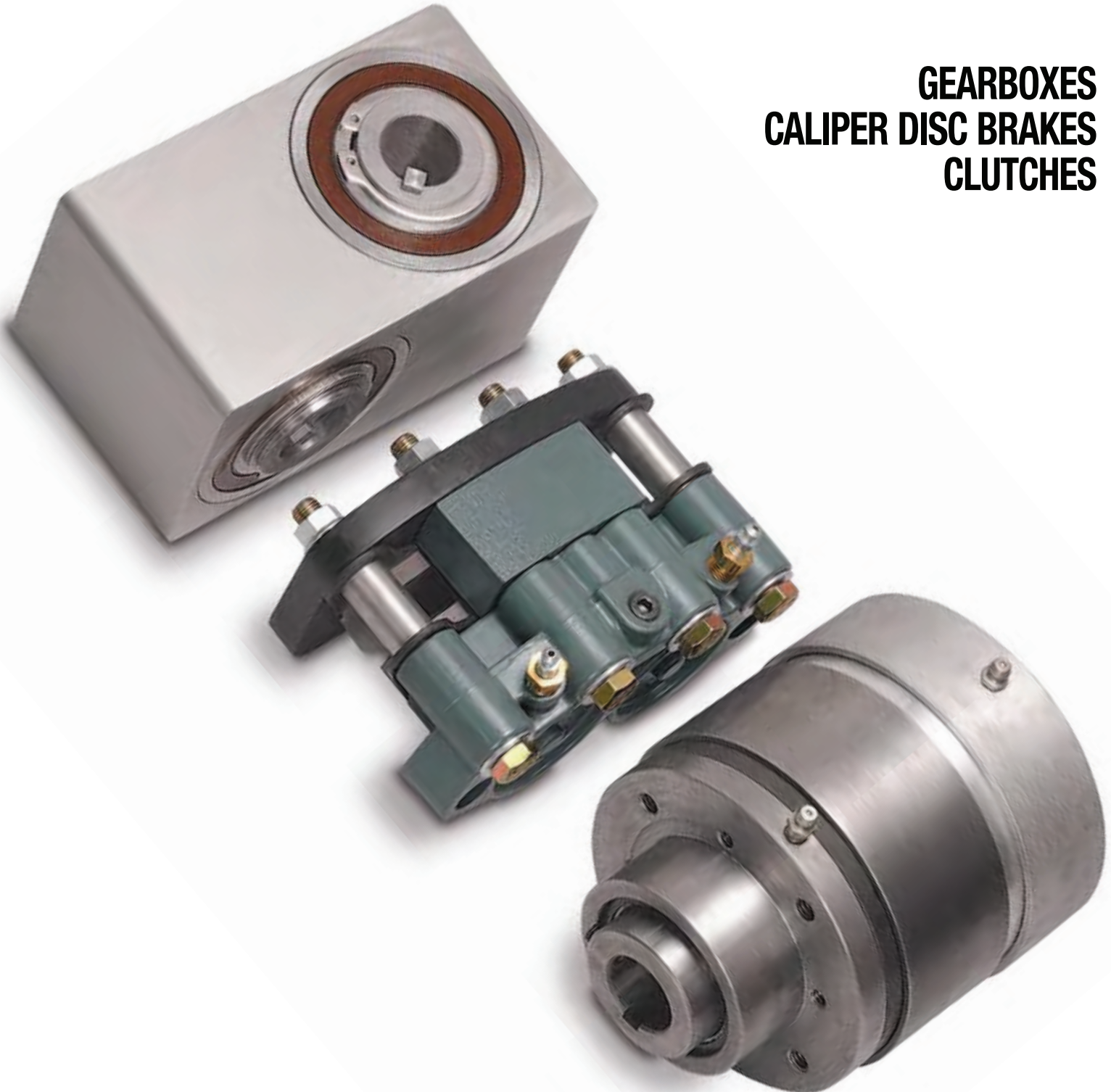


POWER TRANSMISSION

**GEARBOXES
CALIPER DISC BRAKES
CLUTCHES**



OVER 50 YEARS OF PROVEN PERFORMANCE

TOLOMATIC HAS THE RESOURCES TO HELP YOU GET WHAT YOU NEED.

PRODUCTS AND PEOPLE YOU NEED TO GET THE JOB DONE RIGHT.

At Tolomatic we have the resources and the experience to give you what you need when you need it. Working together we can find solutions whether it is a new feature, better performance or a whole new product line. Our sales department will make sure all your questions are answered. Our engineers will assist you with your application design. Our model shop will make all the tooling and specials you need for a new product—not in 6 months or a year—but when you need them.

QUALITY PRODUCTS, COMPETITIVELY PRICED, WHEN YOU WANT THEM.

Our engineering laboratory pushes our products to the breaking point running them 24 hours a day, 7 days a week for millions of cycles looking for ways to improve them. They work with R&D to develop new manufacturing techniques and to perfect new products. For each new product, detailed engineered drawings are converted into hand-crafted sample products for testing, then precision tooling is built on site by Tolomatic's own skilled craftsmen with the highest standards of quality, care and dedication to details. The products are tested again by engineering and by selected field representatives. Tolomatic has heavily invested in research to guarantee you delivery of the highest quality products not in months or weeks, but within days of your order, and with a warranty rate less than 1/2 of 1%.

UNCONDITIONAL 100% SATISFACTION GUARANTEE.

Tolomatic has built its reputation on customer satisfaction. For over 50 years it has been our policy that, if for any reason you have a problem with any Tolomatic product ordered, we will do whatever it takes to make sure you are 100% satisfied. Working together we will arrive at a solution that works best for you.

TOLOMATIC TRAINING CENTER

There is a Tolomatic product for just about every application that may come your way and it is our goal to remove every obstacle, give you every tool, device and piece of knowledge necessary to learn how to size and apply Tolomatic products. That is why we supply the most advanced in-depth training in the industry— free of charge to all our distributors and their customers.



Located in west suburban Minneapolis, Minnesota, Tolomatic headquarters (a 100,000 sq. ft. state-of-the-art facility) is designed for improved communication and manufacturing techniques to meet customer needs today and well into the future.

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The Tolomatic Difference

Over 50 Years of Proven Performance

EXCELLENT TECHNICAL SUPPORT



OUR PEOPLE MAKE THE DIFFERENCE!

Expect prompt, courteous replies to all of your application and product questions.

INDUSTRY LEADING DELIVERIES



STANDARD CATALOG PRODUCTS SHIP IN FIVE WORKING DAYS OR LESS - same day for many items. Modified and custom products ship weeks ahead of the competition. Every product is built with **ENDURANCE TECHNOLOGY** components and quality tested before shipment.

CONVENIENT ORDERING



www.tolomatic.com - Be assured of speedy service, quality products and great pricing, all at your convenience.

The Tolomatic Difference

Over 50 Years of Proven Performance

CREATIVE SOLUTIONS...ENGINEERED DAILY

STANDARD PRODUCTS



*ISO 9001 quality procedures combined with **ENDURANCE TECHNOLOGY** for trouble-free installation and start-up.*

- Over 35 distinct product lines detailed in over 4,000 web pages.
- User specified stroke length is standard.

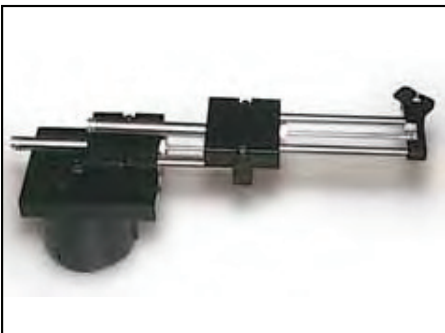
MODIFIED PRODUCTS



Modified products, like this spring applied brake with modified pressure chamber for low pressure release, extend the range of environments and applications where Tolomatic products can be used.

- Modifications include user specified tapped holes, materials, lubricants, coatings, and/or mounting brackets.

CUSTOM PRODUCTS



Challenges like this multi-axis actuator built to fit a manufacturer's motion, space and accuracy requirements are a regular part of our daily activities.

- Custom solutions for unique motion requirements.
- We will work with you to design a motion product within your space, budget, and time requirements.

The Tolomatic Difference

A USEFUL WEB SITE: www.tolomatic.com

COMPLETE INFORMATION AVAILABLE ONLINE

PRODUCT SUPPORT AVAILABLE 24/7 AT www.tolomatic.com

Our web site is your definitive source for EVERYTHING you need to know about Tolomatic and our products.

Check the home page for news and featured products

Check here for similar products

Search tool gets the information you need - fast!

Easy access to sizing software

2D drawings and 3D models available on the web

- Available in many popular formats

Similar to Windows Explorer®, this handy navigation is always available

Power Transmission - Hydraulic Caliper Disc Brakes - Mounting Dimensions

H220: Mounting Dimensions

Disc Diameter	6.313"	8"	10"	12"	16"
Braking Radius E	2.38"	3.15"	4.11"	5.08"	7.21"
F	2.13"	3.00"	4.00"	5.00"	7.09"
G	3.07"	3.94"	4.94"	5.94"	8.03"
H	3.45"	4.32"	5.32"	6.32"	8.41"
J	4.30"	5.17"	6.17"	7.17"	9.26"



SLIDE-RITE™ GEARBOX and SLIDE-RITE™CR GEARBOX

Pages 2 through 7



FLOAT-A-SHAFT (FAS) GEARBOX

Pages 8 through 24

Visit www.tolomatic.com for the latest updates, CAD files and ordering.

Slide-Rite® & Slide-Rite®CR Gearbox

COMPACT SIZE & STANDARD SIZE

The **Slide-Rite®**, like the classic **Float-A-Shaft®**, is a universal right angle gearbox. It consists of two 45° helical gears that mesh at right angles, designed to turn power at 90°. It can be operated in either direction and can slide axially along the drive or driven shaft.

The **Slide-Rite®** gearbox's unique floating design maintains perfect shaft alignment allowing for easy installation.

A solid one-piece aluminum housing seals the gears from outside contaminants, providing for smooth operation in even the harshest industrial environments.

ENDURANCE TECHNOLOGY SM

Look for this endurance technology symbol indicating our durability design features

LEAK-PROOF PERFORMANCE

- One-piece housing, one-piece geared shaft and sealed bearings offer leak-proof performance and excellent service life

PRELUBRICATED

- Prelubricated for long, trouble-free service

ONE-PIECE GEARED SHAFT

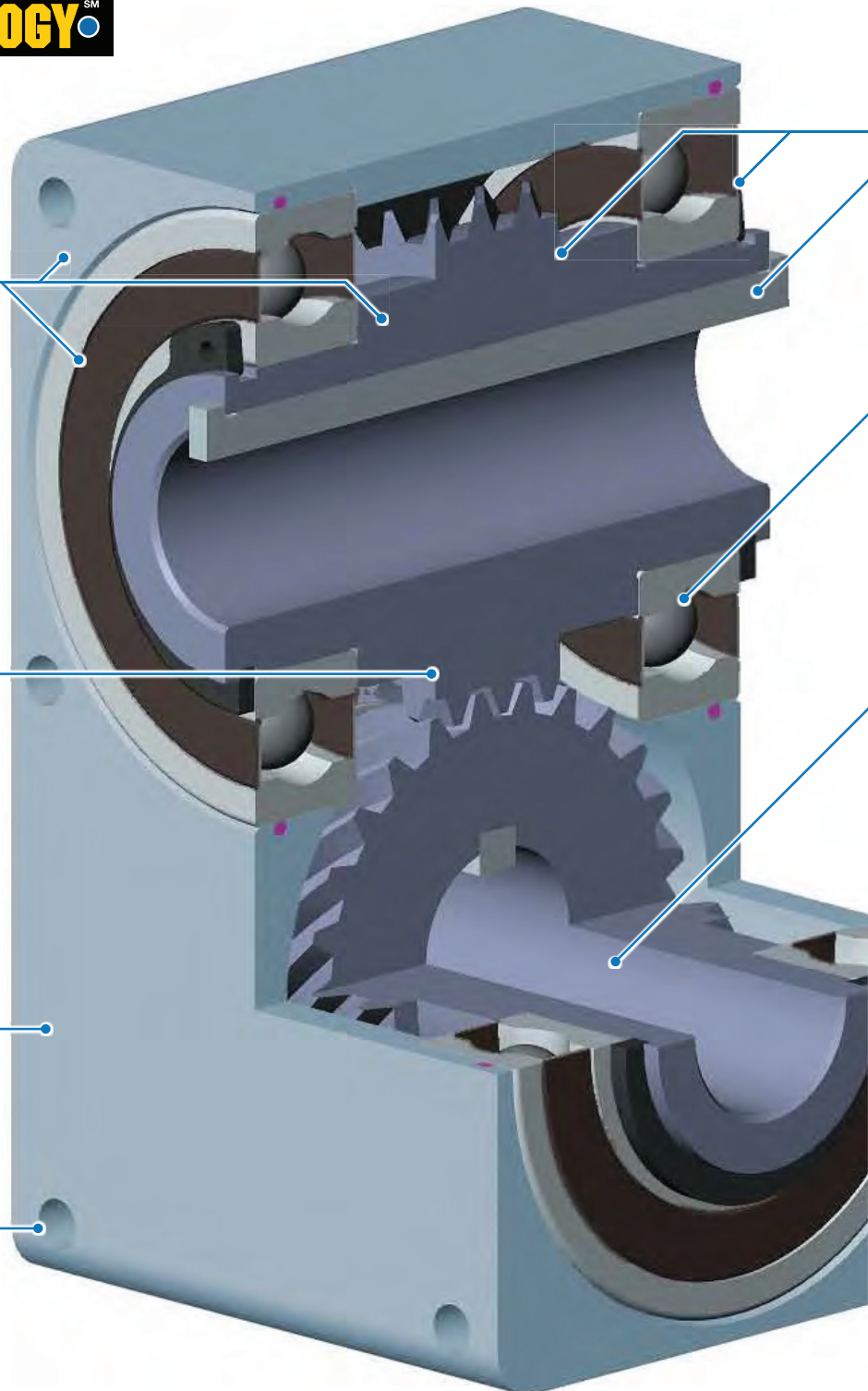
- Fewer parts to wear out

USES STANDARD TRANSMISSION SHAFTING

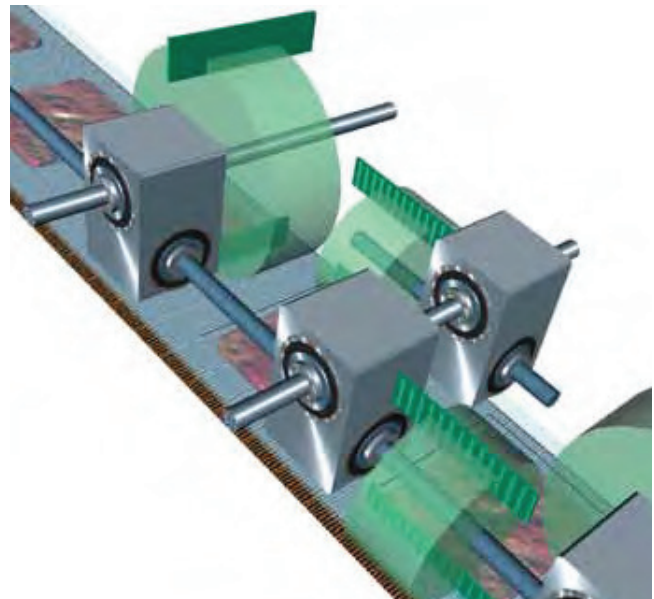
HARD COATED ALUMINUM CASE

- Resists corrosion and forms its own lubricant reservoir

THREADED MOUNTING HOLES



APPLICATION EXAMPLE



The specially selected corrosion resistant components of the **Slide-Rite®CR** Gearbox make it the perfect choice for environmentally challenging applications.

SLIDE-RITE®CR FEATURES:

• HELICAL GEARS, KEYS, RETAINING RINGS •

ALLOY STEEL

- 45 degree helical gears are hardened alloy steel
- High performance, long life construction

NICKEL PLATED

- Corrosion resistant electroless nickel-plated geared sleeves, keys and retaining rings

• BEARINGS AND BEARING RACES •

HARDENED STEEL

- High performance, long life materials

STAINLESS STEEL

- Corrosion resistant stainless steel balls and races

• PRECISION GROUND BORES •

SPECIFICATIONS

- Max speed: 1,200 RPM
- Backlash: < 1 degree
- Bidirectional
- Slide through bore: limited only by length of keyway on shaft

Specifications and endurance technology features apply to all sizes of Slide-Rite® gearboxes.

Application Description:

A manufacturer of frozen pizzas needed a way to cut and seal the plastic packaging for multiple sizes of their signature square pizza.

Application Requirements:

- Output of 60 pizzas per minute
- 4" adjustment range
- No maintenance - washdown environment

Tolomatic Solution: Slide-Rite®CR Gearboxes

The sealed, high speed, corrosion resistant design of the Slide-Rite®CR provides the high throughput necessary in this application. Other important application design features: Using multiple right angle gearboxes, a single motor, located outside the wash down area, synchronously drives both cutting and sealing units. The slide through bore feature of the Slide-Rite® offers adjustability for several pizza sizes.

