Assembly



TRCA Carriage Assemblies

Model Number	Nominal Shaft Dia. (inches)	Carriage Length (inches)	Linear Bearing Used	Each Bearing (1) Dyn. Load Capacity (lbs)	Dyn. Load (1) Capacity (lbs)	d_r (inches)	d_1 (inches)	d_2 (inches)
TRCA8-6	0.500	6.00	DLBO	230	920	1.062	3.00	1.90
TRCA8-12	0.500	12.00	SLBO	230	920	1.062	3.00	10.00
TRCA8-18	0.500	18.00	SLBO	230	920	1.062	3.00	16.00
TRCA10-6	0.625	6.00	DLBO	320	1,280	1.250	3.75	2.15
TRCA10-12	0.625	12.00	SLBO	320	1,280	1.250	3.75	9.75
TRCA10-18	0.625	18.00	SLBO	320	1,280	1.250	3.75	15.75
TRCA12-6	0.750	6.00	DLBO	470	1,880	1.437	4.50	2.50
TRCA12-12	0.750	12.00	SLBO	470	1,880	1.437	4.50	9.62
TRCA12-18	0.750	18.00	SLBO	470	1,880	1.437	4.50	15.62
TRCA16-6	1.000	6.00	DLBO	780	3,120	1.687	5.25	3.25
TRCA16-12	1.000	12.00	SLBO	780	3,120	1.687	5.25	8.87
TRCA16-18	1.000	18.00	SLBO	780	3,120	1.687	5.25	14.87
TRCA16-24	1.000	24.00	SLBO	780	3,120	1.687	5.25	20.87
TRCA20-8	1.250	8.00	DLBO	1,170	4,680	2.250	6.00	3.90
TRCA20-12	1.250	12.00	SLBO	1,170	4,680	2.250	6.00	8.12
TRCA20-18	1.250	18.00	SLBO	1,170	4,680	2.250	6.00	14.12
TRCA20-24	1.250	24.00	SLBO	1,170	4,680	2.250	6.00	20.12
TRCA24-12	1.500	12.00	DLBO	1,560	6,240	2.750	6.62	5.00
TRCA24-18	1.500	18.00	SLBO	1,560	6,240	2.750	6.62	13.75
TRCA24-24	1.500	24.00	SLBO	1,560	6,240	2.750	6.62	19.75
TRCA24-30	1.500	30.00	SLBO	1,560	6,240	2.750	6.62	25.75
TRCA32-18	2.000	18.00	SLBO	2,350	9,400	3.375	7.25	12.75
TRCA32-24	2.000	24.00	SLBO	2,350	9,400	3.375	7.25	18.75
TRCA32-30	2.000	30.00	SLBO	2,350	9,400	3.375	7.25	24.75

Footnotes:

(1) Rating based upon 2 million inches of travel with the load forces being applied downward on the linear bearing, while in a horizontal application, and based upon 1060 steel shafting (Rockwell 60c). The actual load rating is dependent upon factors detailed on pages A-8 to A-9.

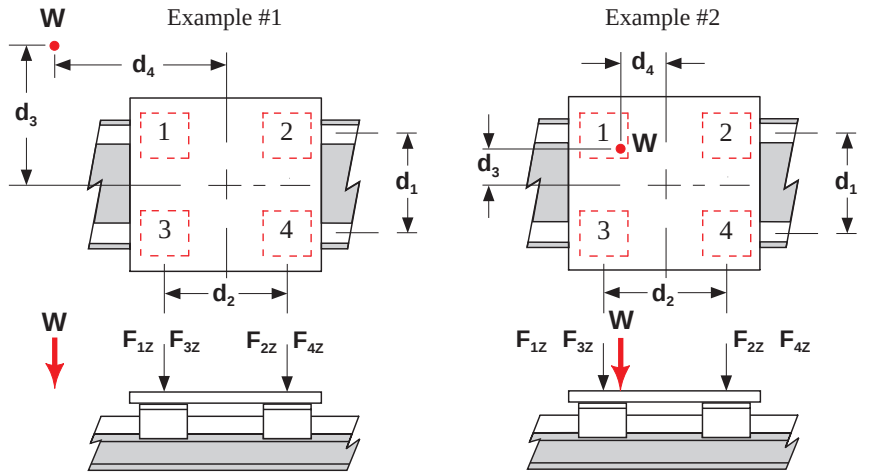
All individual bearing force equations below pertain to a four bearing carriage which is at constant uniform velocity or with the carriage at rest. During acceleration and deceleration intervals of a positioning system, the force exerted upon an individual bearing changes as the acceleration or deceleration rate varies. In most cases, the extra force acting upon an individual bearing during the acceleration interval is offset by a reduced force during the deceleration interval. Therefore, using just the constant uniform velocity equations will adequately determine the life of an individual bearing for a particular application.

d_1 - distance between center lines of shafts or rails (in)
d_2 - distance between center lines of linear bearing blocks (in)
d_3 - distance between carriage center and load center of gravity (in)
d_4 - distance between carriage center and load center of gravity (in)
d_r - distance between carriage surface and linear bearings (in)

F_{BX} - force acting upon bearing in X-axis direction (lbs)
F_{BY} - force acting upon bearing in Y-axis direction (lbs)
F_{BZ} - force acting upon bearing in Z-axis direction (lbs)
W - load weight (lbs)

A

Horizontal Applications



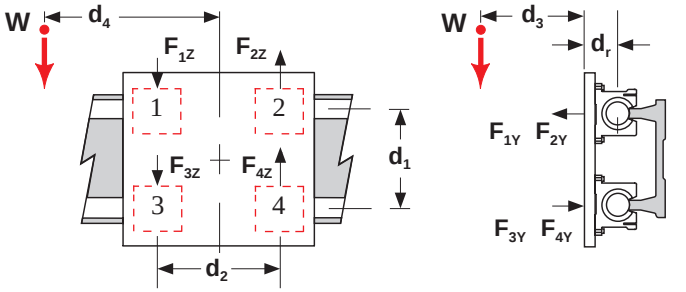
$$F_{1Z} = \frac{W}{4} + \left[\frac{W}{2} \times \frac{d_4}{d_2}\right] + \left[\frac{W}{2} \times \frac{d_3}{d_1}\right]$$

$$F_{2Z} = \frac{W}{4} - \left[\frac{W}{2} \times \frac{d_4}{d_2}\right] + \left[\frac{W}{2} \times \frac{d_3}{d_1}\right]$$

$$F_{3Z} = \frac{W}{4} + \left[\frac{W}{2} \times \frac{d_4}{d_2}\right] - \left[\frac{W}{2} \times \frac{d_3}{d_1}\right]$$

$$F_{4Z} = \frac{W}{4} - \left[\frac{W}{2} \times \frac{d_4}{d_2}\right] - \left[\frac{W}{2} \times \frac{d_3}{d_1}\right]$$

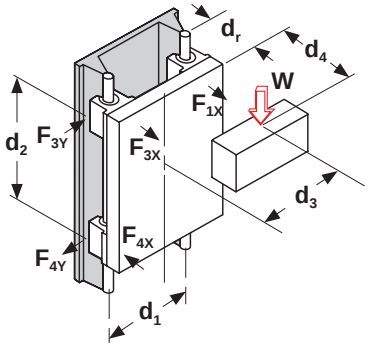
Side Mounted Applications



$$F_{1Z} = F_{3Z} = \frac{W}{4} + \left[\frac{W}{2} \times \frac{d_4}{d_2}\right] \qquad F_{1Y} \sim F_{3Y} = \left[\frac{W}{2} \times \frac{d_3 + d_r}{d_1}\right]$$

$$F_{2Z} = F_{4Z} = \frac{W}{4} - \left[\frac{W}{2} \times \frac{d_4}{d_2}\right]$$

Vertical Applications



$$F_{1X} \sim F_{3X} = \frac{W}{2} \times \frac{d_4 + d_r}{d_2} \qquad F_{1Y} \sim F_{3Y} = \frac{W}{2} \times \frac{d_3}{d_2}$$

$$F_{1X} + F_{3X} \sim F_{2X} + F_{4X} \qquad F_{1Y} + F_{3Y} \sim F_{2Y} + F_{4Y}$$

Mean Bearing Load Calculation

When the force acting upon an individual bearing varies, as is the case with the bottom axis bearings of a multi-axes positioning system, a mean bearing load calculation determines the life of that bearing.

$$F_{avg} = \frac{1}{3}\left(F_{min} + 2 \times F_{max}\right)$$

F_{avg} - average force acting upon bearing (lbs)
F_{min} - minimum force acting upon bearing (lbs)
F_{max} - maximum force acting upon bearing (lbs)

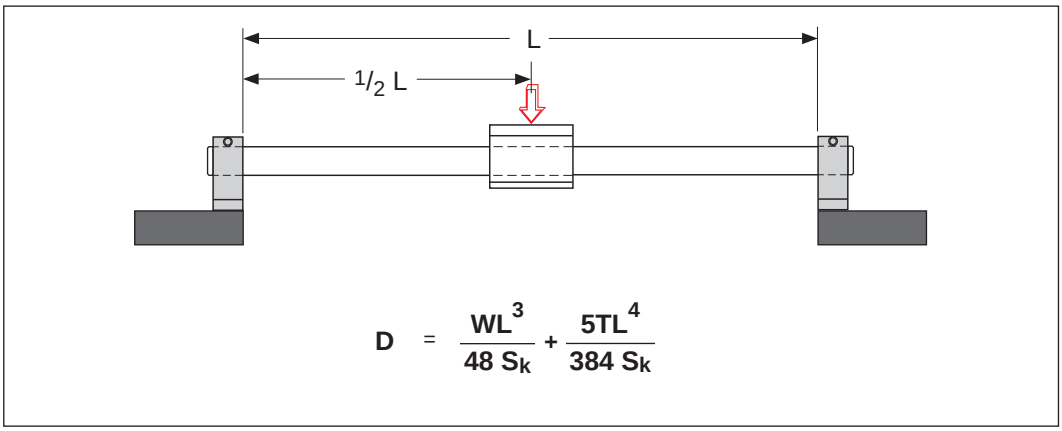
Deflection

The equations below can be used when applying *LINTECH* closed linear bearings (LBC, LBCA, SLBC, or DLBC series), case hardened shafting (SL series), with shaft end supports (ES series), or with threaded shaft ends attached to a plate on each end. The estimated deflection that a configuration will experience is dependent upon the shaft diameter, unsupported shaft length, shaft material, and the type and number of bearings being used.

Minimizing the deflection of the components will reduce additional stresses which can lead to premature failure. Excessive deflection can cause binding or rough operation when the bearings are at the area of travel furthest from the supported portion (mid-stroke).

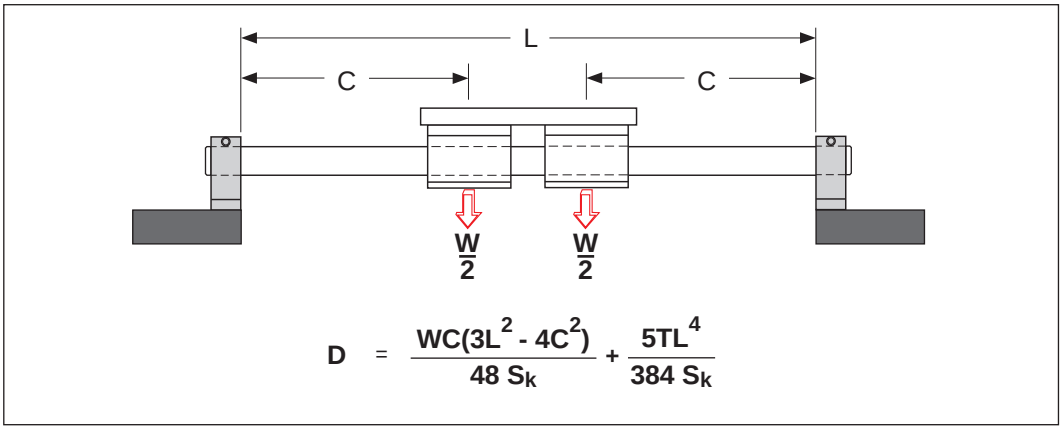
Model Number	Nominal Shaft Diameter (inches)	Shaft Weight T (lbs/in)	Strength Factor S_k (psi)
SL4	0.250	0.014	5,700
SL6	0.375	0.031	29,100
SL8	0.500	0.055	91,800
SL10	0.625	0.086	224,400
SL12	0.750	0.125	465,000
SL16	1.000	0.222	1,470,000
SL20	1.250	0.348	3,594,000
SL24	1.500	0.500	7,455,000
SL32	2.000	0.890	23,562,000

One (1) bearing per shaft



$$D = \frac{WL^3}{48\,S_k} + \frac{5TL^4}{384\,S_k}$$

Two (2) bearings per shaft



$$D = \frac{WC(3L^2 - 4C^2)}{48\,S_k} + \frac{5TL^4}{384\,S_k}$$

D = deflection (inches)

W = user applied load (lbs)

L = length of unsupported shaft (inches)

C = distance from support to center of first bearing (inches)

T = total weight of unsupported shaft length (lbs)

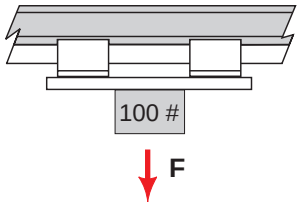
S_k = strength constant - modulus of elasticity x moment of inertia

Life Example

The following example is provided to aid in understanding how the various charts and equations are implemented. For this example, the life estimation will be determined for an application that will use a ***LINTECH*** TRCA *TWIN RAIL®* carriage assembly.

Application Parameters

The load is 100 lbs centered on the carriage, with 12" total travel of motion in the horizontal plane. The ***LINTECH*** TRSA *TWIN RAIL®* shaft assembly will use 440C stainless steel shafts, and will be mounted to a support structure so that its carriage will be inverted.



Various outward moves will be made with a return speed of 4 IPS. The return speed will be the most demanding profile. The installation environment is 80° F.

Determine Safety and Correction Factors

- Use chart on A-7 for 4 IPS for safety factor. **S** = 2
- Use chart on A-8 for 440C hardness factor. $\mathbf{F_H}$ = .52
- Use chart on A-8 for 80° F temperature factor. $\mathbf{F_T}$ = 1
- Use chart on A-12 to estimate carriage assembly based upon load of 100 lbs and safety factor of 2. **R** = TRCA12-6: 1,880 lbs dynamic rating
- Use chart on A-9 for DLBO-12 load factor. $\mathbf{F_L}$ = .5
- Use equation on A-9 to compute life estimate

$$\mathbf{L} = \left[.52 \times 1 \times .4 \times \frac{1880}{100 \times 2} \right]^3 \times 2{,}000{,}000$$

$$\mathbf{L} = \mathbf{29{,}196{,}688 \text{ inches of travel}}$$

- Use equation on A-6 to determine the number of inches traveled for the desired time frame (years). If the estimated L value above is less than the desired life, then select a larger carriage assembly from chart on A-12, and plug its dynamic load capacity for the R value to re-calculate L life estimate. The TRCA16-6 load rating of 3,120 lbs would increase the L life estimate to 133,451,615 inches.

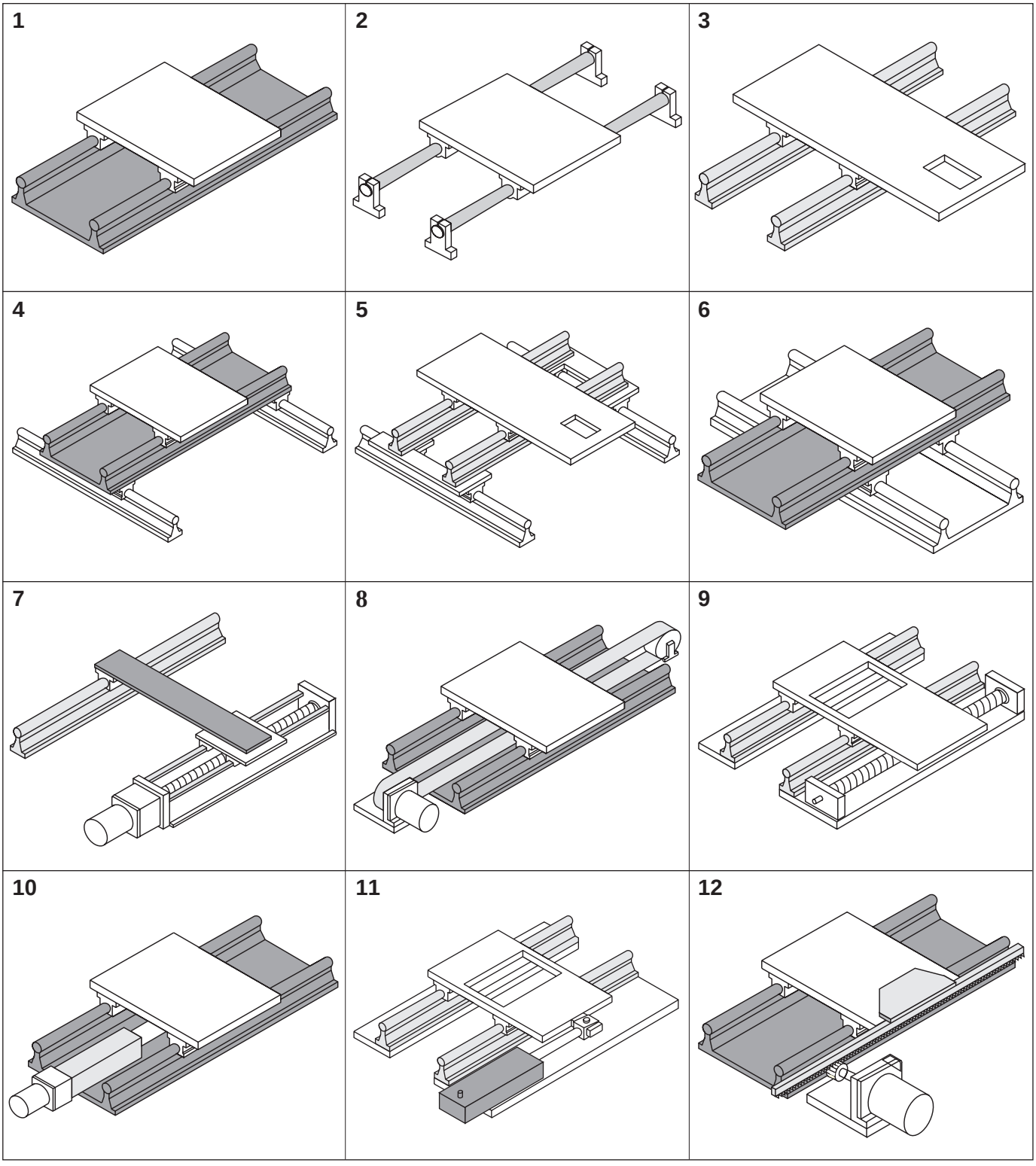
Custom Options

Some applications may require a custom option from ***LINTECH***. By utilizing a custom carriage length which has (6) SLBO-12, it would increase the R value to 2,820 lbs. The L life estimate would then become 98,538,824 inches. Another option would be to utilize chrome plated shafts for the TRSA assembly which will increase the hardness to 67 - 72 Rc. Thus, the hardness factor will become 1 from the chart on A-8. This increases the L life estimate to 207,646,000 inches for the standard TRCA12-6.

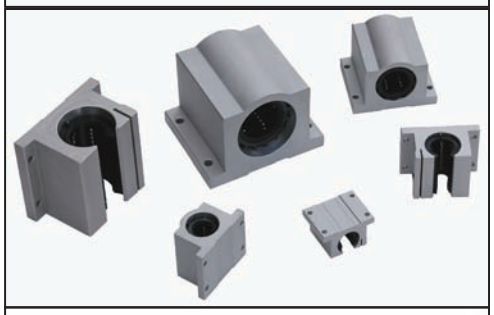
A

Shafting & Shaft Assembly Applications

LINTECH shafting, shaft assemblies, linear bearings and carriage assemblies are used in many different applications requiring mechanical motion. These components are utilized with air cylinders, hydraulic actuators, lead screws, rack & pinion systems, belt & pulleys, chain & sprockets, as well as manual positioning. **LINTECH**'s shaft assemblies, along with the linear bearings, are typically used when the designers wish to spread apart the SA shaft assemblies and make a custom carriage assembly. The TRSA shaft and TRCA carriage assemblies are utilized when ease of installation is of essence.