Slide-Rite® & Slide-Rite®CR Gearbox

COMPACT SIZE – 1:1 RATIO – U.S. & METRIC

AVAILABLE STYLES

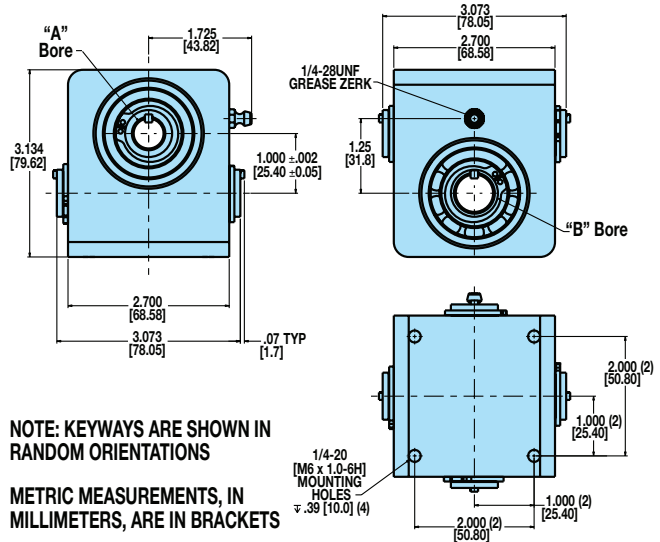
1:1 US STANDARD
1:1 METRIC

1:1 SLIDE-RITE®CR; US STANDARD



DIMENSIONS

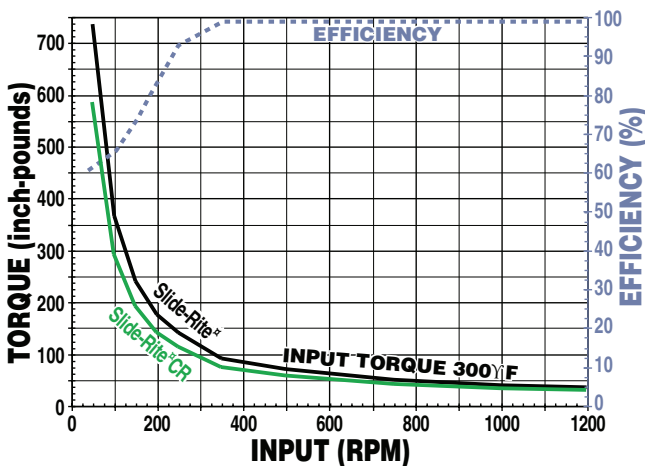
Model Builder 3D CAD Available at: www.tolomatic.com



PERFORMANCE DATA

High Torque Ball Bearings

Torque and Efficiency vs RPM at Maximum Operating Temperature



Models and Bore Dimensions

COMPACT SIZE – 1:1 RATIO – U.S. HIGH TORQUE BALL BEARING

SLIDE-RITE® MODEL NUMBER	SLIDE-RITE®CR MODEL NUMBER	RH or LH	"A" BORE		"B" BORE		APPROX. WEIGHT (LBS.)
			BORE SIZE (IN.)	WxD KEYWAY (IN.)	BORE SIZE (IN.)	WxD KEYWAY (IN.)	
0120-0400	0120-0420	RH	1/2	1/8 x 1/16	1/2	1/8 x 1/16	2.7
0121-0400	0121-0420	LH	1/2	1/8 x 1/16	1/2	1/8 x 1/16	2.7
0122-0400	0122-0420	RH	1/2	1/8 x 1/16	5/8	1/8 x 1/16	2.6
0123-0400	0123-0420	LH	1/2	1/8 x 1/16	5/8	1/8 x 1/16	2.6
0124-0400	0124-0420	RH	5/8	1/8 x 1/16	5/8	1/8 x 1/16	2.5
0125-0400	0125-0420	LH	5/8	1/8 x 1/16	5/8	1/8 x 1/16	2.5

COMPACT SIZE – 1:1 RATIO – METRIC HIGH TORQUE BALL BEARING

MODEL NUMBER	RH or LH	"A" BORE		"B" BORE		APPROX. WEIGHT (kg.)
		BORE SIZE (mm)	WxD KEYWAY (mm)	BORE SIZE (mm)	WxD KEYWAY (mm)	
0120-0410	RH	12	4 x 2	12	4 x 2	1.2
0121-0410	LH	12	4 x 2	12	4 x 2	1.2
0122-0410	RH	12	4 x 2	15	5 x 2.5	1.2
0123-0410	LH	12	4 x 2	15	5 x 2.5	1.2
0124-0410	RH	15	5 x 2.5	15	5 x 2.5	1.1
0125-0410	LH	15	5 x 2.5	15	5 x 2.5	1.1

Slide-Rite® & Slide-Rite®CR Gearbox

STANDARD SIZE – 1:1 RATIO – U.S. & METRIC

AVAILABLE STYLES

1:1 US STANDARD
1:1 METRIC

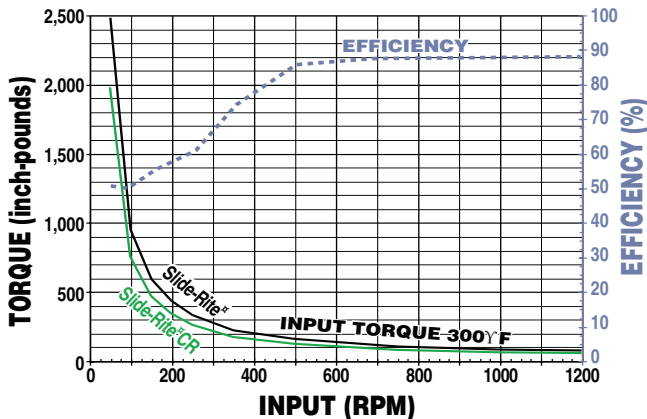


1:1 SLIDE-RITE®CR; US STANDARD



PERFORMANCE DATA

High Torque Ball Bearings
Torque and Efficiency vs RPM
at Maximum Operating Temperature



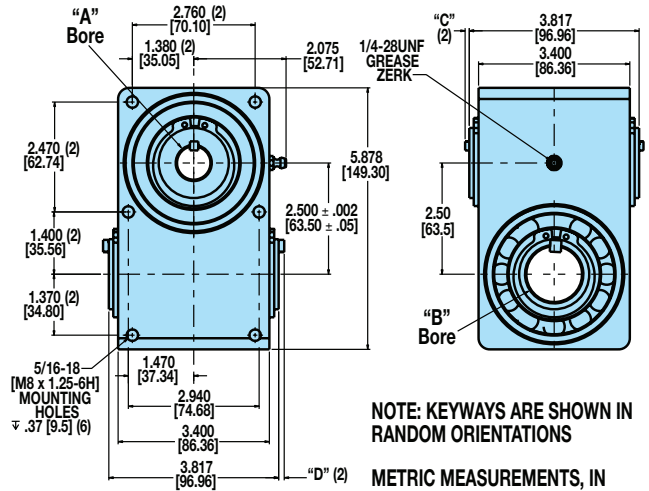
Models and Bore Dimensions

STANDARD SIZE – 1:1 RATIO – U.S. HIGH TORQUE BALL BEARING

SLIDE-RITE® MODEL NUMBER	SLIDE-RITE®CR MODEL NUMBER	RH or LH	"A" BORE			"B" BORE			APPROX. WEIGHT (LBS.)
			BORE SIZE (IN.)	WxD KEYWAY (IN.)	"C" DIM. (IN.)	BORE SIZE (IN.)	WxD KEYWAY (IN.)	"D" DIM. (IN.)	
0220-0400	0220-0420	RH	3/4	3/16 x 3/32	.10	3/4	3/16 x 3/32	.10	10.7
0221-0400	0221-0420	LH	3/4	3/16 x 3/32	.10	3/4	3/16 x 3/32	.10	10.7
0222-0400	0222-0420	RH	3/4	3/16 x 3/32	.10	1	1/4 x 1/8	.13	10.4
0223-0400	0223-0420	LH	3/4	3/16 x 3/32	.10	1	1/4 x 1/8	.13	10.4
0224-0400	0224-0420	RH	3/4	3/16 x 3/32	.10	1-1/4	1/4 x 1/8	.13	9.9
0225-0400	0225-0420	LH	3/4	3/16 x 3/32	.10	1-1/4	1/4 x 1/8	.13	9.9
0226-0400	0226-0420	RH	1	1/4 x 1/8	.13	1	1/4 x 1/8	.13	10.0
0227-0400	0227-0420	LH	1	1/4 x 1/8	.13	1	1/4 x 1/8	.13	10.0
0228-0400	0228-0420	RH	1	1/4 x 1/8	.13	1-1/4	1/4 x 1/8	.13	9.6
0229-0400	0229-0420	LH	1	1/4 x 1/8	.13	1-1/4	1/4 x 1/8	.13	9.6
0230-0400	0230-0420	RH	1-1/4	1/4 x 1/8	.13	1-1/4	1/4 x 1/8	.13	9.1
0231-0400	0231-0420	LH	1-1/4	1/4 x 1/8	.13	1-1/4	1/4 x 1/8	.13	9.1

DIMENSIONS

Model Builder 3D CAD Available at: www.tolomatic.com



STANDARD SIZE – 1:1 RATIO – METRIC HIGH TORQUE BALL BEARING

MODEL NUMBER	RH or LH	"A" BORE			"B" BORE			APPROX. WEIGHT (kg.)
		BORE SIZE (mm)	WxD KEYWAY (mm)	"C" DIM. (mm)	BORE SIZE (mm)	WxD KEYWAY (mm)	"D" DIM. (mm)	
0220-0410	RH	20	6 x 3	3.2	20	6 x 3	3.2	4.8
0221-0410	LH	20	6 x 3	3.2	20	6 x 3	3.2	4.8
0222-0410	RH	20	6 x 3	3.2	25	8 x 3.5	3.2	4.7
0223-0410	LH	20	6 x 3	3.2	25	8 x 3.5	3.2	4.7
0224-0410	RH	20	6 x 3	3.2	30	8 x 3.5	3.2	4.5
0225-0410	LH	20	6 x 3	3.2	30	8 x 3.5	3.2	4.5
0226-0410	RH	25	8 x 3.5	3.2	25	8 x 3.5	3.2	4.5
0227-0410	LH	25	8 x 3.5	3.2	25	8 x 3.5	3.2	4.5
0228-0410	RH	25	8 x 3.5	3.2	30	8 x 3.5	3.2	4.4
0229-0410	LH	25	8 x 3.5	3.2	30	8 x 3.5	3.2	4.4
0230-0410	RH	30	8 x 3.5	3.2	30	8 x 3.5	3.2	4.2
0231-0410	LH	30	8 x 3.5	3.2	30	8 x 3.5	3.2	4.2

GEARBOXES

SLIDE-RITE GEARBOX

ENDURANCE TECHNOLOGY

APPLICATION EXAMPLE

COMPACT SERIES 1:1 RATIO

STANDARD SERIES 1:1 RATIO

STANDARD SERIES 3:2 RATIO

STANDARD SERIES 2:1 RATIO

FLOAT-A-SHAFT

APPLICATIONS

INTRODUCTION

COMPACT SERIES 1:1 RATIO

STANDARD SERIES 1:1 RATIO

STANDARD SERIES 3:2 RATIO

STANDARD SERIES 2:1 RATIO

STANDARD SERIES 2.5:1 RATIO

SELECTION

INSTALLATION

SHAFT & KEYWAY REQUIREMENTS

Slide-Rite® Gearbox

STANDARD SIZE – 3:2 RATIO – U.S.

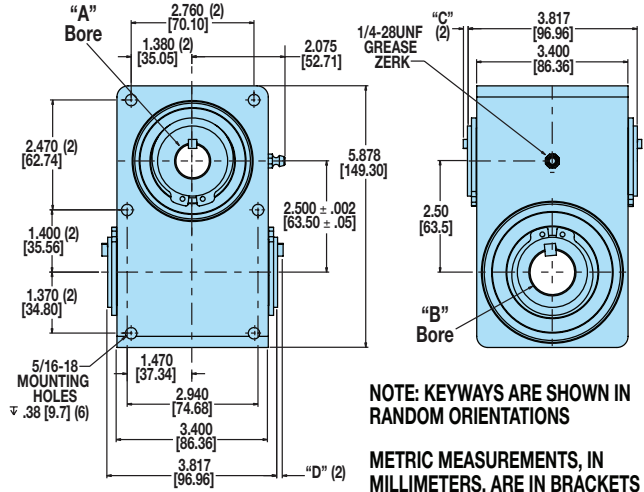
AVAILABLE STYLES

3:2 US STANDARD



DIMENSIONS

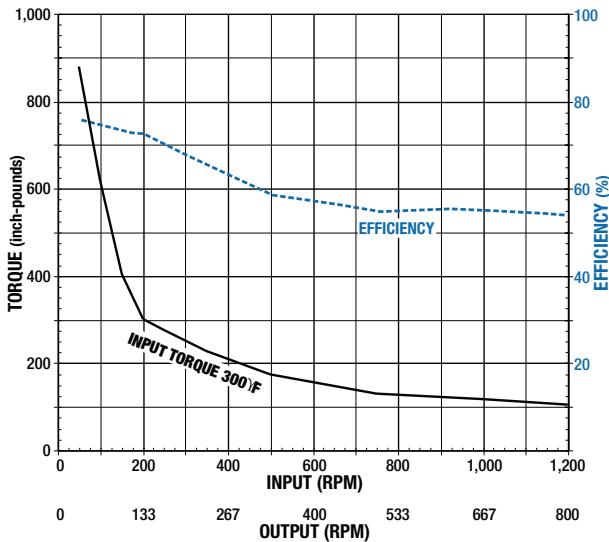
Model Builder 3D CAD Available at: www.tolomatic.com



PERFORMANCE DATA

High Torque Ball Bearings

Torque and Efficiency vs RPM at Maximum Operating Temperature



Models and Bore Dimensions

STANDARD SIZE – 3:2 RATIO – U.S. HIGH TORQUE BALL BEARING

MODEL NUMBER	RH or LH	"A" BORE			"B" BORE			APPROX. WEIGHT (LBS.)
		BORE SIZE (IN.)	WxD (IN.)	"C" DIM. (IN.)	BORE SIZE (IN.)	WxD (IN.)	"D" DIM. (IN.)	
0320-0460	RH	3/4	3/16 x 3/32	.10	3/4	3/16 x 3/32	.10	10.3
0321-0460	LH	3/4	3/16 x 3/32	.10	3/4	3/16 x 3/32	.10	10.3
0322-0460	RH	3/4	3/16 x 3/32	.10	1	1/4 x 1/8	.13	10.0
0323-0460	LH	3/4	3/16 x 3/32	.10	1	1/4 x 1/8	.13	10.0
0324-0460	RH	3/4	3/16 x 3/32	.10	1-1/4	1/4 x 1/8	.13	9.5
0325-0460	LH	3/4	3/16 x 3/32	.10	1-1/4	1/4 x 1/8	.13	9.5
0326-0460	RH	1	1/4 x 1/8	.13	1	1/4 x 1/8	.13	9.6
0327-0460	LH	1	1/4 x 1/8	.13	1	1/4 x 1/8	.13	9.6
0328-0460	RH	1	1/4 x 1/8	.13	1-1/4	1/4 x 1/8	.13	9.1
0329-0460	LH	1	1/4 x 1/8	.13	1-1/4	1/4 x 1/8	.13	9.1
0330-0460	RH	1-1/4	1/4 x 1/8	.13	1-1/4	1/4 x 1/8	.13	8.7
0331-0460	LH	1-1/4	1/4 x 1/8	.13	1-1/4	1/4 x 1/8	.13	8.7

STANDARD SIZE – 2:1 RATIO – U.S.

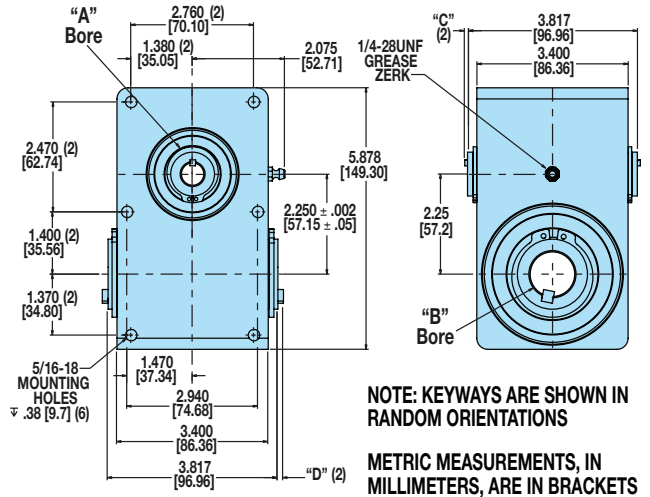
AVAILABLE STYLES

2:1 US STANDARD



DIMENSIONS

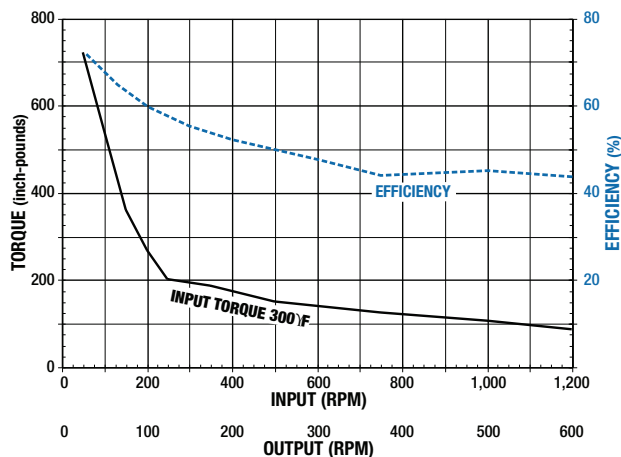
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PERFORMANCE DATA

High Torque Ball Bearings

Torque and Efficiency vs RPM at Maximum Operating Temperature



Models and Bore Dimensions

STANDARD SIZE – 2:1 RATIO – U.S. HIGH TORQUE BALL BEARING

MODEL NUMBER	RH or LH	"A" BORE			"B" BORE			APPROX. WEIGHT (LBS.)
		BORE SIZE (IN.)	WxD (IN.)	"C" DIM. (IN.)	BORE SIZE (IN.)	WxD (IN.)	"D" DIM. (IN.)	
0220-0460	RH	1/2	1/8 x 1/16	.07	3/4	3/16 x 3/32	.10	10.7
0221-0460	LH	1/2	1/8 x 1/16	.07	3/4	3/16 x 3/32	.10	10.7
0222-0460	RH	1/2	1/8 x 1/16	.07	1	1/4 x 1/8	.13	10.4
0223-0460	LH	1/2	1/8 x 1/16	.07	1	1/4 x 1/8	.13	10.4
0224-0460	RH	1/2	1/8 x 1/16	.07	1-1/4	1/4 x 1/8	.13	9.9
0225-0460	LH	1/2	1/8 x 1/16	.07	1-1/4	1/4 x 1/8	.13	9.9
0226-0460	RH	5/8	1/8 x 1/16	.07	3/4	3/16 x 3/32	.10	10.0
0227-0460	LH	5/8	1/8 x 1/16	.07	3/4	3/16 x 3/32	.10	10.0
0228-0460	RH	5/8	1/8 x 1/16	.07	1	1/4 x 1/8	.13	9.6
0229-0460	LH	5/8	1/8 x 1/16	.07	1	1/4 x 1/8	.13	9.6
0230-0460	RH	5/8	1/8 x 1/16	.07	1-1/4	1/4 x 1/8	.13	9.1
0231-0460	LH	5/8	1/8 x 1/16	.07	1-1/4	1/4 x 1/8	.13	9.1
0232-0460	RH	3/4	3/16 x 3/32	.10	3/4	3/16 x 3/32	.10	10.0
0233-0460	LH	3/4	3/16 x 3/32	.10	3/4	3/16 x 3/32	.10	10.0
0234-0460	RH	3/4	3/16 x 3/32	.10	1	1/4 x 1/8	.13	9.6
0235-0460	LH	3/4	3/16 x 3/32	.10	1	1/4 x 1/8	.13	9.6
0236-0460	RH	3/4	3/16 x 3/32	.10	1-1/4	1/4 x 1/8	.13	9.1
0237-0460	LH	3/4	3/16 x 3/32	.10	1-1/4	1/4 x 1/8	.13	9.1

GEARBOXES

SLIDE-RITE GEARBOX

ENDURANCE TECHNOLOGY

APPLICATION EXAMPLE

COMPACT SERIES 1:1 RATIO

STANDARD SERIES 1:1 RATIO

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FLOAT-A-SHAFT

APPLICATIONS

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STANDARD SERIES 1:1 RATIO

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STANDARD SERIES 2.5:1 RATIO

SELECTION

INSTALLATION

SHAFT & KEYWAY REQUIREMENTS

Float-A-Shaft Gearbox

APPLICATIONS

YOU CAN'T FIND A MORE FLEXIBLE GEAR DRIVE

If the distances between take-ups are varied during operation, both shafts can be slid axially through the Float-A-Shaft. They're available in right or left hand drives to meet your exact requirements. And what's more, the shaft's direction is reversible to suit your changing operation.