Linear Bearings, Pillow Blocks and Carriage Assemblies



LBCA - 12 - S

Linear Bearing Series

- **LBCA** - One Precision linear bearing (closed - all steel)
- **LBOA** - One Precision linear bearing (open - all steel)

Nominal Diameter

- **4** - 0.250 inch diameter
- **6** - 0.375 inch diameter
- **8** - 0.500 inch diameter
- **10** - 0.625 inch diameter
- **12** - 0.750 inch diameter
- **16** - 1.000 inch diameter
- **20** - 1.250 inch diameter
- **24** - 1.500 inch diameter
- **32** - 2.000 inch diameter

Wiper Seals

- **-** - No seals
- **S** - Seals at both ends

Specifications: LBCA & LBOA Linear Bearings

Operating Temperature	0^{o} F to $+600^{o}$ F (without seals)
Maximum Speed	10 ft/second
Bearing Seals (optional)	Internal Wiper Seals on both ends, Plastic Bearing Retainer
Shafting match	SS - Class S, hardened & ground

Mating Housing Tolerances
C = clearance
P = preload

LBCA (closed style)

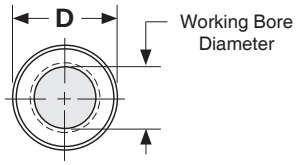
Nominal Shaft Diameter (inches)	Recommended Housing Bore: Normal Fit (inches)	Recommended Housing Bore: Press Fit (inches)	Bearing and Shaft Fit-up (inches)
0.250	.5005 / .5000	.4995 / .4990	.0015C / .0005C
0.375	.6255 / .6250	.6245 / .6240	.0015C / .0005C
0.500	.8755 / .8750	.8745 / .8740	.0015C / .0005C
0.625	1.1255 / 1.1250	1.1245 / 1.1240	.0015C / .0005C
0.750	1.2505 / 1.2500	1.2495 / 1.2490	.0015C / .0005C
1.000	1.5630 / 1.5625	1.5620 / 1.5615	.0015C / .0005C
1.250	2.0010 / 2.0000	1.9993 / 1.9983	.0015C / .0004C
1.500	2.3760 / 2.3750	2.3743 / 2.3733	.0016C / .0005C
2.000	3.0010 / 3.0000	2.9992 / 2.9982	.0020C / .0005C

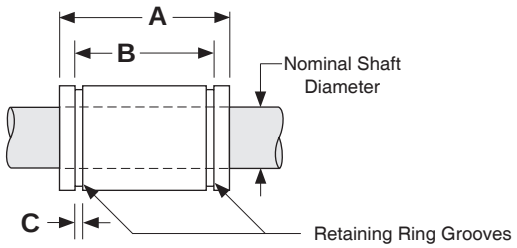
LBOA (open style)

Nominal Shaft Diameter (inches)	Recommended Housing Bore before adjustment (inches)
0.500	.8760 / .8740
0.625	1.1260 / 1.1240
0.750	1.2510 / 1.2490
1.000	1.5635 / 1.5615
1.250	2.0010 / 1.9990
1.500	2.3760 / 2.3740
2.000	3.0010 / 2.9990

Dimensions & Specifications: LBCA Precision Linear Bearing (closed)

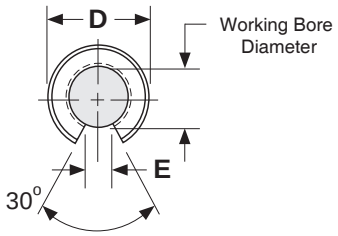
Model Number (2)		Nominal Shaft Diameter (inches)	Working Bore Diameter (inches)	Dyn. (1) Load Capacity (lbs)	Dimensions (inches)				Bearing Weight (lbs)
					A	B	C	D	
LBCA-4	LBCA-4-S	0.250	0.2500/0.2495	19	0.750/0.735	0.515/0.499	0.039	0.5000/0.4996	0.02
LBCA-6	LBCA-6-S	0.375	0.3750/0.3745	37	0.875/0.860	0.640/0.624	0.039	0.6250/0.6246	0.06
LBCA-8	LBCA-8-S	0.500	0.5000/0.4995	85	1.250/1.235	0.967/0.951	0.046	0.8750/0.8746	0.08
LBCA-10	LBCA-10-S	0.625	0.6250/0.6245	150	1.500/1.485	1.108/1.092	0.056	1.1250/1.1246	0.16
LBCA-12	LBCA-12-S	0.750	0.7500/0.7495	200	1.625/1.610	1.170/1.154	0.056	1.2500/1.2496	0.21
LBCA-16	LBCA-16-S	1.000	1.0000/0.9995	350	2.250/2.235	1.759/1.741	0.068	1.5625/1.5621	0.38
LBCA-20	LBCA-20-S	1.250	1.2500/1.2494	520	2.625/2.605	2.009/1.991	0.068	2.0000/1.9995	1.10
LBCA-24	LBCA-24-S	1.500	1.5000/1.4994	770	3.000/2.980	2.415/2.397	0.086	2.3750/2.3745	1.43
LBCA-32	LBCA-32-S	2.000	2.0000/1.9992	1,100	4.000/3.980	3.195/3.177	0.103	3.0000/2.9994	2.75

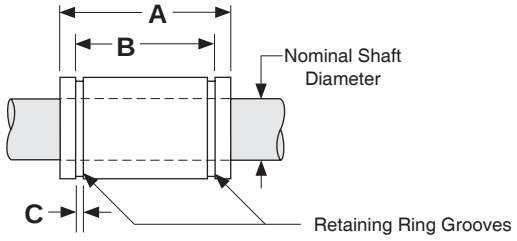




Dimensions & Specifications: LBOA Precision Linear Bearing (open)

Model Number (2)		Nominal Shaft Diameter (inches)	Working Bore Diameter (inches)	Dyn. (1) Load Capacity (lbs)	Dimensions (inches)					Bearing Weight (lbs)
					A	B	C	D	E min.	
LBOA-8	LBOA-8-S	0.500	0.5005/0.4995	60	1.250/1.235	0.967/0.951	0.046	0.8760/0.8746	0.31	0.07
LBOA-10	LBOA-10-S	0.625	0.6255/0.6245	105	1.500/1.485	1.108/1.092	0.056	1.1260/1.1240	0.38	0.11
LBOA-12	LBOA-12-S	0.750	0.7505/0.7495	140	1.625/1.610	1.170/1.154	0.056	1.2510/1.2490	0.44	0.17
LBOA-16	LBOA-16-S	1.000	1.0005/0.9995	240	2.250/2.235	1.759/1.741	0.068	1.5635/1.5615	0.56	0.32
LBOA-20	LBOA-20-S	1.250	1.2506/1.2494	400	2.625/2.605	2.009/1.991	0.068	2.0010/1.9990	0.63	0.90
LBOA-24	LBOA-24-S	1.500	1.5006/1.4994	600	3.000/2.980	2.415/2.397	0.086	2.3760/2.3740	0.75	1.12
LBOA-32	LBOA-32-S	2.000	2.0008/1.9992	860	4.000/3.980	3.195/3.177	0.103	3.0010/2.9990	1.00	2.16





Footnotes:

(1) Rating based upon 2 million inches of travel with the load forces being applied downward on the linear bearing, while in a horizontal application, and based upon 1060 steel shafting (Rockwell 60c). The actual load rating is dependent upon factors detailed on pages A-8 to A-9.

(2) The bearing retainer is plastic when the internal -S seal option is selected.

LBC - 10 - S - CR

Linear Bearing Series

- **LBC** - One linear bearing (closed)
- **LBO** - One linear bearing (open)

Nominal Diameter

- **4** - 0.250 inch diameter
- **6** - 0.375 inch diameter
- **8** - 0.500 inch diameter
- **10** - 0.625 inch diameter
- **12** - 0.750 inch diameter
- **16** - 1.000 inch diameter
- **20** - 1.250 inch diameter
- **24** - 1.500 inch diameter
- **32** - 2.000 inch diameter

Wiper Seals

- - No seals
- **S** - Seals at both ends

Bearing Options

- - Standard
- **CR** - Corrosion resistant

Specifications: LBC & LBO Linear Bearings

Operating Temperature	0^{o} F to + 185^{o} F
Maximum Speed	9 ft/second
Bearing Seals	Optional Internal Wiper Seals on both ends
Shafting match	SL - Class L, hardened & ground

Mating Housing/Pillow Block
C = clearance
P = preload

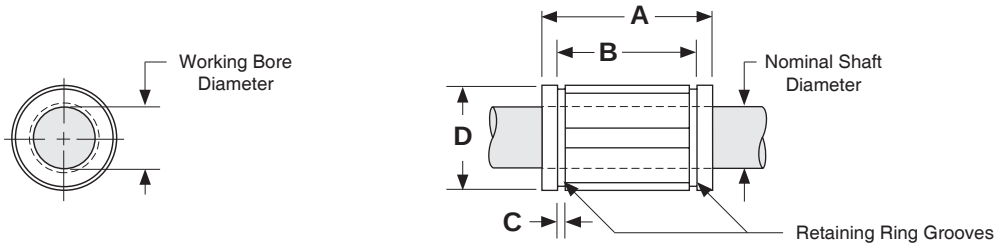
Nominal Shaft Diameter (inches)	Recommended Housing Bore - D		Bearing and Shaft Fit-up[1] (before adjustment)	
	Fixed Housing (inches)	Adjustable Housing (inches)	Fixed Housing (inches)	Adjustable Housing (inches)
0.250	.5005 / .5000	.5010 / .5000	.0015C / .0000	.002C / .0000
0.375	.6255 / .6250	.6260 / .6250	.0015C / .0000	.002C / .0000
0.500	.8755 / .8750	.8760 / .8750	.0015C / .0000	.002C / .0000
0.625	1.1255 / 1.1250	1.1260 / 1.1250	.0015C / .0000	.002C / .0000
0.750	1.2505 / 1.2500	1.2510 / 1.2500	.0015C / .0000	.002C / .0000
1.000	1.5630 / 1.5625	1.5635 / 1.5625	.0015C / .0000	.002C / .0000
1.250	2.0008 / 2.0000	2.0010 / 2.0000	.0018C / .0001P	.002C / .0000
1.500	2.3760 / 2.3750	2.3760 / 2.3750	.0021C / .0000	.0021C / .0000
2.000	3.0010 / 3.0000	3.0010 / 3.0000	.0023C / .0002P	.0023C / .0002P

Footnotes:

(1) Adjustable Housing Diameter (before adjustment) for LBO-20 is .002C/.0001P.

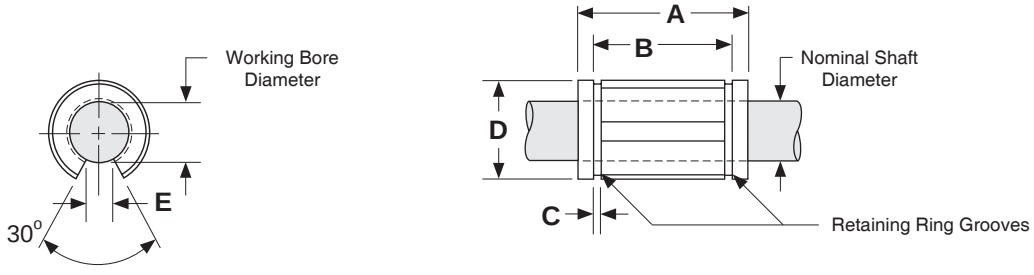
Dimensions & Specifications: LBC Linear Bearing (closed)

Model Number		Nominal Shaft Diameter (inches)	Dyn. (1) Load Capacity (lbs)	Working Bore Diameter (inches)	Housing (2) Bore D (inches)	Dimensions (inches)			Bearing Weight (lbs)
						A	B	C	
LBC-4	LBC-4-S	0.250	60	0.2500/0.2495	0.5005/0.5000	0.750/0.735	0.511/0.501	0.039	0.01
LBC-6	LBC-6-S	0.375	105	0.3750/0.3745	0.6255/0.6250	0.875/0.860	0.699/0.689	0.039	0.02
LBC-8	LBC-8-S	0.500	265	0.5000/0.4995	0.8755/0.8750	1.250/1.230	1.032/1.012	0.050	0.04
LBC-10	LBC-10-S	0.625	420	0.6250/0.6245	1.1255/1.1250	1.500/1.480	1.105/1.095	0.056	0.10
LBC-12	LBC-12-S	0.750	640	0.7500/0.7495	1.2505/1.2500	1.625/1.605	1.270/1.250	0.056	0.14
LBC-16	LBC-16-S	1.000	1,045	1.0000/0.9995	1.5630/1.5625	2.250/2.230	1.884/1.864	0.068	0.25
LBC-20	LBC-20-S	1.250	1,585	1.2500/1.2494	2.0008/2.0000	2.625/2.600	2.004/1.984	0.068	0.45
LBC-24	LBC-24-S	1.500	1,930	1.5000/1.4994	2.3760/2.3750	3.000/2.970	2.410/2.390	0.086	0.85
LBC-32	not available	2.000	3,000	2.0000/1.9992	3.0010/3.0000	4.000/3.960	3.193/3.163	0.105	1.45



Dimensions & Specifications: LBO Linear Bearing (open)

Model Number		Nominal Shaft Diameter (inches)	Dyn. (1) Load Capacity (lbs)	Working Bore Diameter (inches)	Housing (2) Bore D (inches)	Dimensions (inches)				Bearing Weight (lbs)
						A	B	C	E min.	
LBO-8	LBO-8-S	0.500	230	0.5000/0.4995	0.8755/0.8750	1.250/1.230	1.032/1.012	0.050	0.312	0.04
LBO-10	LBO-10-S	0.625	320	0.6250/0.6245	1.1255/1.1250	1.500/1.480	1.105/1.095	0.056	0.375	0.08
LBO-12	LBO-12-S	0.750	470	0.7500/0.7495	1.2505/1.2500	1.625/1.605	1.270/1.250	0.056	0.437	0.12
LBO-16	LBO-16-S	1.000	780	1.0000/0.9995	1.5630/1.5625	2.250/2.230	1.884/1.864	0.068	0.562	0.21
LBO-20	LBO-20-S	1.250	1,170	1.2500/1.2494	2.0008/2.0000	2.625/2.600	2.004/1.984	0.068	0.625	0.38
LBO-24	LBO-24-S	1.500	1,560	1.5000/1.4994	2.3760/2.3750	3.000/2.970	2.410/2.390	0.086	0.750	0.71
LBO-32	not available	2.000	2,350	2.0000/1.9992	3.0010/3.0000	4.000/3.960	3.193/3.163	0.105	1.000	1.20



Footnotes:

(1) Rating based upon 2 million inches of travel with the load forces being applied downward on the linear bearing, while in a horizontal application, and based upon 1060 steel shafting (Rockwell 60c). The actual load rating is dependent upon factors detailed on pages A-8 to A-9.

(2) This specification is based upon the bearing being on the shaft. Refer to B-3 for additional details.

LBCM - 16 - S

Linear Bearing Series (metric)

LBCM - One linear bearing (closed)[1]

Nominal Diameter

16 - 16 mm diameter
20 - 20 mm diameter
25 - 25 mm diameter
30 - 30 mm diameter
40 - 40 mm diameter
50 - 50 mm diameter

Wiper Seals

- No seals
S - Seals at both ends

Specifications: LBCM Linear Bearings

Operating Temperature	0^{o} F to $+100^{o}$ C
Maximum Speed	2,74 meters/second
Bearing Seals	Optional internal wiper Seals on both ends
Dimensional Standard	ISO
Shafting match	SM, hardened & ground

Housing tolerance

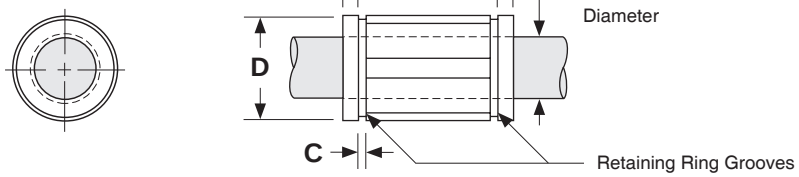
Nominal Shaft Diameter (mm)	Recommended Housing Bore D (mm)
16	26,10 / 26,03
20	32,10 / 32,05
25	40,10 / 40,05
30	47,15 / 47,05
40	62,15 / 62,05
50	75,20 / 75,02

Footnotes:

(1) Open linear bearing, closed pillow block, and open pillow block models are available upon request. Contact factory.

Dimensions & Specifications: LBCM Linear Bearing (closed - metric)

Model Number		Nominal Shaft Diameter (mm)	Dynamic Load Capacity (1) N (Kgf)	Housing Bore D (2) (inches)	Dimensions (mm) A	B	C	Bearing Weight (kg)
LBCM-16	**LBCM-16-S**	16	1176 (119,9)	26	36	24,6	1,30	0,028
LBCM-20	**LBCM-20-S**	20	2352 (239,8)	32	45	31,2	1,60	0,061
LBCM-25	**LBCM-25-S**	25	4508 (459,6)	40	58	43,7	1,85	0,122
LBCM-30	**LBCM-30-S**	30	5586 (569,6)	47	68	51,7	1,85	0,185
LBCM-40	**LBCM-40-S**	40	9310 (949,3)	62	80	60,3	2,15	0,360
LBCM-50	**LBCM-50-S**	50	13720 (1399,0)	75	100	77,3	2,65	0,608



Footnotes:

(1) Rating based upon 2 million inches of travel with the load forces being applied downward on the linear bearing, while in a horizontal application, and based upon 1060 steel shafting (Rockwell 60c). The actual load rating is dependent upon factors detailed on pages A-8 to A-9.

(2) This specification is based upon the bearing being on the shaft. Refer to B-5 for additional details.