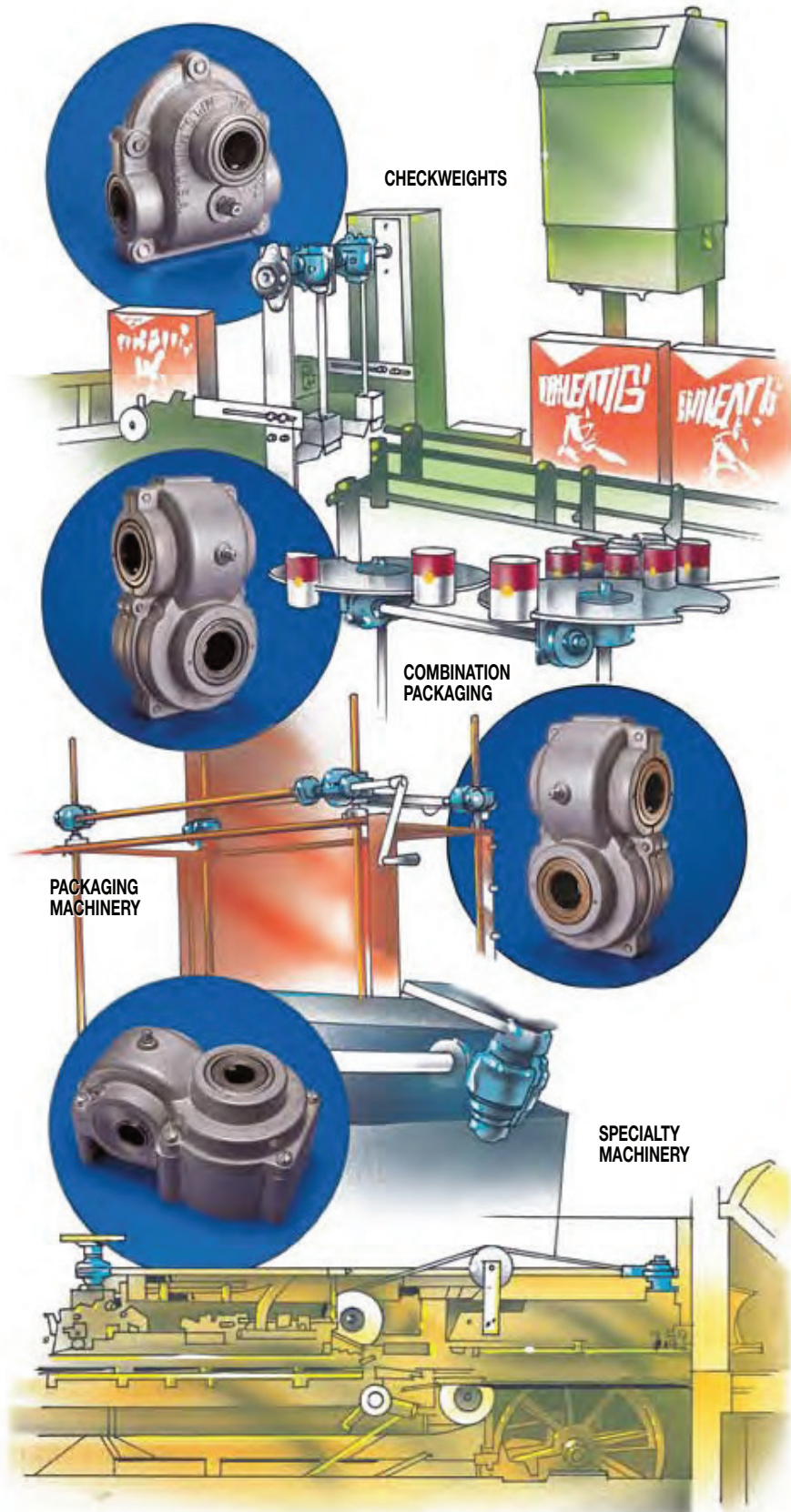
FLOAT-A-SHAFT IS EASILY INSTALLED

An ingenious installation technique and one piece assembly eliminates coupling and shaft alignment problems.

Tolomatic makes the best right angle gear drives you can buy. We're out to prove that no one can get you around a corner faster than Tolomatic.

NOTE: Pillow block bearing supports are recommended on all Float-A-Shaft applications. Effectively mounted directly between the Float-A-Shaft unit and the load, the pillow block bearing supports will absorb any shaft deflection or sideloading and assure alignment.

NOTE: All Float-A-Shaft units have 3° to 5° of backlash on reversal of input.



INTRODUCTION

TOLOMATIC IS TURNING THINGS AROUND

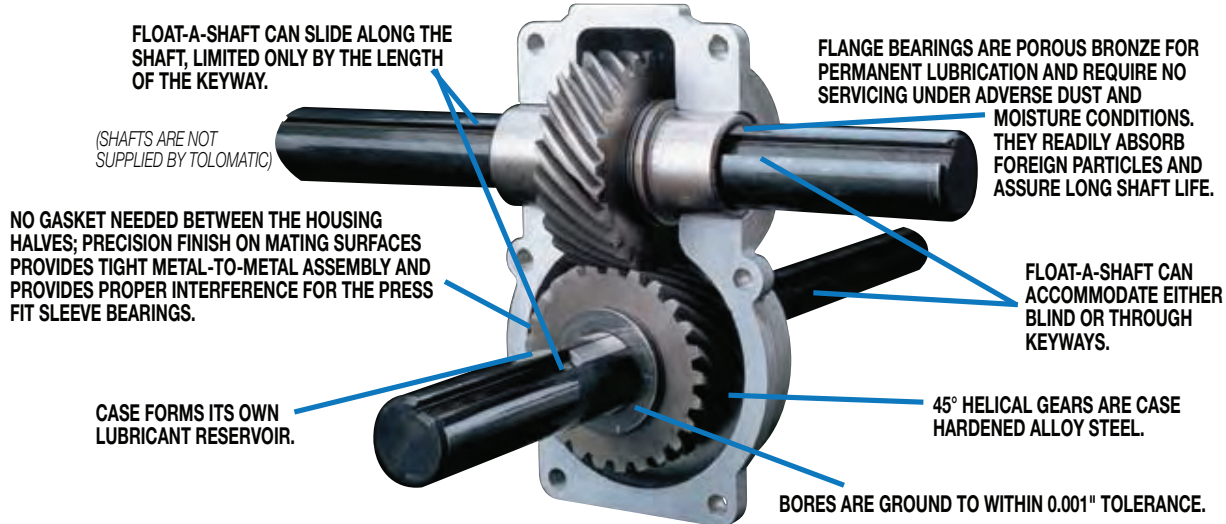
Tolomatic's Float-A-Shaft right angle gear drive was invented 50 years ago, and the competition still hasn't caught up. That's because Tolomatic gearboxes "float" on rotating shafts. Along with the Slide-Rite gearbox, no other design has the versatility, durability, safety, or the ease of operation as Float-A-Shaft.

Float-A-Shaft is a universal right angle gear drive coupling. It consists of two 45° helical gears that mesh at right angles, designed to turn power around any corner. Float-A-Shaft can be operated in either direction and can slide axially along the drive or driven shaft.

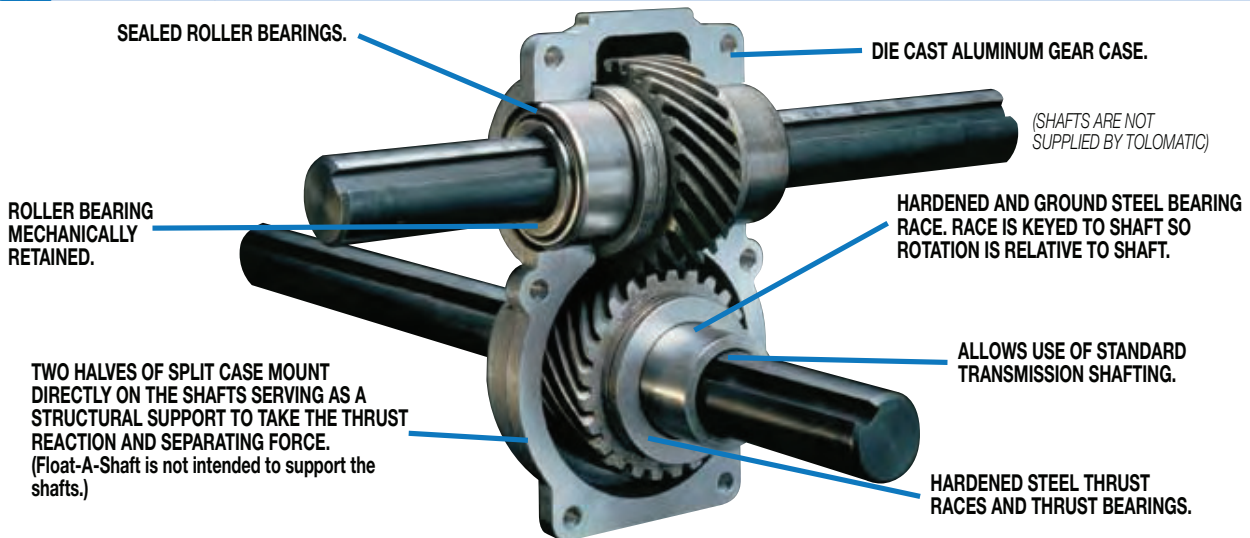
A lightweight aluminum housing encloses the gears, serving as a structural support and a lubricant reservoir. The gears mount directly on the shafts through keyways in the gears and shafts. These rugged and durable hardened helical gears have been field-proven for 50 years, assuring dependable operation. Yet with all of that, Float-A-Shaft retains a compact design well suited for use in tight quarters.

Float-A-Shaft's unique floating design maintains perfect alignment. It also eliminates dangerous chain sprocket drives and the additional adjustments required for chain drive applications.

LOW TORQUE JOURNAL BEARING SERIES



HIGH TORQUE ROLLER BEARING SERIES



GEARBOXES

SLIDE-RITE GEARBOX

ENDURANCE TECHNOLOGY

APPLICATION EXAMPLE

COMPACT SERIES 1:1 RATIO

STANDARD SERIES 1:1 RATIO

STANDARD SERIES 3:2 RATIO

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STANDARD SERIES 2.5:1 RATIO

SELECTION INSTALLATION

SHAFT & KEYWAY REQUIREMENTS

Float-A-Shaft Gearbox

COMPACT SERIES - 1:1 RATIO - US & METRIC

AVAILABLE STYLES

Low Torque Journal Bearings

Standard

1-1/2 lbs. (0.68 kgs.)



Foot Mount

1-3/4 lbs. (0.79 kgs.)



AVAILABLE STYLES

High Torque Roller Bearings

Standard

1-1/2 lbs. (0.68 kgs.)



Foot Mount

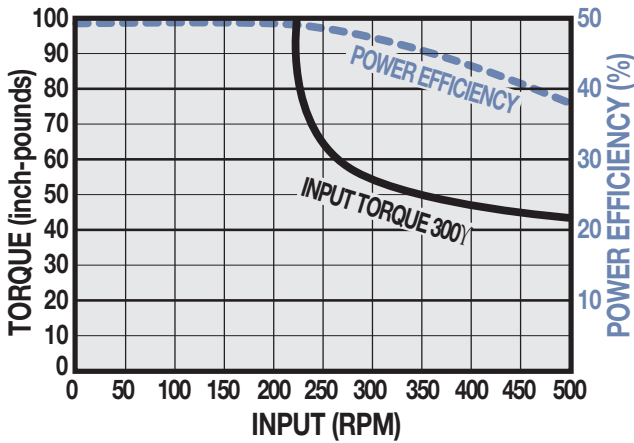
1-3/4 lbs. (0.79 kgs.)



PERFORMANCE DATA

Low Torque Journal Bearings

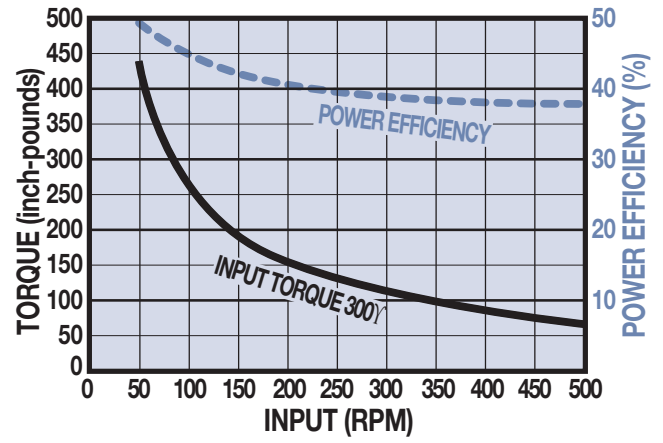
Torque and Efficiency vs RPM at Maximum Bearing Temperature



PERFORMANCE DATA

High Torque Roller Bearings

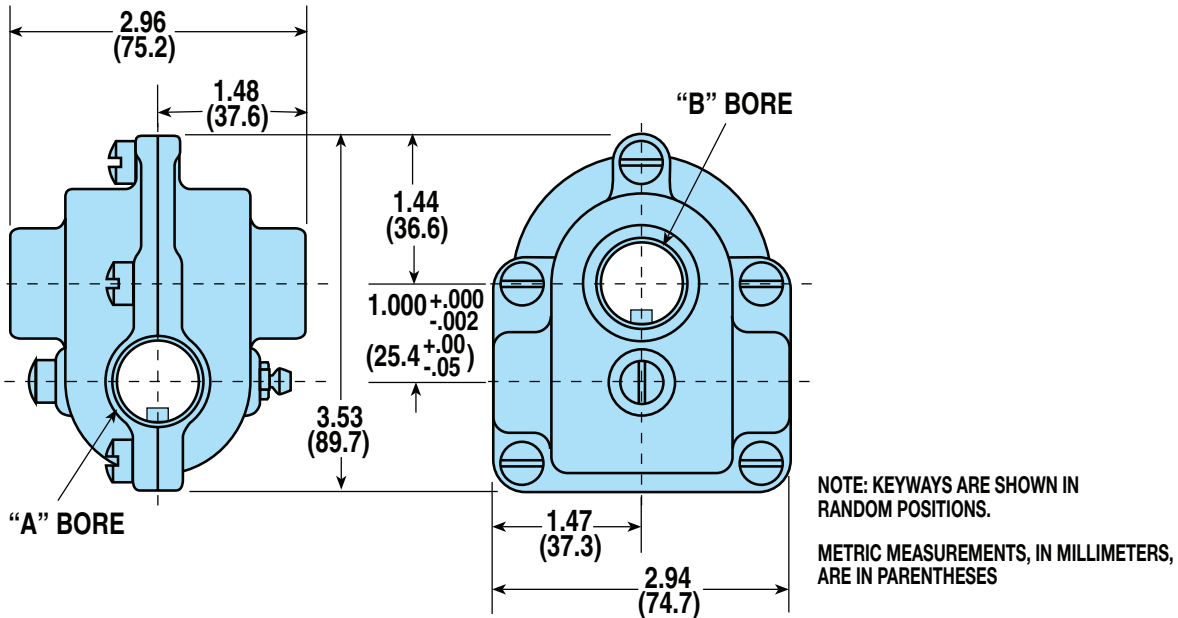
Torque and Efficiency vs RPM at Maximum Bearing Temperature