SLBC - 10 - CR - L

Pillow Block Series

- **SLBC** - One LBC bearing per pillow block
- **DLBC** - Two LBC bearings per pillow block
- **SLBO** - One LBO bearing per pillow block
- **DLBO** - Two LBO bearings per pillow block

Nominal Diameter

- **8** - 0.500 inch diameter
- **10** - 0.625 inch diameter
- **12** - 0.750 inch diameter
- **16** - 1.000 inch diameter
- **20** - 1.250 inch diameter
- **24** - 1.500 inch diameter
- **32** - 2.000 inch diameter (only in SLBC & SLBO style)

Bearing Options

- \- Standard
- **CR** - Corrosion resistant

Bearing Lock

- \- None
- **L** - Hand wheel lock

Specifications: SLBC, SLBO, DLBC & DLBO Pillow Blocks

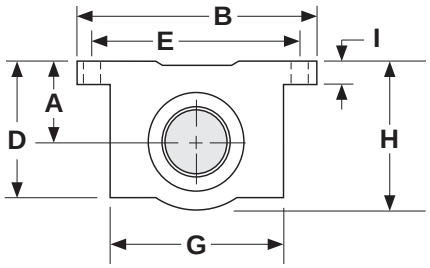
Bearing Housing Type & Finish	Aluminum 6061-T6 Pillow Block, Clear Anodized
Bearing Seals	Internal Wiper Seals on Both Ends
Operating Temperature	0^{o} F to + 185^{o} F
Maximum Speed	9 ft/second
Shafting match	SL - Class L, hardened & ground

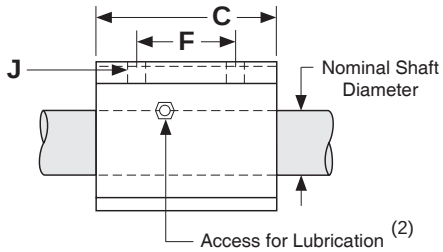
Diameter Tolerance

Nominal Shaft Diameter (inches)	Shaft Diameter Tolerance (inches)
0.500	.4995 / .4990
0.625	.6245 / .6240
0.750	.7495 / .7490
1.000	.9995 / .9990
1.250	1.2495 / 1.2490
1.500	1.4994 / 1.4989
2.000	1.9994 / 1.9987

Dimensions & Specifications: SLBC Single Linear Bearing Pillow Block (closed)

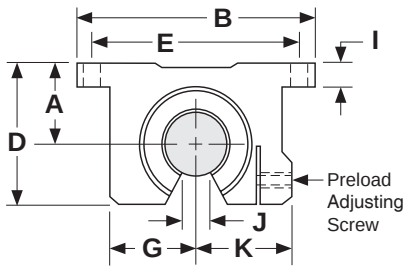
Model Number	Nominal Shaft Diameter (inches)	Dyn.(1) Load Capacity (lbs)	Dimensions (inches)											Block Weight
			A +/- .003	B	C	D	E +/- .010	F +/- .010	G	H	I	J hole	J bolt	(lbs)
SLBC-8	0.500	265	0.687	2.00	1.69	1.13	1.688	1.000	1.38	1.25	.25	.16	# 6	0.20
SLBC-10	0.625	420	0.875	2.50	1.94	1.44	2.125	1.125	1.75	1.63	.28	.19	# 8	0.50
SLBC-12	0.750	640	0.937	2.75	2.06	1.56	2.375	1.250	1.88	1.75	.31	.19	# 8	0.60
SLBC-16	1.000	1,045	1.187	3.25	2.81	1.94	2.875	1.750	2.38	2.19	.38	.22	#10	1.20
SLBC-20	1.250	1,585	1.500	4.00	3.63	2.50	3.500	2.000	3.00	2.81	.44	.22	#10	2.50
SLBC-24	1.500	1,930	1.750	4.75	4.00	2.88	4.125	2.500	3.50	3.25	.50	.28	1/4	3.80
SLBC-32	2.000	3,000	2.125	6.00	5.00	3.63	5.250	3.250	4.50	4.06	.63	.41	3/8	7.00

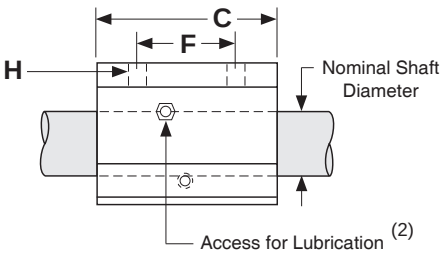




Dimensions & Specifications: SLBO Single Linear Bearing Pillow Block (open)

Model Number	Nominal Shaft Diameter (inches)	Dyn.(1) Load Capacity (lbs)	Dimensions (inches)												Block Weight
			A +/- .003	B	C	D	E +/- .010	F +/- .010	G	H hole	H bolt	I	J min.	K	(lbs)
SLBO-8	0.500	230	0.687	2.00	1.50	1.13	1.688	1.000	0.69	.16	# 6	.25	0.31	0.75	0.20
SLBO-10	0.625	320	0.875	2.50	1.75	1.44	2.125	1.125	0.88	.19	# 8	.28	0.37	0.94	0.40
SLBO-12	0.750	470	0.937	2.75	1.88	1.56	2.375	1.250	0.94	.19	# 8	.31	0.43	1.00	0.50
SLBO-16	1.000	780	1.187	3.25	2.63	2.00	2.875	1.750	1.19	.22	#10	.38	0.56	1.25	1.00
SLBO-20	1.250	1,170	1.500	4.00	3.38	2.56	3.500	2.000	1.50	.22	#10	.44	0.62	1.63	2.10
SLBO-24	1.500	1,560	1.750	4.75	3.75	2.94	4.125	2.500	1.75	.28	1/4	.50	0.75	1.88	3.20
SLBO-32	2.000	2,350	2.125	6.00	4.75	3.63	5.250	3.250	2.25	.41	3/8	.63	1.00	2.44	6.00





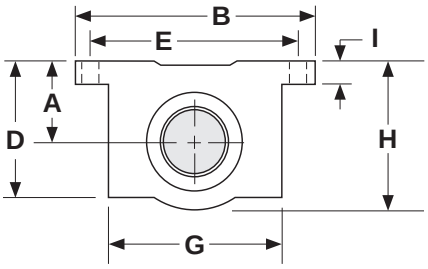
Footnotes:

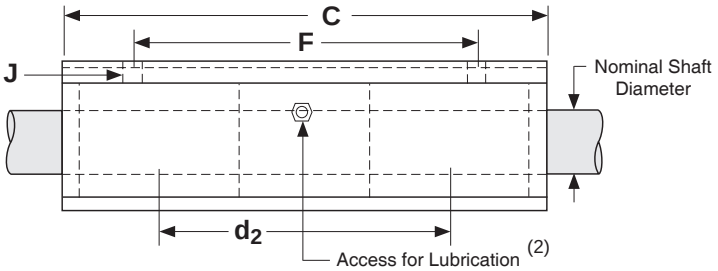
(1) Rating based upon 2 million inches of travel with the load forces being applied downward on the linear bearing, while in a horizontal application, and based upon 1060 steel shafting (Rockwell 60c). The actual load rating is dependent upon factors detailed on pages A-8 to A-9.

(2) Size 0.500 has oil lubricant fitting. Sizes 0.625 and above have a $^1/_4$-28 UNF straight thread access for lubrication.

Dimensions & Specifications: DLBC Double Linear Bearing Pillow Block (closed)

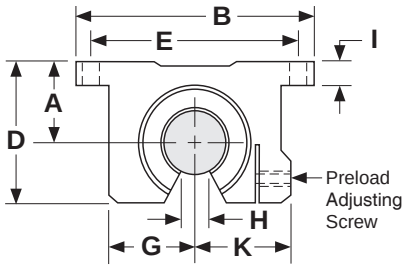
Model Number	Nominal Shaft Diameter (inches)	Dyn.(1) Load Capacity (lbs)	Dimensions (inches)												Block Weight (lbs)
			A +/- .003	B	C	D	E +/- .010	F +/- .010	G	H	I	J hole	J bolt	d_2(3)	
DLBC-8	0.500	510	0.687	2.00	3.50	1.13	1.688	2.500	1.38	1.25	.25	.16	# 6	1.75	0.40
DLBC-10	0.625	900	0.875	2.50	4.00	1.44	2.125	3.000	1.75	1.63	.28	.19	# 8	2.00	1.00
DLBC-12	0.750	1,200	0.937	2.75	4.50	1.56	2.375	3.500	1.88	1.75	.31	.19	# 8	2.25	1.20
DLBC-16	1.000	2,100	1.187	3.25	6.00	1.94	2.875	4.500	2.38	2.19	.38	.22	#10	3.00	2.40
DLBC-20	1.250	3,000	1.500	4.00	7.50	2.50	3.500	5.500	3.00	2.81	.44	.22	#10	3.75	5.00
DLBC-24	1.500	4,000	1.750	4.75	9.00	2.88	4.125	6.500	3.50	3.25	.50	.28	1/4	4.50	7.80

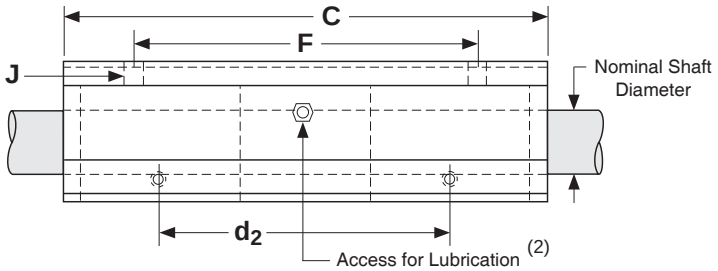




Dimensions & Specifications: DLBO Double Linear Bearing Pillow Block (open)

Model Number	Nominal Shaft Diameter (inches)	Dyn.(1) Load Capacity (lbs)	Dimensions (inches)													Block Weight (lbs)
			A +/- .003	B	C	D	E +/- .010	F +/- .010	G	H min.	I	J hole	J bolt	K	d_2(3)	
DLBO-8	0.500	460	0.687	2.00	3.50	1.13	1.688	2.500	0.69	.31	.25	.16	# 6	0.75	1.75	0.40
DLBO-10	0.625	640	0.875	2.50	4.00	1.44	2.125	3.000	0.88	.37	.28	.19	# 8	0.94	2.00	0.80
DLBO-12	0.750	940	0.937	2.75	4.50	1.56	2.375	3.500	0.94	.43	.31	.19	# 8	1.00	2.25	1.00
DLBO-16	1.000	1,560	1.187	3.25	6.00	2.00	2.875	4.500	1.19	.56	.38	.22	#10	1.25	3.00	2.00
DLBO-20	1.250	2,340	1.500	4.00	7.50	2.56	3.500	5.500	1.50	.62	.44	.22	#10	1.63	3.75	4.20
DLBO-24	1.500	3,120	1.750	4.75	9.00	2.94	4.125	6.500	1.75	.75	.50	.28	1/4	1.88	4.50	6.70





Footnotes:

(1) Rating based upon 2 million inches of travel with the load forces being applied downward on the linear bearing, while in a horizontal application, and based upon 1060 steel shafting (Rockwell 60c). The actual load rating is dependent upon factors detailed on pages A-8 to A-9.

(2) Size 0.500 has oil lubricant fitting. Sizes 0.625 and above have a 1/4-28 UNF straight thread access for lubrication.

(3) This value is center to center distance (spacing) of the bearings on a single shaft **(d_2)**.

TRCA 12 - 12 - CR - P - L1

TWIN RAIL® Carriage Assembly series
TRCA - Plate with mounted SLBO or DLBO

Nominal Bearing Diameter
8 - 0.500 inch diameter
10 - 0.625 inch diameter
12 - 0.750 inch diameter
16 - 1.000 inch diameter
20 - 1.250 inch diameter
24 - 1.500 inch diameter
32 - 2.000 inch diameter

Carriage Plate Length
6 - 6 inches
8 - 8 inches
12 - 12 inches
18 - 18 inches
24 - 24 inches
30 - 30 inches

Bearing Options
- Standard
CR - Corrosion resistant

Carriage Plate Mounting
- No Holes
P - Pre-Machined Mounting holes

Bearing Lock
- None
Lx - Hand wheel locks (x = number of locks - 1, 2, 3 or 4)

B

Specifications: TRCA TWIN RAIL® Carriage Assembly

Bearing Housing Type & Finish	Aluminum 6061-T6 Pillow Block, Clear Anodized
Bearing Seals	Internal Wiper Seals on Both Ends
Carriage Plate Type & Finish	Machined Aluminum 6061-T6 Plate, Black Anodized
Bearing Alignment on Plate	+/- 0.001", Pillow Blocks Doweled to Carriage Plate
Operating Temperature	0^{o} F to + 185^{o} F
Maximum Speed	9 ft/second
Shafting match	SL - Class L, SA or TRSA series

Diameter Tolerance

Nominal Shaft Diameter (inches)	Shaft Diameter Tolerance (inches)
0.500	.4995 / .4990
0.625	.6245 / .6240
0.750	.7495 / .7490
1.000	.9995 / .9990
1.250	1.2495 / 1.2490
1.500	1.4994 / 1.4989
2.000	1.9994 / 1.9987

Specifications subject to change without notice

Dimensions & Specifications: TRCA *TWIN RAIL*® Carriage assembly

Model Number	Nom. Shaft Dia. (inches)	Dyn.(1) Load Cap. (lbs)	Dimensions (inches)													Assembly Weight (lbs)
			A +/- .005	B +/- .005	C	D	E	F	G	H	J	K	d_r(2)	d_1(3)	d_2(4)	
TRCA8-6	0.500	920	6.00	5.50	1.25	0.75	0.68	1.12	2.00	.25	3.50	0.375	1.062	3.00	1.90	2.4
TRCA8-12	0.500	920	12.00	5.50	0.25	0.75	0.68	1.12	2.00	.25	11.50	0.375	1.062	3.00	10.00	4.6
TRCA8-18	0.500	920	18.00	5.50	0.25	0.75	0.68	1.12	2.00	.25	17.50	0.375	1.062	3.00	16.00	5.9
TRCA10-6	0.625	1,280	6.00	6.75	1.00	0.93	0.87	1.43	2.50	.25	4.00	0.375	1.250	3.75	2.15	3.5
TRCA10-12	0.625	1,280	12.00	6.75	0.25	0.93	0.87	1.43	2.50	.25	11.50	0.375	1.250	3.75	9.75	6.0
TRCA10-18	0.625	1,280	18.00	6.75	0.25	0.93	0.87	1.43	2.50	.25	17.50	0.375	1.250	3.75	15.75	7.7
TRCA12-6	0.750	1,880	6.00	7.75	0.75	1.00	0.93	1.56	2.75	.25	4.50	0.500	1.437	4.50	2.50	4.8
TRCA12-12	0.750	1,880	12.00	7.75	0.25	1.00	0.93	1.56	2.75	.25	11.49	0.500	1.437	4.50	9.62	8.2
TRCA12-18	0.750	1,880	18.00	7.75	0.25	1.00	0.93	1.56	2.75	.25	17.49	0.500	1.437	4.50	15.62	10.7
TRCA16-6	1.000	3,120	6.00	9.00	0.00	1.25	1.18	2.00	3.25	.25	6.00	0.500	1.687	5.25	3.25	7.2
TRCA16-12	1.000	3,120	12.00	9.00	0.25	1.25	1.18	2.00	3.25	.25	11.49	0.500	1.687	5.25	8.87	11.0
TRCA16-18	1.000	3,120	18.00	9.00	0.25	1.25	1.18	2.00	3.25	.25	17.49	0.500	1.687	5.25	14.87	14.0
TRCA16-24	1.000	3,120	24.00	9.00	0.25	1.25	1.18	2.00	3.25	.25	23.49	0.500	1.687	5.25	20.87	16.9
TRCA20-8	1.250	4,680	8.00	10.50	0.25	1.62	1.50	2.56	4.00	.25	7.50	0.750	2.250	6.00	3.90	16.0
TRCA20-12	1.250	4,680	12.00	10.50	0.25	1.62	1.50	2.56	4.00	.25	11.49	0.750	2.250	6.00	8.12	16.4
TRCA20-18	1.250	4,680	18.00	10.50	0.25	1.62	1.50	2.56	4.00	.25	17.49	0.750	2.250	6.00	14.12	21.6
TRCA20-24	1.250	4,680	24.00	10.50	0.25	1.62	1.50	2.56	4.00	.25	23.49	0.750	2.250	6.00	20.12	26.8
TRCA24-12	1.500	6,240	12.00	12.00	1.50	1.87	1.75	2.93	4.75	.31	9.00	1.000	2.750	6.62	5.00	30.0
TRCA24-18	1.500	6,240	18.00	12.00	0.25	1.87	1.75	2.93	4.75	.31	17.50	1.000	2.750	6.62	13.75	40.2
TRCA24-24	1.500	6,240	24.00	12.00	0.25	1.87	1.75	2.93	4.75	.31	23.50	1.000	2.750	6.62	19.75	48.1
TRCA24-30	1.500	6,240	30.00	12.00	0.25	1.87	1.75	2.93	4.75	.31	29.50	1.000	2.750	6.62	25.75	56.0
TRCA32-18	2.000	9,400	18.00	14.00	0.25	2.43	2.25	3.62	6.00	.37	17.50	1.250	3.375	7.25	12.75	61.7
TRCA32-24	2.000	9,400	24.00	14.00	0.25	2.43	2.25	3.62	6.00	.37	23.50	1.250	3.375	7.25	18.75	73.2
TRCA32-30	2.000	9,400	30.00	14.00	0.25	2.43	2.25	3.62	6.00	.37	29.50	1.250	3.375	7.25	24.75	84.8

Footnotes:

(1) Rating based upon 2 million inches of travel with the load forces being applied downward on the linear bearing, while in a horizontal application, and based upon 1060 steel shafting (Rockwell 60c). The actual load rating is dependent upon factors detailed on pages A-8 to A-9.

(2) This value is center distance of the bearing to top of carriage plate surface **(d_r)**.

(3) This value is center to center distance (spread) between the rails **(d_1)**.

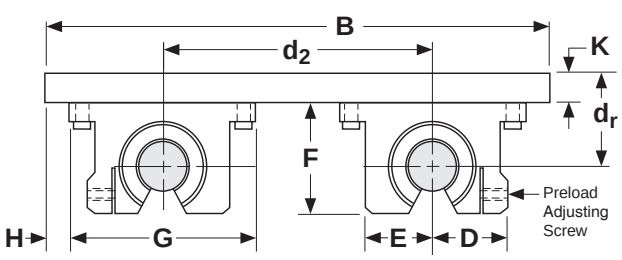
(4) This value is center to center distance (spacing) of the bearings on a single shaft **(d_2)**.

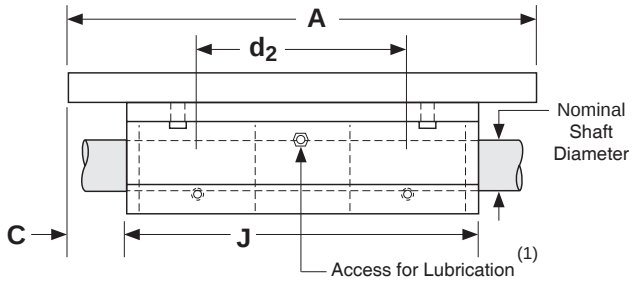
Dimensions

inches

Available For:

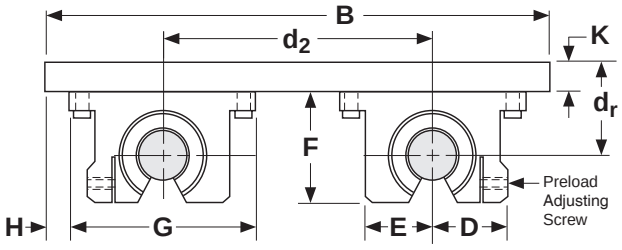
TRCA8-6, TRCA10-6,TRCA12-6,
TRCA16-6,TRCA20-8, TRCA24-12

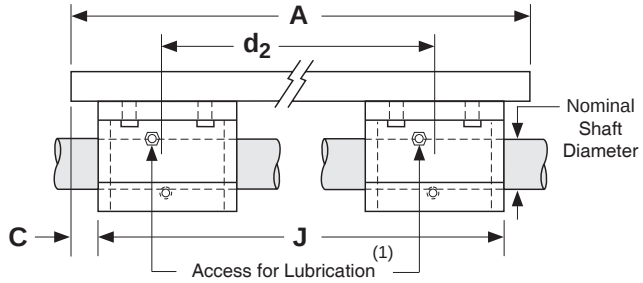




Available For:

All other TRCA models,
not shown above





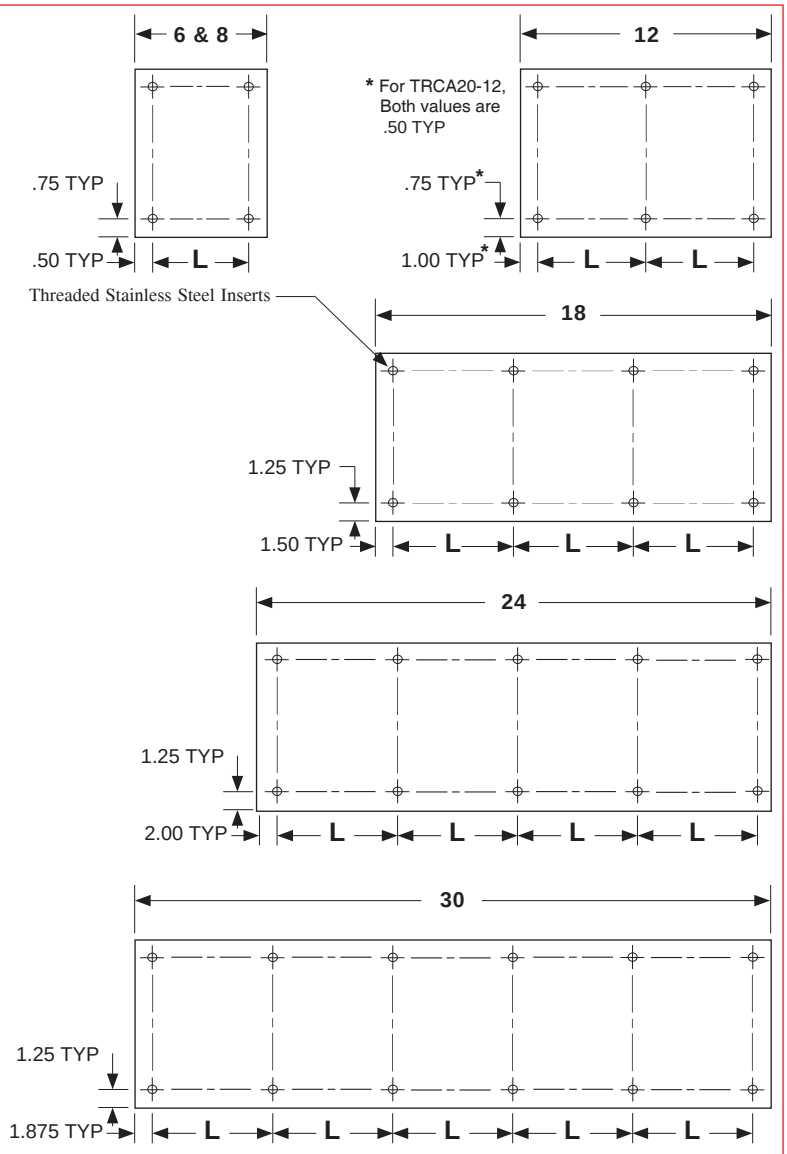
Footnotes:

(1) Size 0.500 has oil lubricant fitting. Sizes 0.625 and above have a $^{1}/_{4}$-28 UNF straight thread access for lubrication.

(-P) Pre-Machined Carriage Mounting Holes

All carriage assembly plates are available with a pre-determined number & location of mounting holes. These holes consist of stainless steel threaded inserts per the below chart. Custom mounting patterns are available upon request.

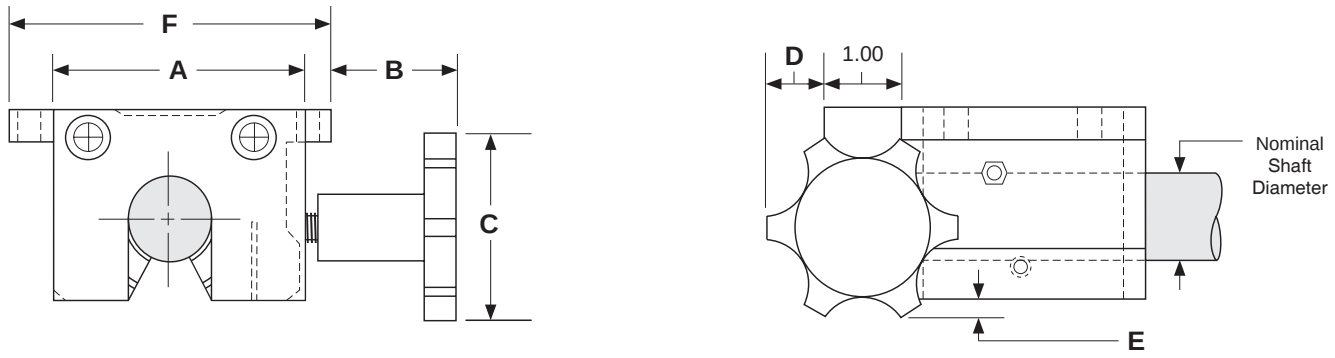
Model Number	Carriage Length (inches)	L (inches)	Threaded Insert Size
TRCA8-6-P	6.00	5.00	#10-32
TRCA8-12-P	12.00	5.00	#10-32
TRCA8-18-P	18.00	5.00	#10-32
TRCA10-6-P	6.00	5.00	#10-32
TRCA10-12-P	12.00	5.00	#10-32
TRCA10-18-P	18.00	5.50	#10-32
TRCA12-6-P	6.00	5.00	1/4-28
TRCA12-12-P	12.00	5.00	1/4-28
TRCA12-18-P	18.00	5.50	1/4-28
TRCA16-6-P	6.00	5.00	5/16-24
TRCA16-12-P	12.00	5.00	5/16-24
TRCA16-18-P	18.00	5.00	5/16-24
TRCA16-24-P	24.00	5.00	5/16-24
TRCA20-8-P	8.00	7.00	3/8-24
TRCA20-12-P	12.00	5.00	3/8-24
TRCA20-18-P	18.00	5.00	3/8-24
TRCA20-24-P	24.00	5.00	3/8-24
TRCA24-12-P	12.00	5.00	3/8-24
TRCA24-18-P	18.00	5.00	3/8-24
TRCA24-24-P	24.00	5.00	3/8-24
TRCA24-30-P	30.00	5.25	3/8-24
TRCA32-18-P	18.00	5.00	1/2-20
TRCA32-24-P	24.00	5.00	1/2-20
TRCA32-30-P	30.00	5.25	1/2-20



(-L) Bearing Locks

This option adds an aluminum clamping block to the bearing pillow block which provides for a manual lock of the bearing to the shaft. The hand wheel with threaded shaft presses into a bronze insert which makes contact to provide a "pressure lock" to the shaft. The threaded steel screw will not back drive and does not make physical contact with the steel shaft (no steel to steel contact). Below please find the dimensional data for this option. The lock will be installed as shown below when ordered with an SLBC, SLBO, DLBC, DLBO, or TRCA. Multiple locks can be installed onto a TRCA assembly.

Nominal Shaft Diameter (inches)	Dimensions (inches)						
	A	B	C	D	E		F
					open	closed	
8 - 0.500	1.680	1.72	2.00	0.50	.56	.44	2.00
10 - 0.625	1.875	1.53	2.00	0.50	.50	.31	2.50
12 - 0.750	2.067	1.46	2.00	0.50	.37	.18	2.75
16 - 1.000	2.312	1.34	2.00	0.50	.19	---	3.25
20 - 1.250	3.125	1.66	2.50	0.75	.17	---	4.00
24 - 1.500	3.625	1.46	2.50	0.75	.05	---	4.75
32 - 2.000	4.600	1.45	2.50	0.75	---	---	6.00



Custom Carriage Sizes

Custom sizes (wider or longer) not shown in this catalog can be provided upon request. This will allow for larger rail and bearing spacing (d_1 & d_2 dimensions).

Custom Carriage Material & Finishes

The standard material is aluminum with black anodized finish. Aluminum plates can be finished in many different colors. Plates can also be provided utilizing steel. If steel is used, the plate can be provided with a black oxide finish. Chrome plated and many other custom alternatives are available. Greater plate thickness dimensions are also available upon request.

Other Plate & Bearing Modifications

The bearings or carriage plates can be modified to meet the specific user mounting requirements. Modifications can also be made to the carriage plates to allow for thru holes and other special "cut-outs".

Special Grease Options

Bearings can be "packed" with special greases to meet the installation environmental requirements. Examples of operating environments which may require a special grease include: high or low temperature, clean rooms, vacuums, food grade, etc..

Notes

Shafting, Shaft Supports and Shaft Assembly Products

SL 12 - SS - PD x 105.375

Shafting

- **SL** - Class L diameter tolerance
- **SS** - Class S diameter tolerance
- **SN** - Class N diameter tolerance
- **SM** - Metric diameter

Shaft Diameter

- **4** - 0.250 inch diameter
- **6** - 0.375 inch diameter
- **8** - 0.500 inch diameter
- **10** - 0.625 inch diameter
- **12** - 0.750 inch diameter
- **16** - 1.000 inch diameter
- **20** - 1.250 inch diameter
- **24** - 1.500 inch diameter
- **32** - 2.000 inch diameter
- **8** - 8 mm diameter
- **10** - 10 mm diameter
- **12** - 12 mm diameter
- **16** - 16 mm diameter
- **20** - 20 mm diameter
- **25** - 25 mm diameter
- **30** - 30 mm diameter
- **40** - 40 mm diameter
- **50** - 50 mm diameter

Shaft Material

- **-** - 1060 Steel
- **SS** - 440C Stainless Steel (not available in class N)
- **CR** - Chrome Plated 1060 Steel

Pre-Drilled

- **-** - No mounting hole pattern
- **PD** - pre-drilled hole pattern

Overall Length

- **xxx.xxx** - inches for all series

Specifications: SL, SS & SN Shafting

Shaft Straightness[1]	0.001/0.002 in/ft, cumulative
Shaft Type	1060 Steel or 440C Stainless steel (only with L & S tolerance)
Shaft Roundness	0.000080 inches
Shaft Chamfer	0.25 - 0.75 dia. : 0.03 inch x 45°, 1.00 - 2.00 dia. : 0.06 inch x 45°
Surface Finish	8 - 12 R_a microinch

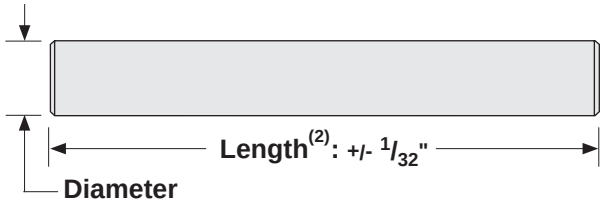
Diameter Tolerance
Hardness Depth

Nominal Shaft Diameter (inches)	Class L Diameter Tolerance (inches)	Class S Diameter Tolerance (inches)	Class N Diameter Tolerance (inches)	Minimum Hardness Depth (inches)
0.250	.2495 / .2490	.2490 / .2485	.2500 / .2498	0.040
0.375	.3745 / .3740	.3740 / .3735	.3750 / .3748	0.040
0.500	.4995 / .4990	.4990 / .4985	.5000 / .4998	0.040
0.625	.6245 / .6240	.6240 / .6235	.6250 / .6248	0.040
0.750	.7495 / .7490	.7490 / .7485	.7500 / .7498	0.060
1.000	.9995 / .9990	.9990 / .9985	1.0000 / .9998	0.080
1.250	1.2495 / 1.2490	1.2490 / 1.2485	1.2500 / 1.2498	0.080
1.500	1.4994 / 1.4989	1.4989 / 1.4984	1.5000 / 1.4997	0.080
2.000	1.9994 / 1.9987	1.9987 / 1.9980	2.0000 / 1.9997	0.100

C

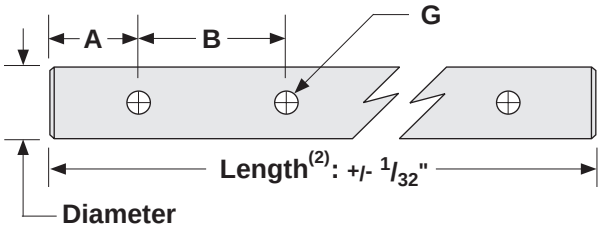
Dimensions & Specifications: SL, SS & SN Shafting

Model Number	Nominal Shaft Diameter (inches)	Maximum Length Class L (inches)	Class L -SS (inches)	Class S (inches)	Class S -SS (inches)	Class N (inches)	Shaft Weight (lbs/in)
Sx4	0.250	96	144	96	144	96	0.014
Sx6	0.375	172	154	172	154	172	0.031
Sx8	0.500	184	154	184	154	184	0.055
Sx10	0.625	184	154	184	154	184	0.086
Sx12	0.750	184	154	184	154	184	0.125
Sx16	1.000	184	154	184	154	184	0.222
Sx20	1.250	184	154	184	154	184	0.348
Sx24	1.500	184	154	184	154	184	0.500
Sx32	2.000	184	154	184	154	184	0.890



Dimensions & Specifications: SL-PD Shafting

Model Number	Nominal Shaft Diameter (inches)	Maximum Length (inches)	-SS (inches)	Pre-Drilled Holes (inches) A +/- .016	B	G	Shaft Weight (lbs/in)
SL8-PD	0.500	172	154	2.00	4.00	#6-32	0.055
SL10-PD	0.625	184	154	2.00	4.00	#8-32	0.086
SL12-PD	0.750	184	154	3.00	6.00	#10-32	0.125
SL16-PD	1.000	184	154	3.00	6.00	1/4-20	0.222
SL20-PD	1.250	184	154	3.00	6.00	5/16-18	0.348
SL24-PD	1.500	184	154	4.00	8.00	3/8-16	0.500
SL32-PD	2.000	184	154	4.00	8.00	1/2-13	0.890



Footnotes:

(1) Straightness of .0005/.001 in/ft cumulative is available. Contact the factory.
(2) Length tolerance for 2" diameter shafting is +/- 1/16 inches. Tighter tolerance available. Contact the factory.

Specifications: SM Metric Shafting

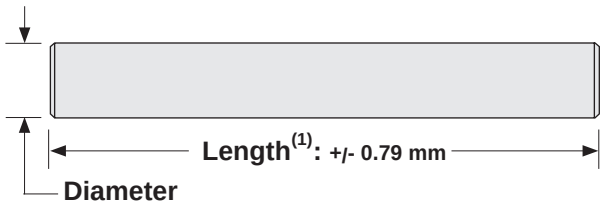
Shaft Straightness	0,0254/0,0508 mm/300 mm - cumulative
Shaft Type	1060 Steel
Shaft Roundness	0,0020 mm
Shaft Chamfer	8 - 20 dia. : 0,762 mm x 45°, 25 - 50 dia. : 1,524 mm inch x 45°
Surface Finish	8 - 12 R_a microinch

Diameter Tolerance Hardness Depth

Nominal Shaft Diameter (mm)	Diameter Tolerance (mm)	Minimum Hardness Depth (mm)
8	8,00 / 7,99	1,02
10	10,00 / 9,99	1,02
12	12,00 / 11,99	1,52
16	16,00 / 15,99	1,52
20	20,00 / 19,99	1,52
25	25,00 / 24,99	1,52
30	30,00 / 29,99	2,03
40	40,00 / 39,99	2,03
50	50,00 / 49,98	2,54

Dimensions & Specifications: SM Metric Shafting

Model Number	Nominal Shaft Diameter (mm)	Maximum Length inches (mm)	Shaft Weight (kg/mm)
SM8	8	172 (4368,8)	0,0030
SM10	10	172 (4368,8)	0,0035
SM12	12	184 (4673,6)	0,0050
SM16	16	184 (4673,6)	0,0096
SM20	20	184 (4673,6)	0,0120
SM25	25	184 (4673,6)	0,0190
SM30	30	184 (4673,6)	0,0270
SM40	40	184 (4673,6)	0,0480
SM50	50	184 (4673,6)	0,0750



Footnotes:

(1) Tighter tolerance available. Contact the factory.

ES 10 - A

End Support Block

Shaft Diameter

- **8** - 0.500 inch diameter
- **10** - 0.625 inch diameter
- **12** - 0.750 inch diameter
- **16** - 1.000 inch diameter
- **20** - 1.250 inch diameter
- **24** - 1.500 inch diameter
- **32** - 2.000 inch diameter

Support Material

- **A** - Aluminum
- **S** - Steel

ARS 10 - PD - 24

Aluminum Rail Support

Shaft Diameter Supported

- **8** - 0.500 inch diameter
- **10** - 0.625 inch diameter
- **12** - 0.750 inch diameter
- **16** - 1.000 inch diameter
- **20** - 1.250 inch diameter
- **24** - 1.500 inch diameter
- **32** - 2.000 inch diameter

Pre-Drilled

Support length

- **24** - 24 inch length

LSRS 10 - PD - 48

Low Profile Steel Rail Support

Shaft Diameter Supported

- **8** - 0.500 inch diameter
- **10** - 0.625 inch diameter
- **12** - 0.750 inch diameter
- **16** - 1.000 inch diameter
- **20** - 1.250 inch diameter
- **24** - 1.500 inch diameter
- **32** - 2.000 inch diameter

Pre-Drilled

Support length

- **48** - 48 inch length

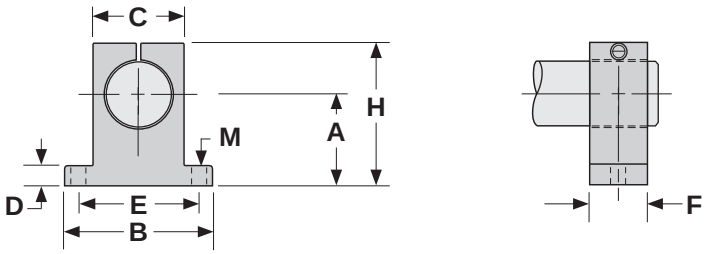
C

Specifications: ES, ARS & LSRS End support block

ES material & Finish	**-A:** 6061-T6 aluminum, natural finish **-S:** C1045 steel, blue enamel
ARS material & Finish	6061-T6 aluminum, natural finish
LSRS material & Finish	AISI C-1018 steel, natural finish

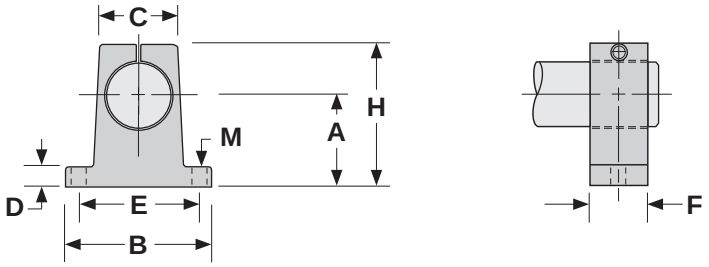
Dimensions & Specifications: ES-A End support block

Model Number	Nominal Shaft Diameter (inches)	Dimensions (inches)									Support Weight (lbs)
		A +/- .001	B	C	D	E +/- .010	F	H	M hole	M bolt size	
ES8-A	0.500	1.000	2.000	0.875	.250	1.500	0.625	1.625	.188	#8	.08
ES12-A	0.750	1.250	2.500	1.250	.313	2.000	0.750	2.063	.218	#10	.16
ES16-A	1.000	1.500	3.063	1.500	.375	2.500	1.000	2.500	.281	1/4	.30
ES20-A	1.250	1.750	3.750	2.000	.438	3.000	1.125	3.000	.346	5/16	.53
ES24-A	1.500	2.000	4.375	2.250	.500	3.500	1.250	3.437	.346	5/16	.73
ES32-A	2.000	2.500	5.500	3.000	.625	4.500	1.500	4.375	.406	3/8	1.40



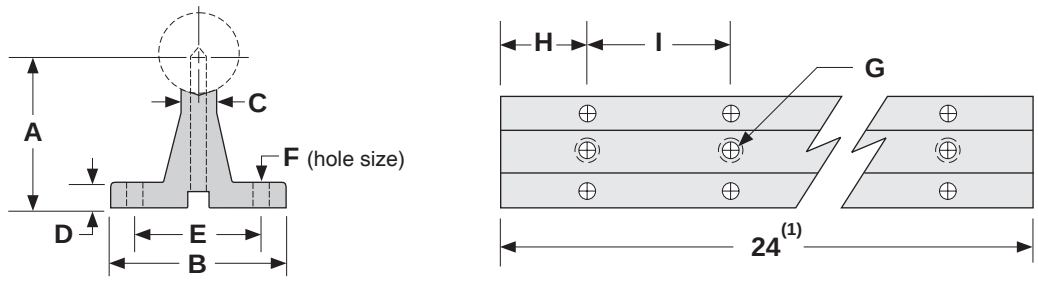
Dimensions & Specifications: ES-S End support block

Model Number	Nominal Shaft Diameter (inches)	Dimensions (inches)									Support Weight (lbs)
		A +/- .001	B	C	D	E +/- .010	F	H	M hole	M bolt size	
ES8-S	0.500	1.000	2.000	0.750	.250	1.500	0.625	1.625	.218	#10	.28
ES10-S	0.625	1.000	2.500	0.875	.312	1.875	0.750	1.750	.218	#10	.36
ES12-S	0.750	1.250	2.750	1.000	.375	2.000	0.750	2.125	.281	1/4	.53
ES16-S	1.000	1.500	3.312	1.375	.375	2.500	1.000	2.625	.281	1/4	1.00
ES20-S	1.250	1.750	4.000	1.750	.438	3.000	1.250	3.000	.343	5/16	2.10
ES24-S	1.500	2.000	4.750	2.000	.500	3.500	1.250	3.500	.343	5/16	2.80
ES32-S	2.000	2.500	6.000	2.625	.625	4.500	1.500	4.500	.406	3/8	5.10



Dimensions & Specifications: ARS-PD Shaft Support

Model Number	Nominal Shaft Diameter (inches)	Dimensions (inches)									Support Weight (lbs/in)
		A +/- .002	B	C	D	E +/- .010	F hole	G bolt size	H	I	
ARS8-PD	0.500	1.125	1.500	.250	.187	1.000	.169	#6-32 x 0.87	2.00	4.00	.050
ARS10-PD	0.625	1.125	1.625	.312	.250	1.125	.193	#8-32 x 0.87	2.00	4.00	.063
ARS12-PD	0.750	1.500	1.750	.375	.250	1.250	.221	#10-32 x 1.25	3.00	6.00	.083
ARS16-PD	1.000	1.750	2.125	.500	.250	1.500	.281	1/4-20 x 1.50	3.00	6.00	.108
ARS20-PD	1.250	2.125	2.500	.562	.312	1.875	.343	5/16-18 x 1.75	3.00	6.00	.146
ARS24-PD	1.500	2.500	3.000	.687	.375	2.250	.343	3/8-16 x 2.00	4.00	8.00	.213
ARS32-PD	2.000	3.250	3.750	.875	.500	2.750	.406	1/2-13 x 3.25	4.00	8.00	.342



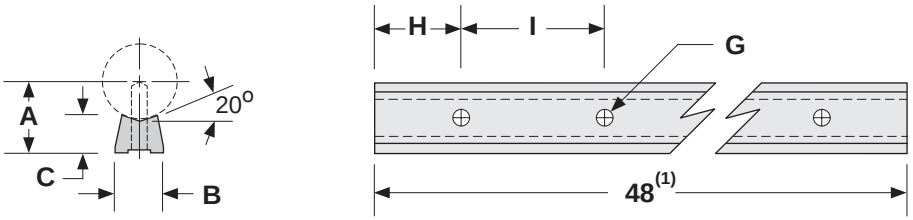
Footnotes:

(1) Shorter lengths available. Contact the factory.