COMPACT SERIES - 1:1 RATIO - US & METRIC

DIMENSIONS: COMPACT STANDARD HIGH TORQUE & LOW TORQUE BEARINGS

Model Builder 3D CAD Available at: www.tolomatic.com



Models and Bore Dimensions

U.S. - COMPACT STANDARD - 1:1

LOW TORQUE JOURNAL BEARING & HIGH TORQUE ROLLER BEARING

LOW TORQUE JOURNAL MODEL NO.	HIGH TORQUE ROLLER MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
			BORE SIZE (IN.)	WxD KEYWAY (IN.)	BORE SIZE (IN.)	WxD KEYWAY (IN.)
0106-0000	0105-0100	RH	1/2	1/8 x 1/16	1/2	1/8 x 1/16
0105-0000	0106-0100	LH	1/2	1/8 x 1/16	1/2	1/8 x 1/16
0108-0000	0107-0100	RH	1/2	1/8 x 1/16	5/8	1/8 x 1/16
0107-0000	0108-0100	LH	1/2	1/8 x 1/16	5/8	1/8 x 1/16
0110-0000	0109-0100	RH	5/8	1/8 x 1/16	5/8	1/8 x 1/16
0109-0000	0110-0100	LH	5/8	1/8 x 1/16	5/8	1/8 x 1/16

METRIC - COMPACT STANDARD - 1:1 HIGH TORQUE ROLLER BEARING

HIGH TORQUE ROLLER MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
		BORE SIZE (MM)	WxD KEYWAY (MM)	BORE SIZE (MM)	WxD KEYWAY (MM)
0120-0100	RH	12	4 x 2	12	4 x 2
0121-0100	LH	12	4 x 2	12	4 x 2
0122-0100	RH	12	4 x 2	15	5 x 2.5
0123-0100	LH	12	4 x 2	15	5 x 2.5
0124-0100	RH	15	5 x 2.5	15	5 x 2.5
0125-0100	LH	15	5 x 2.5	15	5 x 2.5

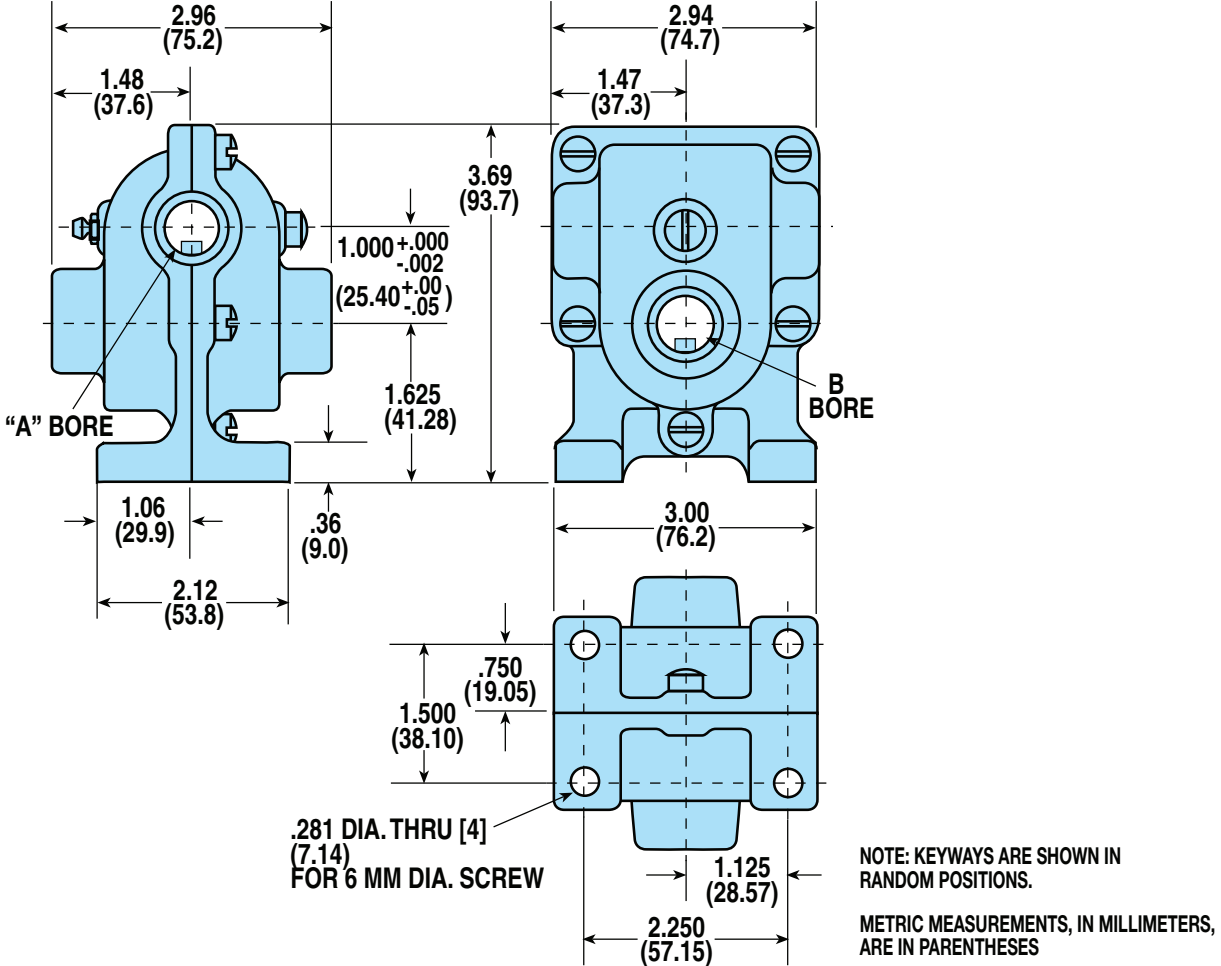
NOTE: METRIC SIZES AVAILABLE ONLY IN HIGH TORQUE ROLLER BEARING MODELS.

Float-A-Shaft Gearbox

COMPACT SERIES - 1:1 RATIO - US & METRIC

DIMENSIONS: COMPACT FOOT MOUNT HIGH TORQUE & LOW TORQUE BEARINGS

Model Builder 3D CAD Available at: www.tolomatic.com



Models and Bore Dimensions

U.S. - COMPACT FOOT MOUNT - 1:1

LOW TORQUE JOURNAL BEARING & HIGH TORQUE ROLLER BEARING

LOW TORQUE JOURNAL MODEL NO.	HIGH TORQUE ROLLER MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
			BORE SIZE (IN.)	WxD KEYWAY (IN.)	BORE SIZE (IN.)	WxD KEYWAY (IN.)
0112-0000	0111-0100	RH	1/2	1/8 x 1/16	1/2	1/8 x 1/16
0111-0000	0112-0100	LH	1/2	1/8 x 1/16	1/2	1/8 x 1/16
0114-0000	0113-0100	RH	1/2	1/8 x 1/16	5/8	1/8 x 1/16
0113-0000	0114-0100	LH	1/2	1/8 x 1/16	5/8	1/8 x 1/16
0116-0000	0115-0100	RH	5/8	1/8 x 1/16	5/8	1/8 x 1/16
0115-0000	0116-0100	LH	5/8	1/8 x 1/16	5/8	1/8 x 1/16

METRIC - COMPACT FOOT MOUNT - 1:1 HIGH TORQUE ROLLER BEARING

HIGH TORQUE ROLLER MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
		BORE SIZE (MM)	WxD KEYWAY (MM)	BORE SIZE (MM)	WxD KEYWAY (MM)
0126-0100	RH	12	4 x 2	12	4 x 2
0127-0100	LH	12	4 x 2	12	4 x 2
0128-0100	RH	12	4 x 2	15	5 x 2.5
0129-0100	LH	12	4 x 2	15	5 x 2.5
0130-0100	RH	15	5 x 2.5	15	5 x 2.5
0131-0100	LH	15	5 x 2.5	15	5 x 2.5

NOTE: METRIC SIZES AVAILABLE ONLY IN HIGH TORQUE ROLLER BEARING MODELS.

STANDARD SERIES - 1:1 RATIO - US & METRIC

AVAILABLE STYLES

Low Torque Journal Bearings

Standard

5 lbs. (2.27 kgs.)



Flat Base

5-3/4 lbs. (2.61 kgs.)



AVAILABLE STYLES

High Torque Roller Bearings

Standard

5-1/2 lbs. (2.49 kgs.)



Flat Base

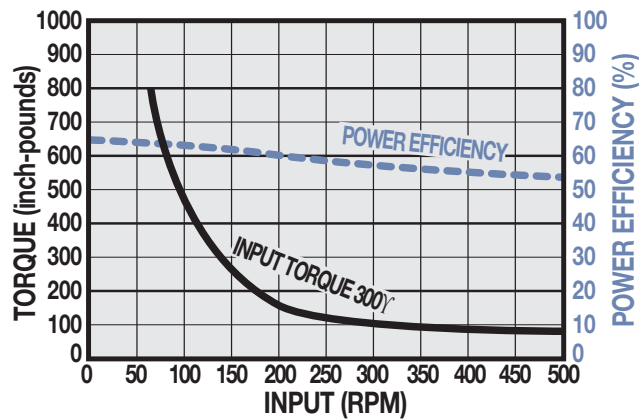
6-1/2 lbs. (2.95 kgs.)



PERFORMANCE DATA

Low Torque Journal Bearings

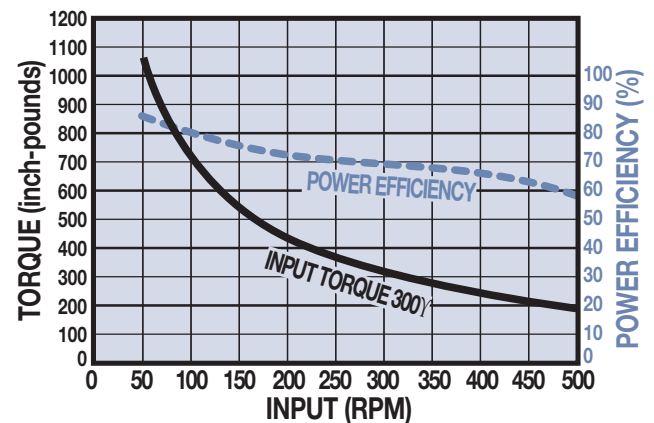
Torque and Efficiency vs RPM at Maximum Bearing Temperature



PERFORMANCE DATA

High Torque Roller Bearings

Torque and Efficiency vs RPM at Maximum Bearing Temperature



GEARBOXES

SLIDE-RITE GEARBOX

ENDURANCE TECHNOLOGY

APPLICATION EXAMPLE

COMPACT SERIES 1:1 RATIO

STANDARD SERIES 1:1 RATIO

STANDARD SERIES 3:2 RATIO

STANDARD SERIES 2:1 RATIO

FLOAT-A-SHAFT

APPLICATIONS INTRODUCTION

COMPACT SERIES 1:1 RATIO

STANDARD SERIES 1:1 RATIO

STANDARD SERIES 3:2 RATIO

STANDARD SERIES 2:1 RATIO

STANDARD SERIES 2.5:1 RATIO

SELECTION

INSTALLATION

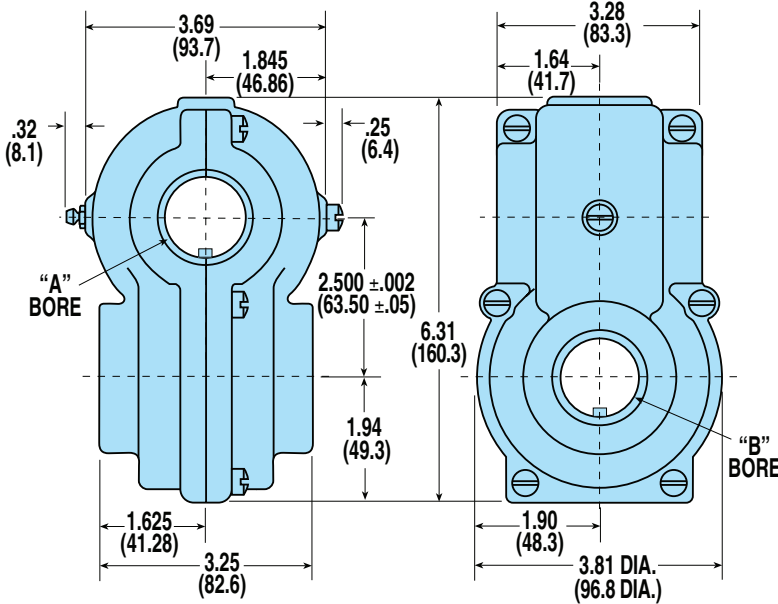
SHAFT & KEYWAY REQUIREMENTS

Float-A-Shaft Gearbox

STANDARD SERIES - 1:1 RATIO - US & METRIC

DIMENSIONS: STANDARD HIGH TORQUE & LOW TORQUE BEARINGS

Model Builder 3D CAD Available at: www.tolomatic.com



NOTE: KEYWAYS ARE SHOWN IN RANDOM POSITIONS.
METRIC MEASUREMENTS, IN MILLIMETERS, ARE IN PARENTHESES

Models and Bore Dimensions

U.S. - STANDARD - 1:1

LOW TORQUE JOURNAL BEARING & HIGH TORQUE ROLLER BEARING

LOW TORQUE JOURNAL MODEL NO.	HIGH TORQUE ROLLER MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
			BORE SIZE (IN.)	WxD KEYWAY (IN.)	BORE SIZE (IN.)	WxD KEYWAY (IN.)
0204-0000	0203-0200	RH	3/4	3/16 x 3/32	3/4	3/16 x 3/32
0203-0000	0204-0200	LH	3/4	3/16 x 3/32	3/4	3/16 x 3/32
0208-0000	0205-0200	RH	3/4	3/16 x 3/32	1	1/4 x 1/8
0207-0000	0206-0200	LH	3/4	3/16 x 3/32	1	1/4 x 1/8
0212-0000	0207-0200	RH	3/4	3/16 x 3/32	1-1/4	1/4 x 1/8
0211-0000	0208-0200	LH	3/4	3/16 x 3/32	1-1/4	1/4 x 1/8
0216-0000	NA	RH	3/4	3/16 x 3/32	1-1/2	3/8 x 3/16
0215-0000	NA	LH	3/4	3/16 x 3/32	1-1/2	3/8 x 3/16
0220-0000	0209-0200	RH	1	1/4 x 1/8	1	1/4 x 1/8
0219-0000	0210-0200	LH	1	1/4 x 1/8	1	1/4 x 1/8
0224-0000	0211-0200	RH	1	1/4 x 1/8	1-1/4	1/4 x 1/8
0223-0000	0212-0200	LH	1	1/4 x 1/8	1-1/4	1/4 x 1/8
0228-0000	NA	RH	1	1/4 x 1/8	1-1/2	3/8 x 3/16
0227-0000	NA	LH	1	1/4 x 1/8	1-1/2	3/8 x 3/16
0232-0000	0213-0200	RH	1-1/4	1/4 x 1/8	1-1/4	1/4 x 1/8
0231-0000	0214-0200	LH	1-1/4	1/4 x 1/8	1-1/4	1/4 x 1/8
0236-0000	NA	RH	1-1/4	1/4 x 1/8	1-1/2	3/8 x 3/16
0235-0000	NA	LH	1-1/4	1/4 x 1/8	1-1/2	3/8 x 3/16
0240-0000	NA	RH	1-1/2	3/8 x 3/16	1-1/2	3/8 x 3/16
0239-0000	NA	LH	1-1/2	3/8 x 3/16	1-1/2	3/8 x 3/16

METRIC - STANDARD - 1:1 HIGH TORQUE ROLLER BEARING

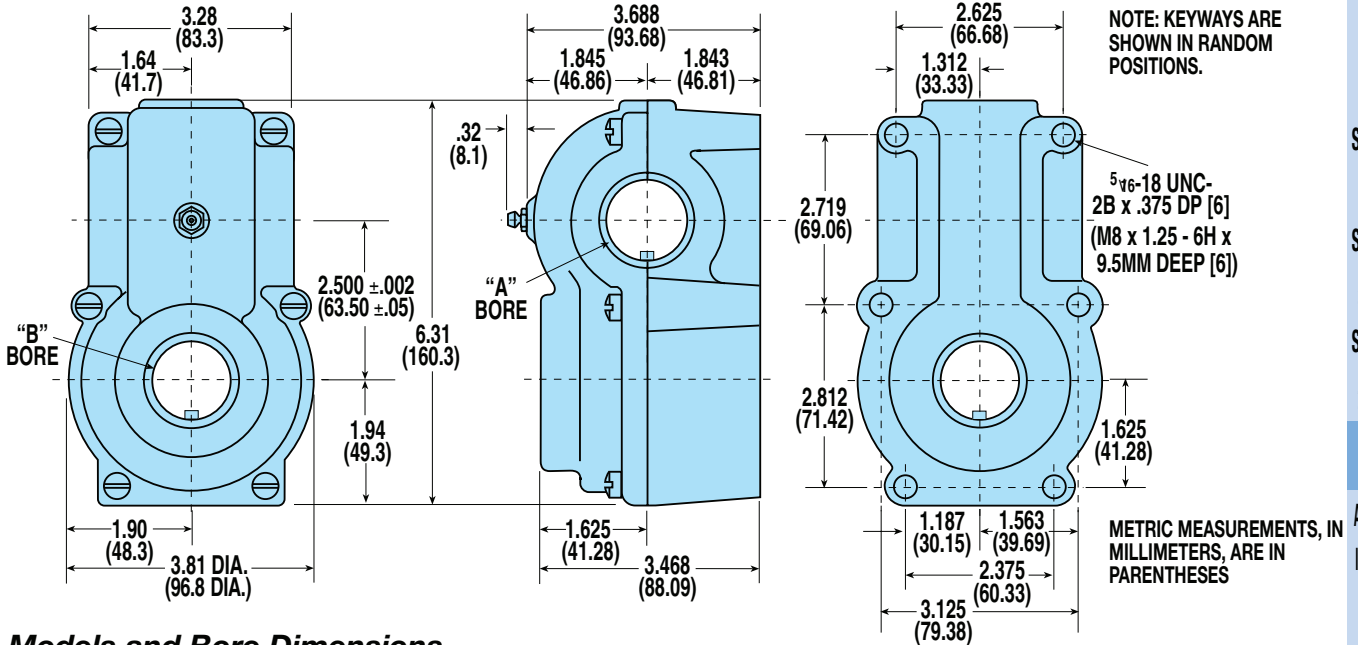
HIGH TORQUE ROLLER MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
		BORE SIZE (MM)	WxD KEYWAY (MM)	BORE SIZE (MM)	WxD KEYWAY (MM)
0308-0200	RH	20	6 x 3	20	6 x 3
0309-0200	LH	20	6 x 3	20	6 x 3
0310-0200	RH	20	6 x 3	25	8 x 3.5
0311-0200	LH	20	6 x 3	25	8 x 3.5
0312-0200	RH	20	6 x 3	30	8 x 3.5
0313-0200	LH	20	6 x 3	30	8 x 3.5
0314-0200	RH	25	8 x 3.5	25	8 x 3.5
0315-0200	LH	25	8 x 3.5	25	8 x 3.5
0316-0200	RH	25	8 x 3.5	30	8 x 3.5
0317-0200	LH	25	8 x 3.5	30	8 x 3.5
0318-0200	RH	30	8 x 3.5	30	8 x 3.5
0319-0200	LH	30	8 x 3.5	30	8 x 3.5

NOTE: METRIC SIZES AVAILABLE ONLY IN HIGH TORQUE ROLLER BEARING MODELS.