C

Dimensions & Specifications: LSRS-PD Shaft Support

Model Number	Nominal Shaft Diameter (inches)	Dimensions (inches)							Support Weight (lbs/in)
		A +/- .002	B	C	G hole	G bolt size	H	I	
LSRS8-PD	0.500	0.562	0.37	.341	.169	#6-32	2.00	4.00	.028
LSRS10-PD	0.625	0.687	0.45	.412	.193	#8-32	2.00	4.00	.041
LSRS12-PD	0.750	0.750	0.51	.420	.221	#10-32	3.00	6.00	.047
LSRS16-PD	1.000	1.000	0.69	.560	.281	1/4-20	3.00	6.00	.089
LSRS20-PD	1.250	1.187	0.78	.626	.343	5/16-18	3.00	6.00	.106
LSRS24-PD	1.500	1.375	0.93	.703	.406	3/8-16	4.00	8.00	.140
LSRS32-PD	2.000	1.750	1.18	.845	.531	1/2-13	4.00	8.00	.230



Footnotes:

(1) Shorter lengths available. Contact the factory.

TRSA 12 - 6 - SS - E4

Assembly Type

- **SA** - Single rail shaft assembly
- **TRSA** - *TWIN RAIL®* shaft assembly

Shaft Diameter

- **8** - 0.500 inch diameter
- **10** - 0.625 inch diameter
- **12** - 0.750 inch diameter
- **16** - 1.000 inch diameter
- **20** - 1.250 inch diameter
- **24** - 1.500 inch diameter
- **32** - 2.000 inch diameter

Overall Length

- **xxx** - inches

Shaft Material

- - 1060 Steel
- **SS** - 440C Stainless Steel
- **CR** - Chrome Plated 1060 Steel

End Stops

- - No end stops
- **E1** - One end stop
- **E2** - Two end stops
- **E3** - Three end stops
- **E4** - Four end stops

C

Specifications: SA & TRSA Shaft assemblies

Support Type & Finish	Precision Machined 6061-T6 Aluminum, Black Anodized
Shaft Straightness	0.001/0.002 in/ft, cumulative
Shaft Parallelism (TRSA only)	+/- 0.002 in overall
Shaft Type	SL - 1060 Steel or 440C Stainless steel
Shaft Roundness	0.000080 inches
Shaft Chamfer	0.50 - 0.75 dia. : 0.03 inch x 45°, 1.00 - 2.00 dia. : 0.06 inch x 45°
Surface Finish	8 - 12 R_a microinch

Diameter Tolerance
Hardness Depth

Nominal Shaft Diameter (inches)	Shaft Diameter Tolerance (inches)	Minimum Hardness Depth (inches)
0.500	.4995 / .4990	0.040
0.625	.6245 / .6240	0.040
0.750	.7495 / .7490	0.060
1.000	.9995 / .9990	0.080
1.250	1.2495 / 1.2490	0.080
1.500	1.4994 / 1.4989	0.080
2.000	1.9994 / 1.9987	0.100

Dimensions & Specifications: SA Shaft assembly

Model Number	Nominal Shaft Diameter (inches)	Overall Length (inches)	Dimensions (inches)							Assembly Weight (lbs)
			A +/- .002	B	C	D	E +/- .010	F hole	G bolt size	
SA8-6	0.500	6	1.125	1.500	.250	.187	1.000	.169	#6-32	0.5
SA10-6	0.625	6	1.125	1.625	.312	.250	1.125	.193	#8-32	0.8
SA12-6	0.750	6	1.500	1.750	.375	.250	1.250	.221	#10-32	1.0
SA16-6	1.000	6	1.750	2.125	.500	.250	1.500	.281	1/4-20	1.7
SA20-6 (1)	1.250	6	2.125	2.500	.562	.312	1.875	.281	1/4-20	2.7
SA24-6 (1)	1.500	6	2.500	3.000	.687	.375	2.250	.343	5/16-18	3.7
SA32-6 (1)	2.000	6	3.250	3.750	.875	.500	2.750	.406	3/8-16	6.4
SA8-12	0.500	12	1.125	1.500	.250	.187	1.000	.169	#6-32	0.9
SA10-12	0.625	12	1.125	1.625	.312	.250	1.125	.193	#8-32	1.5
SA12-12	0.750	12	1.500	1.750	.375	.250	1.250	.221	#10-32	2.0
SA16-12	1.000	12	1.750	2.125	.500	.250	1.500	.281	1/4-20	3.4
SA20-12	1.250	12	2.125	2.500	.562	.312	1.875	.281	1/4-20	5.3
SA24-12	1.500	12	2.500	3.000	.687	.375	2.250	.343	5/16-18	7.3
SA32-12 (1)	2.000	12	3.250	3.750	.875	.500	2.750	.406	3/8-16	12.8
SA8-18	0.500	18	1.125	1.500	.250	.187	1.000	.169	#6-32	1.4
SA10-18	0.625	18	1.125	1.625	.312	.250	1.125	.193	#8-32	2.2
SA12-18	0.750	18	1.500	1.750	.375	.250	1.250	.221	#10-32	3.0
SA16-18	1.000	18	1.750	2.125	.500	.250	1.500	.281	1/4-20	5.1
SA20-18	1.250	18	2.125	2.500	.562	.312	1.875	.281	1/4-20	7.9
SA24-18	1.500	18	2.500	3.000	.687	.375	2.250	.343	5/16-18	11.0
SA32-18 (1)	2.000	18	3.250	3.750	.875	.500	2.750	.406	3/8-16	19.2
SA8-24	0.500	24	1.125	1.500	.250	.187	1.000	.169	#6-32	1.8
SA10-24	0.625	24	1.125	1.625	.312	.250	1.125	.193	#8-32	2.9
SA12-24	0.750	24	1.500	1.750	.375	.250	1.250	.221	#10-32	4.0
SA16-24	1.000	24	1.750	2.125	.500	.250	1.500	.281	1/4-20	6.8
SA20-24	1.250	24	2.125	2.500	.562	.312	1.875	.281	1/4-20	10.5
SA24-24	1.500	24	2.500	3.000	.687	.375	2.250	.343	5/16-18	14.6
SA32-24	2.000	24	3.250	3.750	.875	.500	2.750	.406	3/8-16	25.6
SA8-30	0.500	30	1.125	1.500	.250	.187	1.000	.169	#6-32	2.3
SA10-30	0.625	30	1.125	1.625	.312	.250	1.125	.193	#8-32	3.6
SA12-30	0.750	30	1.500	1.750	.375	.250	1.250	.221	#10-32	5.0
SA16-30	1.000	30	1.750	2.125	.500	.250	1.500	.281	1/4-20	8.4
SA20-30	1.250	30	2.125	2.500	.562	.312	1.875	.281	1/4-20	13.1
SA24-30	1.500	30	2.500	3.000	.687	.375	2.250	.343	5/16-18	18.3
SA32-30	2.000	30	3.250	3.750	.875	.500	2.750	.406	3/8-16	32.0

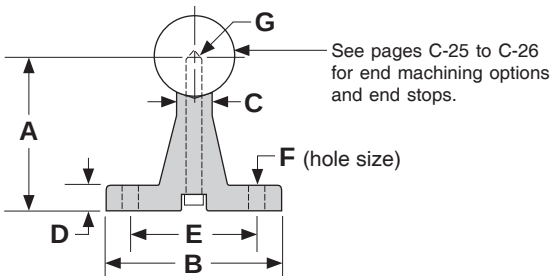
Footnotes:

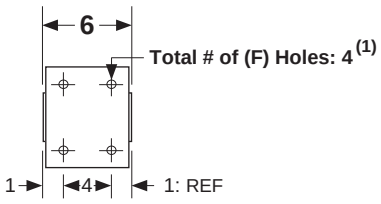
(1) Not a stock item, but available upon request.

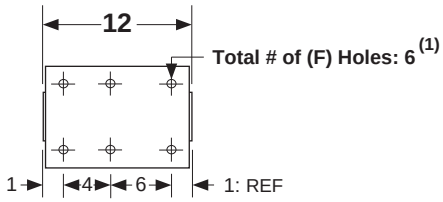
Specifications subject to change without notice

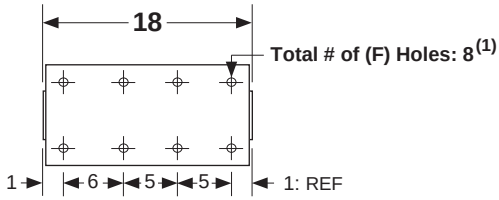
Dimensions

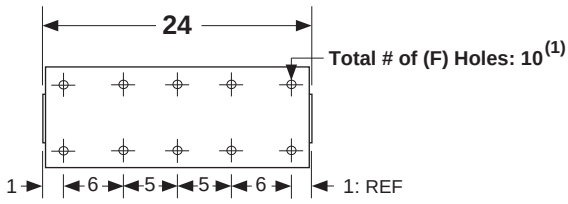
(inches)

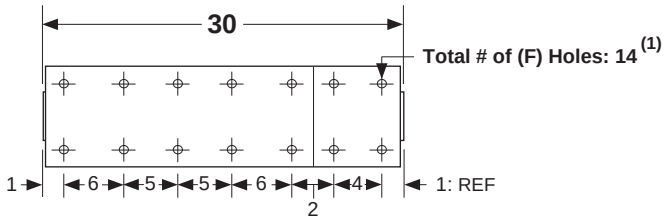












Footnotes:

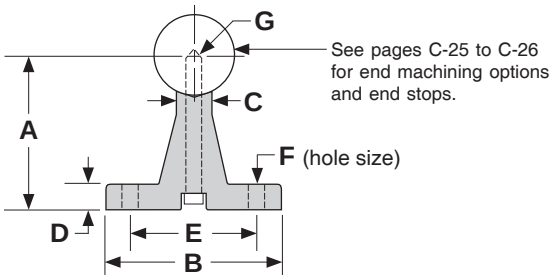
(1) Shaft supports come in 6, 12, 18 and 24 inch segments. The mounting hole location linear tolerance is +/- .010 inches noncumulative per segment. These supports are not one piece for lengths over 24 inches. The mounting hole linear tolerance is +/- .015 inches cumulative from one support segment to the next.

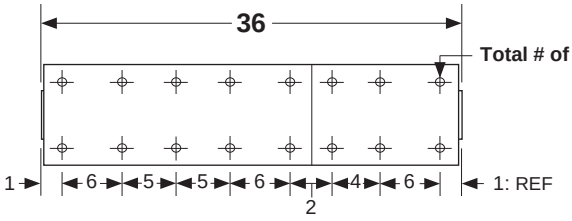
Dimensions & Specifications: SA Shaft assembly

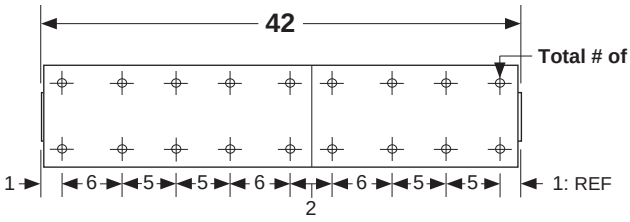
Model Number	Nominal Shaft Diameter (inches)	Overall Length (inches)	Dimensions (inches)							Assembly Weight (lbs)
			A +/- .002	B	C	D	E +/- .010	F hole	G bolt size	
SA8-36	0.500	36	1.125	1.500	.250	.187	1.000	.169	#6-32	2.7
SA10-36	0.625	36	1.125	1.625	.312	.250	1.125	.193	#8-32	4.3
SA12-36	0.750	36	1.500	1.750	.375	.250	1.250	.221	#10-32	6.0
SA16-36	1.000	36	1.750	2.125	.500	.250	1.500	.281	1/4-20	10.1
SA20-36	1.250	36	2.125	2.500	.562	.312	1.875	.281	1/4-20	15.7
SA24-36	1.500	36	2.500	3.000	.687	.375	2.250	.343	5/16-18	21.9
SA32-36	2.000	36	3.250	3.750	.875	.500	2.750	.406	3/8-16	38.4
SA8-42	0.500	42	1.125	1.500	.250	.187	1.000	.169	#6-32	3.2
SA10-42	0.625	42	1.125	1.625	.312	.250	1.125	.193	#8-32	5.1
SA12-42	0.750	42	1.500	1.750	.375	.250	1.250	.221	#10-32	7.0
SA16-42	1.000	42	1.750	2.125	.500	.250	1.500	.281	1/4-20	11.8
SA20-42	1.250	42	2.125	2.500	.562	.312	1.875	.281	1/4-20	18.4
SA24-42	1.500	42	2.500	3.000	.687	.375	2.250	.343	5/16-18	25.6
SA32-42	2.000	42	3.250	3.750	.875	.500	2.750	.406	3/8-16	44.8
SA8-48	0.500	48	1.125	1.500	.250	.187	1.000	.169	#6-32	3.6
SA10-48	0.625	48	1.125	1.625	.312	.250	1.125	.193	#8-32	5.8
SA12-48	0.750	48	1.500	1.750	.375	.250	1.250	.221	#10-32	8.0
SA16-48	1.000	48	1.750	2.125	.500	.250	1.500	.281	1/4-20	13.5
SA20-48	1.250	48	2.125	2.500	.562	.312	1.875	.281	1/4-20	21.0
SA24-48	1.500	48	2.500	3.000	.687	.375	2.250	.343	5/16-18	29.2
SA32-48	2.000	48	3.250	3.750	.875	.500	2.750	.406	3/8-16	51.2
SA8-54	0.500	54	1.125	1.500	.250	.187	1.000	.169	#6-32	4.1
SA10-54	0.625	54	1.125	1.625	.312	.250	1.125	.193	#8-32	6.5
SA12-54	0.750	54	1.500	1.750	.375	.250	1.250	.221	#10-32	9.0
SA16-54	1.000	54	1.750	2.125	.500	.250	1.500	.281	1/4-20	15.2
SA20-54	1.250	54	2.125	2.500	.562	.312	1.875	.281	1/4-20	23.6
SA24-54	1.500	54	2.500	3.000	.687	.375	2.250	.343	5/16-18	32.9
SA32-54	2.000	54	3.250	3.750	.875	.500	2.750	.406	3/8-16	57.6
SA8-60	0.500	60	1.125	1.500	.250	.187	1.000	.169	#6-32	4.5
SA10-60	0.625	60	1.125	1.625	.312	.250	1.125	.193	#8-32	7.2
SA12-60	0.750	60	1.500	1.750	.375	.250	1.250	.221	#10-32	10.0
SA16-60	1.000	60	1.750	2.125	.500	.250	1.500	.281	1/4-20	16.8
SA20-60	1.250	60	2.125	2.500	.562	.312	1.875	.281	1/4-20	26.2
SA24-60	1.500	60	2.500	3.000	.687	.375	2.250	.343	5/16-18	36.5
SA32-60	2.000	60	3.250	3.750	.875	.500	2.750	.406	3/8-16	63.9

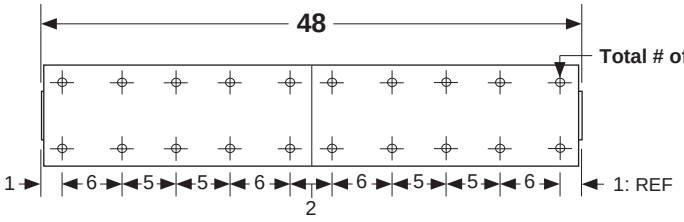
Dimensions

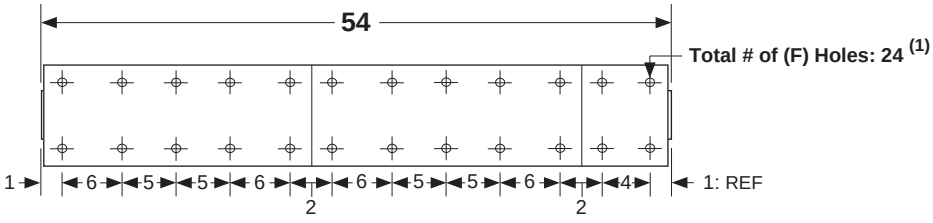
inches

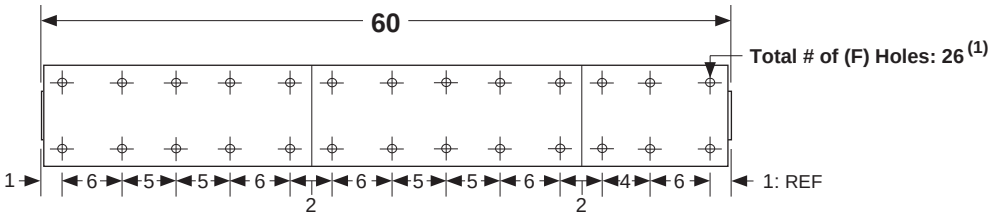












C

Footnotes:

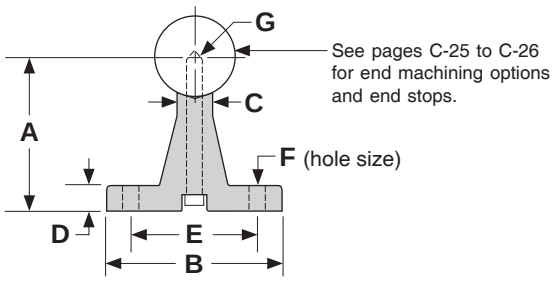
(1) Shaft supports come in 6, 12, 18 and 24 inch segments. The mounting hole location linear tolerance is +/- .010 inches noncumulative per segment. These supports are not one piece for lengths over 24 inches. The mounting hole linear tolerance is +/- .015 inches cumulative from one support segment to the next.