STANDARD SERIES - 1:1 RATIO - US & METRIC

DIMENSIONS: STANDARD FLAT BASE HIGH TORQUE & LOW TORQUE BEARINGS

Model Builder 3D CAD Available at: www.tolomatic.com



Models and Bore Dimensions

U.S. - STANDARD FLAT BASE - 1:1

LOW TORQUE JOURNAL BEARING & HIGH TORQUE ROLLER BEARING

LOW TORQUE JOURNAL MODEL NO.	HIGH TORQUE ROLLER MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
			BORE SIZE (IN.)	WxD KEYWAY (IN.)	BORE SIZE (IN.)	WxD KEYWAY (IN.)
0245-0000	0217-0200	RH	3/4	3/16 x 3/32	3/4	3/16 x 3/32
0246-0000	0218-0200	LH	3/4	3/16 x 3/32	3/4	3/16 x 3/32
0247-0000	0219-0200	RH	3/4	3/16 x 3/32	1	1/4 x 1/8
0248-0000	0220-0200	LH	3/4	3/16 x 3/32	1	1/4 x 1/8
0249-0000	0221-0200	RH	3/4	3/16 x 3/32	1-1/4	1/4 x 1/8
0250-0000	0222-0200	LH	3/4	3/16 x 3/32	1-1/4	1/4 x 1/8
0251-0000	NA	RH	3/4	3/16 x 3/32	1-1/2	3/8 x 3/16
0252-0000	NA	LH	3/4	3/16 x 3/32	1-1/2	3/8 x 3/16
0253-0000	0223-0200	RH	1	1/4 x 1/8	1	1/4 x 1/8
0254-0000	0224-0200	LH	1	1/4 x 1/8	1	1/4 x 1/8
0255-0000	0225-0200	RH	1	1/4 x 1/8	1-1/4	1/4 x 1/8
0256-0000	0226-0200	LH	1	1/4 x 1/8	1-1/4	1/4 x 1/8
0257-0000	NA	RH	1	1/4 x 1/8	1-1/2	3/8 x 3/16
0258-0000	NA	LH	1	1/4 x 1/8	1-1/2	3/8 x 3/16
0269-0000	0227-0200	RH	1-1/4	1/4 x 1/8	1-1/4	1/4 x 1/8
0270-0000	0228-0200	LH	1-1/4	1/4 x 1/8	1-1/4	1/4 x 1/8
0271-0000	NA	RH	1-1/4	1/4 x 1/8	1-1/2	3/8 x 3/16
0272-0000	NA	LH	1-1/4	1/4 x 1/8	1-1/2	3/8 x 3/16
0273-0000	NA	RH	1-1/2	3/8 x 3/16	1-1/2	3/8 x 3/16
0274-0000	NA	LH	1-1/2	3/8 x 3/16	1-1/2	3/8 x 3/16

METRIC - STANDARD FLAT BASE - 1:1 HIGH TORQUE ROLLER BEARING

HIGH TORQUE ROLLER MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
		BORE SIZE (MM)	WxD KEYWAY (MM)	BORE SIZE (MM)	WxD KEYWAY (MM)
0328-0200	RH	20	6 x 3	20	6 x 3
0329-0200	LH	20	6 x 3	20	6 x 3
0330-0200	RH	20	6 x 3	25	8 x 3.5
0331-0200	LH	20	6 x 3	25	8 x 3.5
0332-0200	RH	20	6 x 3	30	8 x 3.5
0333-0200	LH	20	6 x 3	30	8 x 3.5
0334-0200	RH	25	8 x 3.5	25	8 x 3.5
0335-0200	LH	25	8 x 3.5	25	8 x 3.5
0336-0200	RH	25	8 x 3.5	30	8 x 3.5
0337-0200	LH	25	8 x 3.5	30	8 x 3.5
0338-0200	RH	30	8 x 3.5	30	8 x 3.5
0339-0200	LH	30	8 x 3.5	30	8 x 3.5

NOTE: METRIC SIZES AVAILABLE ONLY IN HIGH TORQUE ROLLER BEARING MODELS.

Float-A-Shaft Gearbox

STANDARD SERIES - 3:2 RATIO - US & METRIC

AVAILABLE STYLES

Low Torque Journal Bearings

Standard

5-3/4 lbs. (2.61 kgs.)

Flat Base

5-3/4 lbs. (2.61 kgs.)



AVAILABLE STYLES

High Torque Roller Bearings

Standard

6 lbs. (2.72 kgs.)

Flat Base

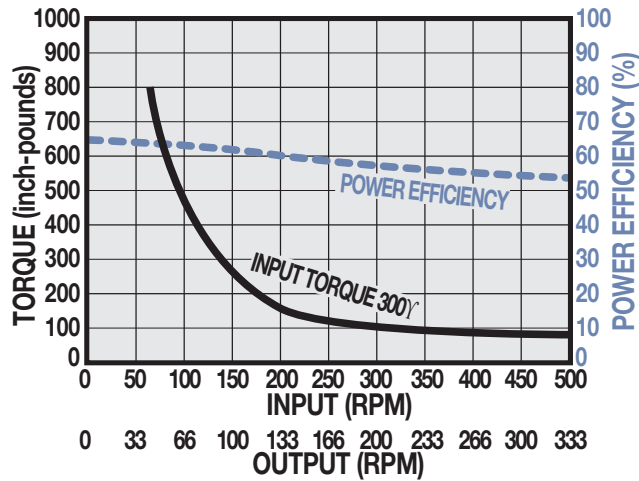
6-3/4 lbs. (3.06 kgs.)



PERFORMANCE DATA

Low Torque Journal Bearings

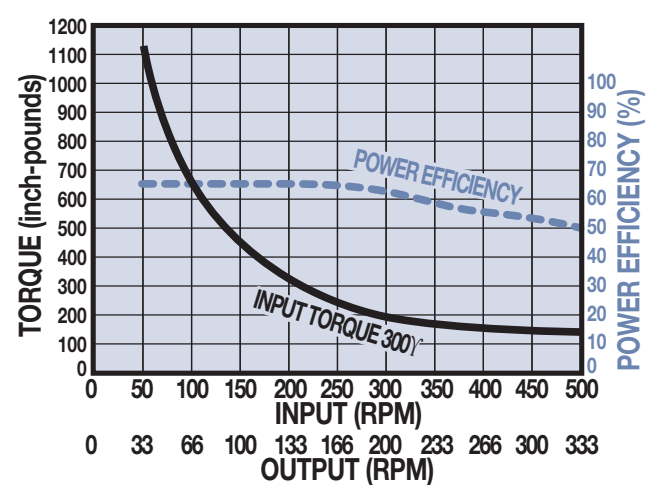
Torque and Efficiency vs RPM at Maximum Bearing Temperature



PERFORMANCE DATA

High Torque Roller Bearings

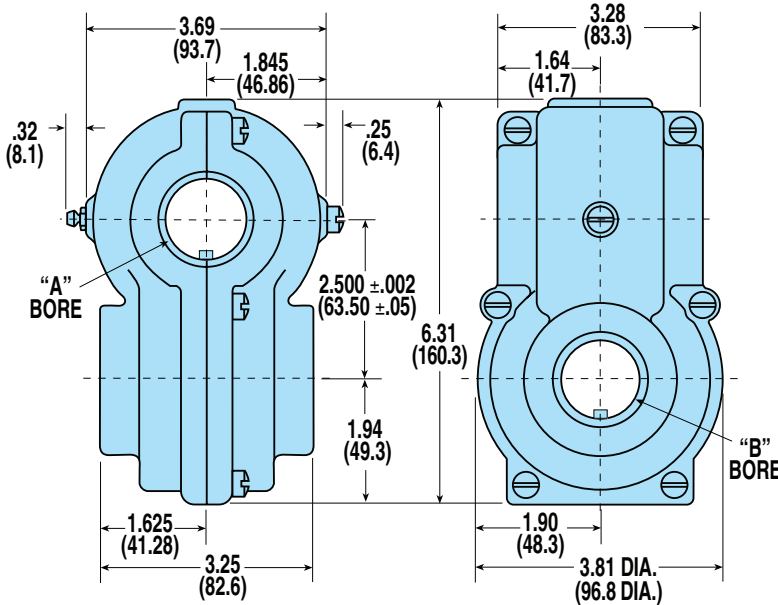
Torque and Efficiency vs RPM at Maximum Bearing Temperature



STANDARD SERIES - 3:2 RATIO - US & METRIC

DIMENSIONS: STANDARD HIGH TORQUE & LOW TORQUE BEARINGS

Model Builder 3D CAD Available at: www.tolomatic.com



NOTE: KEYWAYS ARE SHOWN IN RANDOM POSITIONS.

METRIC MEASUREMENTS, IN MILLIMETERS, ARE IN PARENTHESES

Models and Bore Dimensions

U.S. - STANDARD - 3:2

LOW TORQUE JOURNAL BEARING & HIGH TORQUE ROLLER BEARING

LOW TORQUE JOURNAL MODEL NO.	HIGH TORQUE ROLLER MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
			BORE SIZE (IN.)	WxD KEYWAY (IN.)	BORE SIZE (IN.)	WxD KEYWAY (IN.)
0241-0000	0231-0200	RH	3/4	3/16 x 3/32	3/4	3/16 x 3/32
0242-0000	0232-0200	LH	3/4	3/16 x 3/32	3/4	3/16 x 3/32
0259-0000	0233-0200	RH	3/4	3/16 x 3/32	1	1/4 x 1/8
0260-0000	0234-0200	LH	3/4	3/16 x 3/32	1	1/4 x 1/8
NA	0235-0200	RH	3/4	3/16 x 3/32	1-1/4	1/4 x 1/8
NA	0236-0200	LH	3/4	3/16 x 3/32	1-1/4	1/4 x 1/8
0261-0000	0237-0200	RH	1	1/4 x 1/8	1	1/4 x 1/8
0262-0000	0238-0200	LH	1	1/4 x 1/8	1	1/4 x 1/8
0263-0000	0239-0200	RH	1	1/4 x 1/8	1-1/4	1/4 x 1/8
0264-0000	0240-0200	LH	1	1/4 x 1/8	1-1/4	1/4 x 1/8
0265-0000	0241-0200	RH	1-1/4	1/4 x 1/8	1-1/4	1/4 x 1/8
0266-0000	0242-0200	LH	1-1/4	1/4 x 1/8	1-1/4	1/4 x 1/8

NOTE: FOR LOW TORQUE JOURNAL BEARING MODELS
THE "A" BORE CONTAINS THE 20 TOOTH GEAR. THE "B" BORE CONTAINS THE 30 TOOTH GEAR.

NOTE: FOR HIGH TORQUE ROLLER BEARING MODELS
THE "A" BORE CONTAINS THE 20 TOOTH GEAR. THE "B" BORE CONTAINS THE 30 TOOTH GEAR.

METRIC - STANDARD - 3:2 HIGH TORQUE ROLLER BEARING

HIGH TORQUE ROLLER MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
		BORE SIZE (MM)	WxD KEYWAY (MM)	BORE SIZE (MM)	WxD KEYWAY (MM)
0354-0200	RH	25	8 x 3.5	25	8 x 3.5
0355-0200	LH	25	8 x 3.5	25	8 x 3.5
0356-0200	RH	25	8 x 3.5	30	8 x 3.5
0357-0200	LH	25	8 x 3.5	30	8 x 3.5
0358-0200	RH	30	8 x 3.5	30	8 x 3.5
0359-0200	LH	30	8 x 3.5	30	8 x 3.5

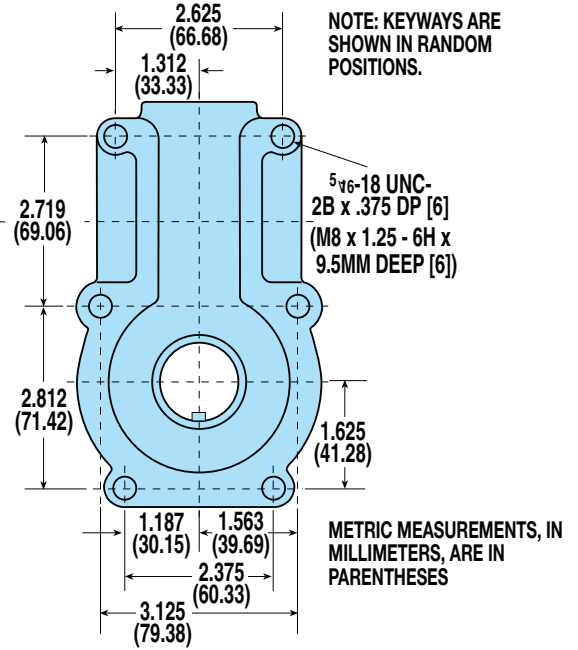
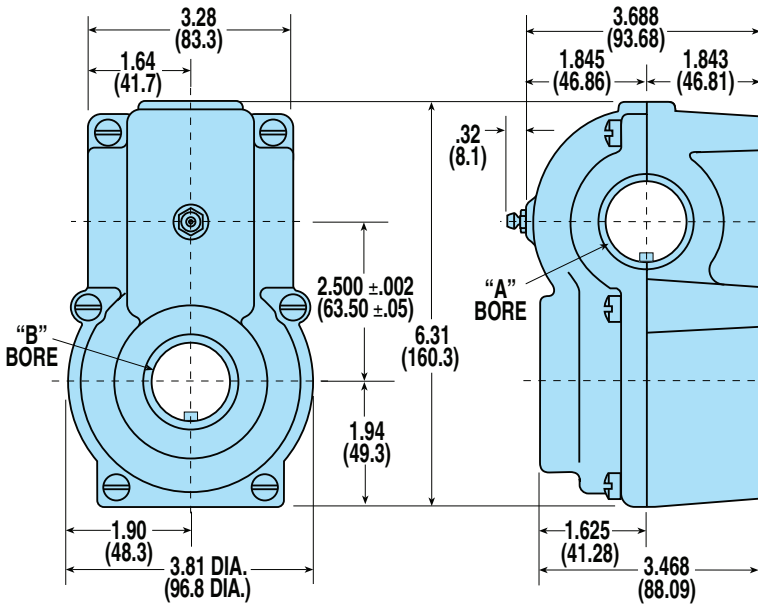
NOTE: METRIC SIZES AVAILABLE ONLY IN HIGH TORQUE ROLLER BEARING MODELS.

Float-A-Shaft Gearbox

STANDARD SERIES - 3:2 RATIO - US & METRIC

DIMENSIONS: STANDARD FLAT BASE HIGH TORQUE & LOW TORQUE BEARINGS

Model Builder 3D CAD Available at: www.tolomatic.com



Models and Bore Dimensions

U.S. - STANDARD FLAT BASE - 3:2

LOW TORQUE JOURNAL BEARING & HIGH TORQUE ROLLER BEARING

LOW TORQUE JOURNAL MODEL NO.	HIGH TORQUE ROLLER MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
			BORE SIZE (IN.)	WxD KEYWAY (IN.)	BORE SIZE (IN.)	WxD KEYWAY (IN.)
0277-0000	0245-0200	RH	3/4	3/16 x 3/32	3/4	3/16 x 3/32
0278-0000	0246-0200	LH	3/4	3/16 x 3/32	3/4	3/16 x 3/32
0279-0000	0247-0200	RH	3/4	3/16 x 3/32	1	1/4 x 1/8
0280-0000	0248-0200	LH	3/4	3/16 x 3/32	1	1/4 x 1/8
NA	0249-0200	RH	3/4	3/16 x 3/32	1-1/4	1/4 x 1/8
NA	0250-0200	LH	3/4	3/16 x 3/32	1-1/4	1/4 x 1/8
0281-0000	0251-0200	RH	1	1/4 x 1/8	1	1/4 x 1/8
0282-0000	0252-0200	LH	1	1/4 x 1/8	1	1/4 x 1/8
0283-0000	0253-0200	RH	1	1/4 x 1/8	1-1/4	1/4 x 1/8
0284-0000	0254-0200	LH	1	1/4 x 1/8	1-1/4	1/4 x 1/8
0285-0000	0255-0200	RH	1-1/4	1/4 x 1/8	1-1/4	1/4 x 1/8
0286-0000	0256-0200	LH	1-1/4	1/4 x 1/8	1-1/4	1/4 x 1/8

METRIC - STANDARD FLAT BASE - 3:2 HIGH TORQUE ROLLER BEARING

HIGH TORQUE ROLLER MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
		BORE SIZE (MM)	WxD KEYWAY (MM)	BORE SIZE (MM)	WxD KEYWAY (MM)
0374-0200	RH	25	8 x 3.5	25	8 x 3.5
0375-0200	LH	25	8 x 3.5	25	8 x 3.5
0376-0200	RH	25	8 x 3.5	30	8 x 3.5
0377-0200	LH	25	8 x 3.5	30	8 x 3.5
0378-0200	RH	30	8 x 3.5	30	8 x 3.5
0379-0200	LH	30	8 x 3.5	30	8 x 3.5

NOTE: FOR LOW TORQUE JOURNAL BEARING MODELS
THE "A" BORE CONTAINS THE 20 TOOTH GEAR. THE "B" BORE CONTAINS THE 30 TOOTH GEAR.

NOTE: FOR HIGH TORQUE ROLLER BEARING MODELS
THE "A" BORE CONTAINS THE 20 TOOTH GEAR. THE "B" BORE CONTAINS THE 30 TOOTH GEAR.

STANDARD SERIES - 2:1 RATIO - US & METRIC

AVAILABLE STYLES

Low Torque Journal Bearings

Standard

3-1/2 lbs. (1.59 kgs.)



AVAILABLE STYLES

High Torque Roller Bearings

Standard

6-1/4 lbs. (2.84 kgs.)



Flat Base

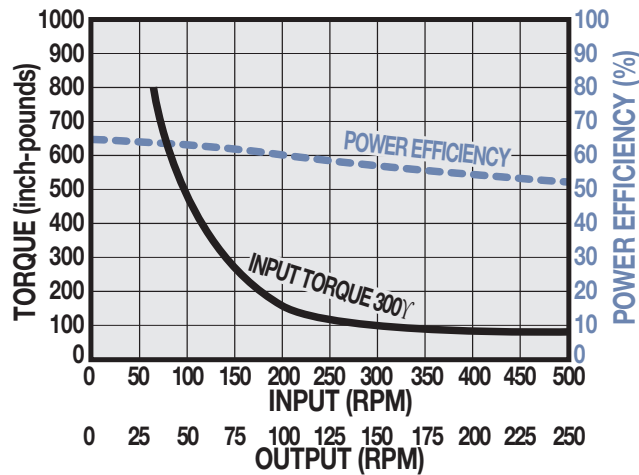
6-3/4 lbs. (3.06 kgs.)



PERFORMANCE DATA

Low Torque Journal Bearings

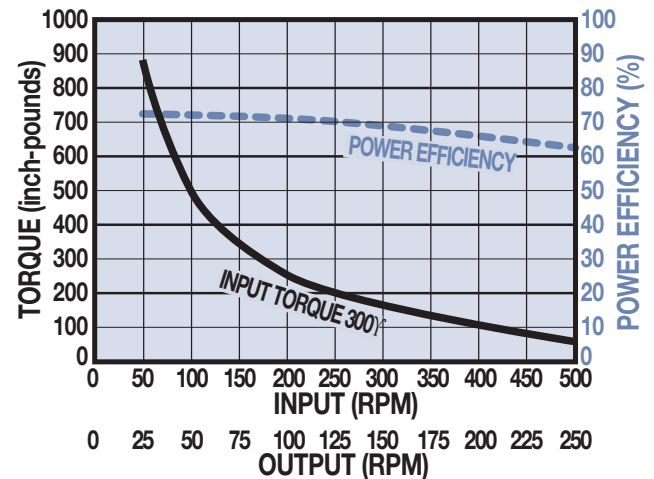
Torque and Efficiency vs RPM at Maximum Bearing Temperature



PERFORMANCE DATA

High Torque Roller Bearings

Torque and Efficiency vs RPM at Maximum Bearing Temperature

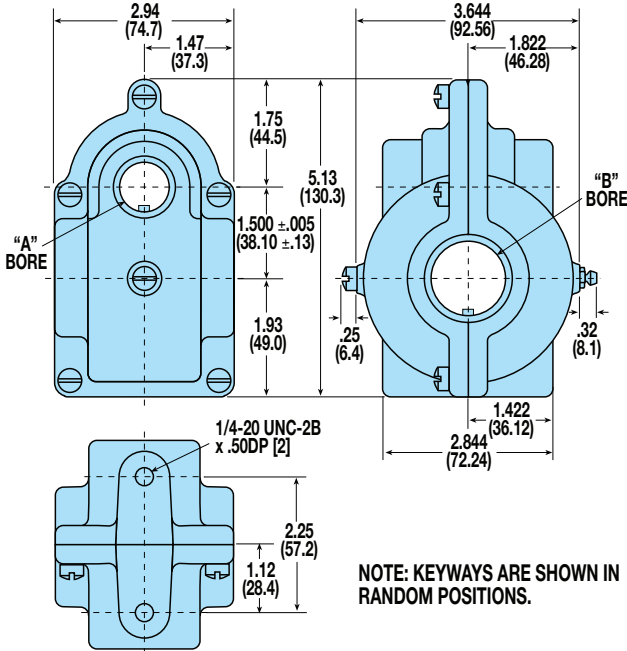


Float-A-Shaft Gearbox

STANDARD SERIES - 2:1 RATIO - US & METRIC

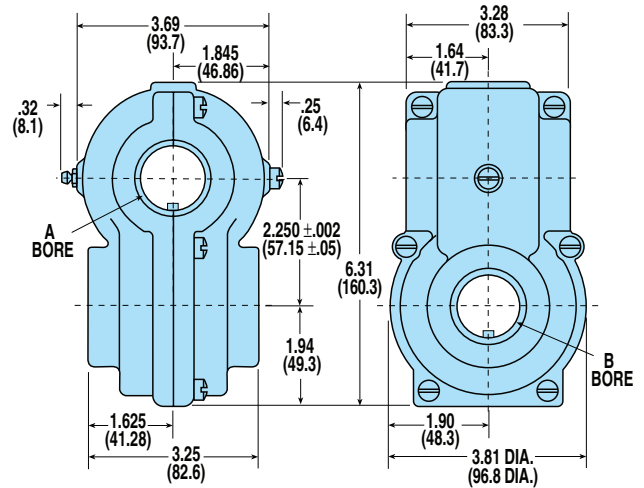
DIMENSIONS: STANDARD LOW TORQUE BEARINGS

Model Builder 3D CAD Available at: www.tolomatic.com



DIMENSIONS: STANDARD HIGH TORQUE BEARINGS

Model Builder 3D CAD Available at: www.tolomatic.com



METRIC MEASUREMENTS, IN MILLIMETERS, ARE IN PARENTHESES

Models and Bore Dimensions

U.S. - STANDARD - 2:1

LOW TORQUE JOURNAL BEARING & HIGH TORQUE ROLLER BEARING

LOW TORQUE JOURNAL BEARING MODEL NO.	HIGH TORQUE ROLLER BEARING MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
			BORE SIZE (IN.)	WxD KEYWAY (IN.)	BORE SIZE (IN.)	WxD KEYWAY (IN.)
0304-0000	0259-0200	RH	1/2	1/8 x 1/16	3/4	3/16 x 3/32
0303-0000	0260-0200	LH	1/2	1/8 x 1/16	3/4	3/16 x 3/32
0308-0000	0261-0200	RH	1/2	1/8 x 1/16	1	1/4 x 1/8
0307-0000	0262-0200	LH	1/2	1/8 x 1/16	1	1/4 x 1/8
0312-0000	0263-0200	RH	1/2	1/8 x 1/16	1-1/4	1/4 x 1/8
0311-0000	0264-0200	LH	1/2	1/8 x 1/16	1-1/4	1/4 x 1/8
0318-0000	0265-0200	RH	5/8	1/8 x 1/16	3/4	3/16 x 3/32
0317-0000	0266-0200	LH	5/8	1/8 x 1/16	3/4	3/16 x 3/32
0322-0000	0267-0200	RH	5/8	1/8 x 1/16	1	1/4 x 1/8
0321-0000	0268-0200	LH	5/8	1/8 x 1/16	1	1/4 x 1/8
0326-0000	0269-0200	RH	5/8	1/8 x 1/16	1-1/4	1/4 x 1/8
0325-0000	0270-0200	LH	5/8	1/8 x 1/16	1-1/4	1/4 x 1/8
NA	0271-0200	RH	3/4	3/16 x 3/32	3/4	3/16 x 3/32
NA	0272-0200	LH	3/4	3/16 x 3/32	3/4	3/16 x 3/32
NA	0273-0200	RH	3/4	3/16 x 3/32	1	1/4 x 1/8
NA	0274-0200	LH	3/4	3/16 x 3/32	1	1/4 x 1/8
NA	0275-0200	RH	3/4	3/16 x 3/32	1-1/4	1/4 x 1/8
NA	0276-0200	LH	3/4	3/16 x 3/32	1-1/4	1/4 x 1/8

NOTE: FOR LOW TORQUE JOURNAL BEARING MODELS: THE "A" BORE CONTAINS THE 10 TOOTH GEAR. THE "B" BORE CONTAINS THE 20 TOOTH GEAR.

METRIC - STANDARD - 2:1 HIGH TORQUE ROLLER BEARING

HIGH TORQUE ROLLER BEARING MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
		BORE SIZE (MM)	WxD KEYWAY (MM)	BORE SIZE (MM)	WxD KEYWAY (MM)
0390-0200	RH	15	5 x 2.5	20	6 x 3
0391-0200	LH	15	5 x 2.5	20	6 x 3
0392-0200	RH	15	5 x 2.5	25	8 x 3.5
0393-0200	LH	15	5 x 2.5	25	8 x 3.5
0394-0200	RH	15	5 x 2.5	30	8 x 3.5
0395-0200	LH	15	5 x 2.5	30	8 x 3.5

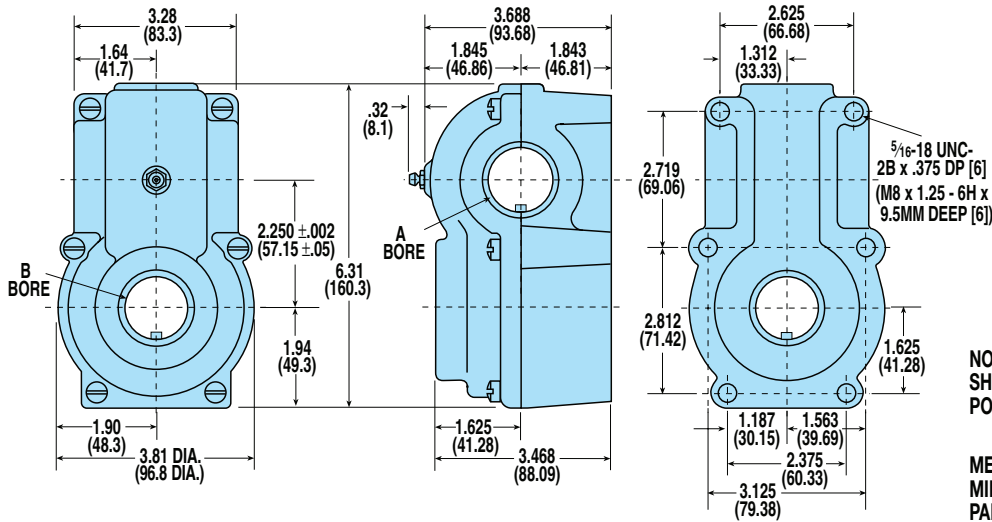
NOTE: METRIC SIZES AVAILABLE ONLY IN HIGH TORQUE ROLLER BEARING MODELS.

NOTE: FOR HIGH TORQUE ROLLER BEARING MODELS: THE "A" BORE CONTAINS THE 15 TOOTH GEAR. THE "B" BORE CONTAINS THE 30 TOOTH GEAR.

STANDARD SERIES - 2:1 RATIO - US & METRIC

DIMENSIONS: STANDARD FLAT BASE HIGH TORQUE BEARINGS

Model Builder 3D CAD Available at: www.tolomatic.com



Models and Bore Dimensions

U.S.- STANDARD FLAT BASE - 2:1 HIGH TORQUE ROLLER BEARING

HIGH TORQUE ROLLER MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
		BORE SIZE (IN.)	WxD KEYWAY (IN.)	BORE SIZE (IN.)	WxD KEYWAY (IN.)
0279-0200	RH	1/2	1/8 x 1/16	3/4	3/16 x 3/32
0280-0200	LH	1/2	1/8 x 1/16	3/4	3/16 x 3/32
0281-0200	RH	1/2	1/8 x 1/16	1	1/4 x 1/8
0282-0200	LH	1/2	1/8 x 1/16	1	1/4 x 1/8
0283-0200	RH	1/2	1/8 x 1/16	1-1/4	1/4 x 1/8
0284-0200	LH	1/2	1/8 x 1/16	1-1/4	1/4 x 1/8
0285-0200	RH	5/8	1/8 x 1/16	3/4	3/16 x 3/32
0286-0200	LH	5/8	1/8 x 1/16	3/4	3/16 x 3/32
0287-0200	RH	5/8	1/8 x 1/16	1	1/4 x 1/8
0288-0200	LH	5/8	1/8 x 1/16	1	1/4 x 1/8
0289-0200	RH	5/8	1/8 x 1/16	1-1/4	1/4 x 1/8
0290-0200	LH	5/8	1/8 x 1/16	1-1/4	1/4 x 1/8
0291-0200	RH	3/4	3/16 x 3/32	3/4	3/16 x 3/32
0292-0200	LH	3/4	3/16 x 3/32	3/4	3/16 x 3/32
0293-0200	RH	3/4	3/16 x 3/32	1	1/4 x 1/8
0294-0200	LH	3/4	3/16 x 3/32	1	1/4 x 1/8
0295-0200	RH	3/4	3/16 x 3/32	1-1/4	1/4 x 1/8
0296-0200	LH	3/4	3/16 x 3/32	1-1/4	1/4 x 1/8

METRIC - STANDARD FLAT BASE - 2:1 HIGH TORQUE ROLLER BEARING

HIGH TORQUE ROLLER MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
		BORE SIZE (MM)	WxD KEYWAY (MM)	BORE SIZE (MM)	WxD KEYWAY (MM)
0422-0200	RH	15	5 x 2.5	20	6 x 3
0423-0200	LH	15	5 x 2.5	20	6 x 3
0424-0200	RH	15	5 x 2.5	25	8 x 3.5
0425-0200	LH	15	5 x 2.5	25	8 x 3.5
0426-0200	RH	15	5 x 2.5	30	8 x 3.5
0427-0200	LH	15	5 x 2.5	30	8 x 3.5

NOTE: METRIC SIZES AVAILABLE ONLY IN HIGH TORQUE ROLLER BEARING MODELS.

NOTE: FOR HIGH TORQUE ROLLER BEARING MODELS THE "A" BORE CONTAINS THE 15 TOOTH GEAR. THE "B" BORE CONTAINS THE 30 TOOTH GEAR.

Float-A-Shaft Gearbox

STANDARD SERIES - 2 1/2:1 RATIO - US

AVAILABLE STYLES

Low Torque Journal Bearings

Standard

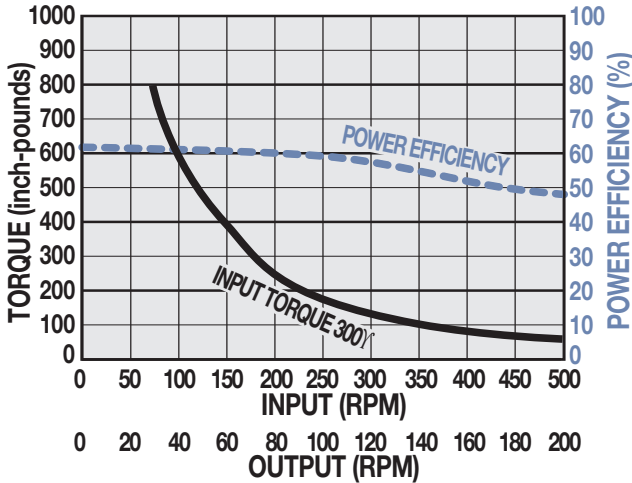
3-1/2 lbs. (1.59 kgs.)



PERFORMANCE DATA

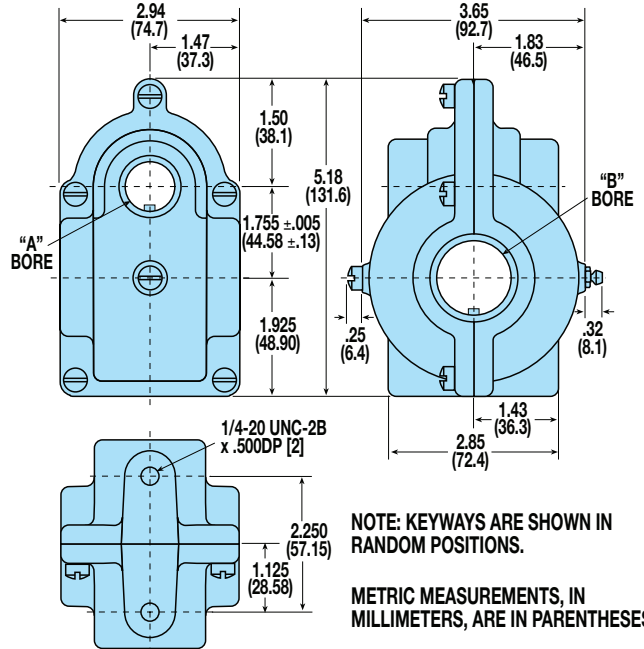
Low Torque Journal Bearings

Torque and Efficiency vs RPM at Maximum Bearing Temperature



DIMENSIONS: STANDARD LOW TORQUE BEARINGS

Model Builder 3D CAD Available at: www.tolomatic.com



Models and Bore Dimensions

U.S. - STANDARD - 2 1/2:1 LOW TORQUE JOURNAL BEARING

LOW TORQUE JOURNAL MODEL NO.	RH OR LH	"A" BORE		"B" BORE	
		BORE SIZE (IN.)	WXD KEYWAY (IN.)	BORE SIZE (IN.)	WXD KEYWAY (IN.)
0403-0000	LH	1/2	1/8 x 1/16	3/4	3/16 x 3/32
0404-0000	RH	1/2	1/8 x 1/16	3/4	3/16 x 3/32
0407-0000	LH	1/2	1/8 x 1/16	1	1/4 x 1/8
0408-0000	RH	1/2	1/8 x 1/16	1	1/4 x 1/8
0411-0000	LH	1/2	1/8 x 1/16	1-1/4	1/4 x 1/8
0412-0000	RH	1/2	1/8 x 1/16	1-1/4	1/4 x 1/8
0417-0000	LH	5/8	1/8 x 1/16	3/4	3/16 x 3/32
0418-0000	RH	5/8	1/8 x 1/16	3/4	3/16 x 3/32
0421-0000	LH	5/8	1/8 x 1/16	1	1/4 x 1/8
0422-0000	RH	5/8	1/8 x 1/16	1	1/4 x 1/8
0425-0000	LH	5/8	1/8 x 1/16	1-1/4	1/4 x 1/8
0426-0000	RH	5/8	1/8 x 1/16	1-1/4	1/4 x 1/8

NOTE: THE "A" BORE CONTAINS THE 10 TOOTH GEAR. THE "B" BORE CONTAINS THE 25 TOOTH GEAR.