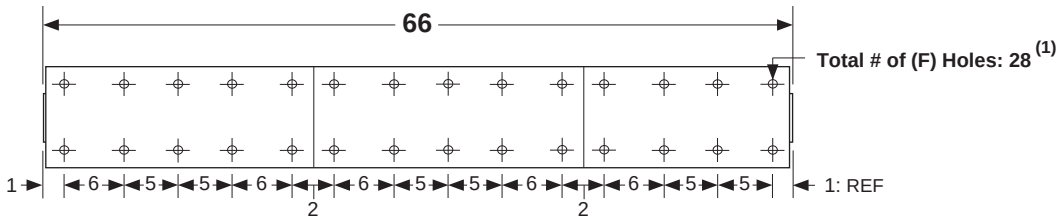
Dimensions & Specifications: SA Shaft assembly

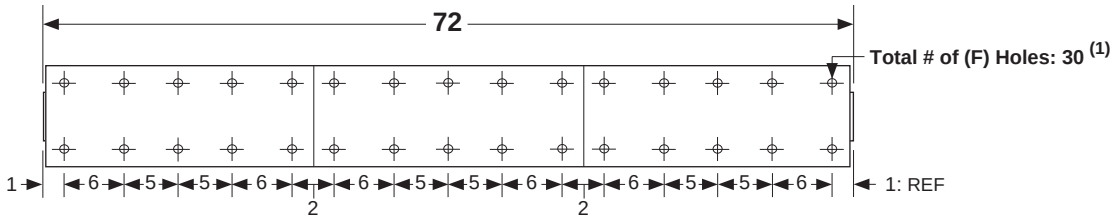
Model Number	Nominal Shaft Diameter (inches)	Overall Length (inches)	Dimensions (inches)							Assembly Weight (lbs)
			A +/- .002	B	C	D	E +/- .010	F hole	G bolt size	
SA8-66	0.500	66	1.125	1.500	.250	.187	1.000	.169	#6-32	5.0
SA10-66	0.625	66	1.125	1.625	.312	.250	1.125	.193	#8-32	7.9
SA12-66	0.750	66	1.500	1.750	.375	.250	1.250	.221	#10-32	11.0
SA16-66	1.000	66	1.750	2.125	.500	.250	1.500	.281	1/4-20	18.5
SA20-66	1.250	66	2.125	2.500	.562	.312	1.875	.281	1/4-20	28.8
SA24-66	1.500	66	2.500	3.000	.687	.375	2.250	.343	5/16-18	40.2
SA32-66	2.000	66	3.250	3.750	.875	.500	2.750	.406	3/8-16	70.3
SA8-72	0.500	72	1.125	1.500	.250	.187	1.000	.169	#6-32	5.4
SA10-72	0.625	72	1.125	1.625	.312	.250	1.125	.193	#8-32	8.6
SA12-72	0.750	72	1.500	1.750	.375	.250	1.250	.221	#10-32	12.0
SA16-72	1.000	72	1.750	2.125	.500	.250	1.500	.281	1/4-20	20.2
SA20-72	1.250	72	2.125	2.500	.562	.312	1.875	.281	1/4-20	31.4
SA24-72	1.500	72	2.500	3.000	.687	.375	2.250	.343	5/16-18	43.8
SA32-72	2.000	72	3.250	3.750	.875	.500	2.750	.406	3/8-16	76.7
SA8-84	0.500	84	1.125	1.500	.250	.187	1.000	.169	#6-32	6.3
SA10-84	0.625	84	1.125	1.625	.312	.250	1.125	.193	#8-32	10.0
SA12-84	0.750	84	1.500	1.750	.375	.250	1.250	.221	#10-32	14.0
SA16-84	1.000	84	1.750	2.125	.500	.250	1.500	.281	1/4-20	23.6
SA20-84	1.250	84	2.125	2.500	.562	.312	1.875	.281	1/4-20	36.6
SA24-84	1.500	84	2.500	3.000	.687	.375	2.250	.343	5/16-18	51.1
SA32-84	2.000	84	3.250	3.750	.875	.500	2.750	.406	3/8-16	89.5
SA8-96	0.500	96	1.125	1.500	.250	.187	1.000	.169	#6-32	7.2
SA10-96	0.625	96	1.125	1.625	.312	.250	1.125	.193	#8-32	11.5
SA12-96	0.750	96	1.500	1.750	.375	.250	1.250	.221	#10-32	16.0
SA16-96	1.000	96	1.750	2.125	.500	.250	1.500	.281	1/4-20	26.9
SA20-96	1.250	96	2.125	2.500	.562	.312	1.875	.281	1/4-20	41.9
SA24-96	1.500	96	2.500	3.000	.687	.375	2.250	.343	5/16-18	58.4
SA32-96	2.000	96	3.250	3.750	.875	.500	2.750	.406	3/8-16	102.3
SA8-108	0.500	108	1.125	1.500	.250	.187	1.000	.169	#6-32	8.1
SA10-108	0.625	108	1.125	1.625	.312	.250	1.125	.193	#8-32	12.9
SA12-108	0.750	108	1.500	1.750	.375	.250	1.250	.221	#10-32	18.0
SA16-108	1.000	108	1.750	2.125	.500	.250	1.500	.281	1/4-20	30.3
SA20-108	1.250	108	2.125	2.500	.562	.312	1.875	.281	1/4-20	47.1
SA24-108	1.500	108	2.500	3.000	.687	.375	2.250	.343	5/16-18	65.7
SA32-108	2.000	108	3.250	3.750	.875	.500	2.750	.406	3/8-16	115.1

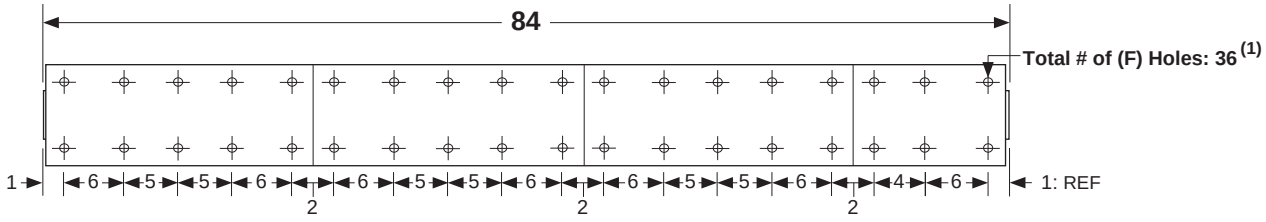
Dimensions

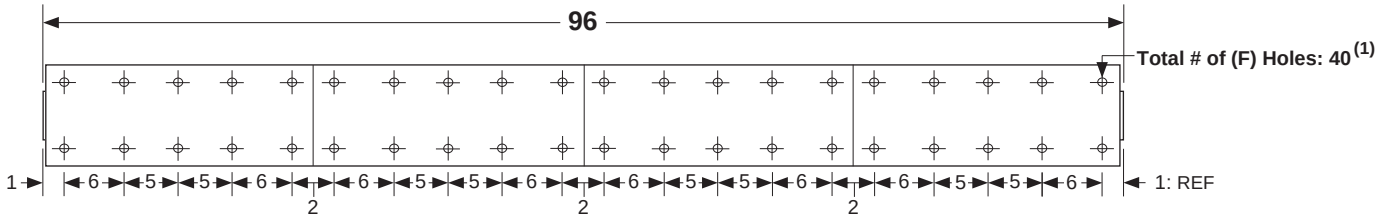
inches

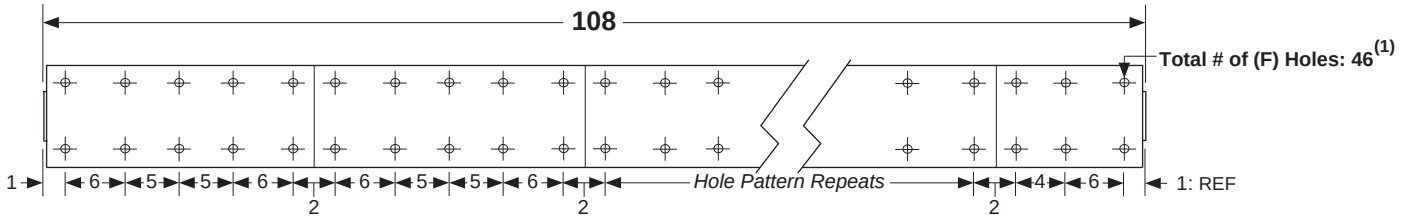












C

Footnotes:

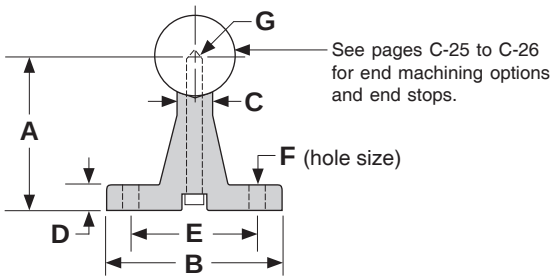
(1) Shaft supports come in 6, 12, 18 and 24 inch segments. The mounting hole location linear tolerance is +/- .010 inches noncumulative per segment. These supports are not one piece for lengths over 24 inches. The mounting hole linear tolerance is +/- .015 inches cumulative from one support segment to the next.

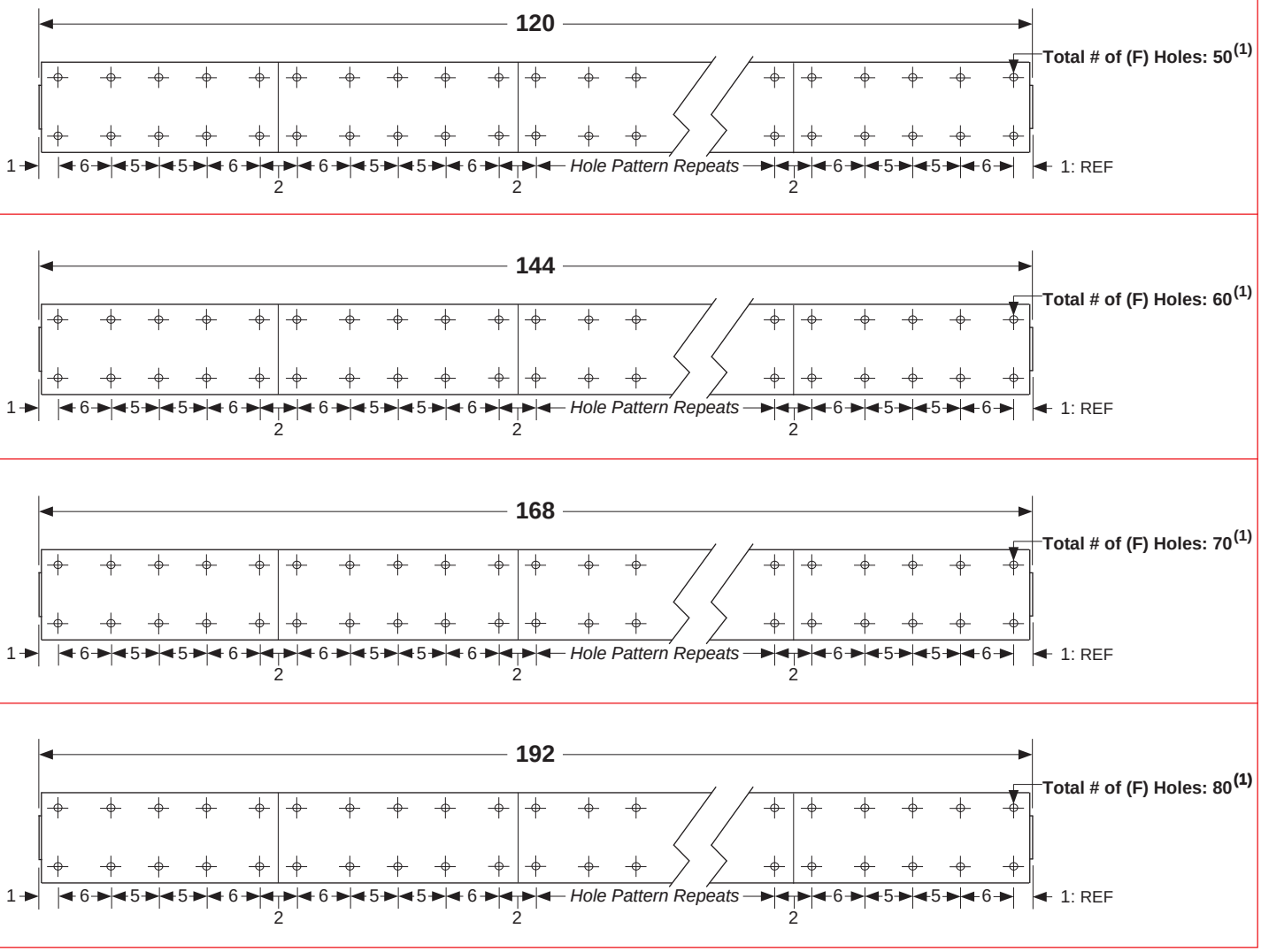
Dimensions & Specifications: SA Shaft assembly

Model Number	Nominal Shaft Diameter (inches)	Overall Length (inches)	Dimensions (inches)							Assembly Weight (lbs)
			A +/- .002	B	C	D	E +/- .010	F hole	G bolt size	
SA8-120	0.500	120	1.125	1.500	.250	.187	1.000	.169	#6-32	9.0
SA10-120	0.625	120	1.125	1.625	.312	.250	1.125	.193	#8-32	14.3
SA12-120	0.750	120	1.500	1.750	.375	.250	1.250	.221	#10-32	20.0
SA16-120	1.000	120	1.750	2.125	.500	.250	1.500	.281	1/4-20	33.6
SA20-120	1.250	120	2.125	2.500	.562	.312	1.875	.281	1/4-20	52.3
SA24-120	1.500	120	2.500	3.000	.687	.375	2.250	.343	5/16-18	73.0
SA32-120	2.000	120	3.250	3.750	.875	.500	2.750	.406	3/8-16	127.8
SA8-144	0.500	144	1.125	1.500	.250	.187	1.000	.169	#6-32	10.8
SA10-144	0.625	144	1.125	1.625	.312	.250	1.125	.193	#8-32	17.2
SA12-144	0.750	144	1.500	1.750	.375	.250	1.250	.221	#10-32	24.0
SA16-144	1.000	144	1.750	2.125	.500	.250	1.500	.281	1/4-20	40.4
SA20-144	1.250	144	2.125	2.500	.562	.312	1.875	.281	1/4-20	62.8
SA24-144	1.500	144	2.500	3.000	.687	.375	2.250	.343	5/16-18	87.6
SA32-144	2.000	144	3.250	3.750	.875	.500	2.750	.406	3/8-16	153.4
SA12-168	0.750	168	1.500	1.750	.375	.250	1.250	.221	#10-32	28.0
SA16-168	1.000	168	1.750	2.125	.500	.250	1.500	.281	1/4-20	47.1
SA20-168	1.250	168	2.125	2.500	.562	.312	1.875	.281	1/4-20	73.3
SA24-168	1.500	168	2.500	3.000	.687	.375	2.250	.343	5/16-18	102.2
SA32-168	2.000	168	3.250	3.750	.875	.500	2.750	.406	3/8-16	179.0
SA12-192	0.750	192	1.500	1.750	.375	.250	1.250	.221	#10-32	32.0
SA16-192	1.000	192	1.750	2.125	.500	.250	1.500	.281	1/4-20	53.8
SA20-192	1.250	192	2.125	2.500	.562	.312	1.875	.281	1/4-20	83.7
SA24-192	1.500	192	2.500	3.000	.687	.375	2.250	.343	5/16-18	116.8
SA32-192	2.000	192	3.250	3.750	.875	.500	2.750	.406	3/8-16	204.5

Dimensions

inches





C

Footnotes:

(1) Shaft supports come in 6, 12, 18 and 24 inch segments. The mounting hole location linear tolerance is +/- .010 inches noncumulative per segment. These supports are not one piece for lengths over 24 inches. The mounting hole linear tolerance is +/- .015 inches cumulative from one support segment to the next.

Dimensions & Specifications: TRSA *TWIN RAIL*® shaft assembly

Model Number	Nominal Shaft Diameter (inches)	Overall Length (inches)	Dimensions (inches)											Assembly Weight (lbs)
			A +/- .002	B +/- .002	C	D	E +/- .010	F	G	H	J hole	K Bolt Size	L (2) Thread	
TRSA8-6	0.500	6	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	1.8
TRSA10-6	0.625	6	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	2.4
TRSA12-6	0.750	6	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	3.4
TRSA16-6	1.000	6	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	5.0
TRSA20-6 (1)	1.250	6	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	7.5
TRSA24-6 (1)	1.500	6	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	10.5
TRSA32-6 (1)	2.000	6	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	15.7
TRSA8-12	0.500	12	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	3.6
TRSA10-12	0.625	12	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	4.8
TRSA12-12	0.750	12	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	6.8
TRSA16-12	1.000	12	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	10.0
TRSA20-12	1.250	12	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	15.0
TRSA24-12	1.500	12	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	21.0
TRSA32-12(1)	2.000	12	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	31.3
TRSA8-18	0.500	18	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	5.4
TRSA10-18	0.625	18	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	7.2
TRSA12-18	0.750	18	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	10.1
TRSA16-18	1.000	18	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	15.0
TRSA20-18	1.250	18	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	22.4
TRSA24-18	1.500	18	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	31.4
TRSA32-18(1)	2.000	18	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	46.9
TRSA8-24	0.500	24	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	7.2
TRSA10-24	0.625	24	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	9.6
TRSA12-24	0.750	24	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	13.5
TRSA16-24	1.000	24	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	20.0
TRSA20-24	1.250	24	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	29.9
TRSA24-24	1.500	24	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	41.9
TRSA32-24	2.000	24	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	62.5
TRSA8-30	0.500	30	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	9.0
TRSA10-30	0.625	30	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	12.0
TRSA12-30	0.750	30	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	16.8
TRSA16-30	1.000	30	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	25.0
TRSA20-30	1.250	30	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	37.3
TRSA24-30	1.500	30	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	52.3
TRSA32-30	2.000	30	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	78.1

Footnotes:

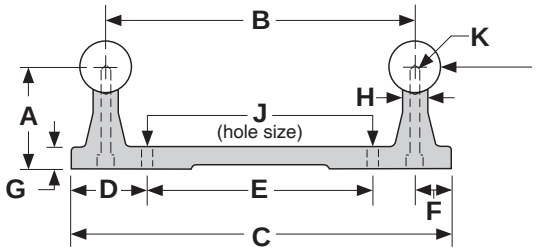
(1) Not a stock item, but available upon request.

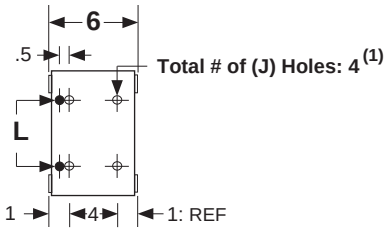
(2) Two threaded leveling holes per *TWIN RAIL*® support segment are used for setscrew adjustment to aid in assembly leveling to the user mounting surfaces.