SELECTION

1.) DETERMINE INPUT TORQUE AND RPM REQUIRED

To select the Slide-Rite®, Slide-Rite®CR Gearbox, or Float-A-Shaft gearbox required for your application, you must determine the input torque and RPM required for your application. The maximum RPM rating for the Float-A-Shaft is 500 RPM, for the Slide-Rite® and the Slide-Rite®CR Gearbox it's 1200 RPM.

2.) NEED A GEAR RATIO OTHER THAN 1:1?

When utilizing the Float-A-Shaft ratioed units, the highest RPM shaft speed on either the input or the output shaft should not exceed 500 RPM. For the Slide-Rite ratioed units, the shaft speed (input or output) should not exceed 1200 RPM.

3.) REFER TO THE CATALOG PAGE FOR THE RATIO YOU HAVE SELECTED

Find your input torque in inch-pounds for the selected gearbox unit on the graph and intersect it with the RPM of the input shaft. In general, gearbox capacity increases as listed below:

- 1.) Float-A-Shaft: Compact: Low Torque Journal Bearings
- 2.) Float-A-Shaft: Compact: High Torque Roller Bearings
- 3.) Slide-Rite CR: Compact
- 4.) Float-A-Shaft: Standard: Low Torque Journal Bearings
- 5.) Slide-Rite: Compact
- 6.) Slide-Rite CR: Standard
- 7.) Float-A-Shaft: Standard: High Torque Roller Bearings
- 8.) Slide-Rite: Standard

For ratios other than 1:1 refer to the performance graph for that Float-A-Shaft gearbox. When torque vs RPM intersects below the 300°F curve, you have selected a gearbox suitable for your application.

If your torque vs RPM intersection point is above the 300°F curve, then you do not have a proper application for that gearbox. Your options are to reduce either your input torque or RPM to get under the 300°F curve or try a gearbox with greater capacity.

4.) SELECT PROPER BORE SIZE

After gearbox series selection, choose the bore size that suits your shaft requirements. (NOTE: Float-A-Shaft high torque roller bearing models and Slide-Rite 1:1 ratio models are available in metric sizes also.)

5.) DETERMINE YOUR OUTPUT TORQUE

SLIDE-RITE™ & SLIDE-RITE™CR SELECTION EXAMPLE

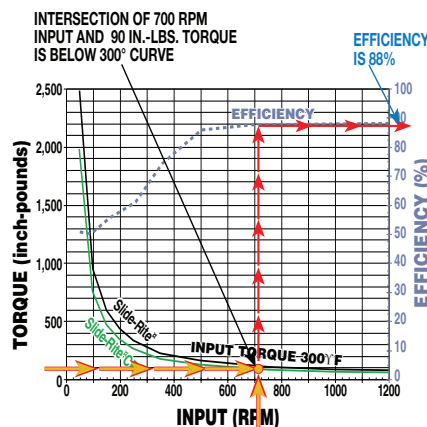
Example: Slide-Rite® Gearbox Standard Series at 700 RPM and 90 inch-pounds of input torque (Refer to the graph shown below. From page 5)

Output torque = (Input torque) (efficiency) (ratio)
 Output torque = (90 in.-lbs.) (.88) (1:1)
 Output torque = 79 in.-lbs.

PERFORMANCE DATA

High Torque Ball Bearings

Torque and Efficiency vs RPM at Maximum Bearing Temperature



FLOAT-A-SHAFT SELECTION EXAMPLE

Multiply the input torque by the gearbox's efficiency times the gear ratio. See examples:

Output torque = (Input torque) (efficiency) (ratio)
 Example: 3:2 Ratio Journal Bearing Float-A-Shaft at 50 RPM and 500 inch-pounds of input torque (See graph below. From page 16)

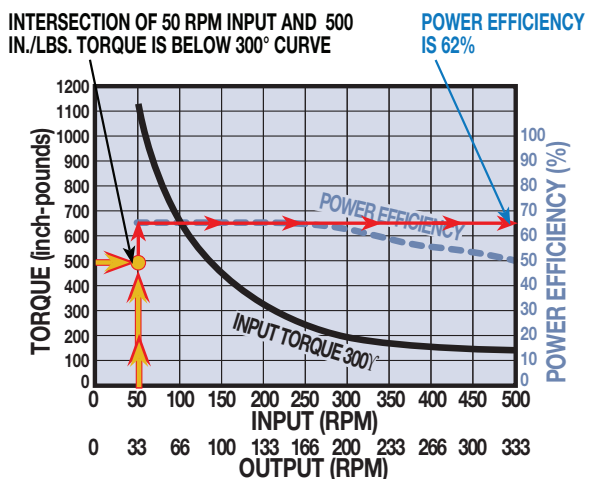
Output torque = (500 in.-lbs.) (.62) (3:2)
 Output torque = 465 in.-lbs.

STANDARD SERIES 3:2 RATIO

PERFORMANCE DATA

Low Torque Journal Bearings

Torque and Efficiency vs RPM at Maximum Bearing Temperature



Gearbox

INSTALLATION



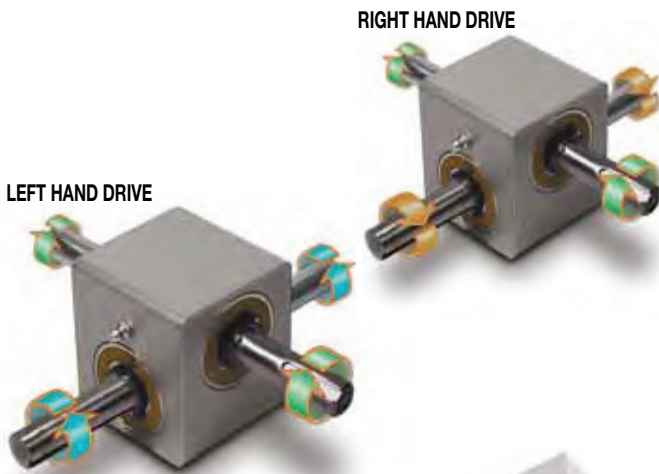
A plastic or cardboard dowel is inserted through the shaft bores during assembly and shipped in place. It allows you to install the Slide-Rite®, Slide-Rite®CR Gearbox, or Float-A-Shaft gearbox on your shafts in less than a minute.

To install your gearbox, simply line up the keyway on your shaft with the key and bore of the gearbox. Push the shaft through into place! The dowel falls out the other side and can be thrown away.

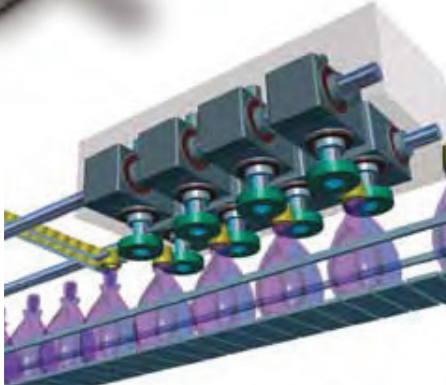
Gearboxes need not be disassembled and reassembled during installation. The dowel holds the gears in perfect alignment during installation and protects the precision internal parts from contamination and damage during shipping.

This fast and easy method of installation can be used whenever the keyways on your shafts extend out to the end of the shafts. For shafts with shorter keyways, the Float-A-Shaft can be built around the shaft. (Slide-Rite® and Slide-Rite®CR gearboxes cannot be disassembled.)

Rotation of left hand and right hand drive compared, Slide-Rite® gearbox shown



This bottle capping application utilizes both left hand and right hand gearboxes



SHAFT & KEYWAY REQUIREMENTS

Shaft Diameter

Tolerance of plus 0.000 in. to minus 0.002 in. is recommended and should have runout within 0.002 in. TIR.

Shaft Material

Use only alloy steel or stainless-steel for shafting, having a minimum hardness of RC40, or transmission shafting grade like 4140 or equivalent.

Shaft Finish

In stationary applications the shaft finish should be 64 RMS or better. Shaft finish for traversing applications should be 32 RMS.

Shaft Straightness

Shaft should be straight within 0.0015 in. TIR. per foot.

Keyway

Keyway should be made up to 0.001 oversize than the nominal. See dimension table for nominal keyway sizes. Sharp edges of keyway should be avoided.

Shaft Support

The shafts should be supported rigidly with either bearing blocks or pillow blocks to avoid excessive deflection. Gearbox bearings are designed to support the internal thrust and radial loads generated by the gear teeth. Shaft support should be located as close to the gearbox body as the application will allow. Supports greater than 25" from gearbox body (20" for compact models) can reduce gearbox efficiency and, ultimately, its life.

Lubrication, all gearboxes

An extreme-pressure synthetic lubricant which exhibits excellent anti-wear and rust protection qualities such as Mobilith® SHC 460 [14 oz. cartridge #0100-1605] or equivalent is recommended.

Temperature range	0 - 300°F
NLGI Number	1.5 - 2
Dropping Point (ASTM D566)	490+
Penetration Worked (ASTM D217)	300

Slide-Rite® Gearbox is a registered trademark of Tolomatic, Inc.

Mobilith® SHC 460 is a registered trademark of Exxon Mobil Corporation, www.mobil.com

Lubrication, Slide-Rite® gearboxes

The Slide-Rite® Gearbox is lubricated at the factory and is ready for installation. **For most applications the unit is greased for life.** (See the Slide-Rite Gearbox service sheet [#0100-4002 at tolomatic.com] for lubrication guidelines.)

Engineering Resources

GLOSSARY

GLOSSARY

CONVERSION
TABLES

- A**
- AXIAL LOADING:** A load with a force directed along an axis, such as a shaft.
- B**
- BACKING PLATE:** Steel plate on which brake linings are mounted.
- BLEEDING:** Method of purging air from a brake system's hydraulic lines and cylinders. Air is compressible and contaminates brake fluid. It is released via a "bleeder valve".
- BONDED LINING:** Brake lining (friction material) attached to the backing plate with adhesive.
- BRAKE BALANCE:** The ratio of braking force distributed between the front and rear wheels.
- BRAKE DISC (OR ROTOR):** The basis of a disc brake system: a round metal disc which rotates with the road wheel and, in order to generate braking power, is clamped by a caliper holding two friction linings (pads).
- BRAKE FADE:** Reduction (or complete loss) of braking performance, usually caused by too much heat in the system.
- BRAKE FEEL:** Sensation transmitted to the driver during a braking action via the brake pedal.
- BRAKE FLUID:** Liquid formulated specifically to be used in hydraulic brake systems.
- BRAKE HOSE:** Flexible rubber (or synthetic) hose used to join hydraulic brake components.
- BRAKE LINE:** Rigid tubing which links various hydraulic components in a brake system.
- BRAKE LINING:** Common name for Friction Material.
- BRAKE PAD:** The component in a disc brake system which is fitted with brake lining and clamped against the brake disc to cause friction.
- BUNA-N:** A widely used copolymer (artificial rubber) used for making seals. Buna-N seals should never be used with automotive brake fluid.
- C**
- CALIPER:** A type of clamp which grips a disc rotor to create friction and thereby generate stopping power.
- CENTER OF GRAVITY:** (Center of Mass) The point at which the entire weight of a body may be considered as concentrated so that if supported at this point the body would remain in equilibrium in any position.
- COEFFICIENT OF FRICTION:** The measurement of friction of one object sliding across another. Symbolized by the Greek letter Mu (μ) it is defined as the tangent of the angle of repose of a static body. The coefficient is expressed in decimal values (clean iron on clean iron is 1.0, while metal on solid rubber may range from 1.0 up to 4.0). When objects are wet, the coefficient of friction decreases.
- CROSS-DRILLED DISC:** Disc with friction surfaces which have been drilled with rows of holes to improve cooling, reduce weight and provide an escape route for dirt and gasses which can be wedged between the pads and disc. High-performance rotors can be both cross-drilled and slotted.
- CURVED VANE DISC:** Ventilated rotor in which the cooling channels (or vanes) have been curved to increase their ability to pump out hot air and cool the disc. Curved vane rotors are more efficient than conventional ventilated rotors and, as a side benefit, tend to be stronger.
- D**
- DISC BRAKE:** The most popular and effective type of automotive brake. It uses a rotor (a round grey metal plate) which is squeezed by a caliper to create friction and thereby generate stopping power.
- DISC THICKNESS VARIATION:** A variation in thickness between two points on the friction surface of a disc rotor (usually caused by poor manufacture, poor machining or rubbing of the rotor against the caliper when the brakes are "off").
- DISCARD THICKNESS:** Alternative term for Minimum Thickness.
- DOUBLE-ACTING BRAKES:** Double-acting brakes apply pressure to pucks on each side of the disc. Both disc and brake may be fixed mounted.
- DRUM BRAKE:** A type of older - but still popular and effective - automotive brake in which a circular drum rotates around a set of brake shoes which are fixed to the hub and act on the drum by expanding.
- F**
- FLAT BASE:** Mounting style for Float-A-Shaft standard series
- FLOATING BRACKET:** Method of mounting single acting caliper disc brake that allows the force of the brake to be applied to both sides of the disc.
- FOOT MOUNT:** Mounting style for Float-A-Shaft compact series.
- FRICTION MATERIAL:** Material which is pushed against a disc by a shoe or caliper to generate friction.
- FRICTION SURFACES:** Any of the surfaces designed to rub together in a brake system to create friction and therefore stopping power.
- G**
- GLAZING:** The process whereby a brake lining or disc rotor becomes smooth and glossy due to excess heat.
- H**
- HEAT DISSIPATION:** The process whereby braking components rid themselves of heat caused by friction. The heat in a disc system is mostly dissipated into the surrounding air. Dissipation can be accelerated by various forms of ventilation.
- HEAT SPOTS:** Shiny dark areas on a rotor caused by extreme heat.
- HERRINGBONE PATTERN:** Pattern found on the surface of a disc which has been poorly machined.
- HYDRAULIC SYSTEM:** The delivery system of a modern braking set-up. It uses fluid to transmit the force applied at the pedal to activate the disc calipers.
- HYGROSCOPIC:** A characteristic whereby something tends to absorb water. Brake fluid is hygroscopic.
- J**
- JOURNAL BEARING:** A type of bearing material used in Float-A-Shafts for applications with lower torque requirements.
- K**
- KEY:** A demountable machinery part, which, when assembled into a keyseat, provides a positive means for transmitting torque between two other machine parts.
- KEYWAY:** An axially-located groove in the length of a shaft along which a key might move.
- M**
- MANUAL BRAKES:** Braking system which does not use power-assistance to magnify the pedal effort.
- MASTER CYLINDER:** The engine-room of a brake system, where the force applied at the pedal is converted into hydraulic pressure.
- MINIMUM THICKNESS:** The thickness at which a disc rotor must be discarded. Through wear and machining a disc rotor becomes thinner over time; as a result it becomes less able to dissipate heat and more prone to warping and other problems. The minimum thickness is usually determined by the vehicle manufacturer.
- MODIFIED STANDARD PRODUCTS:** Tolomatic can easily accommodate your special needs. Our standard products are often customized with extra mounting holes, different materials and other requests. This can often be done within our normal 5 day production time. We welcome modifications as well as completely new custom products.
- N**
- NEEDLE BEARING:** A type of roller bearing where the journal turns on small-diameter, hardened needle-like rollers which roll easily in a metal race.
- NON-ASBESTOS LINING:** Friction material which uses no asbestos, thereby being easier on public health (breathing asbestos dust can cause the disease asbestosis).
- O**
- ORIGINAL EQUIPMENT:** Industry term for a component supplied with a new vehicle or as an official replacement part. Known as OEM or "Original Equipment Manufacturer" parts, they are not necessarily produced by the vehicle-maker in question.
- OUT-OF-ROUND:** Effect where a disc is no longer true to its original shape, as a result of either warping, inconsistent wear or other damage. This can cause pulsing, grabbing, additional noise and lowered performance.
- P**
- PARALLELISM:** A term which refers to the relationship between the two friction surfaces on a disc brake rotor.
- PROPORTIONING VALVE:** Hydraulic control designed to stop the rear wheels from locking up (rear wheels become "light" under heavy braking and therefore more likely to skid).
- PULLING:** Tendency of a vehicle to pull to one side under braking.
- PULSING:** Uneven or stutter-like force transmitted through the brake pedal during braking, usually caused by problems with disc rotors or linings.
- R**
- RESERVOIR:** Chamber connected to the master cylinder (usually by hoses) and used for storing hydraulic fluid.
- ROLLER BEARING:** An anti-friction device consisting of a journal which rests on free-rolling, hardened cylinders in a race.
- ROTOR:** Alternative name for brake disc.
- RUN-OUT:** Rotors which are warped or out-of-true have excess "run-out", meaning the surface varies or wobbles as it rotates around a fixed point.
- S**
- SINGLE-ACTING BRAKES:** Single-acting brakes have piston and puck on "live side" and a non-actuated puck on the "dead side". Since only one side applies force to the disc, a means to allow movement of the disc or caliper must be provided.
- SLOTTED DISC:** Type of disc brake rotor which has a series of slots or grooves across its friction surfaces. These are designed to improve the bite of the pads and break down the build-up of gas and dirt which can occur between pad and rotor. High-performance rotors can be both slotted and cross-drilled.
- SOLID ROTOR:** Disc rotor with solid metal between the two friction surfaces.
- SPONGY PEDAL:** Pedal which feels spring-like, perhaps due to the presence of air in the hydraulic system.
- SWEEP AREA:** Total friction area contacted by the pads during one revolution of the rotor.
- T**
- TENSILE STRENGTH:** The greatest longitudinal stress a substance can bear without permanent deformation.
- T.I.R. (Total Indicated Reading):** An industry-accepted standard for measuring straightness and roundness.
- TOLERANCE:** A specified allowance for error from a desired or measured quantity.
- TORQUE:** A force that produces rotation. A turning or twisting force. (From the Latin torquere - to twist.)
- V**
- VENTILATED ROTOR:** Disc rotor which has a series of fins (or cooling passages) between the two friction surfaces to aid in heat dissipation.
- VITON®:** A DuPont Chemical Co. trademark for a fluorocarbon rubber used in high temperature applications. At Tolomatic, Viton® is used for seals in high temperature situations and for brakes designed to be operated with non-flammable hydraulic fluids such as phosphate-ester.

Engineering Resources

CONVERSION TABLES

(TO CONVERT FROM A TO B, MULTIPLY BY ENTRY IN TABLE)

Length

A \ B	in	ft	yd	mm	cm	m
in	1	0.0833	0.028	25.4	2.54	0.0254
ft	12	1	0.333	304.8	30.48	0.3048
yd	36	3	1	914.4	91.44	0.914
mm	0.03937	0.00328	0.00109	1	0.1	0.001
cm	0.3937	0.03281	0.0109	10	1	0.01
m	39.37	3.281	1.09	1,000	100	1

Mass

A \ B	gm	kg	slug	lb(m)	oz(m)
gm	1	0.001	6.852×10^{-5}	2.205×10^{-3}	0.03527
kg	1,000	1	6.852×10^{-2}	2.205	35.274
slug	14,590	14.59	1	32.2	514.72
lb(m)	453.6	0.45359	0.0311	1	16
oz(m)	28.35	0.02835	1.94×10^{-3}	0.0625	1

Pressure

A \ B	atm	bar	millibar	lbs/sqr ft (PSF)	lbs/sqr in (PSI)	N/sqr m (NSM)	N/sqr mm (NSMM)
atm	1	1.01325	1,013.25	2116.22	14.6454	101,325	0.101325
bar	0.986923	1	1,000	2088.54	14.5037	100000	0.1
millibar	0.000987	0.001	1	2.08854	0.014504	100	0.0001
PSF	0.000473	0.000479	0.478803	1	0.006944	47.880	0.000048
PSI	0.068046	0.068948	68.94757	144	1	6,894.757	0.006895
NSM	0.00001	0.00001	0.01	0.020885	0.000145	1	0.000001
NSMM	98,692	10	10,000	20,885.43	145.0377	1,000,000	1

Temperature

$^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$
$^{\circ}\text{C} = .555 (^{\circ}\text{F} - 32)$

Gravity

(Acceleration Constant)
$g = 386 \text{ in/s}^2 = 32.2 \text{ ft/s}^2 = 9.8 \text{ m/s}^2$

Force

A \ B	lb(f)	N	dyne	oz(f)	kg(f)	gm(f)
lb(f)	1	4.4482	4.448×10^5	16	0.45359	453.6
N	0.22481	1	100,000	3.5967	0.10197	101.97
dyne	2.248×10^{-6}	0.00001	1	3.59×10^{-5}	1.02×10^{-6}	0.00102
oz(f)	0.0625	0.27801	2.78×10^4	1	.02835	28.35
kg(f)	2.205	9.80665	980,665	35.274	1	1,000
gm(f)	2.205×10^{-3}	0.0098	980.665	0.03527	0.001	1

Power

A \ B	Watts	KW	HP (English)	HP (Metric)	ft-lb/s	in-lb/s
Watts	1	1×10^{-3}	1.34×10^{-3}	1.36×10^{-3}	0.74	8.88
kw	1,000	1	1.34	1.36	738	8,880
hp(English)	746	0.746	1	1.01	550	6,600
hp(Metric)	736	0.736	0.986	1	543	6,516
ft-lb/s	1.36	1.36×10^{-3}	1.82×10^{-3}	1.84×10^{-3}	1	12
in-lb/s	0.113	1.13×10^{-4}	1.52×10^{-4}	1.53×10^{-4}	8.3×10^{-2}	1

NOTE: lb(f) = 1 slug x 1 ft/s² N = 1 kg x 1 m/s² dyne = 1gm x 1 cm/s²

Abbreviated Terms

atm = atmosphere (STD)	g = gravity	kg = kilogram	mm = millimeter	rad = radians
C = Celsius	gm = gram	kg(f) = kilogram force	m = meter	rpm = revs per minute
cm = centimeter	gm(f) = gram force	kw = Kilowatt	N = Newton	rps = revs per second
F = Fahrenheit	hp = horse power	lb(f) = pound force	oz(f) = ounce force	s = seconds
ft = foot	in = inch	lb(m) = pound mass	oz(m) = ounce mass	sq = square
		min = minute		

Engineering Resources

CONVERSION TABLES

(TO CONVERT FROM A TO B, MULTIPLY BY ENTRY IN TABLE)

Torque

A \ B	dyne-cm	gm-cm	oz-in	kg-cm	lb-in	N-m	lb-ft	kg-m
dyne-cm	1	1.019×10^{-2}	1.416×10^{-5}	1.0197×10^{-6}	8.850×10^{-7}	10^{-7}	7.375×10^{-6}	1.019×10^{-6}
gm-cm	980.665	1	1.388×10^{-2}	10-3	8.679×10^{-4}	9.806×10^{-5}	7.233×10^{-5}	10^{-5}
oz-in	7.061×10^4	72.007	1	7.200×10^{-2}	6.25×10^{-2}	7.061×10^{-3}	5.208×10^{-3}	7.200×10^{-4}
kg-cm	9.806×10^5	1,000	13.877	1	0.8679	9.806×10^{-2}	7.233×10^{-2}	10^2
lb-in	1.129×10^6	1.152×10^3	16	1.152	1	0.112	8.333×10^{-2}	1.152×10^{-2}
N-m	10^7	1.019×10^4	141.612	10.197	8.850	1	0.737	0.102
lb-ft	1.355×10^7	1.382×10^4	192	13.825	12	1.355	1	0.138
kg-m	9.806×10^7	10^5	1.388×10^3	100	86.796	9.806	7.233	1

Inertia (Rotary) NOTE: Mass inertia = $\frac{\text{wt. inertia}}{g}$

A \ B	gm-cm ²	oz-in ²	gm-cm-s ²	kg-cm ²	lb-in ²	oz-in-s ²	lb-ft ²	kg-cm-s ²	lb-in-s ²	lb-ft-s ² or slug-ft-s ²
gm-cm ²	1	5.46×10^{-2}	1.01×10^{-3}	10^{-3}	3.417×10^{-4}	1.41×10^{-5}	2.37×10^{-6}	1.01×10^{-4}	8.85×10^{-7}	7.37×10^{-4}
oz-in ²	182.9	1	0.186	0.182	0.0625	2.59×10^{-2}	4.34×10^{-4}	1.86×10^{-4}	1.61×10^{-4}	1.34×10^{-5}
gm-cm-s ²	980.6	5.36	1	0.9806	0.335	1.38×10^{-2}	2.32×10^{-3}	10^{-3}	8.67×10^{-4}	7.23×10^{-5}
kg-cm ²	1,000	5.46	1.019	1	0.3417	1.41×10^{-2}	2.37×10^{-3}	1.019×10^{-3}	8.85×10^{-4}	7.37×10^{-5}
lb-in ²	2.92×10^3	16	2.984	2.925	1	4.14×10^{-2}	6.94×10^{-3}	2.96×10^{-3}	2.59×10^{-3}	2.15×10^{-4}
oz-in-s ²	7.06×10^4	386.08	72.0	70.615	24.13	1	0.1675	7.20×10^{-2}	6.25×10^{-2}	5.20×10^{-3}
lb-ft ²	4.21×10^5	2,304	429.71	421.40	144	5.967	1	0.4297	0.3729	3.10×10^{-2}
kg-cm-s ²	9.8×10^5	5.36×10^3	1,000	980.66	335.1	13.887	2.327	1	0.8679	7.23×10^{-2}
lb-in-s ²	1.129×10^4	6.177×10^3	1.152×10^3	1.129×10^3	386.08	16	2.681	1.152	1	8.33×10^{-2}
lb-ft-s ²	1.355×10^7	7.41×10^4	1.38×10^4	1.35×10^4	4.63×10^3	192	32.17	13.825	12	1

Angular Velocity

A \ B	deg/s	rad/s	rpm	rps
deg/s	1	1.75×10^{-2}	0.167	2.78×10^{-3}
rad/s	57.3	1	9.55	0.159
rpm	6	0.105	1	1.67×10^{-2}
rps	360	6.28	60	1

Linear Velocity

A \ B	in/min	ft/min	in/sec	ft/sec	mm/sec	m/sec
in/min	1	0.0833	0.0167	1.39×10^{-3}	0.42	4.2×10^{-4}
ft/min	12	1	.2	0.0167	5.08	5.08×10^{-3}
in/sec	60	5	1	0.083	25.4	0.0254
ft/sec	720	60	12	1	304.8	0.3048
cm/sec	23.62	1.97	0.3937	0.0328	10	0.01
m	2,362.2	196.9	39.37	3.281	1,000	1

TERMS / CONDITIONS OF SALE

1. ORDER ACCEPTANCE. All orders or services are subject to acceptance in Minnesota by the written approval of an authorized official of Tolomatic, Inc.. Any such order shall be subject to these Terms and Conditions of Sale, and acceptance shall be conditioned on Purchaser's assent to such conditions. Purchaser's assent shall be deemed given unless Purchaser shall expressly notify Tolomatic, Inc. in writing to the contrary within five (5) days after receipt of acknowledgment to confirmation of an order.

2. CANCELLATION AND CHANGES. No order accepted by Tolomatic, Inc. may be modified in any manner by Purchaser unless agreed to in writing, by an authorized official of Tolomatic, Inc.. Order cancellations, including reductions to order quantities, and changes shall be governed by the following:

- a. Any standard product order scheduled for shipment within five (5) working days of purchaser's request to cancel or modify will be shipped as previously acknowledged and purchaser agrees to accept shipment and payment responsibility, in full, at the price agreed upon.
- b. "Customer Special" orders scheduled for shipment within twenty (20) working days of purchaser's request to cancel or modify will be shipped as previously acknowledged and purchaser agrees to accept shipment and payment responsibility, in full, at the price agreed upon.
- c. All work in connection with "Customer Special" orders, not covered under Paragraph b, will be stopped immediately upon notification, and purchaser agrees to reimburse Tolomatic, Inc. for all work-in-process and any materials or supplies used, or for which commitments have been made by Tolomatic, Inc. in connection therewith.

3. QUOTATIONS AND PRICES. Written quotations automatically expire 30 calendar days from the date issued unless terminated sooner by written notice. (Verbal quotations expire, unless accepted in writing, the same day.)

All published prices and discounts are subject to change without notice. In the event of a net price change, the price of

product(s) on order will be the price in effect on the date of order acknowledgment. Any addition to an outstanding order will be accepted at prices in effect when the addition is made.

4. MINIMUM BILLING. Orders amounting to less than \$35.00 net will be billed at \$35.00

5. TAXES. Any Manufacturer's Tax, Retailers Occupation Tax, Use Tax, Sales Tax, Excise Tax, Duty, Customer, Inspection or Testing Fee, or any other tax, fee or charge of any nature whatsoever, imposed by any government authority, on or measured by any transactions between Tolomatic, Inc. and Purchaser shall be paid by the Purchaser in addition to the prices quoted or involved. In the event Tolomatic, Inc. shall be required to pay any such tax, fee or charge, Purchaser shall reimburse therefore.

6. TERMS OF PAYMENT. Net invoice amount is due within 30 days from date of invoice subject to credit approval. A 2% per month service charge shall apply to all invoices not paid within 30 days. All clerical errors are subject to correction. Any invoice in not paid within 60 days will subject that account to an immediate shipping hold.

7. F.O.B. POINT. All sales are F.O.B. Tolomatic, Inc.'s facility in Hamel, Minnesota, unless quoted otherwise.

8. DELIVERY. Delivery of product(s) by Tolomatic, Inc. to a carrier shall constitute delivery to Purchaser, and regardless of freight payment, title and all risk or loss or damage in transit shall pass to Purchaser at that time.

Should shipment be held beyond scheduled date, upon request of Purchaser, product will be billed and Purchaser agrees to accept any charges for warehousing, trucking and other expenses as may be incident to such delay.

Great care is taken by Tolomatic, Inc. in crating its product. Tolomatic, Inc. cannot be held responsible for breakage after having received "In Good Order" receipts from the transporting carrier. All claims for loss and damage must be made by Purchaser to the carrier within 14 days from receipt of goods. Tolomatic, Inc. will assist insofar as practical in securing satisfactory adjustment of such claims wherever possible.

Claims for shortages or other errors must be made, in writing, within ten (10) days to Tolomatic, Inc. and any additional expense of the method or route of shipment specified by Purchaser shall be borne by the Purchaser.

9. SHIPPING SCHEDULES. All quoted shipping schedules are approximate and will depend upon prompt receipt from Purchaser of confirming copy of Purchase Order. Dimensional drawings and specifications submitted by Tolomatic, Inc. to Purchaser for approval must be returned to Tolomatic, Inc. within 10 working days, with approval granted, and any exceptions noted, in order to avoid delay in manufacturing schedules.

Orders which include penalty clauses for failure to meet shipping schedules will not be acceptable, except in those cases specifically approved in writing by the General Manager of Tolomatic, Inc..

Tolomatic, Inc. shall not be liable for damage as a result of any delay due to any cause beyond Tolomatic, Inc.'s reasonable control, including, without limitation, an Act of Nature; act of Purchaser; embargo, or other government act, regulation or request; fire; accident; strike; slow down; war; riot; flood; delay in transportation; and inability to obtain necessary labor, materials or manufacturing facilities. In the event of any such delay, the date of delivery shall be extended for a period equal to the time loss by reason of the delay. The acceptance of the product when delivered shall constitute a waiver of all claims for damages caused by any such delays.

10. RETURN OF PRODUCT. No product may be returned without first obtaining a Return Goods Authorization form and confirming memorandum from Tolomatic, Inc.. Product, if accepted for credit, shall be subject to a minimum service charge of 35% of the invoice price and all transportation charges shall be prepaid by the Purchaser; however, assembled products classified as "special," such as Cable Cylinders and other products which have been modified or built as "Customer Specials," are not returnable to Tolomatic, Inc..

11. WARRANTY. Tolomatic, Inc., WARRANTS PRODUCT MANUFACTURED BY IT TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF

ONE YEAR FROM DATE OF SHIPMENT BY Tolomatic, Inc.. IF WITHIN SUCH PERIOD ANY SUCH PRODUCT SHALL BE PROVED TO Tolomatic, Inc.'s SATISFACTION TO BE SO DEFECTIVE, SUCH PRODUCT SHALL EITHER BE REPAIRED OR REPLACED AT Tolomatic, Inc.'s OPTION.

THIS WARRANTY SHALL NOT APPLY:

- a. TO PRODUCT NOT MANUFACTURED BY Tolomatic, Inc. WITH RESPECT TO PRODUCT NOT MANUFACTURED BY Tolomatic, Inc.. THE WARRANTY OBLIGATIONS OF Tolomatic, Inc. SHALL IN ALL RESPECTS CONFORM AND BE LIMITED TO THE WARRANTY ACTUALLY EXTENDED TO Tolomatic, Inc. BY ITS SUPPLIER.
- b. TO PRODUCT WHICH SHALL HAVE BEEN REPAIRED OR ALTERED BY PARTIES OTHER THAN Tolomatic, Inc. SO AS, IN Tolomatic, Inc.'s JUDGMENT, TO AFFECT THE SAME ADVERSELY, OR
- c. TO PRODUCT WHICH SHALL HAVE BEEN SUBJECT TO NEGLIGENCE, ACCIDENT, OR DAMAGE BY CIRCUMSTANCES BEYOND THE CONTROL OF Tolomatic, Inc. OR TO IMPROPER OPERATION MAINTENANCE OR STORAGE, OR TO OTHER THAN NORMAL USE AND SERVICE.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, Tolomatic, Inc. SHALL NOT BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES WHATSOEVER WITH RESPECT TO PRODUCT MANUFACTURED OR SUPPLIED BY Tolomatic, Inc. OR SERVICE RENDERED BY IT.

12. CONSEQUENTIAL DAMAGE. Tolomatic, Inc., shall not, under any circumstances be liable for consequential damages.

13. SERVICE CHARGES. Should the Purchaser request the service of any erector, demonstrator or service man (except as specifically provided for and included in the price of the product) such service will be rendered at the rate outlined in the schedule of field service charges in effect at the date of request.

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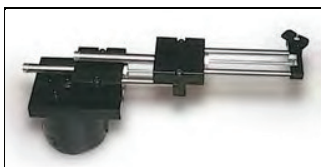
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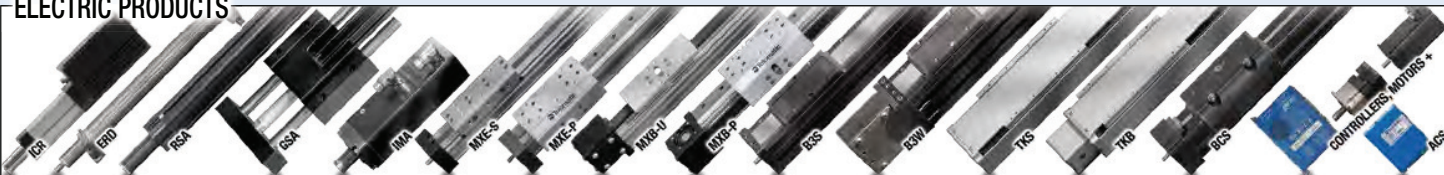
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