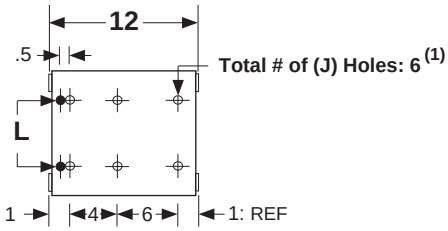
Specifications subject to change without notice

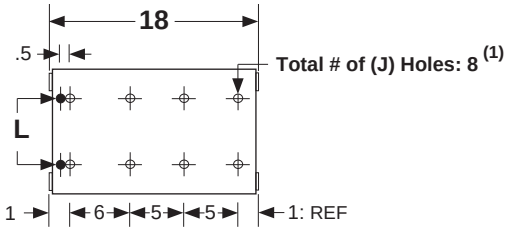
Dimensions

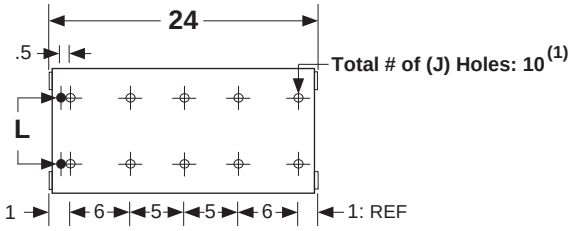
inches

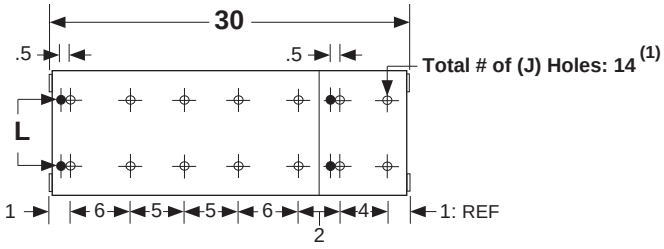












C

Footnotes:

(1) *TWIN RAIL®* supports come in 6, 12, 18 and 24 inch segments. The mounting hole location linear tolerance is +/- .010 inches noncumulative per segment. The supports are not one piece for lengths over 24 inches. The mounting hole linear tolerance is +/- .015 inches cumulative from one support segment to the next.

Dimensions & Specifications: TRSA *TWIN RAIL*® shaft assembly

Model Number	Nominal Shaft Diameter (inches)	Overall Length (inches)	Dimensions (inches)											Assembly Weight (lbs)
			A +/- .002	B +/- .002	C	D	E +/- .010	F	G	H	J hole	K Bolt Size	L (1) Thread	
TRSA8-36	0.500	36	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	10.8
TRSA10-36	0.625	36	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	14.4
TRSA12-36	0.750	36	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	20.2
TRSA16-36	1.000	36	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	30.0
TRSA20-36	1.250	36	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	44.8
TRSA24-36	1.500	36	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	62.8
TRSA32-36	2.000	36	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	93.7
TRSA8-42	0.500	42	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	12.6
TRSA10-42	0.625	42	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	16.7
TRSA12-42	0.750	42	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	23.6
TRSA16-42	1.000	42	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	35.0
TRSA20-42	1.250	42	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	52.3
TRSA24-42	1.500	42	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	73.2
TRSA32-42	2.000	42	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	109.3
TRSA8-48	0.500	48	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	14.4
TRSA10-48	0.625	48	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	19.1
TRSA12-48	0.750	48	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	26.9
TRSA16-48	1.000	48	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	40.0
TRSA20-48	1.250	48	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	59.7
TRSA24-48	1.500	48	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	83.7
TRSA32-48	2.000	48	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	124.9
TRSA8-54	0.500	54	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	16.2
TRSA10-54	0.625	54	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	21.5
TRSA12-54	0.750	54	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	30.3
TRSA16-54	1.000	54	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	45.0
TRSA20-54	1.250	54	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	67.2
TRSA24-54	1.500	54	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	94.1
TRSA32-54	2.000	54	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	140.5
TRSA8-60	0.500	60	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	18.0
TRSA10-60	0.625	60	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	23.9
TRSA12-60	0.750	60	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	33.6
TRSA16-60	1.000	60	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	49.9
TRSA20-60	1.250	60	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	74.6
TRSA24-60	1.500	60	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	104.6
TRSA32-60	2.000	60	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	156.1

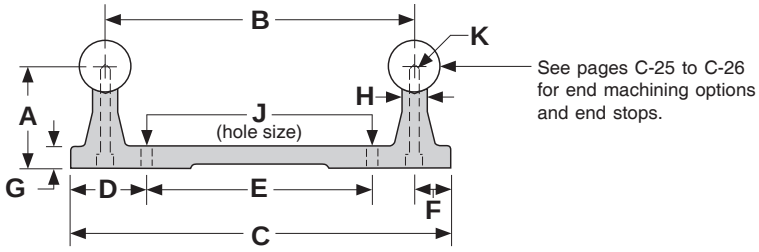
Footnotes:

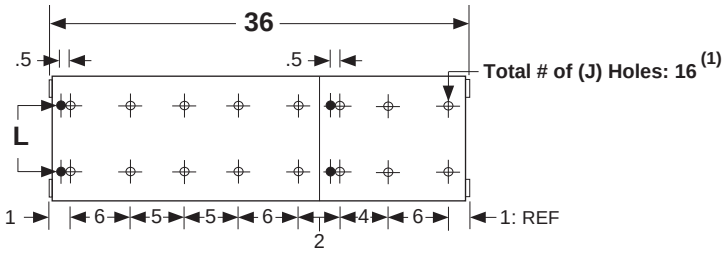
(1) Two threaded leveling holes per *TWIN RAIL*® support segment are used for setscrew adjustment to aid in assembly leveling to the user mounting surfaces.

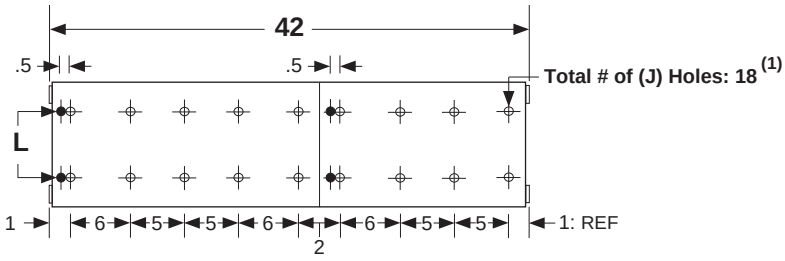
Specifications subject to change without notice

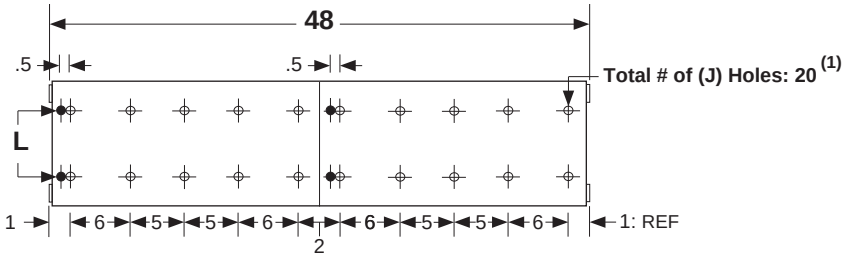
Dimensions

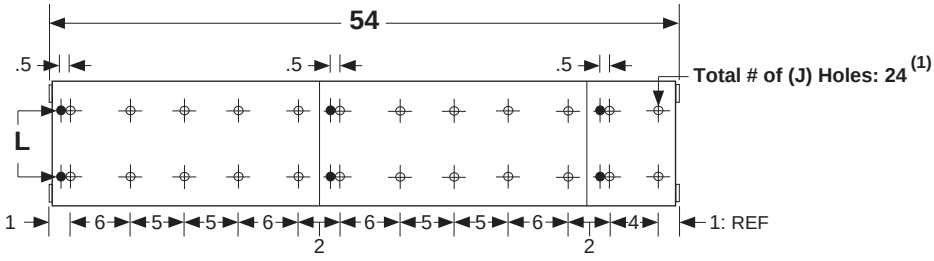
inches

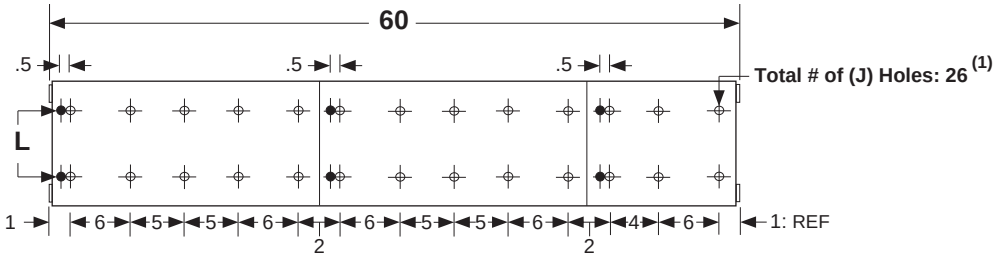












C

Footnotes:

(1) *TWIN RAIL®* supports come in 6, 12, 18 and 24 inch segments. The mounting hole location linear tolerance is +/- .010 inches noncumulative per segment. The supports are not one piece for lengths over 24 inches. The mounting hole linear tolerance is +/- .015 inches cumulative from one support segment to the next.

Dimensions & Specifications: TRSA *TWIN RAIL*® shaft assembly

Model Number	Nominal Shaft Diameter (inches)	Overall Length (inches)	Dimensions (inches)											Assembly Weight (lbs)
			A +/- .002	B +/- .002	C	D	E +/- .010	F	G	H	J hole	K Bolt Size	L (1) Thread	
TRSA8-66	0.500	66	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	19.8
TRSA10-66	0.625	66	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	26.3
TRSA12-66	0.750	66	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	37.0
TRSA16-66	1.000	66	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	54.9
TRSA20-66	1.250	66	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	82.1
TRSA24-66	1.500	66	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	115.1
TRSA32-66	2.000	66	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	171.8
TRSA8-72	0.500	72	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	21.6
TRSA10-72	0.625	72	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	28.7
TRSA12-72	0.750	72	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	40.4
TRSA16-72	1.000	72	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	59.9
TRSA20-72	1.250	72	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	89.6
TRSA24-72	1.500	72	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	125.5
TRSA32-72	2.000	72	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	187.4
TRSA8-84	0.500	84	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	25.2
TRSA10-84	0.625	84	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	33.4
TRSA12-84	0.750	84	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	47.1
TRSA16-84	1.000	84	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	69.9
TRSA20-84	1.250	84	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	104.5
TRSA24-84	1.500	84	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	146.4
TRSA32-84	2.000	84	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	218.6
TRSA8-96	0.500	96	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	28.8
TRSA10-96	0.625	96	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	38.2
TRSA12-96	0.750	96	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	53.8
TRSA16-96	1.000	96	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	79.9
TRSA20-96	1.250	96	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	119.4
TRSA24-96	1.500	96	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	167.3
TRSA32-96	2.000	96	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	249.8
TRSA8-108	0.500	108	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	32.4
TRSA10-108	0.625	108	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	43.0
TRSA12-108	0.750	108	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	60.5
TRSA16-108	1.000	108	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	89.9
TRSA20-108	1.250	108	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	134.3
TRSA24-108	1.500	108	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	188.2
TRSA32-108	2.000	108	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	281.0

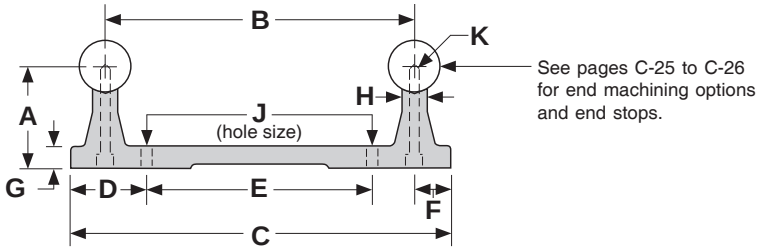
Footnotes:

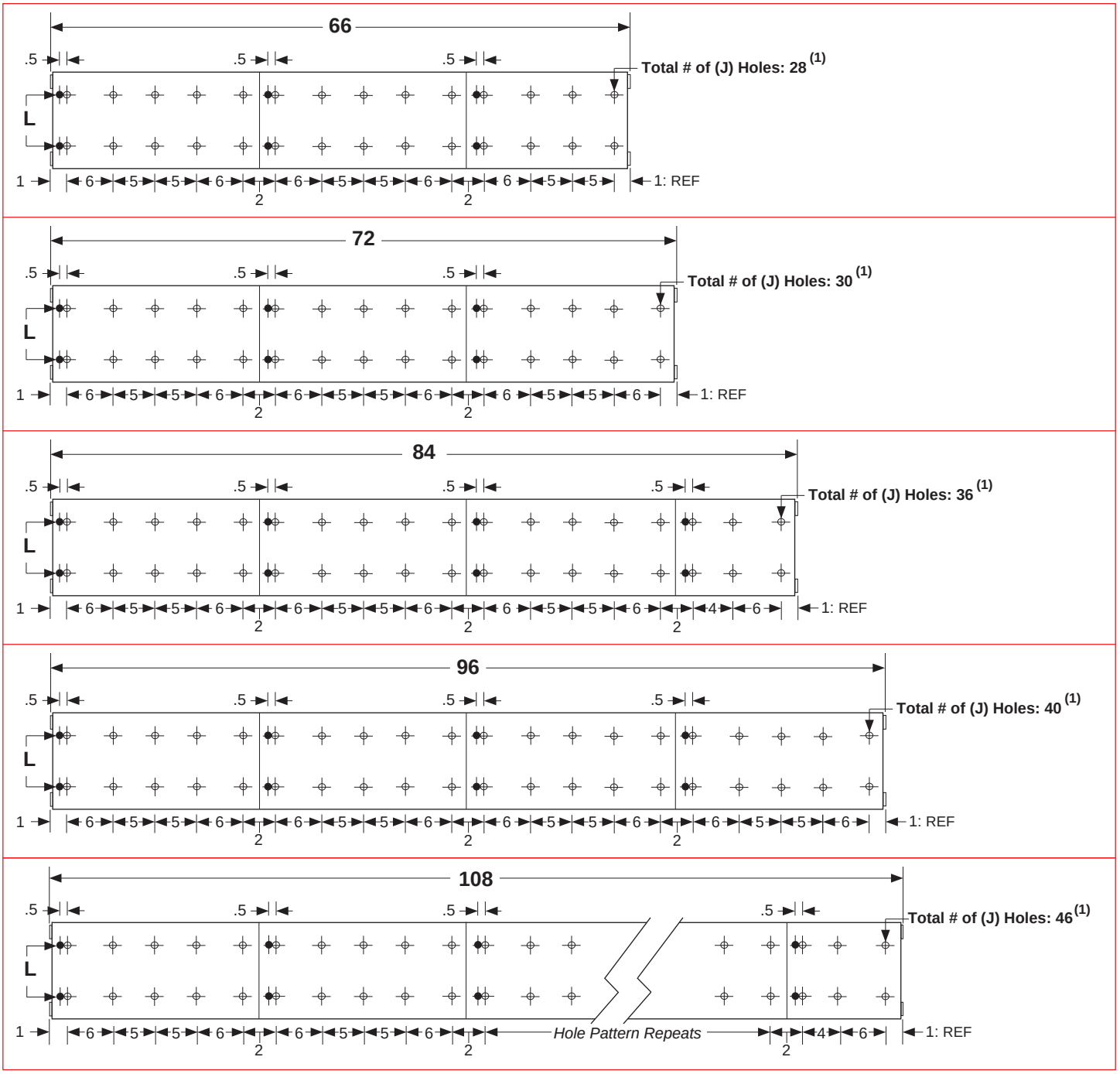
(1) Two threaded leveling holes per *TWIN RAIL*® support segment are used for setscrew adjustment to aid in assembly leveling to the user mounting surfaces.

Specifications subject to change without notice

Dimensions

inches





C

Footnotes:

(1) *TWIN RAIL®* supports come in 6, 12, 18 and 24 inch segments. The mounting hole location linear tolerance is +/- .010 inches noncumulative per segment. The supports are not one piece for lengths over 24 inches. The mounting hole linear tolerance is +/- .015 inches cumulative from one support segment to the next.

Dimensions & Specifications: TRSA *TWIN RAIL*® shaft assembly

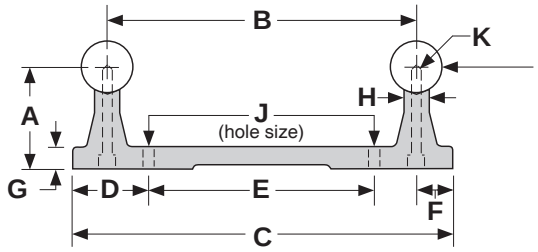
Model Number	Nominal Shaft Diameter (inches)	Overall Length (inches)	Dimensions (inches)											Assembly Weight (lbs)
			A +/- .002	B +/- .002	C	D	E +/- .010	F	G	H	J hole	K Bolt Size	L (1) Thread	
TRSA8-120	0.500	120	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	35.9
TRSA10-120	0.625	120	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	47.7
TRSA12-120	0.750	120	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	67.2
TRSA16-120	1.000	120	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	99.8
TRSA20-120	1.250	120	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	149.2
TRSA24-120	1.500	120	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	209.1
TRSA32-120	2.000	120	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	312.2
TRSA8-144	0.500	144	1.125	3.000	3.750	0.875	2.000	.375	.312	.250	.169	#6-32	#10-32	43.1
TRSA10-144	0.625	144	1.125	3.750	4.625	1.000	2.625	.437	.312	.312	.193	#8-32	#10-32	57.3
TRSA12-144	0.750	144	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	80.7
TRSA16-144	1.000	144	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	119.8
TRSA20-144	1.250	144	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	179.1
TRSA24-144	1.500	144	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	251.0
TRSA32-144	2.000	144	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	374.7
TRSA12-168	0.750	168	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	94.1
TRSA16-168	1.000	168	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	139.8
TRSA20-168	1.250	168	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	208.9
TRSA24-168	1.500	168	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	292.8
TRSA32-168	2.000	168	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	437.1
TRSA12-192	0.750	192	1.500	4.500	5.500	1.125	3.250	.500	.312	.375	.221	#10-32	#10-32	107.6
TRSA16-192	1.000	192	1.750	5.250	6.375	1.312	3.750	.562	.312	.500	.281	1/4-20	#10-32	159.7
TRSA20-192	1.250	192	2.125	6.000	7.250	1.562	4.125	.625	.375	.562	.281	1/4-20	1/4-20	238.8
TRSA24-192	1.500	192	2.500	6.625	8.125	1.875	4.375	.750	.437	.687	.343	5/16-18	5/16-18	334.6
TRSA32-192	2.000	192	3.250	7.250	9.000	2.250	4.500	.875	.562	.875	.406	3/8-16	3/8-16	499.6

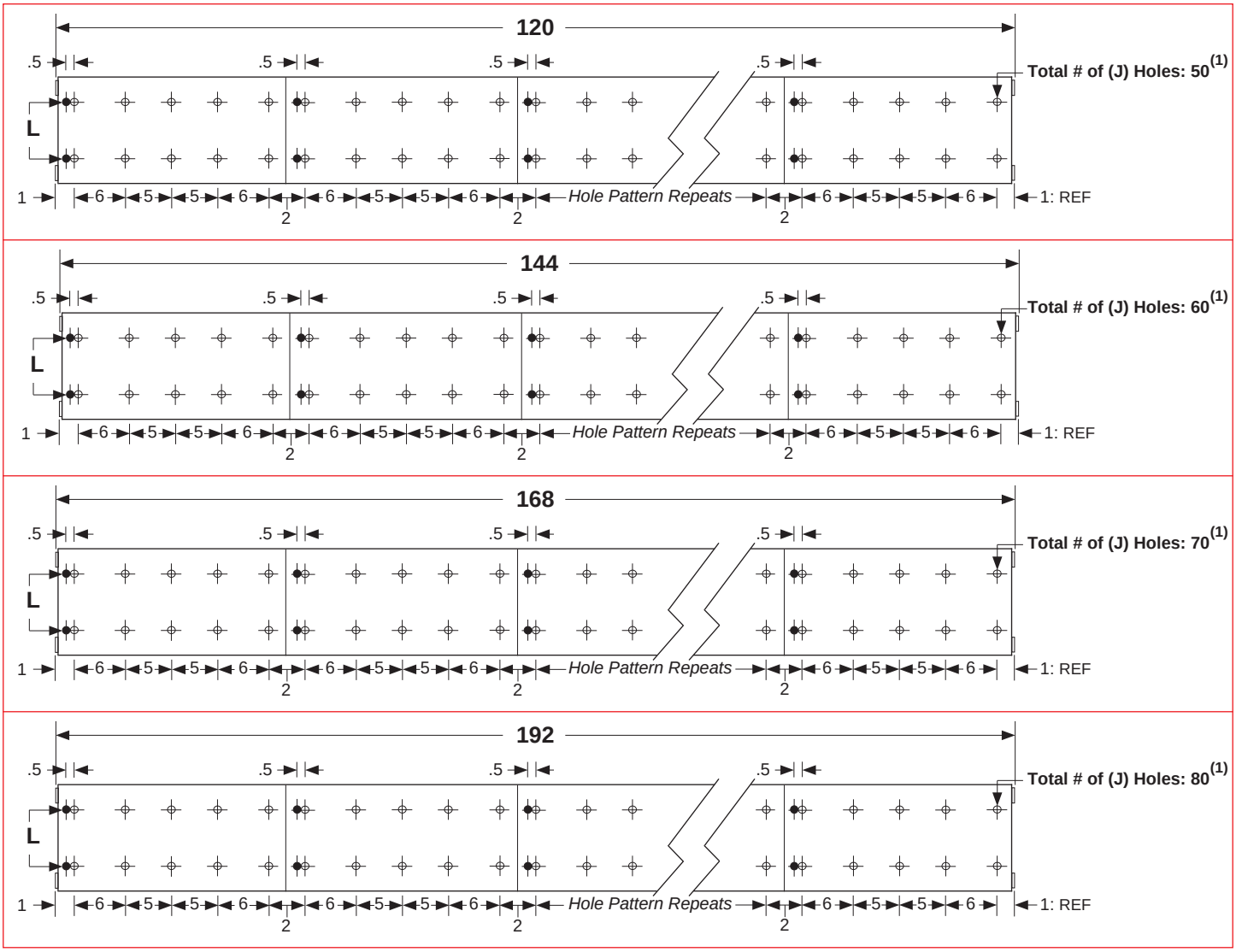
Footnotes:

(1) Two threaded leveling holes per *TWIN RAIL*® support segment are used for setscrew adjustment to aid in assembly leveling to the user mounting surfaces.

Dimensions

inches





C

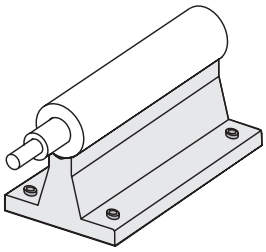
Footnotes:

(1) *TWIN RAIL®* supports come in 6, 12, 18 and 24 inch segments. The mounting hole location linear tolerance is +/- .010 inches noncumulative per segment. The supports are not one piece for lengths over 24 inches. The mounting hole linear tolerance is +/- .015 inches cumulative from one support segment to the next.

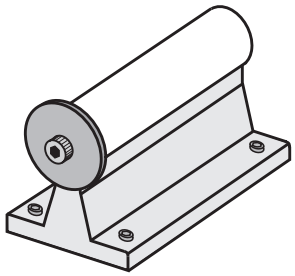
Reduced Diameters, Coaxial Holes & End Stops

The standard tolerance for reduced diameters is +/- .001 inches. The concentricity is .002 inches TIR. The shaft may be annealed and soft around the shaft circumference adjacent to the reduced diameter. Coaxial holes are drilled and tapped in the center of the shaft ends and radial holes can be drilled and tapped as desired. The concentricity of the holes is .005 inches TIR.

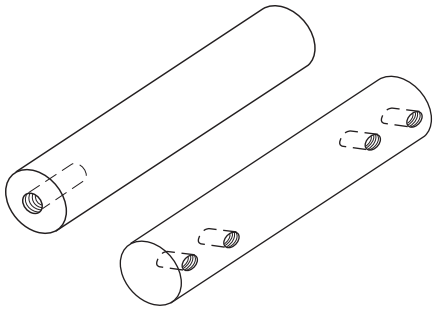
Reduced Diameters



End Stops



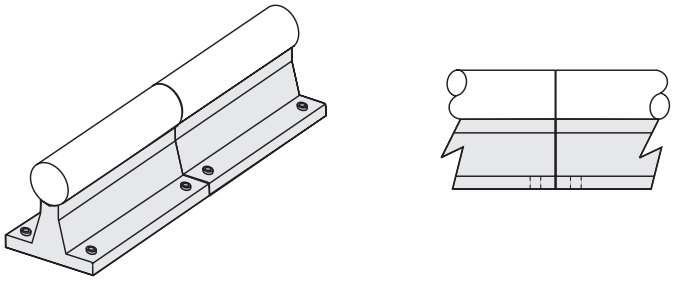
Coaxial & Radial Holes



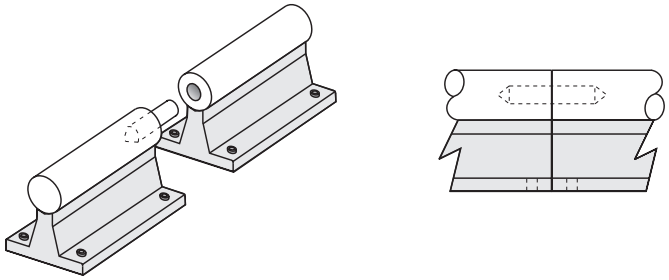
Butted, Doweled, and Threaded & Ground Joints

Standard shaft assemblies cannot be combined to create longer lengths, as the rolling elements of re-circulating linear bearings will "jam" at the joined ends due to the shaft chamfer. For those long length or custom applications, *LINTECH* provides several options for joining shaft assemblies. Butted, doweled, threaded, and ground joints are available with all shaft lengths and diameters. All of these options will have the standard chamfer removed from the shaft ends. The concentricity of doweled joints is < .001 inches, while the concentricity of butted joints will depend upon the user mounting surface.

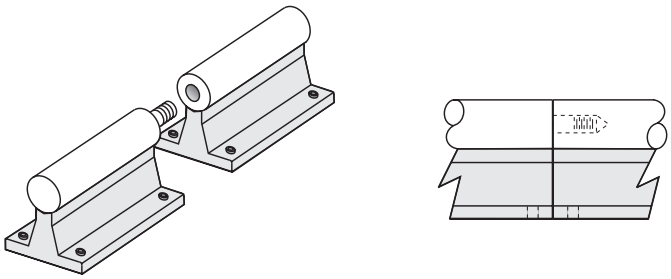
Butt Joint



Dowel Joint



Threaded and Ground Joint



Custom Assembly Lengths & Widths

Custom lengths and widths (shorter and longer) not shown can be provided upon request. Contact Factory.

Metric Shaft Supports

"True metric" shafting (SxxM series) can be combined with aluminum end supports (ES), or aluminum shaft supports (ARS). These products are available upon request. Contact Factory.

Chrome Plated Shafts

For applications in high moisture, high humidity, clean room, or highly corrosive environments, chrome plating of the shafts will offer superior resistance to corrosion. The process uniformly deposits dense, hard, high Chromium alloy onto the shaft, and has a Rockwell C hardness value of 67-72. This process also conforms to MIL Spec: (MIL-C-23422). The chrome plating bonds to the parent steel and will not crack or peel off under the high point loading of the balls on the shaft. This chrome plating process differs from normal hard chrome which just lays on the surface of the part plated. The "-CR" option within the part number will have the shaft chrome plated.

Tubular & Stainless Steel Shafts

Shafting is available upon request in Tubular size. Contact the factory if this is desired. The -SS option within the part number will change the shafts to 440C stainless. The stainless option is also available for Tubular shafting. Contact Factory.

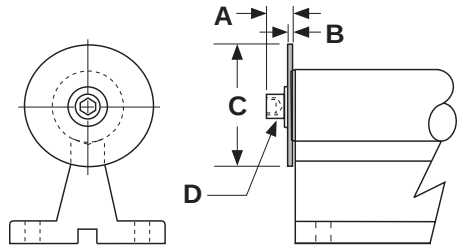
Support Finishes

The standard anodized aluminum finish can be changed to meet the requirements needed for operation in clean rooms, food processing facilities, highly corrosive environments, or for different appearances. The standard enamel or natural steel finish can also be changed. Available options are clear or color anodized, chem-film, nickel plated, chrome plated, different oxide color finishes, or painted per customer specifications.

Shaft End Stops

End stops are available for every shaft assembly size and length. They provide a mechanical stop for linear bearings to prevent them from sliding off the shaft ends. The shaft ends are drilled, tapped, and a washer is installed using a cap screw and lock washer.

Number of (2) End Stops (see model #)	Nominal Shaft Dia. (inches)	Dimensions (inches)			
		A	B	C	D (1) Cap Screw
E1, E2, E3, E4	0.500	.375	.062	1.125	1/4
E1, E2, E3, E4	0.625	.453	.062	1.375	5/16
E1, E2, E3, E4	0.750	.532	.062	1.625	3/8
E1, E2, E3, E4	1.000	.656	.109	1.812	7/16
E1, E2, E3, E4	1.250	.750	.125	2.250	1/2
E1, E2, E3, E4	1.500	.750	.125	2.625	1/2
E1, E2, E3, E4	2.000	.750	.125	3.250	1/2



Notes:

(1) Cap screw for end stops have black oxide finish. End stop & cap screw lock washers are Cadmium plated (QQ-P-416 Type II).

(2) When only Specifying one end stop (E1) for SA, or two end stops for the TRSA (E2), the end stops will be installed on the left hand end of the assembly, as depicted by the above drawing, unless specified otherwise.

Unit Conversions

Torque Conversions

Present Units	Convert To	Multiply By
Gram-centimeters	newton-meters	0.0000981
Gram-centimeters	ounce-inches	0.0138874
Gram-centimeters	pound-inches	0.000868
Gram-centimeters	pound-feet	0.0000723
Newton-meters	gram-centimeters	10,197.162
Newton-meters	ounce-inches	141.612
Newton-meters	pound-inches	8.85
Newton-meters	pound-feet	0.73756
Ounce-inches	gram-centimeters	72.0077
Ounce-inches	newton-meters	0.007062
Ounce-inches	pound-inches	0.0625
Ounce-inches	pound-feet	0.005208
Pound-inches	gram-centimeters	1,152.0
Pound-inches	newton-meters	0.11299
Pound-inches	ounce-inches	16.0
Pound-inches	pound-feet	0.08333
Pound-feet	gram-centimeters	13,825.5
Pound-feet	newton-meters	1.3558
Pound-feet	ounce-inches	192.0
Pound-feet	pound-inches	12.0

Distance Conversions

Present Units	Convert To	Multiply By
Arc-minutes	degrees	0.016666
Arc-seconds	degrees	0.000277
Centimeters	inches	0.3937
Centimeters	feet	0.03280
Centimeters	microns	10,000.0
Degrees	arc-minutes	60.0
Degrees	arc-seconds	3,600.0
Degrees	radians	0.017453
Feet	centimeters	30.48
Feet	meters	0.3048
Inches	centimeters	2.54
Inches	Km	0.0000254
Inches	meters	0.0254
Inches	microns	25,400.0
Inches	millimeters	25.4
Km	inches	39,370.0
Meters	feet	3.2808
Meters	inches	39.37
Meters	microns	1,000,000.0
Microns	centimeters	0.0001
Microns	inches	0.00003937
Microns	meters	0.000001
Microns	millimeters	0.001
Millimeters	inches	0.03937
Millimeters	microns	1,000.0
Radians	degrees	57.295779

Inertia Conversions

Present Units	Convert To	Multiply By
Gram-cm^2	ounce-inches^2	0.00546745
Gram-cm^2	ounce-inch-sec^2	0.000014161
Gram-cm^2	pound-inches^2	0.000341716
Gram-cm^2	pound-inch-sec^2	0.000000885
Gram-cm^2	pound-feet-sec^2	0.000000074
Ounce-inches^2	gram-cm^2	182.901
Ounce-inches^2	ounce-inch-sec^2	0.00259008
Ounce-inches^2	pound-inches^2	0.0625
Ounce-inches^2	pound-inch-sec^2	0.00016188
Ounce-inches^2	pound-feet-sec^2	0.00001349
Ounce-inch-sec^2	gram-cm^2	70,615.4
Ounce-inch-sec^2	ounce-inches^2	386.0
Ounce-inch-sec^2	pound-inches^2	24.13045
Ounce-inch-sec^2	pound-inch-sec^2	0.0625
Ounce-inch-sec^2	pound-feet-sec^2	0.00520833
Pound-inches^2	gram-cm^2	2,926.41
Pound-inches^2	ounce-inches^2	16.0
Pound-inches^2	ounce-inch-sec^2	0.0414413
Pound-inches^2	pound-inch-sec^2	0.00259008
Pound-inches^2	pound-feet-sec^2	0.00021584
Pound-inch-sec^2	gram-cm^2	1,129,850.0
Pound-inch-sec^2	ounce-inches^2	6,177.4
Pound-inch-sec^2	ounce-inch-sec^2	16.0
Pound-inch-sec^2	pound-inches^2	386.0
Pound-inch-sec^2	pound-feet-sec^2	0.0833333
Pound-feet-sec^2	gram-cm^2	13,558,200.0
Pound-feet-sec^2	ounce-inches^2	74,128.9
Pound-feet-sec^2	ounce-inch-sec^2	192.0
Pound-feet-sec^2	pound-inches^2	4,633.06
Pound-feet-sec^2	pound-inch-sec^2	12.0

Load Conversions

Present Units	Convert To	Multiply By
Grams	newtons	0.009806
Grams	ounces	0.03528
Grams	pounds	0.002204
Kilograms	pounds	2.2046
Newtons	grams	101.971
Newtons	ounces	3.59692
Newtons	pounds	0.224808
Ounces	grams	28.3495
Ounces	newtons	0.27802
Ounces	pounds	0.0625
Pounds	grams	453.592
Pounds	kilograms	0.45359
Pounds	newtons	4.44824
Pounds	ounces	16.0
Pounds	tons	0.0005
Tons	pounds	2,000.0

Reference : *Handbook of Tables for Applied Engineering Science*

Terms of Sale

To Order

Any standard positioning component from *LINTECH* may be ordered by mail, email, phone, or fax from an Automation Specialist in your area. To obtain the name of your local Automation Specialist call:

LINTECH ®

1845 Enterprise Way
Monrovia, CA 91016

Toll Free: (800) 435 - 7494
Phone: (626) 358 - 0110
Fax: (626) 303 - 2035

Web Site: www.LintechMotion.com
E-Mail: Lintech@LintechMotion.com

All required options should be reviewed using the part numbering guide for each model series. Your local Automation Specialist or factory personnel can assist you with any questions you may have.

Delivery

All shipping promises are made in good faith. Any shipping dates appearing on acknowledgments of orders or given to a customer in any other manner are approximate. Where the customer delays in supplying information necessary to proceeding with an order, the date of shipment may be extended accordingly. Standard products from *LINTECH* are usually available for delivery within 1 to 6 weeks of receipt of a purchase order. However, component shortages, labor disputes, or any other unforeseen circumstance may delay the delivery of an order. *LINTECH* shall not be held liable under any circumstance. All products are shipped F.O.B. Monrovia, CA. *LINTECH* packages all standard and custom products carefully. However, *LINTECH* is not liable for damage incurred during shipment. Contact the carrier immediately if damage to a package or shipment is noticed upon receipt of such shipment.

Payment Terms

Unless otherwise specified, payment shall be made by C.O.D, credit card (AMEX, Visa, or Master Card), or net thirty (30) days (pending credit approval) from date of shipment of the items purchased hereunder in U.S. currency. *LINTECH* reserves the right to require deposit payments on non-standard items, customs, or product built to Buyer's designs or specifications. Amounts not timely paid shall bear interest at the rate of 1.5% for each month or a portion thereof that Buyer is late in making payments. No responsibility is assumed by *LINTECH* for damages arising from delivery delays, fires, strikes, material shortages, accidents, or any other cause whatsoever, and purchase orders are accepted subject

Minimum Order Amount

LINTECH requires a minimum of $30 List Price U.S. currency on all orders.

Warranty

All *LINTECH* positioning systems are guaranteed to be free from defects in material and workmanship, under normal use, for a period of one year after date of shipment. This warranty covers the repair or replacement of a product when it is sent prepaid to *LINTECH*. *LINTECH* does not assume liability for installation, abuse, alteration, insufficient application data provided for a design, or misuse of any positioning system. Products furnished by *LINTECH*, but not manufactured by *LINTECH* (motors, gearheads, encoders, amplifiers, etc....), are subject to the manufacturers standard warranty terms and conditions.

Returns

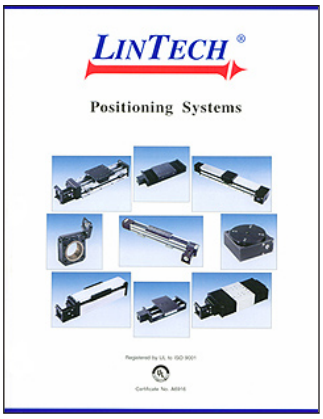
Any product requiring a return to *LINTECH* (for warranty or non-warranty repair) requires pre-approval from the factory prior to shipment. Contact the customer service department at (800) 435-7494 in order to obtain a RMA (Return Materials Authorization) number. At that time, please have your system Model & Serial numbers available, along with the reason for the return. The RMA number should be clearly marked on the returned package label and your packing list, or shipping document. Return product freight prepaid in its original package or one with comparable protection. *LINTECH* will not accept return shipments sent freight collect. Product damage incurred during return shipment, from poor packaging, will not be warranted by *LINTECH*. Keeping original packing materials is recommended until initial inspection and testing is completed.

Dimensions and Product Changes

Published dimensions shown in *LINTECH* catalogs are known to be accurate at time of printing. *LINTECH* shall not be held liable, under any circumstances, for any wrongly documented dimension or specification. Changes in design are made whenever *LINTECH* believes its products will improve by the change. No obligation to incorporate these changes in units manufactured prior to a change will be assumed.

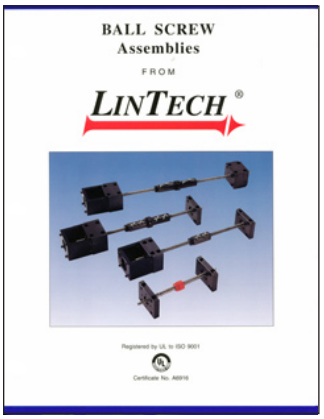
Cancellations

All items entered for production and on which a cancellation is requested shall be paid for on the basis of actual cost of labor, materials, and supplies applied to the production of such items plus proper overhead expenses determined in accordance with good accounting practice, plus 25% of the total of such cost and expenses; provided that such cost and expense plus 25% shall in no case exceed 100% of the quoted price of original order. Upon cancellation, *LINTECH* may dispose of materials used in the manufacture of cancelled order as it sees fit.



Positioning Systems

LINTECH provides 15 different linear & rotary standard positioning systems to choose from. These belt, screw, and worm gear driven systems can handle load capacities from 25 pounds (11 kg) to 16,600 pounds (7530 kg) and are available with numerous options. Custom systems are also available.



Ball Screw Assemblies

LINTECH provides three different types of ball screw assemblies - rolled, precision and ground ball screws. From 0.500 to 1.500 inch, and 16 to 20 mm diameters, with lengths to 138 inches (3500 mm). English & Metric leads available. Simple, Fixed and Rigid supports in various combinations.

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YOUR LOCAL AUTOMATION SPECIALIST: