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**Gatco Anti-Friction Rotary Bushings** are self contained bearing cartridges used to support and guide rotating cutting tools. They consist of a stationary outer case; a hardened and ground inner liner which rotates with the cutting tool; anti-friction bearings and seals. They are manufactured in several series with each having distinct advantages that cover the broadest range of metal working applications. While available in a wide range of standard sizes, **Gatco Rotary Bushings** are commonly and readily modified to suit individual requirements or specifications. For those situations where a standard or modified standard bushing is not suitable, **Gatco's** Engineering Department can provide a special design to suit your specific requirements.

**Gatco Rotary Bushings** provide precision cuts as well as eliminating chatter, heat and wear often encountered using standard drill bushings. While many other uses continue to be found, **Gatco Rotary Bushings** are used primarily to guide and support rotating cutting tools in applications such as:

Precision Line Boring	Spot Facing
Reaming	Core Drilling
Hollow Milling	Gun Drilling
Recessing Tools	Milling Arbor Supports
Inspection Fixtures	Drilling
Special Machine Tools	

## Rebuilding Program

**Gatco Rotary Bushings** will eventually reach their fatigue life. Therefore, **Gatco** offers a rebuilding program which will restore the rotary bushing to its original I.D. size, runout specifications and life expectancy. Rebuilding can be done an indefinite number of times as long as the case is re-usable as received, and involves replacement of the inner liner, bearings and seals.

Upon inspection, if a rotary bushing cannot be rebuilt, it will be returned at a nominal charge for inspection.

## Maintenance/Lubrication

**Gatco Rotary Bushings** require very little maintenance. Only in severe applications or contaminated environments will they require re-greasing. Frequency of re-lubrication must be determined by the end user based on the environment, loads applied and running speed. When re-greasing, it is recommended that the bushing be filled with grease until contaminated grease purges past the seal on both ends. At start up, grease will continue to purge past the seals and will stop when the bearings have purged themselves.

- Recommended grease lubricant is Alvania #2 by Shell Oil (or equivalent).
- Recommended oil lubricant is Mobil DTE ( or equivalent).

## How To Order

- **Order by Gatco design number.**
- **Specify I.D.:** Standard I.D. and tolerance will be assigned unless otherwise specified.
- **Specify O.D.:** O.D. will be provided with approximately .02" grind stock over nominal unless O.D. grind is requested. O.D. will be ground to standard tolerances unless otherwise specified.
- **Special Tolerances:** Tolerances other than shown in this catalog are available. Specify your tolerance requirements.
- **Special Features:** Specify any features required such as flats, etch, keyways, etc.
- **Prints:** Always provide prints or sketches when available.
- **Terms:** Net 30 days.
- **Prices:** Quoted upon request.
- **Delivery:** Standard lead time is approximately 8 weeks. Consult the factory for current lead times.
- **Tool Numbers:** Provide end users tool number if available.

Bushings ordered by bushing number only will be furnished with the nominal I.D. and the O.D. with grind stock. Standard manufacturing tolerances will be assigned. No special modifications will be added unless specified.

## Standard GATCO Manufacturing Tolerances

### Inside Diameter:

Under 1.625 = +.0003  
+.0006

1.625 and above = +.0005  
+.0010

Runout = .0005 T.I.R. (Closer runout avail. on request)

Finish = 12-20 mu. in.

### Outside Diameter:

Standard rotary bushings are furnished .020 oversize for O.D. grinding to fit at assembly by the customer.

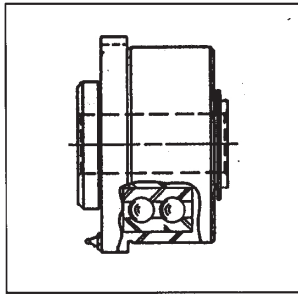
Finish ground diameter available on request (extra cost).

Standard tolerance spread: .0005

# CATALOGED BUSHINGS AND SPECIAL DESIGNS

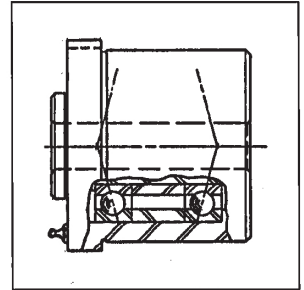
## NUMBER SERIES

Recommended for use only when one end of the guided bar is rigidly supported in a spindle. Number Series bushings are rigid, friction free rotary guide or support bushings which incorporate a heavy duty, double row ball bearing. Number Series bushings are recommended when precision finish part tolerances are *not* required, in applications such as drilling.



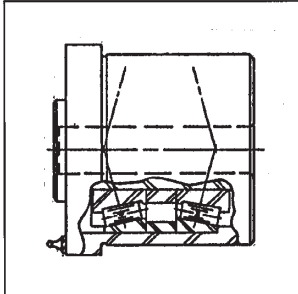
## G SERIES

For use with a bar rigidly mounted in a spindle or with a floating bar. G series bushings feature a spaced pair of single row ball bearings for maximum stability needed with longer bar travel. G series bushings are recommended where finished part tolerance is critical in operations such as precision line boring. These bushings can be provided with tighter size and runout tolerances than standard.



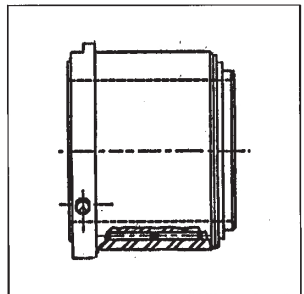
## GTR and GTRS SERIES

These rotary bushings are recommended for use with a bar rigidly mounted in a spindle or with a floating bar. GTR and GTRS bushings incorporate a pair of tapered roller bearings which are capable of taking high radial, thrust and shock loads. They are commonly used in operations where interrupted cuts and heavy loads are encountered such as gang milling.



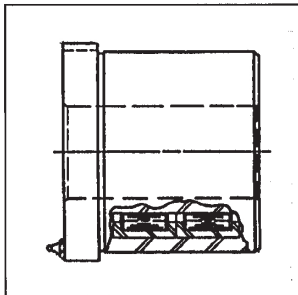
## GNT SERIES

Are used when the bar is mounted rigidly in a spindle. GNT bushings are commonly used in operations where space is limited. Their unique construction allows a larger I.D. for a given O.D. Because they incorporate needle bearings, they are capable of withstanding high radial loads but only nominal thrust loads. They are commonly used in multiple spindle operations where centerline distances between spindles is limited.



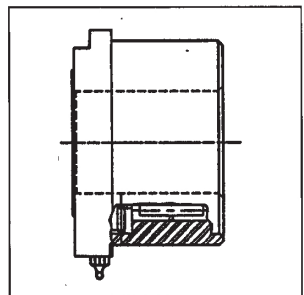
## GN and N SERIES

Are recommended for use when one end of the bar is mounted rigidly in a spindle. GN bushings are commonly used in applications where space is limited. Their needle bearing construction allows for closer centerline distances between spindles. N series bushings are identical in construction to the GN series except peripheral dimension.



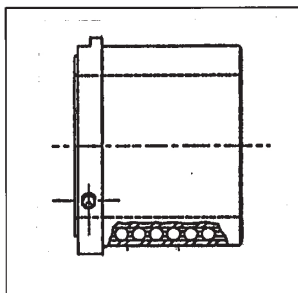
## RECESSING BUSHINGS

These bushings were developed to be used in conjunction with recessing holders. They provide high thrust capabilities required to activate recessing tools. Their unique design incorporates needle bearings for maximum radial load capacity as well as a thrust bearing for thrust loading. Recessing bushings can be used in any operation where high thrust and radial loads are encountered.



## GB SERIES

These bushings are for use with bars mounted rigidly in a spindle. GB bushings incorporate ball and retainer bearing construction. Because the balls are pre-loaded, running clearances are removed and more precise bushing runout is realized. GB series bushings are commonly used for precision line boring when the close centerline distance of the part will not accept the G series.



## SPECIAL DESIGNS

Gatco offers a special design service for rotary bushings. Your special design requirements will be taken from design concept through final manufacture. Our Engineering Department can make recommendations which will make your machine run at maximum optimization. Because of our CAD capability, if we are furnished with size and performance requirements, a special design can usually be prepared for customer's approval within hours. When requesting a special design, please provide prints and all pertinent information regarding the operation. Availability for specials and standards is the same; pricing covers the additional features ordered. Refer to page 32 for DESIGN FAX information.

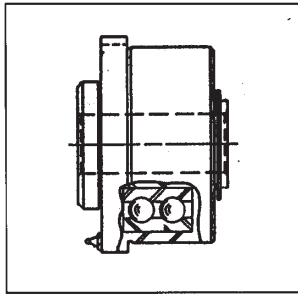
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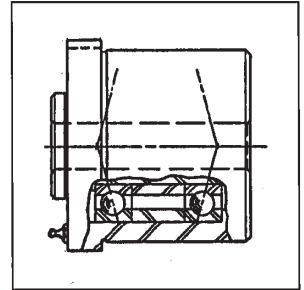
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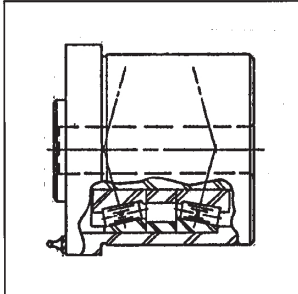
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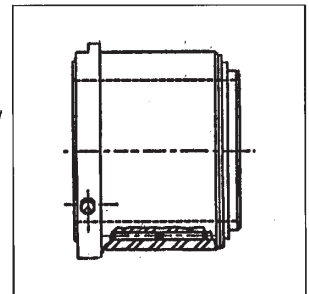
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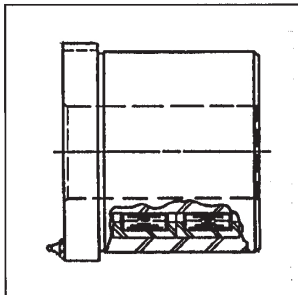
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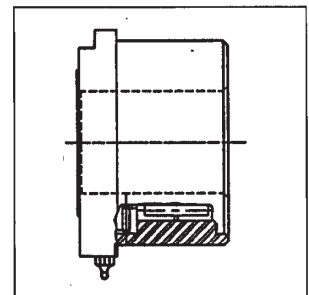
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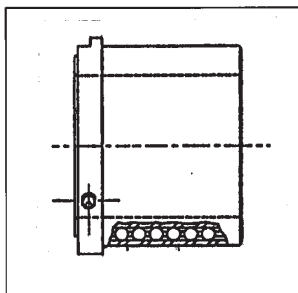
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# CONSTRUCTION

OUTER CASE	INNER ROTATING LINER	BEARINGS	SEALS
MACHINE STEEL	MACHINE STEEL HDN. RC 60-62	DOUBLE ROW ANGULAR CONTACT BEARING	FELT SEALS (LIP SEALS AVAILABLE ON REQUEST)
MACHINE STEEL	MACHINE STEEL HDN. RC 60-62	(1) PAIR SINGLE ROW DEEP GROOVE BEARING	FELT SEALS— SEALED BEARING (LIP SEALS AVAILABLE ON REQUEST)
MACHINE STEEL	MACHINE STEEL HDN. RC 60-62	(1) PAIR TAPERED ROLLER BEARINGS	LIP SEALS
BEARING STEEL HDN. RC 60-62	BEARING STEEL HDN. RC 60-62	(1) PAIR CAGED NEEDLE BEARINGS	O-RING AND REAR FLINGER
BEARING STEEL HDN. RC 60-62	BEARING STEEL HDN. RC 60-62	BALL & RETAINER BEARING	LIP SEALS
MACHINE STEEL	BEARING STEEL HDN. RC 60-62	NEEDLE ROLLER BEARINGS	LIP SEALS
MACHINE STEEL	BEARING STEEL HDN. RC 60-62	NEEDLE ROLLER BEARING (RADIAL) AND NEEDLE THRUST BEARING (AXIAL)	O-RING AND REAR LIP SEAL

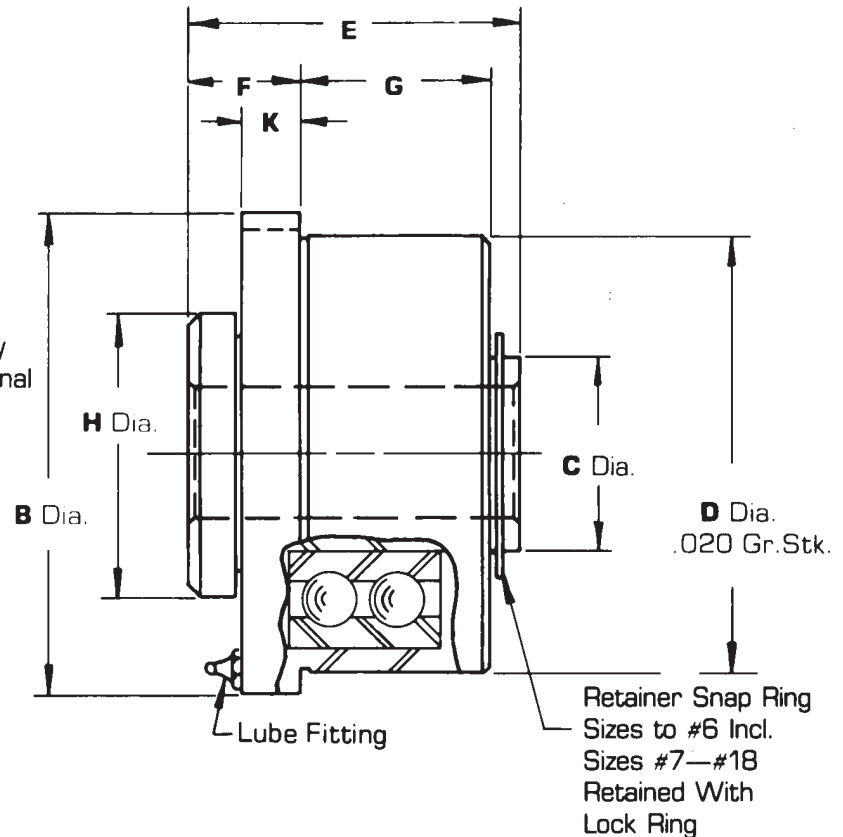
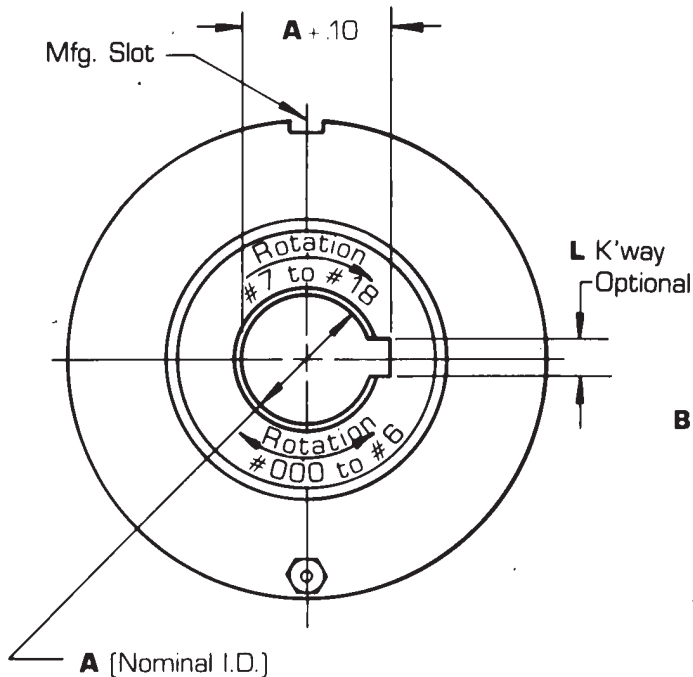
- TAPPED HOLES
- DRILL & C-SINK HOLES
- SLOTS
- LEADS
- FACE GRINDS
- TIMING LEADS

**FOR ANY QUESTION /APPLICATION  
ASSISTANCE OR SPECIAL DESIGNS—  
CONTACT GATCO'S ENGINEERING  
DEPARTMENT AT (313) 453-2295**

# NUMBER SERIES

for use with bar supported  
at one end with spindle

Sizes #7 to #18 incl.  
R.H. Rotation (std.) Shown  
L.H. Rotation Optional



Rotary Bushings may be ordered with I.D. and/or tolerances other than standard.

Contact **GATCO** for sizes not listed in this catalog or FAX your requirements (see pg. 32).

**NOTE: #000, #00, #0 and #1:** No Lube Fitting.  
Lubed for Life

Two place dimensions in tabulation  $\pm .030$   
See GTRS Series for comparative sizes  
See page 13 for Speed and Load Chart

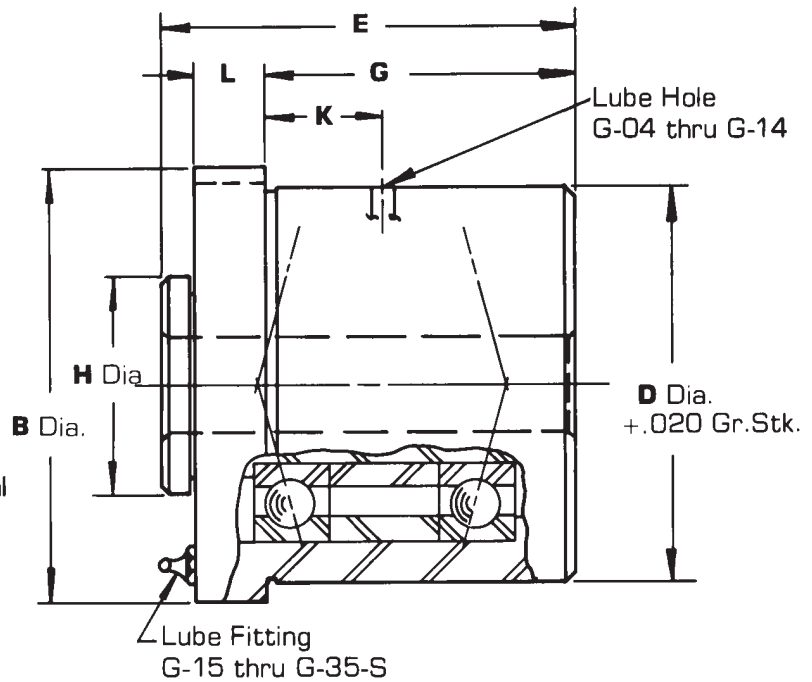
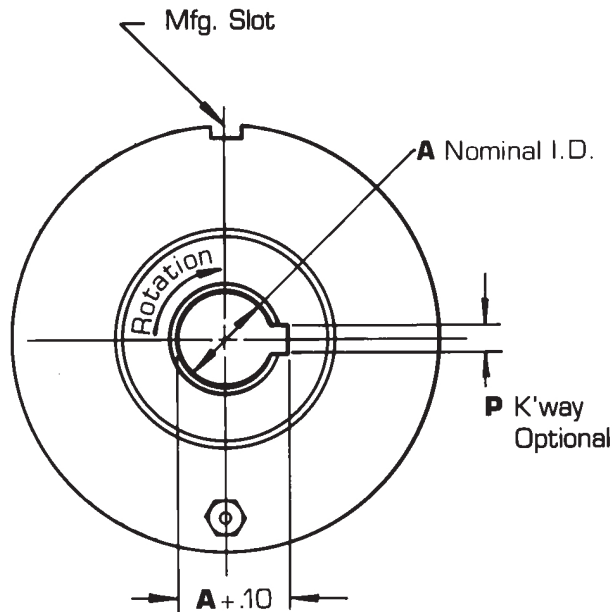
No.	A(Nominal I.D.)			A	B	C	D	E	F	G	H	K	L
	Standard	Max. w/o keyway	Max. w. keyway										
000	.2500	.272	—	+.0003 +.0006	1.75	.47	1.5000	1.38	.41	.81	.88	.19	—
00	.5000	.510	—		2.00	.67	1.7500	1.59	.53	.88	1.19	.31	—
0	.5625	.587	—		2.25	.79	2.0625	1.72	.53	1.00	1.31	.31	—
1	.7500	.784	—		2.50	.98	2.3125	1.78	.59	1.00	1.50	.31	—
2	.9375	.981	—	+.0005 +.0010	3.00	1.18	2.7500	1.91	.59	1.12	1.75	.31	—
3	1.1250	1.178	—		3.44	1.38	3.1875	2.03	.66	1.19	2.00	.38	—
4	1.3125	1.375	1.125		3.75	1.57	3.5000	2.16	.66	1.31	2.25	.38	.25
5	1.5000	1.562	1.250		3.94	1.77	3.6250	2.16	.66	1.31	2.38	.38	.25
6	1.6875	1.750	1.5625		4.19	1.97	3.8750	2.31	.69	1.44	2.62	.38	.25
7	1.8125	1.937	1.625		4.50	2.88	4.1875	2.50	.69	1.56	2.94	.38	.25
8	2.0000	2.125	1.875		4.94	3.00	4.6250	2.62	.69	1.69	3.00	.38	.25
9	2.1875	2.312	2.000		5.25	3.25	5.0000	2.69	.69	1.75	3.25	.38	.25
10	2.3750	2.500	2.250		5.50	3.50	5.1875	2.75	.69	1.81	3.50	.38	.25
11	2.5625	2.688	2.375		5.75	3.75	5.4375	2.81	.69	1.88	3.75	.38	.25
12	2.7500	2.875	2.625		6.12	4.00	5.8125	2.94	.69	2.00	4.00	.38	.25
13	2.8750	3.000	2.750		6.50	4.25	6.2500	3.44	.88	2.31	4.25	.44	.38
14	3.0000	3.125	3.000		7.00	4.50	6.6250	3.56	.88	2.44	4.38	.44	.38
15	3.2500	3.340	3.250		7.38	4.75	7.0000	3.69	.88	2.56	4.75	.44	.38
16	3.4375	3.530	3.4375		7.75	5.00	7.4375	3.88	.88	2.75	5.00	.44	.38
17	3.6250	3.730	3.625		8.25	5.25	7.8750	4.06	.88	2.94	5.25	.44	.38
18	3.8750	3.930	3.875		8.50	5.50	8.2500	4.25	.88	3.12	5.50	.44	.38



for use with floating or  
supported bar and/or longer  
bar travel

# G SERIES

R.H. Rotation (std.) shown  
L.H. Rotation Optional



Rotary Bushings may be ordered with I.D. and/or  
tolerances other than standard.

Contact **GATCO** for sizes not listed in this catalog or  
FAX your requirements (see pg. 32).

Two place dimensions in tabulation:  $\pm .030$

See GTR Series for comparative sizes.

See page 13 for Speed and Load Chart.

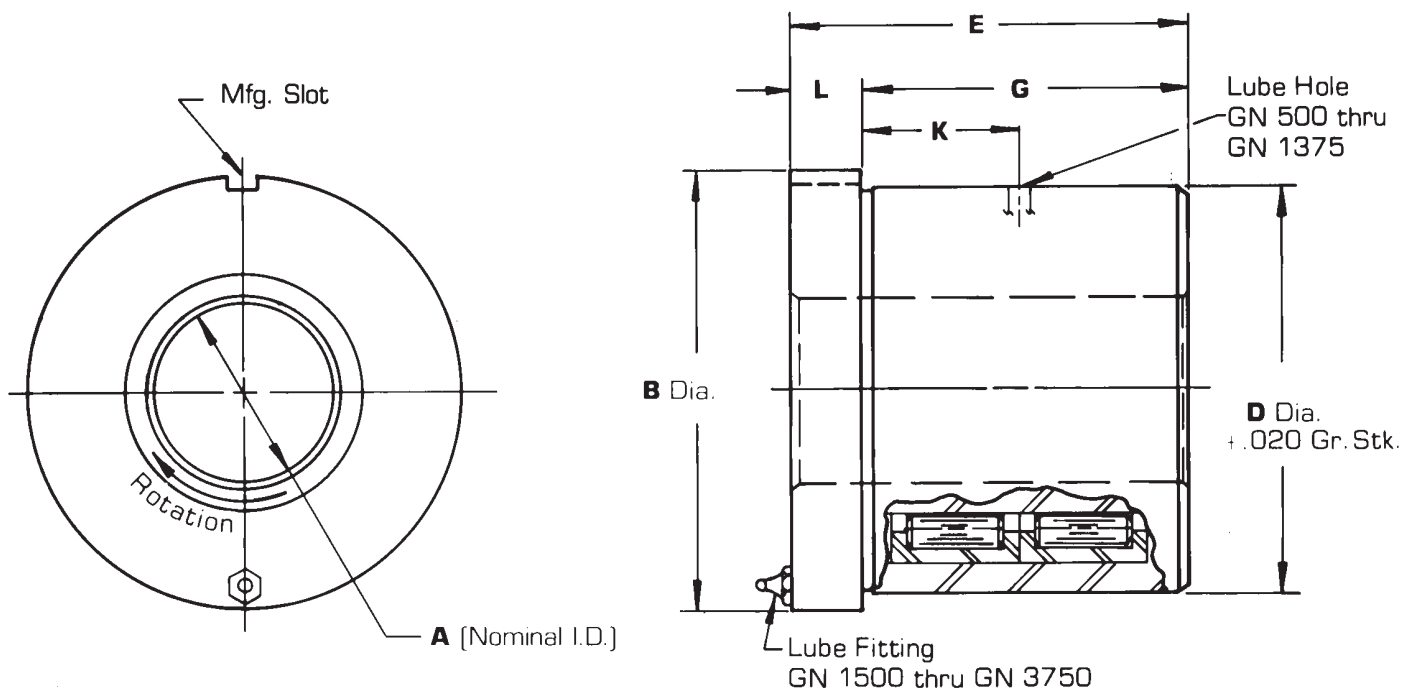
G No.	A (Nominal I.D.)			A Tol.	B	D Nom.	E	G	H	K	L	P
	Standard	Max. Without Keyway	Max. With Keyway									
04	.5000	.590	-	+.0003 +.0006	2.12	1.8750	2.19	1.62	1.25	.62	.38	-
05	.5625	.590	-		2.25	2.0000	2.19	1.62	1.25	.62	.38	-
06	.6250	.780	-		2.62	2.3125	2.38	1.81	1.50	.69	.38	-
07	.7500	.970	-		2.75	2.5000	2.38	1.81	1.62	.72	.38	-
08	.9375	1.160	-		3.00	2.7500	2.44	1.88	1.88	.75	.38	-
09	1.0000	1.160	-		3.00	2.7500	2.44	1.88	1.88	.75	.38	-
10	1.1250	1.320	-		3.50	3.1875	3.34	2.56	2.12	1.00	.53	-
11	1.2500	1.320	-		3.50	3.1875	3.34	2.56	2.12	1.00	.53	-
12	1.3125	1.500	1.340		3.62	3.3750	3.25	2.44	2.25	.94	.56	.25
13	1.5000	1.620	1.530		3.88	3.6250	3.25	2.44	2.50	.94	.56	.25
14	1.6875	1.840	1.720	+.0005 +.0010	4.12	3.8750	3.31	2.50	2.62	1.00	.56	.25
15	1.7500	1.840	1.720		4.38	4.1250	3.38	2.50	2.62	-	.62	.25
16	1.8750	2.000	1.910		4.75	4.5000	3.75	2.88	3.00	-	.62	.25
17	2.0000	2.160	2.060		4.88	4.6250	3.75	2.94	3.25	-	.56	.25
18	2.1250	2.380	2.260		5.25	5.0000	3.75	2.88	3.38	-	.56	.25
19	2.2500	2.380	2.260		5.38	5.1250	3.75	2.88	3.38	-	.56	.25
20	2.3750	2.560	2.440		5.50	5.2500	4.06	3.06	3.62	-	.69	.25
21	2.7500	2.840	2.650		5.75	5.3750	4.12	3.06	3.75	-	.75	.25
22	3.0000	3.190	3.030		6.75	6.3750	4.75	3.75	4.25	-	.69	.38
23	3.5000	3.840	3.720		7.75	7.2500	5.00	4.00	5.00	-	.69	.38
24	3.7500	3.840	3.720		7.75	7.2500	5.00	4.00	5.00	-	.69	.38
25-S	4.0000	4.530	4.410	+.0005 +.0010	8.25	7.7500	5.50	4.25	5.75	-	.88	.38
26-S	4.2500	4.530	4.410		8.25	7.7500	5.50	4.25	5.75	-	.88	.38
27-S	4.5000	4.530	4.410		8.25	7.7500	5.50	4.25	5.75	-	.88	.38
28-S	4.7500	5.030	4.880		8.75	8.2500	5.81	4.50	6.50	-	.88	.38
29-S	5.0000	5.030	4.880		8.75	8.2500	5.81	4.50	6.50	-	.88	.38
30-S	5.2500	5.880	5.810		10.00	9.5000	6.44	5.00	7.50	-	1.00	.38
31-S	5.5000	5.880	5.810		10.00	9.5000	6.44	5.00	7.50	-	1.00	.38
32-S	5.7500	5.880	5.810		10.00	9.5000	6.44	5.00	7.50	-	1.00	.38
33-S	6.0000	6.560	6.530		10.88	10.5000	6.44	5.00	8.00	-	1.00	.38
34-S	6.2500	6.560	6.530		10.88	10.5000	6.44	5.00	8.00	-	1.00	.38
35-S	6.5000	6.560	6.530		10.88	10.5000	6.44	5.00	8.00	-	1.00	.38



# GN SERIES

for use with bar supported  
at one end with spindle

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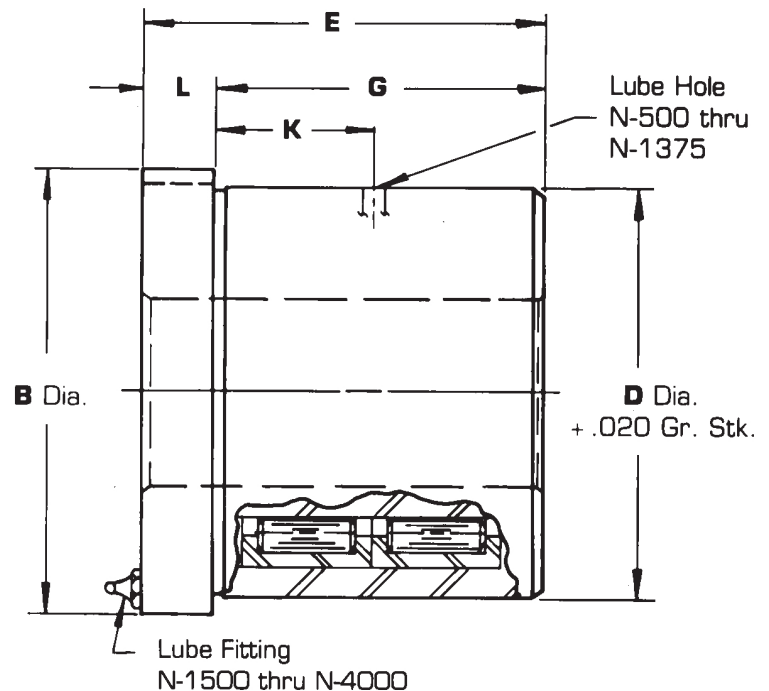
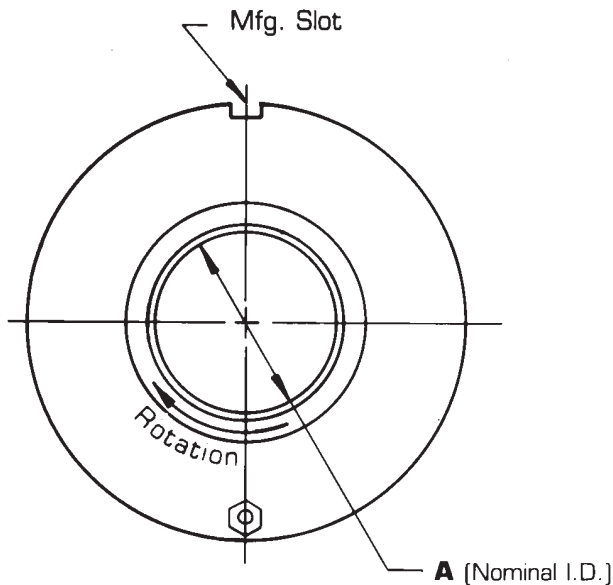
Two place dimensions in tabulation:  $\pm .030$

See Number Series for comparative sizes.

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GN No.	A (Nominal I.D.)		A Tol.	B	D Nom.	E	G	K	L
	Standard	Maximum							
500	.5000	.562	+.0003 +.0006	1.62	1.3750	1.75	1.38	.69	.37
625	.6250	.680		1.88	1.6250	1.75	1.38	.69	.37
750	.7500	.800		2.00	1.7500	1.75	1.38	.72	.37
875	.8750	1.035		2.25	2.0000	1.75	1.38	.72	.37
1000	1.0000	1.156		2.44	2.1875	2.00	1.62	.84	.38
1125	1.1250	1.281		2.56	2.3125	2.00	1.62	.81	.38
1250	1.2500	1.406		2.69	2.4375	2.00	1.62	.81	.38
1375	1.3750	1.531		3.00	2.7500	2.00	1.62	.81	.38
1500	1.5000	1.750		3.50	3.0000	3.12	2.50	-	.62
1625	1.6250	1.880		3.75	3.2500	4.12	3.50	-	.62
1750	1.7500	1.940	-.0005 +.0010	3.75	3.2500	4.12	3.50	-	.62
1875	1.8750	2.190		4.00	3.5000	4.12	3.50	-	.62
2000	2.0000	2.240		4.00	3.5000	4.12	3.50	-	.62
2250	2.2500	2.480		4.50	4.0000	4.18	3.56	-	.62
2500	2.5000	2.730		4.75	4.2500	4.37	3.62	-	.75
2750	2.7500	2.940		5.25	4.7500	4.44	3.69	-	.75
3000	3.0000	3.090		5.50	5.0000	4.75	4.00	-	.75
3250	3.2500	3.320		5.75	5.2500	5.25	4.50	-	.75
3500	3.5000	3.570		6.00	5.5000	5.25	4.50	-	.75
3750	3.7500	3.820		6.25	5.7500	5.38	4.50	-	.88

R.H. Rotation (std.) Shown  
L.H. Rotation Optional

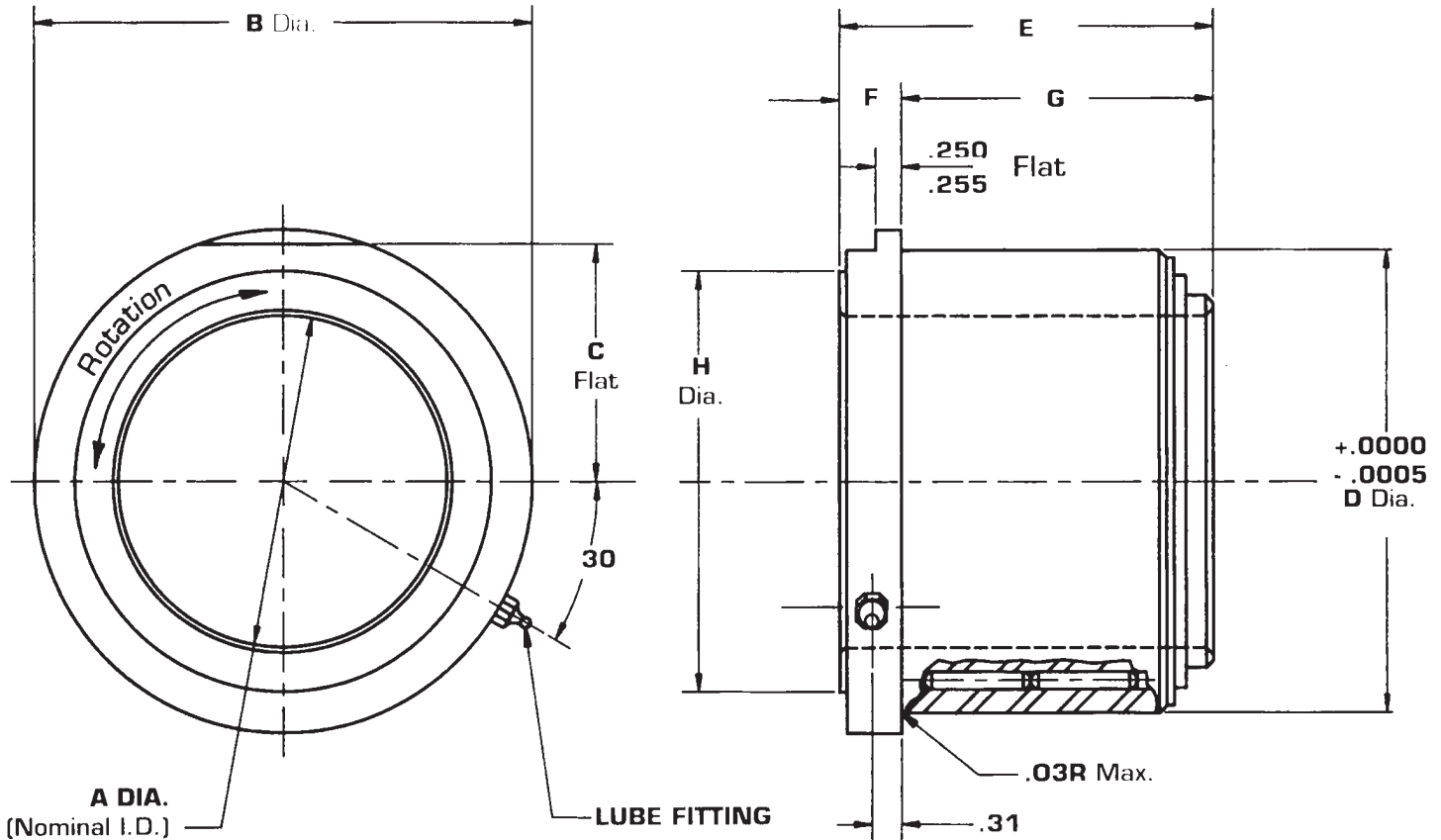


Rotary Bushings may be ordered with I.D. and/or tolerances other than standard.

Contact **GATCO** for sizes not listed in this catalog or FAX your requirements (see pg. 32).

Two place dimensions in tabulation:  $\pm .030$   
See GN Series for comparative sizes.  
See page 13 for Speed and Load Chart.

N No.	A (Nominal I.D.)		A Tol.	B	D Nom.	E	G	K	L
	Standard	Maximum							
500	.5000	.562	+ .0003 + .0006	1.56	1.3750	1.88	1.50	.75	.38
625	.6250	.680		1.88	1.7500	1.75	1.31	.62	.44
750	.7500	.800		2.00	1.8750	1.75	1.31	.65	.44
875	.8750	1.035		2.12	2.0000	1.88	1.44	.72	.44
1000	1.0000	1.156		2.31	2.1870	1.94	1.50	.75	.44
1125	1.1250	1.281		2.44	2.3120	2.06	1.62	.75	.44
1250	1.2500	1.406		2.56	2.4370	2.06	1.62	.75	.44
1375	1.3750	1.531		2.88	2.7500	2.06	1.62	.81	.44
1500	1.5000	1.750		3.25	3.0000	3.50	3.00	-	.50
1625	1.6250	1.880		3.37	3.1250	3.50	3.00	-	.50
1750	1.7500	1.908	+ .0005 + .0010	3.50	3.2500	3.50	3.00	-	.50
1875	1.8750	2.190		3.75	3.5000	4.12	3.00	-	1.12
2000	2.0000	2.240		4.00	3.7500	4.12	3.00	-	1.12
2125	2.1250								
2250	2.2500	2.480		4.25	4.0000	4.25	3.25	-	1.00
2375	2.3750								
2500	2.5000	2.730		4.75	4.5000	4.31	3.25	-	1.08
2625	2.6250								
2750	2.7500	2.940		5.25	5.0000	4.94	3.88	-	1.06
2875	2.8750								
3000	3.0000	3.090		5.62	5.3750	5.44	4.25	-	1.19
3125	3.1250								
3250	3.2500	3.320		5.75	5.5000	5.44	4.25	-	1.19
3375	3.3750								
3500	3.5000	3.570		6.00	5.7500	5.62	4.62	-	1.00
3625	3.6250								
3750	3.7500	3.820		6.25	6.0000	5.62	4.62	-	1.00
3875	3.8750								
4000	4.0000	4.421		7.25	7.0000	6.62	5.50	-	1.12



Rotary Bushings may be ordered with I.D. and/or tolerances other than standard.

Contact **GATCO** for sizes not listed in this catalog or FAX your requirements (see pg. 32).

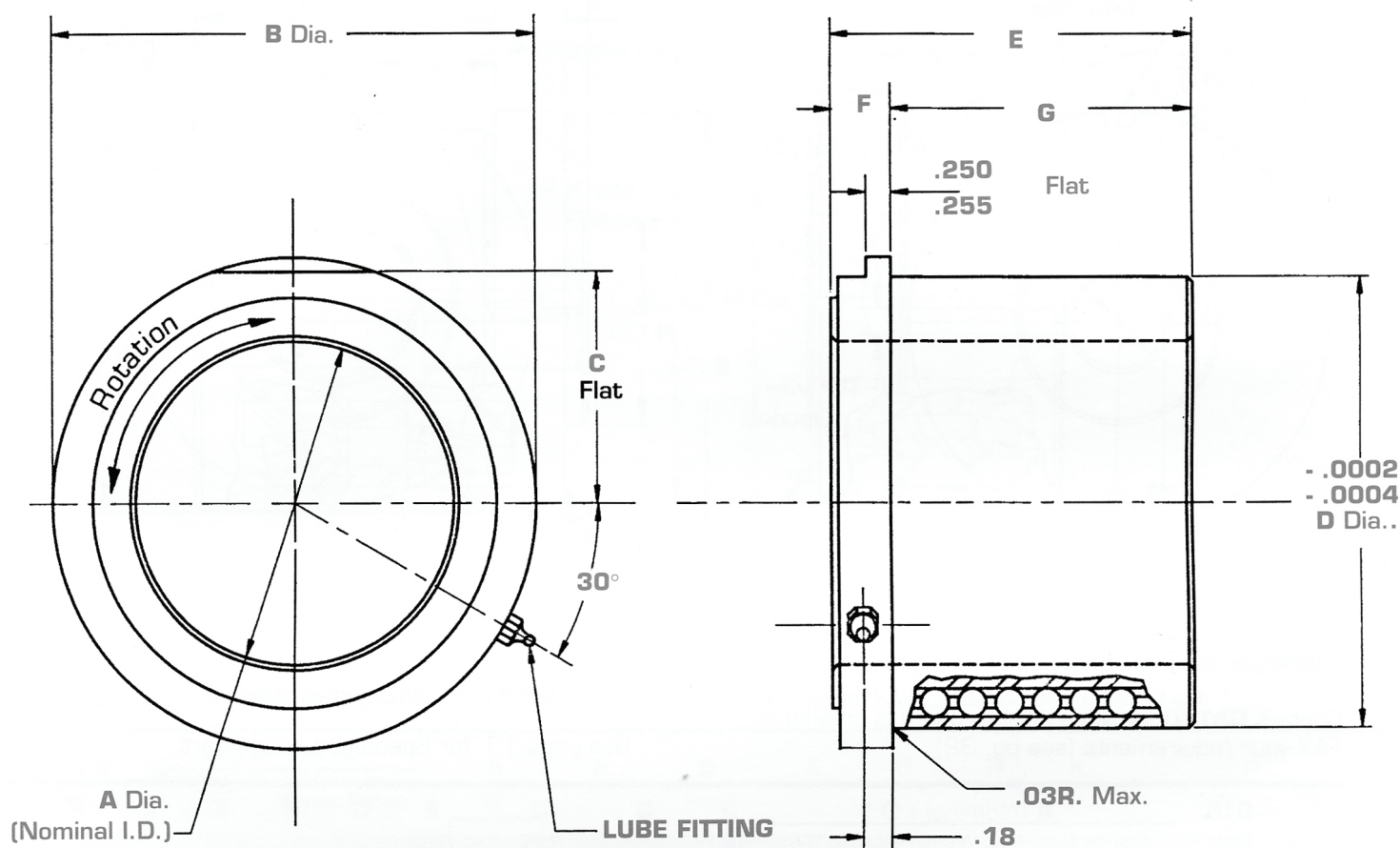
Two place dimensions in tabulation:  $\pm .030$

See GB Series for comparative sizes.

See page 13 for Speed and Load Chart.

GNT NO.	A Nominal D.	TOL	B	C	D Nominal	E	F	G	H
100	1.0000	+.0003 +.0006	2.44	1.06	2.0000	2.06	.620	1.44	1.66
125	1.2500		2.69	1.19	2.2500	2.06	.620	1.44	1.94
150	1.5000	+.0005 +.0010	2.94	1.31	2.5000	2.31	.620	1.69	2.06
175	1.7500		3.19	1.44	2.8750	2.56	.620	1.94	2.50
200	2.0000	+.0005 +.0010	3.44	1.56	3.1250	2.81	.620	2.19	2.75
225	2.2500		4.06	1.88	3.6250	3.25	.690	2.56	3.15
250	2.5000	+.0005 +.0010	4.31	2.00	3.8750	3.50	.690	2.81	3.50
275	2.7500		4.56	2.12	4.1250	3.75	.690	3.06	3.75
300	3.0000	+.0005 +.0010	4.81	2.25	4.5000	3.75	.690	3.06	4.00
325	3.2500		5.06	2.38	4.6250	3.75	.690	3.06	4.24
350	3.5000	+.0005 +.0010	5.31	2.50	4.8750	4.00	.690	3.31	4.44
375	3.7500		5.44	2.56	5.2500	4.00	.690	3.31	4.83
400	4.0000		5.69	2.69	5.3750	4.00	.690	3.31	5.03





Rotary Bushings may be ordered with I.D. and/or tolerances other than standard.

Contact **GATCO** for sizes not listed in this catalog or FAX your requirements (see pg. 32).

Two place dimensions in tabulation:  $\pm .030$

See GNT Series for comparative sizes.

See page 13 for Speed and Load Chart.

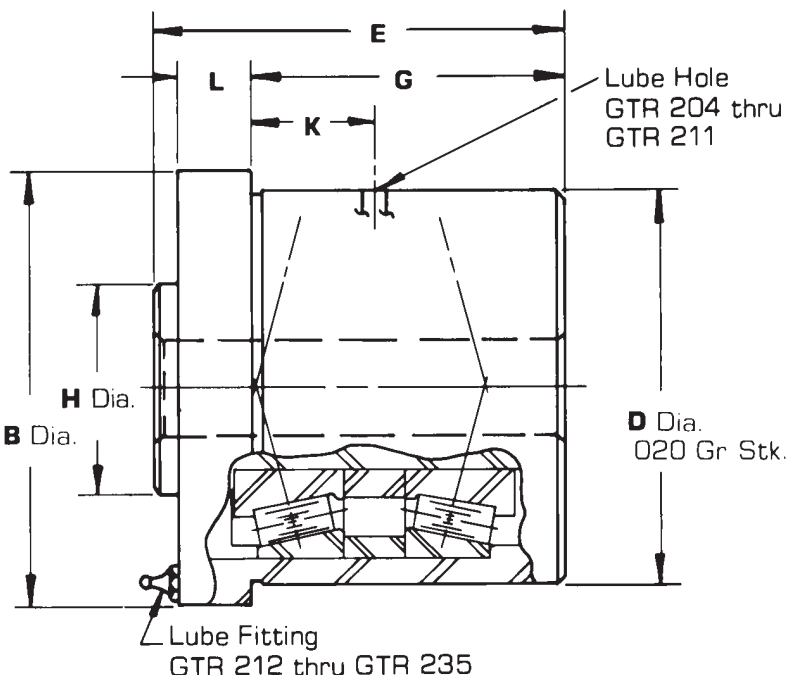
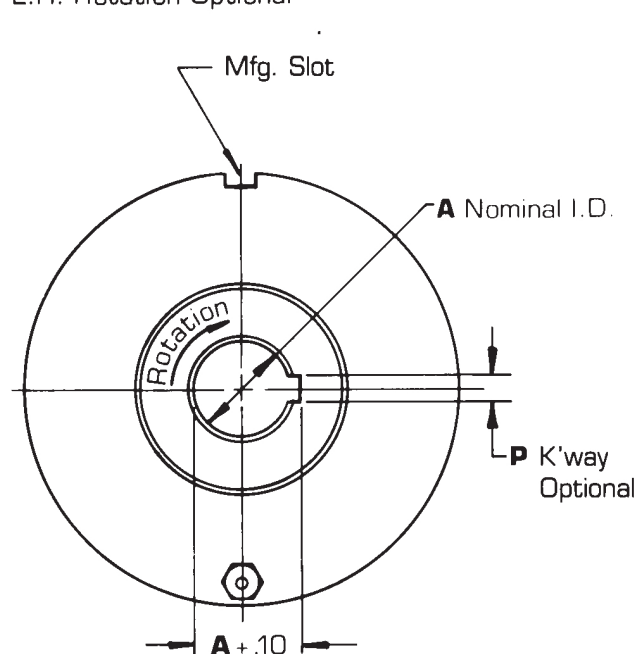
GB NO.	A Nominal I.D.	TOL.	B	C	D Nominal	E	F	G
100	1.0000	+.0003 +.0006	2.44	1.06	2.0000	2.06	.620	1.44
125	1.2500		2.69	1.19	2.2500	2.06	.620	1.44
150	1.5000		2.94	1.31	2.5000	2.31	.620	1.69
175	1.7500		3.19	1.44	2.8750	2.56	.620	1.94
200	2.0000	+.0005 +.0010	3.44	1.56	3.1250	2.81	.620	2.19
225	2.2500		4.06	1.88	3.6250	3.25	.690	2.56
250	2.5000		4.31	2.00	3.8750	3.50	.690	2.81
275	2.7500		4.56	2.12	4.1250	3.75	.690	3.06
300	3.0000		4.81	2.25	4.5000	3.75	.690	3.06
325	3.2500		5.06	2.38	4.6250	3.75	.690	3.06
350	3.5000		5.31	2.50	4.8750	4.00	.690	3.31
375	3.7500		5.44	2.56	5.2500	4.00	.690	3.31
400	4.0000		5.69	2.69	5.3750	4.00	.690	3.31



# GTR SERIES

for use with floating or  
supported bar and/or longer  
bar travel

R.H. Rotation (std.) Shown  
L.H. Rotation Optional



Rotary Bushings may be ordered with I.D. and/or tolerances other than standard.

Two place dimensions in tabulation:  $\pm .030$

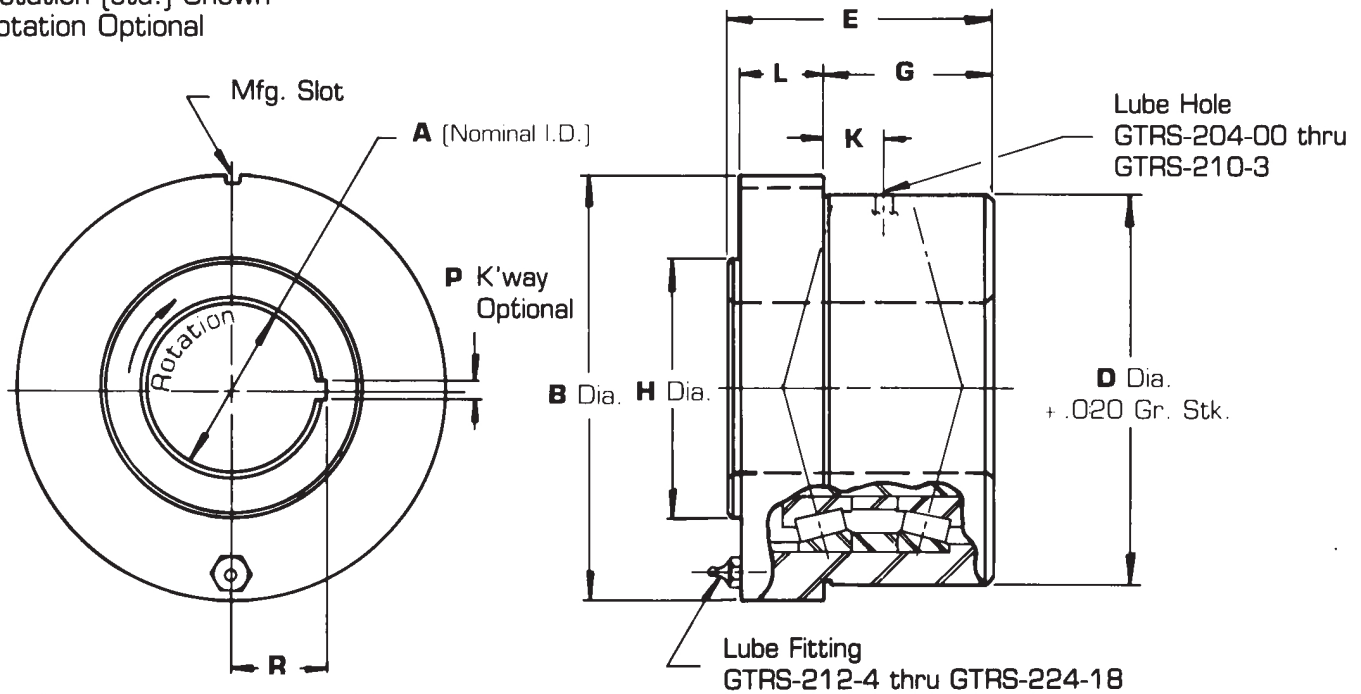
See G Series for comparative sizes.

Contact **GATCO** for sizes not listed in this catalog or  
FAX your requirements (see pg. 32).

See page 13 for Speed and Load Chart.

GTR No.	A (Nominal I.D.)			A Tol.	B	D Nom.	E	G	H	K	L	P
	Standard	Max. Without Keyway	Max. With Keyway									
204	.5000	.565	-	.0003 .0006	2.06	1.8750	2.15	1.62	1.11	.60	.41	-
205	.5625	.565	-		2.19	2.0000	2.15	1.62	1.11	.60	.41	-
206	.6250	.780	-		2.50	2.3125	2.34	1.81	1.36	.70	.41	-
207	.7500	.780	-		2.69	2.5000	2.37	1.81	1.36	.69	.44	-
208	.9375	1.030	-		2.94	2.7500	2.44	1.88	1.73	.72	.44	-
209	1.0000	1.030	-		2.94	2.7500	2.44	1.88	1.73	.72	.44	-
210	1.1250	1.280	-		3.38	3.1875	3.32	2.56	1.98	1.00	.59	-
211	1.2500	1.280	-		3.38	3.1875	3.32	2.56	1.98	1.00	.59	-
212	1.3125	1.500	1.340		3.62	3.3750	3.23	2.44	2.22	-	.62	.25
213	1.5000	1.620	1.560		3.88	3.6250	3.23	2.44	2.47	-	.62	.25
214	1.6875	1.880	1.780	.0005 .0010	4.12	3.8750	3.29	2.50	2.72	-	.62	.25
215	1.7500	1.880	1.780		4.38	4.1250	3.35	2.50	2.72	-	.68	.25
216	1.8750	2.000	1.880		4.75	4.5000	3.73	2.88	2.97	-	.68	.25
217	2.0000	2.130	2.000		4.88	4.6250	3.73	2.94	2.97	-	.62	.25
218	2.1250	2.380	2.250		5.25	5.0000	3.75	2.88	3.47	-	.70	.25
219	2.2500	2.380	2.250		5.38	5.1250	3.74	2.88	3.47	-	.69	.25
220	2.3750	2.750	2.560		5.50	5.2500	3.92	3.06	3.47	-	.69	.25
221	2.7500	3.000	2.780		5.62	5.3750	4.11	3.06	3.97	-	.88	.25
222	3.0000	3.410	3.250		6.62	6.3750	4.61	3.75	4.32	-	.69	.38
223	3.5000	4.190	4.130		7.50	7.2500	4.95	4.00	5.20	-	.78	.38
224	3.7500	4.190	4.130	.0005 .0010	7.50	7.2500	4.95	4.00	5.20	-	.78	.38
225	4.0000	4.690	4.560		8.25	8.0000	5.44	4.25	5.93	-	1.00	.38
226	4.2500	4.690	4.560		8.25	8.0000	5.44	4.25	5.93	-	1.00	.38
227	4.5000	4.690	4.560		8.25	8.0000	5.44	4.25	5.93	-	1.00	.38
228	4.7500	5.780	5.560		10.50	10.0000	6.03	4.75	7.18	-	1.03	.38
229	5.0000	5.780	5.560		10.50	10.0000	6.03	4.75	7.18	-	1.03	.38
230	5.2500	5.780	5.560		10.50	10.0000	6.03	4.75	7.18	-	1.03	.38
231	5.5000	5.780	5.560		10.50	10.0000	6.03	4.75	7.18	-	1.03	.38
232	5.7500	5.780	5.560		10.50	10.0000	6.03	4.75	7.18	-	1.03	.38
233	6.0000	7.000	6.750		11.75	11.0000	6.50	5.25	8.42	-	1.00	.38
234	6.2500	7.000	6.750	.0005 .0010	11.75	11.0000	6.50	5.25	8.42	-	1.00	.38
235	6.5000	7.000	6.750		12.50	11.7500	6.50	5.25	8.42	-	1.00	.38

R.H. Rotation [std.] Shown  
L.H. Rotation Optional



Rotary Bushings may be ordered with I.D. and/or tolerances other than standard.

Contact **GATCO** for sizes not listed in this catalog or FAX your requirements (see pg. 32).

Two place dimensions in tabulation:  $\pm .030$

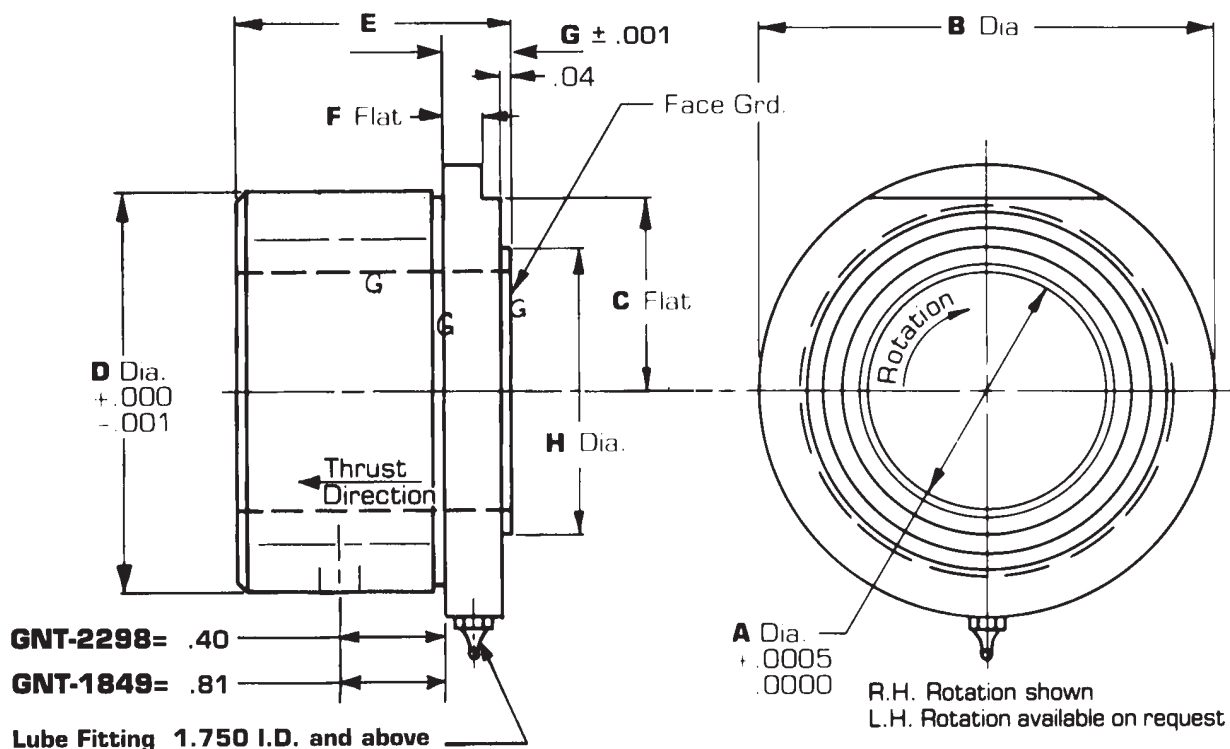
See Number and GTR Series for comparative sizes.

See page 13 for Speed and Load Chart.

GTRS No.	A [Nominal I.D.]		A Tol.	B	D Nom.	E	G	H	K	L	P	R
	Standard	Maximum Without Keyway										
204-00	.5000	.565	+.0003 +.0006	2.00	1.7500	1.88	1.06	1.11	.19	.70	.125	.312
205-0	.5625	.565		2.25	2.0625	1.88	1.06	1.11	.19	.70	.125	.312
207-1	.7500	.780		2.50	2.3125	2.12	1.19	1.36	.19	.81	.125	.437
208-2	.9375	1.030		3.00	2.7500	2.15	1.31	1.73	.28	.72	.187	.562
210-3	1.1250	1.280		3.44	3.1875	2.03	1.44	1.98	.56	.47	.187	.656
212-4	1.3125	1.500		3.75	3.5000	2.40	1.56	2.22	—	.72	.187	.718
213-5	1.5000	1.620	+.0005 +.0010	3.87	3.6250	2.46	1.56	2.47	—	.78	.187	.812
214-6	1.6875	1.880		4.12	3.8750	2.62	1.62	2.74	—	.88	.250	.906
215-7	1.8125	1.880		4.50	4.1875	2.81	1.81	2.74	—	.88	.250	.937
217-8	2.0000	2.130		4.87	4.6250	3.00	1.94	2.97	—	.94	.250	1.125
218-9	2.1875	2.380		5.25	5.0000	3.06	2.00	3.47	—	.94	.250	1.187
220-10	2.3750	2.750		5.50	5.1875	3.12	2.06	3.47	—	.94	.250	1.250
221-11	2.6250	3.000		5.75	5.4375	3.18	2.12	3.97	—	.94	.250	1.437
221-12	2.7500	3.000		6.00	5.8125	3.18	2.25	3.97	—	.81	.250	1.437
222-13	2.8750	3.410		6.50	6.2500	3.74	2.56	4.24	—	1.06	.312	1.562
222-14	3.0000	3.410		7.00	6.6250	3.74	2.69	4.24	—	.94	.312	1.562
223-15	3.2500	3.750		7.38	7.0000	4.05	2.81	5.25	—	1.12	.312	1.937
223-16	3.4375	3.750		7.75	7.4375	4.06	3.00	5.25	—	.94	.312	1.937
223-17	3.5000	3.750		8.25	7.8750	4.06	3.19	5.25	—	.75	.312	1.937
224-18	3.8750	4.190		8.50	8.2500	4.38	3.38	5.20	—	.81	.375	1.937

# RECESSING BUSHINGS

Designed to support Recessing Toolholders for I.D. recessing, chamfering, and backfacing. Also for similar O.D. operations requiring rigid thrust support. (see page 16 for typical recessing operation)



Rotary bushings may be ordered with I.D. and/or tolerances other than standard.

Two place dimensions in tabulation ± .030

Contact **GATCO** for sizes not listed in this catalog or FAX your requirements (see pg. 32).

Capacities based on 1000 R.P.M. 1500 hrs. B<sub>10</sub> life

Gatco No. GNT	Bokum Model	A	B	C	D	E	F	G	H	Max. Speed	Radial Cap. Lbs	Thrust Cap. lbs
2298	"R"	1.2503	2.69	1.22	2.4375	1.22	.19	.380	1.75	3200	800	803
1849	"B&K"	1.2503	2.69	1.09	2.4375	2.00	.19	.380	1.75	3200	1673	803
1850	"B&K" O'Size	1.5003	3.00	1.25	2.7500	2.00	.19	.380	2.12	2600	1807	870
1851	"O"	1.7505	3.88	1.63	3.5000	2.62	.38	.690	2.50	2300	2342	870
1852	"M&L"	2.5005	4.75	2.06	4.2500	2.81	.38	.690	3.25	1763	4800	937

**Gatco, Inc.** can provide Rotary Recessing Bushings for use with Recessing Toolholders of other manufacturers. Call for information on bushings used with Sculley Jones, Cogsdill, Nobur and Maxwell recessing holders.

# SPEED AND LOAD CAPACITIES

**Load capacities in Lbs. based on 1000 R.P.M. 1500 hrs. B<sub>10</sub> life\***

**Max. speed based on grease lubrication; can be increased by using oil lubrication**

G	Max Speed (RPM)	Load Capacity in Lbs.	
		Radial	Thrust
04, 05	5,850	830	380
06	4,800	890	400
07	3,930	1,340	600
08, 09	3,450	1,420	650
10, 11	3,160	1,850	825
12	2,780	2,090	900
13	2,490	2,190	950
14, 15	2,200	2,520	1,100
16	2,110	2,880	1,250
17	1,910	3,000	1,300
18, 19	1,820	3,660	1,600
20	3,200	3,820	1,600
21	3,040	4,510	1,900
22	2,720	5,450	2,300
23, 24	2,160	7,560	3,100
25-S, 26-S, 27-S	2,030	6,860	2,600
28-S, 29-S	1,900	7,070	2,700
30-S, 31-S, 32-S	1,580	8,800	3,200
33-S, 34-S, 35-S	1,470	10,600	3,900

GTR & GTRS	Max Speed (RPM)	Load Capacity in Lbs.	
		Radial	Thrust
204, 205	3,440	850	380
206, 207	2,810	1,860	610
208, 209	2,200	2,520	880
210, 211	1,920	3,570	1,230
212	1,710	3,200	1,390
213	1,540	4,280	1,300
214, 215	1,400	4,495	1,490
216	1,280	7,280	2,640
217	1,280	6,200	2,050
218, 219	1,100	6,640	2,360
220	1,100	8,240	3,560
221	1,000	8,240	2,950
222	2,630	11,360	4,800
223, 224	2,190	11,200	3,190
225, 226, 227	1,910	21,920	6,000
228, thru 232	1,580	24,160	7,960
233, 234, 235	1,300	24,960	9,500

Number	Max Speed (RPM)	Load Capacity in Lbs.	
		Radial	Thrust
000	11,200	470	380
00	8,800	584	470
0	7,200	870	700
1	5,760	940	760
2	4,880	1,320	1,060
3	4,320	1,360	1,090
4	3,760	1,800	1,450
5	3,440	2,350	1,890
6	3,200	2,440	1,960
7	2,880	3,110	2,500
8	2,560	3,840	3,100
9	2,480	3,970	3,200
10	2,320	4,640	3,740
11	2,160	4,800	3,870
12	2,000	5,710	4,600
13	1,840	6,710	5,410
14	1,760	7,740	6,240
15	1,680	8,500	6,850
16	1,600	9,640	7,770
17	1,520	10,840	8,740
18	1,440	11,800	9,520

GNT & GB	Max Speed (RPM)	Load Capacity in Lbs.	
		Radial	Thrust
100	2936	1530	85
125	2437	1686	92
150	2362	1610	94
175	1925	3363	135
200	1749	4121	183
225	1528	4595	194
250	1356	3973	292
275	1265	4092	308
300	1180	4236	316
325	1112	5873	329
350	1078	5400	335
375	992	5874	349
400	939	5968	361

*Note: for GB radial capacities, use 50% of the values shown above*

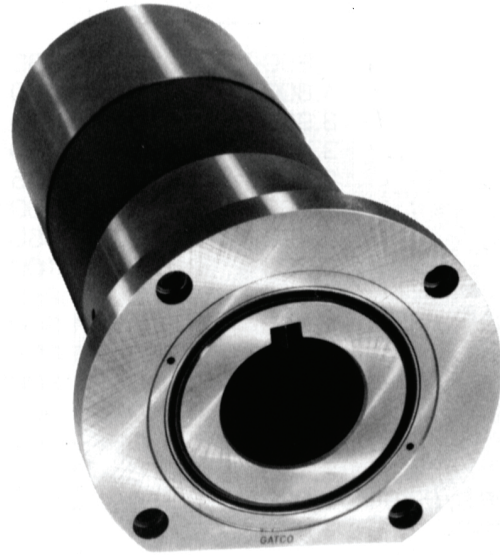
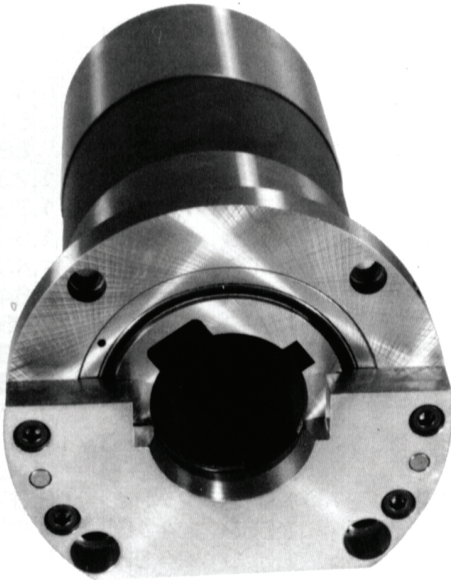
GN & N	Max. Speed (RPM)	Load Cap. in Lbs.	
		Radial	
500	5,200	1,130	
625	4,440	1,160	
750	3,870	1,320	
875	3,090	1,480	
1000	2,790	1,850	
1125	2,680	2,020	
1250	2,370	2,020	
1375	2,210	2,190	
1500	1,910	3,760	
1625	1,700	7,300	
1750	1,700	7,300	
1875	1,530	7,620	
2000	1,530	7,620	
2250	1,390	7,860	
2500	1,280	7,960	
2750	1,180	12,160	
3000	1,100	12,740	
3250	1,020	14,870	
3500	960	Beyond	
3750	900	Max.	
4000	900	Speed	

\* Average life is approximately seven times the minimum life.



# Precision Line Boring Bushings Reduce

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- **Quick-Change Cartridge Design**
- **Built-In Precision**
- **Friction-Free Rotation**

- **Reduced Downtime**
- **Consistent Part Quality**
- **Improved Process Capability**

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**Gatco's** Precision Line Boring Bushings are most commonly used to support line boring bars during machining. A typical application is the cam and crank bores in engine blocks, although they are well suited for any operation where close tolerances must be maintained and friction-free support is required. They help to achieve zero tolerances and can significantly increase a process CPK value. Machine downtime is reduced due to the quick-change, cartridge-style design of the bushings.

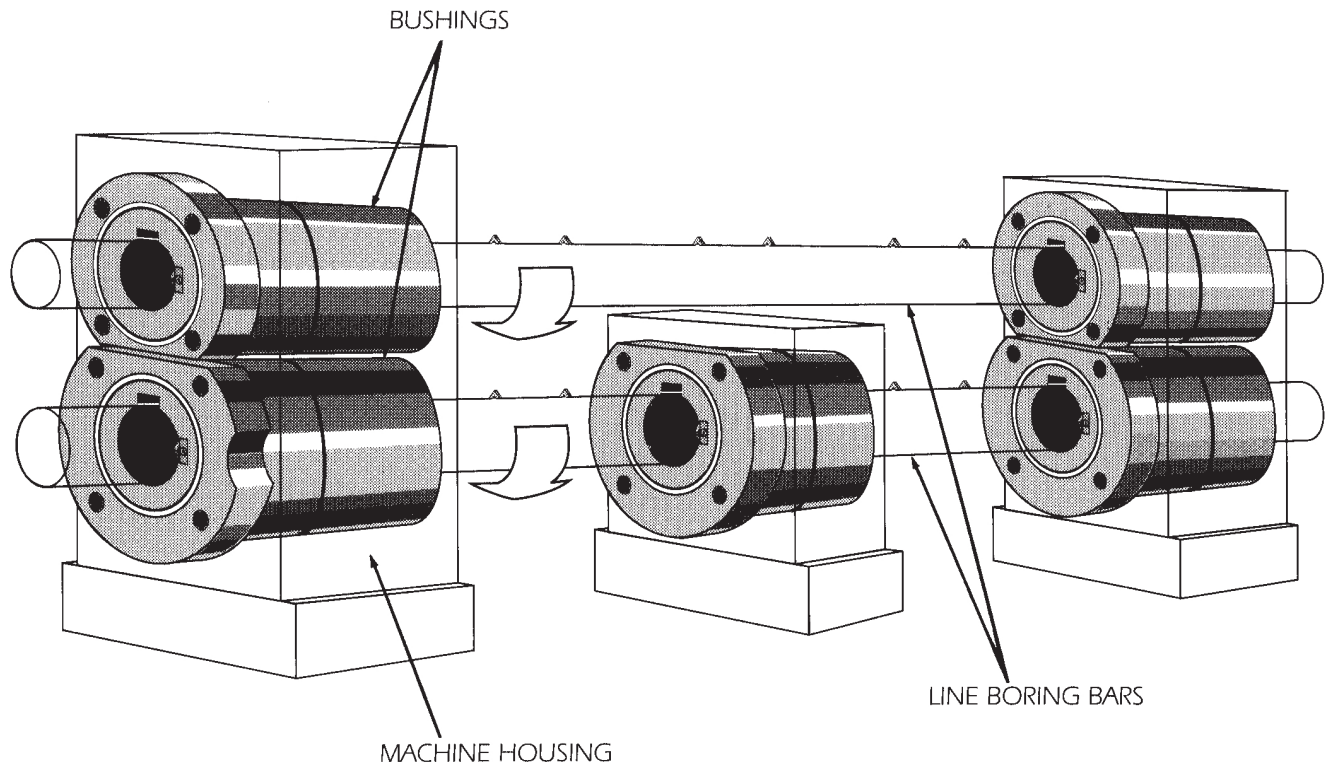
In operation, these bushings are mounted in a machine housing. The line boring bar passes through the inside diameter of the bushing and rotates friction-free supported by precision bearings. Since each application is unique, the bushings are designed and built to meet each customers specific needs.

Many machine designs require the components which make up the bearing support be assembled directly in the machine housing. This requires that the housing be pulled off the machine, rebuilt and realigned, or rebuilt on the production line. In either case, considerable downtime is experienced.

**Gatco** Bushings simplify this process and dramatically reduce downtime because the cartridge bushing can be slipped into the machine housing bore and bolted in place within a matter of minutes. Realignment is not required since the outside diameters of the bushings are tightly fit to the housing bores. Another advantage is that all adjustments are made at **Gatco's** factory and the bushings are ready to run once in place.

# Machine Downtime and Improve Quality

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Typical application shows boring bars being supported by Gatco's Precision Line Boring Bushings

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**Gatco** Line Boring Bushings are made from high grade bearing quality steel. The units consist of a stationary outer case and an inner liner which rotates with the boring bar. Precision bearings are used in every bushing to provide close I.D. runout.

These bearings can handle any radial or axial load that may be generated and also provide the rigidity required to produce precision cuts. All bearing units are sealed to protect against contaminants.

Some of the special features available on Gatco Line Boring Bushings are drive keys, clearance slots, air purge provisions, timing leads and lockout mechanisms. Each critical dimension is ground and lapped to size and monitored throughout the entire process by statistical

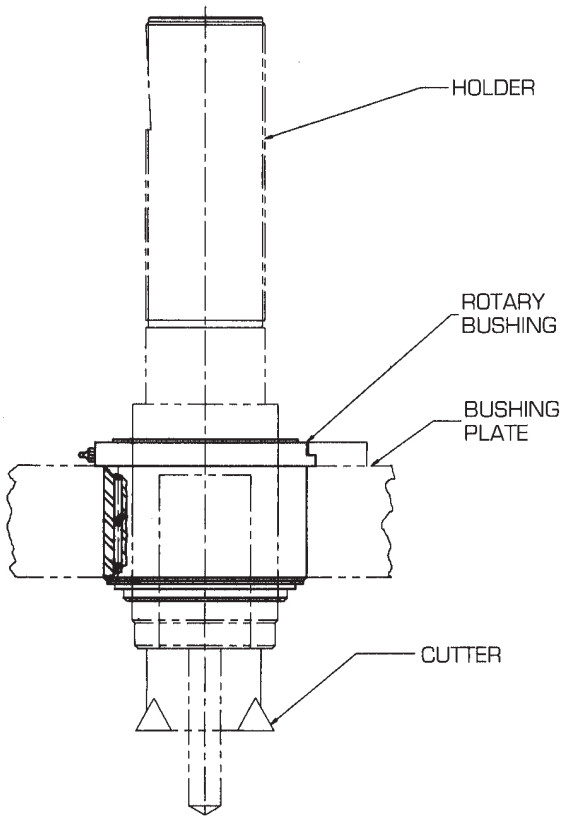
process control techniques. In addition, each unit is 100 percent inspected before shipping to the customer.

**Gatco** offers various rebuilding programs as a service to their customers. These programs relieve the customer of the difficulties encountered rebuilding and maintaining precision tolerances in the supports. After a unit is rebuilt, bushing sizes and runout tolerances will meet original specifications.

**Gatco** also rebuilds housings designed with component parts to service older machines still in operation. Quick-change cartridge bushings manufactured by **Gatco**, Inc. often can be incorporated into these housings requiring little or no modification.

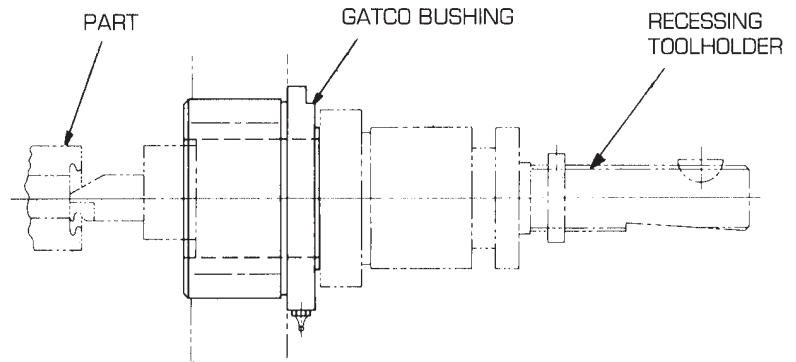
# TYPICAL BUSHING APPLICATIONS

**Gatco Rotary Bushings** can be incorporated into many machining operations requiring precision machined parts. They provide superior support of rotating cutting tools while eliminating friction and wear. Rotary bushings are commonly incorporated into older equipment as well as new. With the demand for continuous improvement and tighter tolerances, **Gatco Rotary Bushings** are the answer to your machining problems.



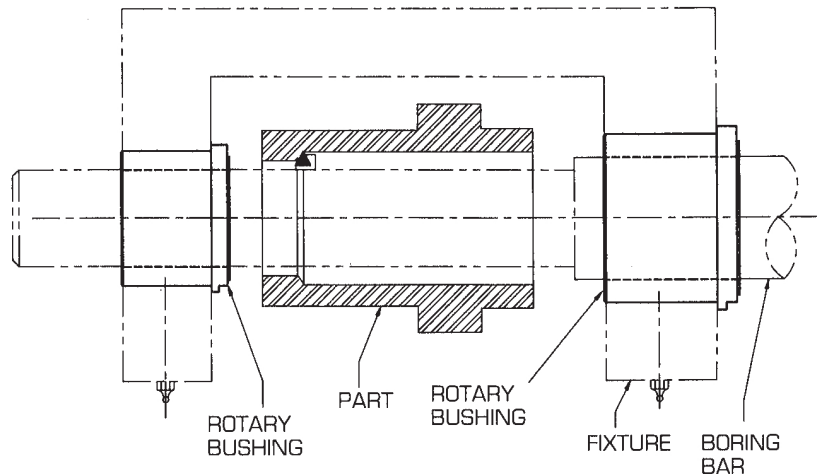
## TYPICAL ROTARY BUSHING SUPPORT APPLICATION

Rotary bushings are commonly used to support and guide shank type holders. They eliminate the wear of the holder pilot diameter, whether this surface is bronze, carbide, or hardened steel wear strips. Rotary bushings are commonly incorporated as an after market replacement for the drill bushings which may have originally been designed in. A rotary bushing can usually be incorporated by simply removing the liner and drill bushing from the bushing plate and replacing it with a rotary bushing.



## TYPICAL BOKUMATIC RECESSING APPLICATION

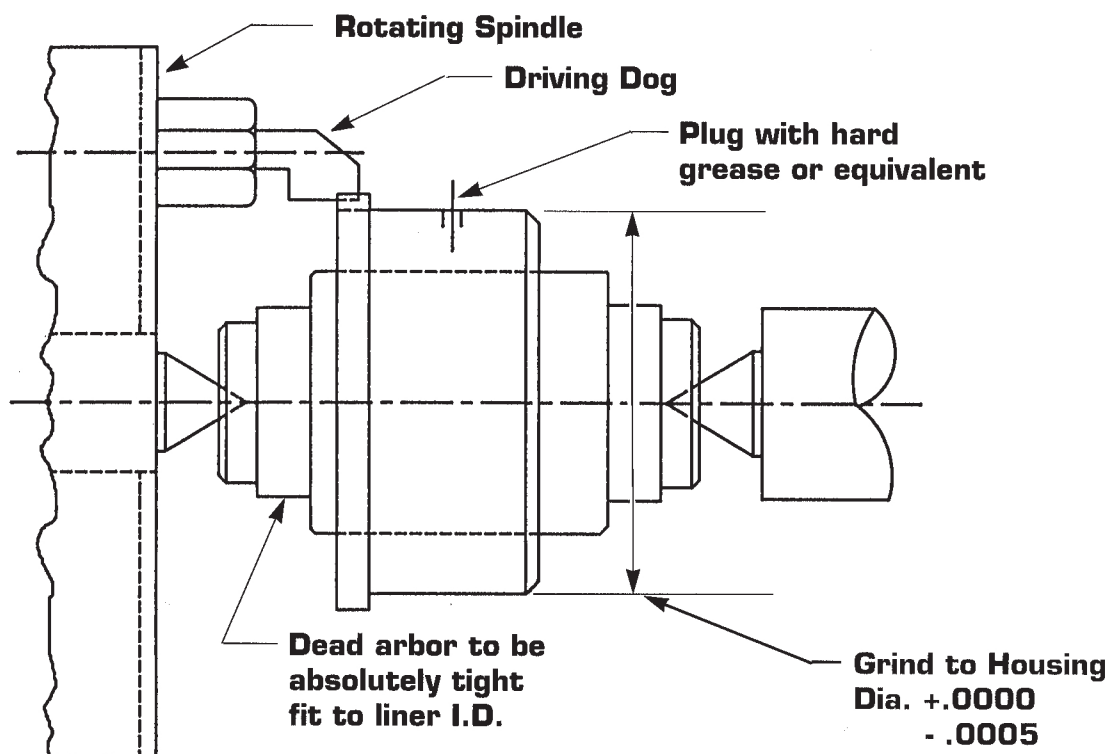
As shown in the drawing above, **Gatco** offers a standard line of rotary bushings designed specifically for use with recessing toolholders. Their unique construction incorporates a radial bearing to accept side loads as well as a thrust bearing to accept axial loads generated by the toolholder activating mechanism and the cutting forces. Recessing bushings can be used in any operation where axial forces are encountered.



## TYPICAL BORING APPLICATION

One of the most common operations for a rotary bushing is boring. The drawing above demonstrates a typical boring operation where the process requires straight and round holes be bored and tight tolerances held. Stationary bushings are unacceptable due to their high wear characteristics which is not tolerable. Rotary bushings can be adapted to most boring applications.

# O.D. GRINDING PROCEDURE



## NOTE:

Grind underside of flange when O.D. grinding to insure O.D. & shoulder are square.

## INSTALLATION

**GATCO Anti-Friction Rotary Bushings** are furnished with .020 grind stock on the O.D. of the outer case to permit selective fitting. (Finish ground O.D.'s are available at extra cost). The figure above shows the simple grinding procedure necessary prior to installation. As illustrated, an arbor must be ground for an absolutely tight, or light press fit to the I.D. of the rotary bushing liner and, with the rotary bushing, is mounted between centers. A drive dog, attached to the machine spindle, is engaged in the manufacturing slot provided in the flange of the outer case. The lubrication hole (for those models with a hole and not a fitting) should be plugged with hard grease. By leaving the arbor "dead" and rotating the outer case with the drive dog, the case O.D. is then ground concentric with the liner I.D. to size determined by the existing or specified housing bore (refer to the figure). An offset clamp may be required at final installation to retain the bushing in the bushing plate.

Sizes GN-500 through GN-1375 have one bearing only, which permits the liner to cant slightly as the rollers are crowned. Live arbor grinding is necessary. When O.D. grinding, follow the above procedure, except drive the arbor and inner liner with the outer case. The inner liner must be locked up to prevent radial movement during grinding. Because the rollers are crowned, I.D. runout must be checked in the center of the needle bearing, at approximately the 2/3 point inside the bushing I.D. from the flange end.

Contact **GATCO** for O.D. grind procedures.

## Standard Gatco Manufacturing Tolerances

### Inside Diameter

Under 1.625	=	+.0003 +.0006
1.625 and above	=	+.0005 +.0010
Runout	=	.0005 T.I.R. (Closer runout avail. on request)
Finish	=	12-20 mu.in.

### Outside Diameter

Standard rotary bushings furnished .020 oversize for O.D. grinding to fit.

Finish ground diameter available on request (extra cost)

Tolerance spread: .0005

## Recommended Fitting Tolerances

Minimum Clearance Between Shaft and Bushing:

- Under 1.625 — .0003
- 1.625 and above — .0005

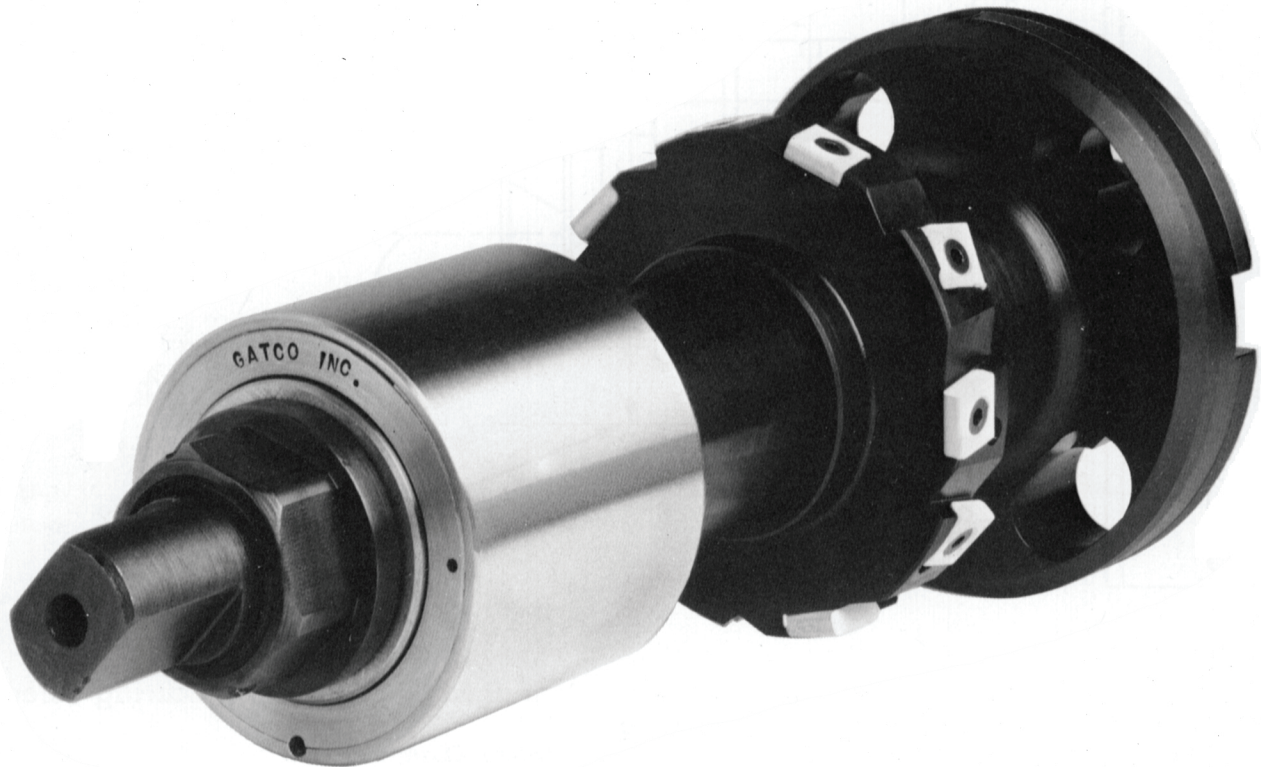
Minimum Clearance Between Housing and Bushing:

- Line on Line to .0005 clearance



# Precision Milling Machine Arbor Bushings

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- Helps dampen and evenly distribute cutting forces
- Eliminates vibration and chatter
- Eliminates excessive mounting clearances

- Sealed to protect bearings from contamination
- Unique cartridge design simplifies replacement
- Incorporates heavy-duty bearings
- Wide selection of I.D., O.D. and length combinations

---

Milling machine arbor bushing supports receive the most abuse in milling applications, next to the cutters themselves. Quite often, however, milling arbor assemblies are designed and built with little thought given to proper mounting, fit or calibration of the precision bearings, resulting in chatter, vibration and premature failure of the cutters and bushings. **Gatco** Rotary Milling Arbor Bushings eliminate these problems.

Horizontal milling creates heavy intermittent radial loads on the milling arbor. **Gatco** Bushings provide the rigid support necessary to evenly distribute these forces, and

their unique design allows them to rotate at high speeds virtually friction-free. They are capable of handling heavy loads and interrupted cuts while maintaining cutting accuracy.

**Gatco** offers a complete line of milling machine bushings for production machines as well as stand-alone horizontal milling machines. These bushings simply slip on the milling arbor at assembly and are secured when the arbor nut is drawn tight. All fitting and calibration is done by **Gatco** at the factory.

# Eliminate Vibration and Chatter

## Types of Milling Machine Bushings

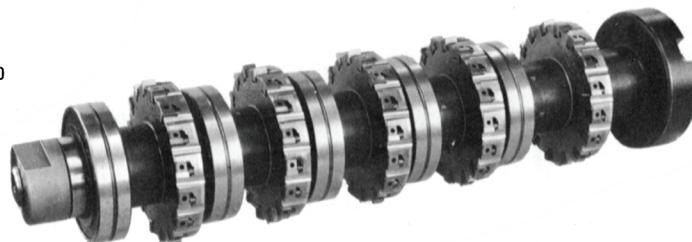
Three types of milling machine bushings are available:

**OUTBOARD SUPPORT BUSHINGS** are mounted on the end of the milling arbor opposite the spindle. This bushing is critical because it has to be capable of handling the high forces generated by the cut and still have the accuracy to hold finish part tolerances.

**MID-SUPPORT BUSHINGS** are mounted on gang arbors and can be positioned anywhere between the spindle and the outboard support bushing. Mounted directly on the arbor, the bushings may be incorporated either singly or in multiples for adequate support. Overall length is held so that they also act as a spacer.

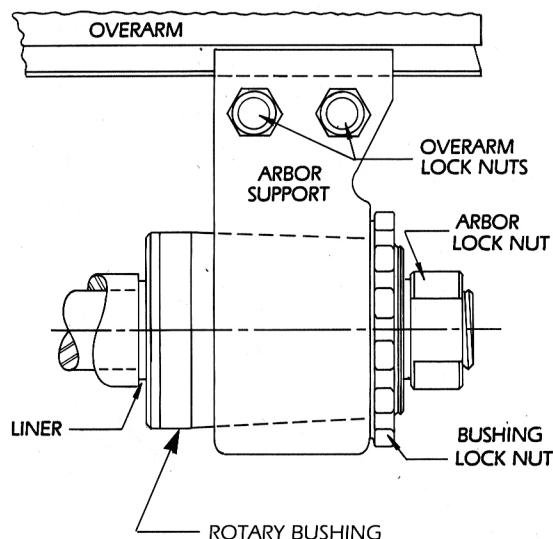
**TAPERED O.D. BUSHINGS** are most commonly used to support milling arbors on stand-alone tool room horizontal milling machines. They replace the tapered O.D. bronze bushings commonly designed into these machines.

Although a large number of dimensional combinations are available, **GATCO** Rotary Bushings may be designed and built to meet the requirements of particular applications. Considering the improvements in milling performance and tool life, **GATCO** bushings are a practical and economical addition to any milling machine.



Milling machine bushings are not cataloged due to the numerous variations. Call or FAX **GATCO** with your milling arbor requirements (see pg. 32).

## Horizontal milling machine outboard support bushings for tool rooms



- Eliminates chatter and vibration
- Increases cutter life
- Provides greater precision through increased rigidity of the arbor
- Eliminates twisted arbors and frozen bushings
- Cutting speeds and feeds can be increased
- Eliminates arbor scoring
- Decreases maintenance costs
- Simple installation
- One bushing for various arbor sizes



# GATCO Milling Machine Bushings

for horizontal milling machine outboard support

## OUTSTANDING FEATURES

- Substantially increase maintainable speeds for advantageous use of carbide tools.
- Eliminate chatter, twisted arbors, frozen bushings, tool breakage, bearing collar wear and scoring, with substantial savings in milling machine maintenance.
- Increase cutter life.
- Provide greater precision through increased rigidity of the arbor.

## DESCRIPTION-APPLICATION

Available in three designs:

- (1) Extended type incorporating taper roller bearings
- (2) Built-in type incorporating taper roller bearings
- (3) Built-in type incorporating straight roller bearings

Gatco live milling machine bushings replace the bronze bushings on the outer support of horizontal milling machines. There are three types of live bushings for outer support applications:

### **EXTENDED TYPE**

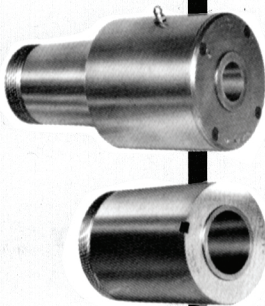
Constructed with a shank that replaces the bronze bushing, the live bushing proper remains outside of the support. It features a pair of precision tapered roller bearings and access for lubrication

### **BUILT-IN TYPE (Tapered Roller Bearings)**

Installed wholly within the outer support bushing cavity, where it is of sufficient size to accommodate it. These also feature a pair of precision tapered roller bearings.

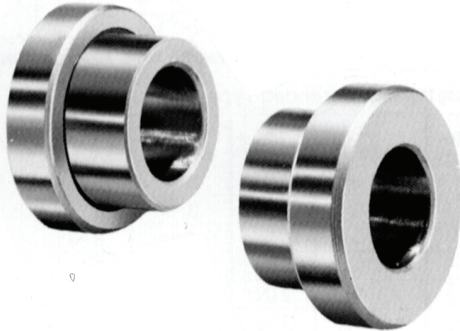
### **BUILT-IN TYPE (Straight Roller Bearings)**

For use where limited diameter requirements exist. Features one or two heavy-duty straight roller bearings. Compact design makes practical its use as an inboard support as well. The built-in type minimizes bearing overhang for greater work clearance.



# GATCO Reducing Bushings

Reducing bushings permit use of various arbor sizes.

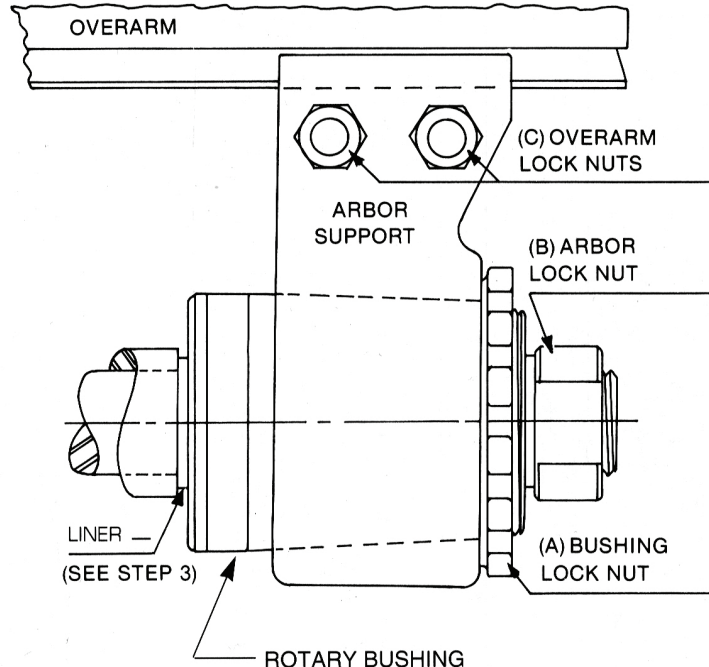


PART NUMBER	OUTSIDE DIA.	INSIDE DIA.	PART NUMBER	OUTSIDE DIA.	INSIDE DIA.
RB-70	1 IN.	3/4"	RB-140	2 IN.	1 1/4"
RB-80	1 1/4"	3/4"	RB-150	2 IN.	1 1/2"
RB-90	1 1/4"	7/8"	RB-160	2 1/2"	1 IN.
RB-100	1 1/4"	1 IN.	RB-170	2 1/2"	1 1/4"
RB-110	1 1/2"	1 IN.	RB-180	2 1/2"	1 1/2"
RB-120	1 1/2"	1 1/4"	RB-190	2 1/2"	2 IN.
RB-130	2 IN.	1 IN.			

# GATCO Milling Machine Bushings

## INSTALLATION

- (1) Mount the bushing securely in the support arm using the original locknut (A).
- (2) Tighten the arbor locknut (B) leaving the overarm locknuts free.
- (3) Position the support arm, equalizing the 1/8" horizontal sleeve movement in the arbor bushing. (N Series arbor bushings only.)
- (4) Tighten the overarm locknuts. (C).



## HOW TO ORDER

- Remove the bronze arbor bushing located in the outer support.
- Measure the large diameter of the bronze bushing and find the corresponding diameter in Column D (see specification charts pages 22 and 23 across from the arbor diameter required for the particular make of machine.
- Column 1 (see specification charts pages 22 and 23) specifies the correct bushing number for each combination of "D" and "A".

For machines not listed or for intermediate support arms, specify also the small diameter and thickness of the support arm for determining the length and degree of taper for the bushing.



# GATCO Milling Machine Bushings

Taper roller bearing arbor support type for Style "B" arbors only.

## GORTON Milling Machines • Extended Type Applications

Following arbor bearings adaptable to Gorton Model #2-28/3-34 and 3-48

BUSHING NO.	D Large Dia.	A Arbor	B Body Dia.	C Extd. Lgth.
G-100	2 5/16"	1 IN.	3 1/2"	3 5/8"
G-125	2 5/16"	1 1/4"	3 7/8"	3 5/8"
G-150	2 5/16"	1 1/2"	4 1/8"	3 5/8"

## BROWN & SHARPE Milling Machines

Extended Type Applications

Following arbor bearings adaptable to B & S Model #000

BUSHING NO.	D Large Dia.	A Arbor	B Body Dia.	C Extd. Lgth.
B & S-1-75	2 5/8"	3/4"	3 1/8"	3 5/16"
B & S-1-87	2 5/8"	7/8"	3 1/8"	3 5/16"
B & S-1-100	2 5/8"	1 IN.	3 1/2"	3 5/8"

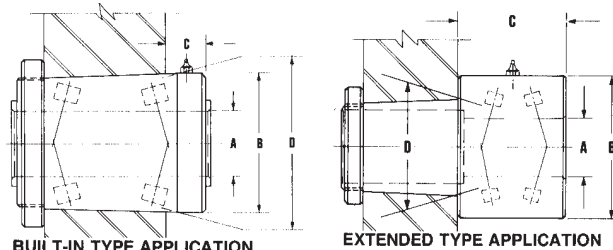
Following arbor bearings adaptable to B & S Model #2 @ 3 HP, #0 and #20

B & S-2-75	2 11/16"	3/4"	3 1/8"	3 5/16"
B & S-2-87	2 11/16"	7/8"	3 1/8"	3 5/16"
B & S-2-100	2 11/16"	1 IN.	3 1/2"	3 5/8"
B & S-2-125	2 11/16"	1 1/4"	3 7/8"	3 5/8"

Following arbor bearings adaptable to B & S Model #2 @ 5 HP, #12 @ 3 and #7 1/2 HP

B & S-3-100	2 3/4"	1 IN.	3 1/2"	3 5/8"
B & S-3-125	2 3/4"	1 1/4"	3 7/8"	3 5/8"
†B & S-3-150	2 3/4"	1 1/2"	4 1/8"	3 5/8"

†Includes 2 - 1 1/2" x 1 7/8" x 1 7/8" Long Special Arbor Collars



## CINCINNATI Milling Machines Extended Type Applications

BUSHING NO.	D Large Dia.	A Arbor	B Body Dia.	C Extd. Lgth.
C3-100	3 1/4"	1 IN.	3 1/2"	3 5/8"
C3-125	3 1/4"	1 1/4"	3 7/8"	3 5/8"
C3-150	3 1/4"	1 1/2"	4 1/8"	3 5/8"
* C3-200	* 3 1/4"	2 IN.	4 7/8"	3 7/8"
C4-200	3 31/32"	2 IN.	4 7/8"	3 7/8"
* C4-250	* 3 31/32"	2 1/2"	5 1/4"	4 1/4"

Following arbor bearings adaptable to Cincinnati Model #0-8

C2-08-75	2 1/2"	3/4"	3 1/8"	3 5/16"
C2-08-87	2 1/2"	7/8"	3 1/8"	3 5/16"
C2-08-100	2 1/2"	1 IN.	3 1/2"	3 5/8"
C2-08-125	2 1/2"	1 1/4"	3 7/8"	3 5/8"

Following arbor bearings adaptable to Cincinnati Model #1-18

C2-18-75	2 1/2"	3/4"	3 1/8"	3 5/16"
C2-18-87	2 1/2"	7/8"	3 1/8"	3 5/16"
C2-18-100	2 1/2"	1 IN.	3 1/2"	3 5/8"
C2-18-125	2 1/2"	1 1/4"	3 7/8"	3 5/8"

Built-in type applications

C4-100	3 31/32"	1 IN.	3 1/2"	3/4"
C4-125	3 31/32"	1 1/4"	3 7/8"	3/4"
C4-150	3 31/32"	1 1/2"	4 1/8"	3/4"

\*Includes 2 - 2" x 2 3/8" x 2 1/8" Long Special Arbor Collars

\*Includes 2 - 2 1/2" x 2 7/8" x 2 1/8" Long Special Arbor Collars

# GATCO Milling Machine Bushings

Straight roller bearing arbor support type.

## BROWN & SHARPE Milling Machines

Following arbor bearings adaptable to B & S Model #000

BUSHING NO.	D Large Dia.	A Arbor	B Body Dia.	C Extd. Lgth.
B & S-1-100-N	2 21/32"	1 IN.	2 11/16"	13/16"

Following arbor bearings adaptable to B & S Model #2 @ 3 HP, #0 and #20

B & S-2-100-N	2 11/16"	1 IN.	2 3/4"	1 1/4"
B & S-2-125-N	2 11/16"	1 1/4"	2 3/4"	1 1/4"

Following arbor bearings adaptable to B & S Model #2 @ 5 HP, #12 @ 3 and 7 1/2 HP

B & S-3-100-N	2 3/4"	1 IN.	2 13/16"	7/8"
B & S-3-125-N	2 3/4"	1 1/4"	2 13/16"	7/8"
B & S-3-150-N	2 3/4"	1 1/2"	2 13/16"	7/8"

## CINCINNATI Milling Machines

Following arbor bearings adaptable to Cincinnati Model #0-8

BUSHING NO.	D Large Dia.	A Arbor	B Body Dia.	C Extd. Lgth.
C2-08-100-N	2 1/2"	1 IN.	2 1/2"	1 3/8"
C2-08-125-N	2 1/2"	1 1/4"	2 1/2"	1 3/8"

Following arbor bearings adaptable to Cincinnati Model #1-18

C2-18-100-N	2 1/2"	1 IN.	2 1/2"	3/4"
C2-18-125-N	2 1/2"	1 1/4"	2 1/2"	3/4"

## CINCINNATI Milling Machines (continued)

Following arbor bearings adaptable to Cincinnati Model #3, #4, #5 and #6 Series

BUSHING NO.	D Large Dia.	A Arbor	B Body Dia.	C Extd. Lgth.
C3-100-N	3 1/4"	1 IN.	3 1/4"	3/4"
C3-125-N	3 1/4"	1 1/4"	3 1/4"	3/4"
C3-150-N	3 1/4"	1 1/2"	3 1/4"	3/4"
C4-200-N	3 31/32"	2 IN.	4 IN.	1 1/4"

## KEMPSMITH Milling Machines

Following arbor bearings adaptable to Model #KMB and #KMC

BUSHING NO.	D Large Dia.	A Arbor	B Body Dia.	C Extd. Lgth.
K3-100-N	2 13/16"	1 IN.	2 13/16"	3/4"
K3-125-N	2 13/16"	1 1/4"	2 13/16"	3/4"
K3-150-N	2 13/16"	1 1/2"	2 13/16"	3/4"

## MILWAUKEE Milling Machines

BUSHING NO.	D Large Dia.	A Arbor	B Body Dia.	C Extd. Lgth.
M3-100-N	2 1/2"	1 IN.	2 9/16"	15/16"
M3-125-N	2 1/2"	1 1/4"	2 9/16"	15/16"
M4-100-N	2 7/8"	1 IN.	2 15/16"	15/16"
M4-125-N	2 7/8"	1 1/4"	2 15/16"	15/16"



**KEMPSMITH MASTER Milling Machines**  
Extended Type Applications  
Adaptable to Model #KMB and #KMC

BUSHING NO.	D Large Dia.	A Arbor	B Body Dia.	C Extd. Lgth.
K3-100	2 13/16"	1 IN.	3 1/2"	3 5/8"
K3-125	2 13/16"	1 1/4"	3 7/8"	3 5/8"
K3-150	2 13/16"	1 1/2"	4 1/8"	3 5/8"

Built-in Type Applications  
For Special Pennant Support Only

K4-150	3 31/32"	1 1/2"	4 1/8"	3/4"
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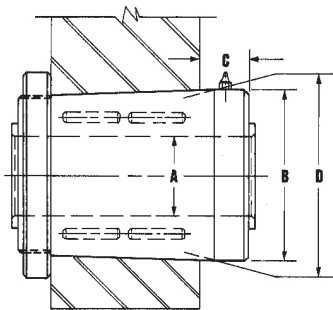
**MILWAUKEE Milling Machines**  
Extended Type Applications

BUSHING NO.	D Large Dia.	A Arbor	B Body Dia.	C Extd. Lgth.
M3-100	2 1/2"	1 IN.	3 1/2"	3 5/8"
M3-125	2 1/2"	1 1/4"	3 7/8"	3 5/8"
M4-100	2 7/8"	1 IN.	3 1/2"	3 5/8"
M4-125	2 7/8"	1 1/4"	3 7/8"	3 5/8"
M4-150	2 7/8"	1 1/2"	4 1/8"	3 5/8"
M5-125	3 1/2"	1 1/4"	3 7/8"	3 5/8"
M5-150	3 1/2"	1 1/2"	4 1/8"	3 5/8"
M5-200	3 1/2"	2 IN.	4 7/8"	3 7/8"
M6-200	4 7/16"	2 IN.	4 7/8"	3 7/8"
M6-250	4 7/16"	2 1/2"	5 1/4"	4 1/4"

Built-in Type Applications

M5-100	3 1/2"	1 IN.	3 1/2"	3/4"
M6-100	4 7/16"	1 IN.	3 1/2"	3/4"
M6-125	4 7/16"	1 1/4"	3 7/8"	3/4"
M6-150	4 7/16"	1 1/2"	4 1/8"	3/4"

- \* Includes 2-2" x 2 3/8" x 1 3/4" Long Special Arbor Collars
- Includes 2-2 1/2" x 2 7/8" x 2 1/8" Long Special Arbor Collars



**MILWAUKEE Milling Machines (continued)**

BUSHING NO.	D Large Dia.	A Arbor	B Body Dia.	C Extd. Lgth.
M4-150-N	2 7/8"	1 1/2"	2 15/16"	15/16"
M5-125-N	3 1/2"	1 1/4"	3 9/16"	1 3/8"
M5-150-N	3 1/2"	1 1/2"	3 9/16"	1 3/8"
M6-200-N	4 7/16"	2 IN.	4 1/2"	1 1/2"

**SUNDSTRAND Milling Machines**- Following arbor bearings adaptable to Sundstrand Model #0 and #00

BUSHING NO.	D Large Dia.	A Arbor	B Body Dia.	C Extd. Lgth.
S-100-N	2 3/16"	1 IN.	2 7/32"	11/16"

Following arbor bearings adaptable to Sundstrand Model #1 and #C1

S1-100-N	2 1/2"	1 IN.	2 17/32"	11/16"
S1-125-N	2 1/2"	1 1/4"	2 17/32"	11/16"

**SUNDSTRAND Milling Machines** Extended Type Applications  
Following arbor bearings adaptable to Sundstrand Model #0 and #00

BUSHING NO.	D Large Dia.	A Arbor	B Body Dia.	C Extd. Lgth.
S-100	2 3/16"	1 IN.	3 1/2"	3 5/8"

Following arbor bearings adaptable to Sundstrand Model #1 and #C1

S1-75	2 1/2"	3/4"	3 1/8"	3 5/16"
S1-87	2 1/2"	7/8"	3 1/8"	3 5/16"
S1-100	2 1/2"	1 IN.	3 1/2"	3 5/8"
S1-125	2 1/2"	1 1/4"	3 7/8"	3 5/8"

Following arbor bearings adaptable to Sundstrand Model #22

S22-100	2 7/8"	1 IN.	3 1/2"	3 5/8"
S22-125	2 7/8"	1 1/4"	3 7/8"	3 5/8"
S22-150	2 7/8"	1 1/2"	4 1/8"	3 5/8"

Following arbor bearings adaptable to Sundstrand Model #33

S33-100	3 3/8"	1 IN.	3 1/2"	3 5/8"
S33-125	3 3/8"	1 1/4"	3 7/8"	3 5/8"
S33-150	3 3/8"	1 1/2"	4 1/8"	3 5/8"
* S33-200	3 3/8"	2 IN.	4 7/8"	3 7/8"

Following arbor bearings adaptable to Sundstrand Model #C2 and #C3

SC2-100	3 3/8"	1 IN.	3 1/2"	3 5/8"
SC2-125	3 3/8"	1 1/4"	3 7/8"	3 5/8"
SC2-150	3 3/8"	1 1/2"	4 1/8"	3 5/8"
* SC2-200	3 3/8"	2 IN.	4 7/8"	3 7/8"

Following arbor bearings adaptable to Sundstrand Model #35, #55, #C4 and #C5

S35-200	4 IN.	2 IN.	4 7/8"	3 7/8"
* S35-250	4 IN.	2 1/2"	5 1/4"	4 1/4"

Following arbor bearings adaptable to Sundstrand Model #C5 with 3" arbor support arm

SC5-300	4 7/8"	3 IN.	6 IN.	4 5/8"
---------	--------	-------	-------	--------

Built-in Type Applications-Following arbor bearings adaptable to Sundstrand Model #35, #55, #C4 and #C5

S35-100	4 IN.	1 IN.	3 1/2"	1 5/16"
S35-125	4 IN.	1 1/4"	3 7/8"	1 5/16"
S35-150	4 IN.	1 1/2"	4 1/8"	1 5/16"

Following arbor bearings adaptable to Sundstrand Model #C5 with 3" arbor support arm

SC5-150	4 7/8"	1 1/2"	4 1/8"	7/8"
SC5-200	4 7/8"	2 IN.	4 7/8"	7/8"
SC5-250	4 7/8"	2 1/2"	5 1/4"	7/8"

**SUNDSTRAND Milling Machines (continued)**

Following arbor bearings adaptable to Sundstrand Model #22

Bushing No.	D Large Dia.	A Arbor	B Body Dia.	C Extd. Lgth.
S22-100-N	2 7/8"	1 IN.	2 29/32"	1 5/16"
S22-125-N	2 7/8"	1 1/4"	2 29/32"	1 5/16"
S22-150-N	2 7/8"	1 1/2"	2 29/32"	1 5/16"

Following arbor bearings adaptable to Sundstrand Model #33

S33-100-N	3 3/8"	1 IN.	3 13/32"	1 1/16"
S33-125-N	3 3/8"	1 1/4"	3 13/32"	1 1/16"
S33-150-N	3 3/8"	1 1/2"	3 13/32"	1 1/16"
S33-200-N	3 3/8"	2 IN.	3 13/32"	1 1/16"

Following arbor bearings adaptable to Sundstrand Model #C2 and #C3

SC2-100-N	3 3/8"	1 IN.	3 13/32"	9/16"
SC2-125-N	3 3/8"	1 1/4"	3 13/32"	9/16"
SC2-150-N	3 3/8"	1 1/2"	3 13/32"	9/16"
SC2-200-N	3 3/8"	2 IN.	3 13/32"	9/16"

Following arbor bearings adaptable to Sundstrand Model #35, #55, #C4 and #C5

S35-200-N	4 IN.	2 IN.	4 1/32"	1 7/8"
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Following arbor bearings adaptable to Sundstrand Model #C5 with 3" arbor support arm

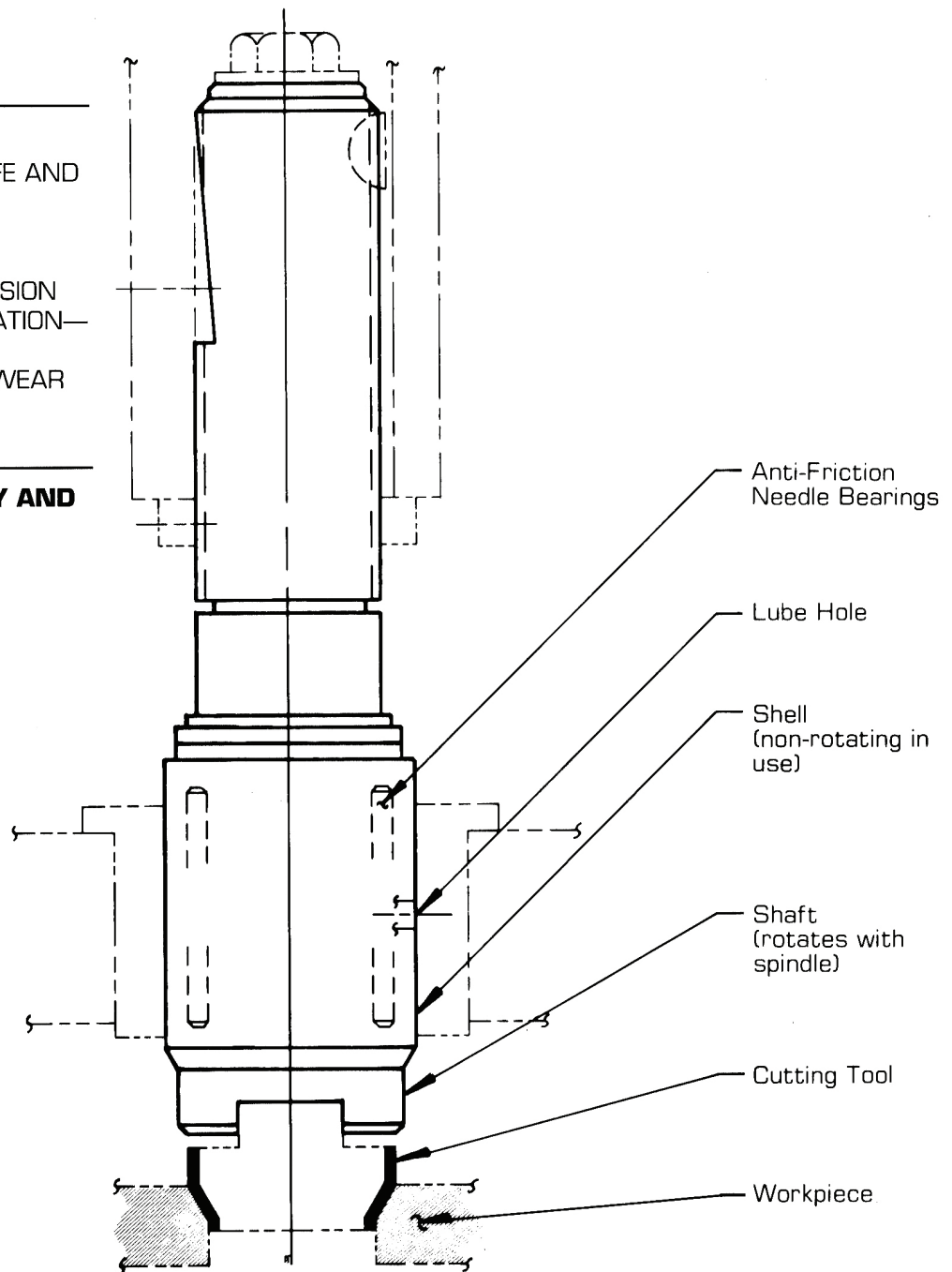
SC5-300-N	4 7/8"	3 IN.	4 7/8"	5/8"
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# ANTIFRICTION ROTARY TOOLHOLDERS

## ROTARY TOOLHOLDER ADVANTAGES

- + ELIMINATES WEAR STRIPS
- + IMPROVES CUTTING TOOL LIFE AND PERFORMANCE
- + FRICTION FREE OPERATION
- + INCREASES ACCURACY
- + MINIMIZES THERMAL EXPANSION
- + ENABLES HIGH SPEED OPERATION—HEAVIER CUTS
- + MINIMAL SUPPORT SLEEVE WEAR
- + ELIMINATES CHATTER
- + REDUCES DOWNTIME

= **INCREASED PRODUCTIVITY AND REDUCED PER UNIT COST**



## Description

**GATCO Anti-Friction Rotary Toolholders** (Patented) are a combination of a solid toolholder with an exterior bearing assembly. They are far superior to solid toolholders in that they eliminate the need for adjustable wear strips, thereby eliminating adjusting downtime. Due to "friction-free" bearing construction, operating temperatures are lowered, permitting higher speeds while eliminating chatter and guide sleeve wear. Their compact construction allows close center-to-center distances. Through precision manufacturing, tight tolerances are achieved. While more expensive than solid toolholders, the cost per piece machined is dramatically lowered, due to virtually no downtime caused by bushing or holder wear normally encountered with solid toolholders. At the same time, scrapage is minimized and tool life is extended.

# PRODUCT DESCRIPTION

## Construction

Rotary Toolholders consist of:

1. **Outer Shell** - Hardened steel, O.D. precision ground to size and tolerance shown. Non-rotating in use.
2. **Rotating Shaft** - Hardened steel, precision ground to size and tolerance shown. Toolholders are provided with four standard types of tool sockets from which to choose. (additional socket and shank combinations are available)
3. **Bearings** - Caged needles provide anti-friction rotation and radial load support.
4. **Seals** - Seal and rear flinger extend the life of the Rotary Toolholder.
5. **Lubrication** - Lubricated with light duty general purpose grease. Lube hole provided for maintenance lubrication.

Note: Woodruff key, stop nut and drawbar are not included.

## Special Design and Features

Special Toolholders and modified standards can be designed for specific applications. Rotary Toolholders can be furnished with tapered shanks, special O.D.'s, special lengths, etc.. In an effort to provide the metal cutting industry with a wide selection of Rotary Toolholders, **GATCO, INC.** also offers Rotary Toolholders in metric sizes. Special Rotary Toolholders designed and quoted upon request. Contact **GATCO's** Engineering Dept. or FAX a sketch of your needs (see pg. 33).

## Operation

In operation, a **GATCO Anti-Friction Rotary Toolholder** is guided by a support sleeve as it travels toward the workpiece. The recommended close tolerance fit (.0003 to .0005 clearance) of the shell to the support sleeve restricts the shell from rotating. The Toolholder shaft rotates friction free within the needle bearings providing an accurate, chatter free operation.

In addition, the anti-friction rotation all but eliminates heat build-up and thermal expansion, greatly increasing the life of the Toolholder, the support sleeve and the tooling. Also, higher operating speeds can be achieved. This ultimately results in a lower cost per piece machined.

## Rebuilding Program

All Rotary Toolholders can be rebuilt provided the shaft and/or socket is not damaged. This restores the Toolholders to their original T.I.R. accuracy and life expectancy. **GATCO, INC.** cannot be responsible for Toolholders rebuilt or modified by anyone other than **GATCO, INC.**

## Maintenance

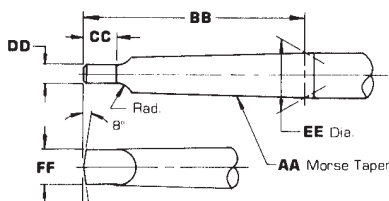
**GATCO Anti-Friction Rotary Toolholders** are lubricated at the factory. Through simple basic maintenance procedures, GATCO customers can extend the useful life of their Rotary Toolholders by using the lubrication hole provided in the outer shell.

**SEE INSIDE FRONT COVER FOR LUBRICATION RECOMMENDATIONS**

## SUGGESTED CUTTING TOOL SHANK DIMENSIONS

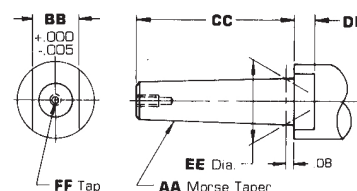
### FA-SERIES MORSE TAPER SHANK WITH TANG DRIVE

AA	BB	CC	DD	EE	FF
#1	2.44	.37	.203	.475	.34
#2	2.94	.43	.250	.700	.53
#3	3.69	.56	.312	.938	.72
#4	4.62	.62	.468	1.231	.97



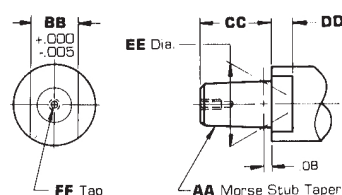
### FB-SERIES MORSE TAPER SHANK WITH DRIVE FLATS

AA	BB	CC	DD	EE	FF
#0	.428	1.97	.24	.356	#8-32
#1	.507	2.16	.31	.475	#10-32
#2	.782	2.56	.35	.700	1/4-28
#3	.979	3.19	.43	.938	5/16-24
#4	1.255	4.06	.51	1.231	3/8-24



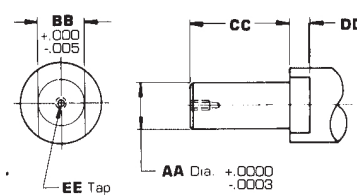
### FC-SERIES MORSE STUB TAPER SHANK WITH DRIVE FLATS

AA	BB	CC	DD	EE	FF
#0	.428	.91	.24	.356	#8-32
#1	.507	.98	.31	.475	#10-32
#2	.782	1.26	.35	.700	1/4-28
#3	.979	1.46	.43	.938	5/16-24
#4	1.255	1.73	.51	1.231	3/8-24



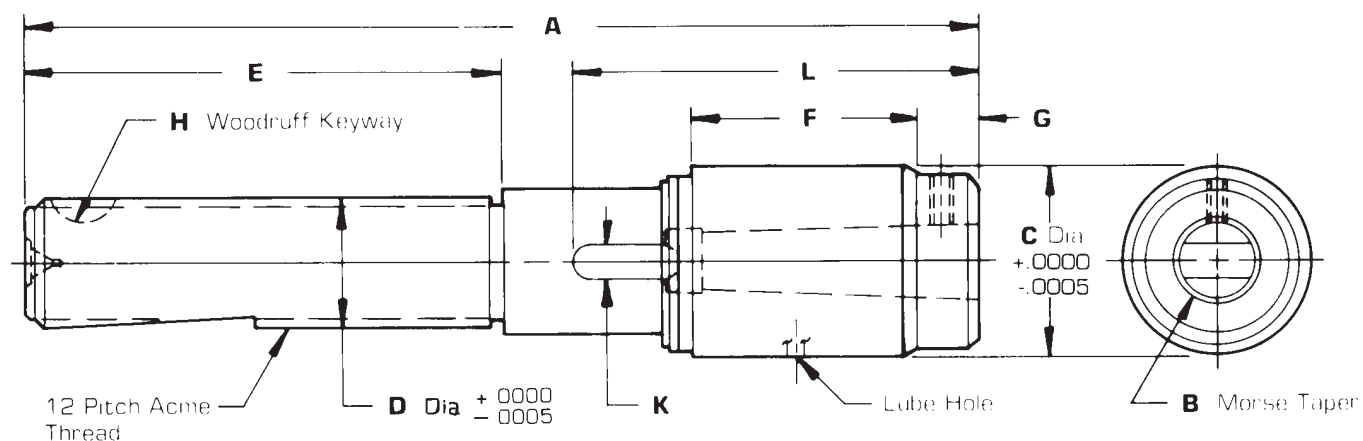
### FD-SERIES STRAIGHT SHANK WITH DRIVE FLATS

AA	BB	CC	DD	EE
.3935	.428	.90	.24	#10-32
.4722	.507	1.10	.31	#10-32
.6297	.703	1.42	.35	#10-32
.7478	.782	1.69	.35	1/4-28
.9447	.979	2.12	.43	1/4-28
1.2203	1.255	2.75	.51	3/8-24



# FA-SERIES

## MORSE TAPER SOCKET WITH TANG DRIVE



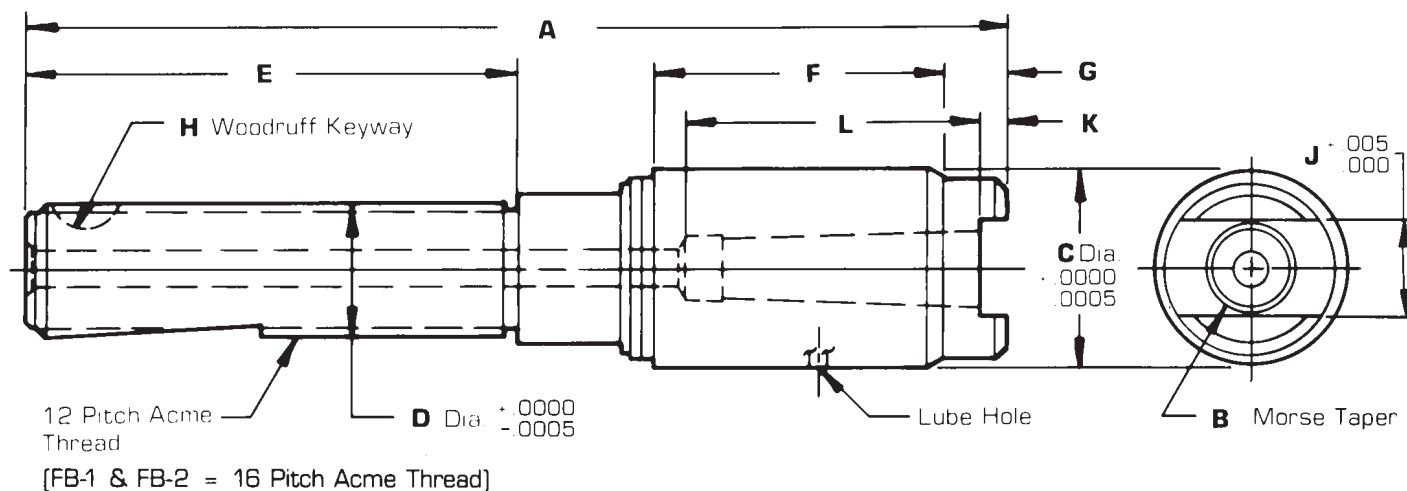
Socket runout within .0005 T.I.R.

Radial capacities based on 1500 hours B<sub>10</sub> Bearing Life at 300 R.P.M.

Contact **GATCO** for sizes not listed in this catalog or FAX your requirements (see pg. 33).

FA No.	A	B	C	D	E	F	G	H	K	L	RADIAL LIMITING CAP. LBS.	SPD. R.P.M.
3	6.50											
4	7.48	1	1.4173	.7495	3.38	1.46	.43	#505	.218	2.81	1,200	10,800
5	8.50											
6	7.24											
7	8.23	1	1.6535	.8745	3.74	1.46	.43	#606	.218	2.81	1,800	8,400
8	9.25											
9	7.24											
10	8.23	2	1.6535	.8745	3.74	1.97	.43	#606	.266	3.25	1,800	8,400
11	9.25											
12	8.23											
13	9.25	2	1.7717	1.0620	3.74	1.82	.63	#607	.266	3.25	2,900	7,800
14	10.24											
15	9.25											
16	10.63	2	2.0079	1.3745	4.65	1.77	.63	#808	.266	3.25	2,600	6,600
17	12.00											
18	9.25											
19	10.63	3	2.0079	1.3745	4.65	2.36	.63	#808	.328	4.25	2,600	6,600
20	12.00											
21	9.25											
22	10.63	3	2.5197	1.3745	4.65	2.36	.63	#808	.328	4.25	3,700	5,400
23	12.00											
25	10.63	4	2.5197	1.3745	4.65	3.19	.63	#808	.484	5.12	3,700	5,400
26	12.00											
27	10.00											
28	11.50	3	2.7559	1.8745	5.67	2.36	.63	#1011	.328	4.25	3,900	4,800
29	13.00											
31	11.50	4	2.7559	1.8745	5.67	3.19	.63	#1011	.484	5.12	3,900	4,800
32	13.00											

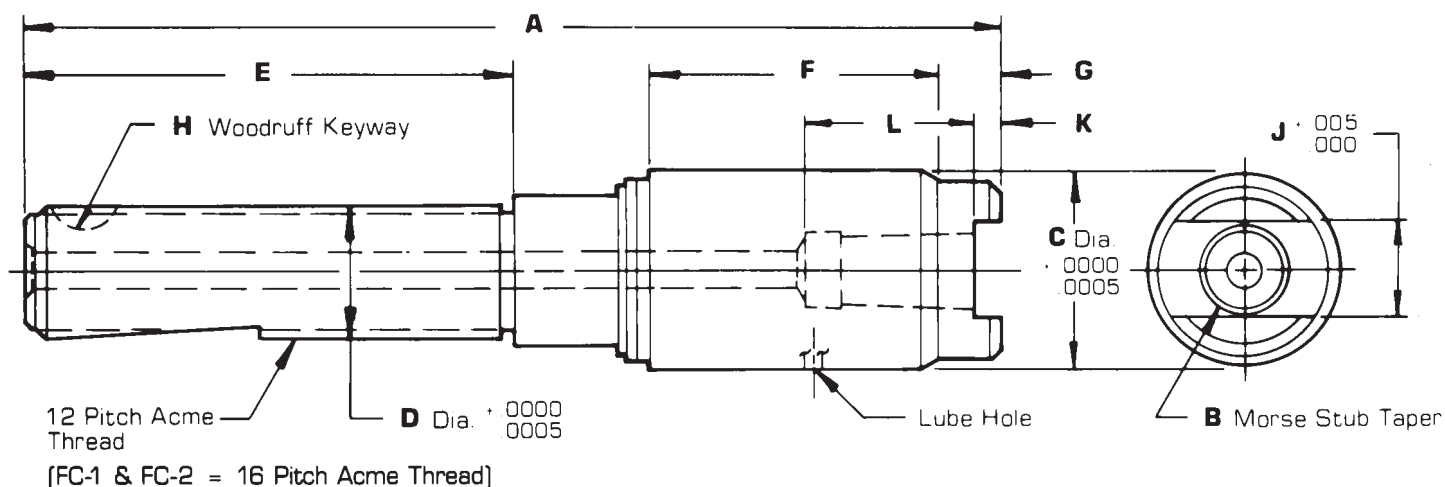




FB No.	A	B	C	D	E	F	G	H	J	K	L	RADIAL CAP. LBS.	LIMITING SPD. R.P.M.
1	6.26												
2	7.24	0	1.2598	.6245	3.38	2.00	.43	#505	.433	.16	2.16	2,400	12,600
3	6.50												
4	7.48	1	1.4173	.7495	3.38	2.13	.43	#505	.512	.24	2.36	1,200	10,800
5	8.50												
6	7.24												
7	8.23	1	1.6535	.8745	3.74	2.48	.43	#606	.512	.24	2.36	1,800	8,400
8	9.25												
9	7.24												
10	8.23	2	1.6535	.8745	3.74	2.48	.43	#606	.787	.28	2.87	1,800	8,400
11	9.25												
12	8.23												
13	9.25	2	1.7717	1.0620	3.74	2.68	.63	#607	.787	.28	2.87	2,900	7,800
14	10.24												
15	9.25												
16	10.63	2	2.0079	1.3745	4.65	2.99	.63	#808	.787	.28	2.87	2,600	6,600
17	12.00												
18	9.25												
19	10.63	3	2.0079	1.3745	4.65	2.99	.63	#808	.984	.35	3.50	2,600	6,600
20	12.00												
21	9.25												
22	10.63	3	2.5197	1.3745	4.65	3.19	.63	#808	.984	.35	3.50	3,700	5,400
23	12.00					3.78							
24	—												
25	10.63	4	2.5197	1.3745	4.65	3.78	.63	#808	1.260	.43	4.37	3,700	5,400
26	12.00					3.78							
27	10.00					3.19							
28	11.50	3	2.7559	1.8745	5.67	4.13	.63	#1011	.984	.35	3.50	3,900	4,800
29	13.00					4.13							
30	10.00					3.19							
31	11.50	4	2.7559	1.8745	5.67	4.13	.63	#1011	1.260	.43	4.37	3,900	4,800
32	13.00					4.13							

# FC-SERIES

## MORSE STUB TAPER SOCKET WITH DRIVE FLATS

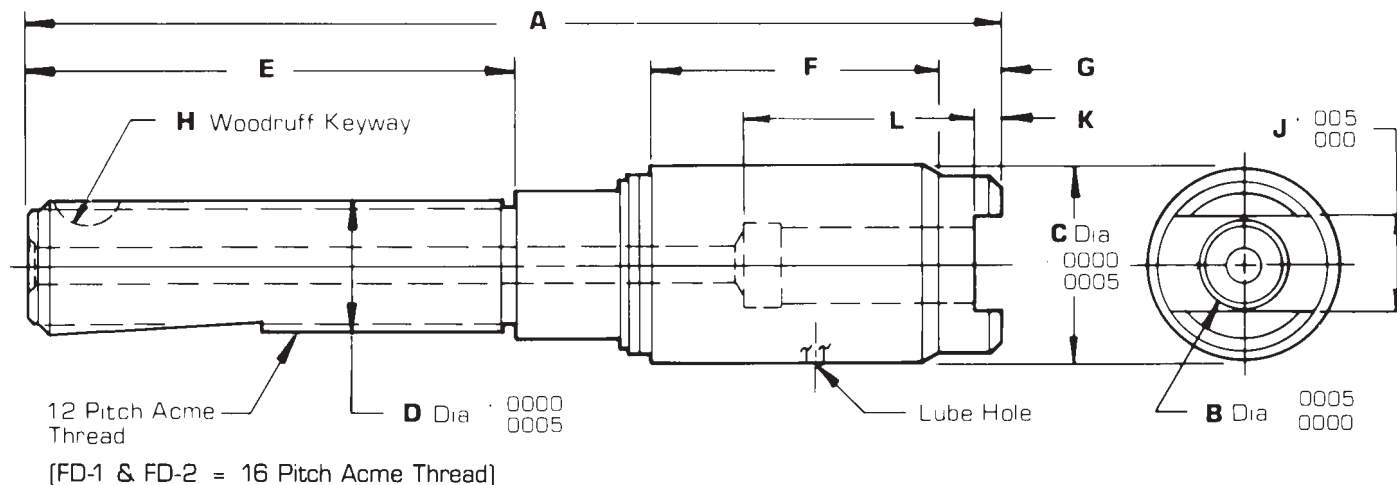


Socket runout within .0005 T.I.R.

Radial capacities based on 1500 hours B<sub>10</sub> Bearing Life at 300 R.P.M.

Contact **GATCO** for sizes not listed in this catalog or FAX your requirements (see pg. 33).

FC No.	A	B	C	D	E	F	G	H	J	K	L	RADIAL CAP. LBS.	LIMITING SPD. R.P.M.
1	6.26												
2	7.24	0	1.2598	.6245	3.38	2.00	.43	#505	.433	.16	1.07	2,400	12,600
3	6.50												
4	7.48	1	1.4173	.7495	3.38	2.13	.43	#505	.512	.24	1.10	1,200	10,800
5	8.50												
6	7.24												
7	8.23	1	1.6535	.8745	3.74	2.48	.43	#606	.512	.24	1.10	1,800	8,400
8	9.25												
9	7.24												
10	8.23	2	1.6535	.8745	3.74	2.48	.43	#606	.787	.28	1.38	1,800	8,400
11	9.25												
12	8.23												
13	9.25	2	1.7717	1.0620	3.74	2.68	.63	#607	.787	.28	1.38	2,900	7,800
14	10.24												
15	9.25												
16	10.63	2	2.0079	1.3745	4.65	2.99	.63	#808	.787	.28	1.38	2,600	6,600
17	12.00												
18	9.25												
19	10.63	3	2.0079	1.3745	4.65	2.99	.63	#808	.984	.35	1.61	2,600	6,600
20	12.00												
21	9.25												
22	10.63	3	2.5197	1.3745	4.65	3.19	.63	#808	.984	.35	1.61	3,700	5,400
23	12.00												
24	9.25												
25	10.63	4	2.5197	1.3745	4.65	3.78	.63	#808	1.260	.43	1.89	3,700	5,400
26	12.00												
27	10.00												
28	11.50	3	2.7559	1.8745	5.67	4.13	.63	#1011	.984	.35	1.61	3,900	4,800
29	13.00												
30	10.00												
31	11.50	4	2.7559	1.8745	5.67	4.13	.63	#1011	1.260	.43	1.89	3,900	4,800
32	13.00												



Socket runout within .0005 T.I.R.

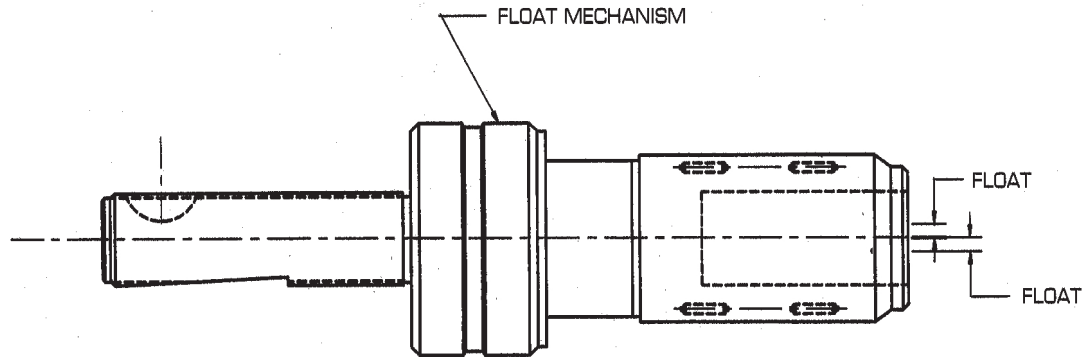
Radial capacities based on 1500 hours B<sub>10</sub> Bearing Life at 300 R.P.M.

Contact **GATCO** for sizes not listed in this catalog or FAX your requirements (see pg. 33).

FD No.	A	B	C	D	E	F	G	H	J	K	L	RADIAL CAP. LBS.	LIMITING SPD. R.P.M.
1	6.26												
2	7.24	.3937	1.2598	.6245	3.38	2.00	.43	#505	.433	.16	1.02	2,400	12,600
3	6.50												
4	7.48	.4724	1.4173	.7495	3.38	2.13	.43	#505	.512	.24	1.26	1,200	10,800
5	8.50												
6	7.24												
7	8.23	.6299	1.6535	.8745	3.74	2.48	.43	#606	.708	.28	1.57	1,800	8,400
8	9.25												
9	7.24												
10	8.23	.7480	1.6535	.8745	3.74	2.48	.43	#606	.787	.28	1.89	1,800	8,400
11	9.25												
12	8.23												
13	9.25	.7480	1.7717	1.0620	3.74	2.68	.63	#607	.787	.28	1.89	2,900	7,800
14	10.24												
15	9.25												
16	10.63	.7480	2.0079	1.3745	4.65	2.99	.63	#808	.787	.28	1.89	2,600	6,600
17	12.00												
18	9.25												
19	10.63	.9449	2.0079	1.3745	4.65	2.99	.63	#808	.984	.35	2.36	2,600	6,600
20	12.00												
21	9.25												
22	10.63	.9449	2.5197	1.3745	4.65	3.19	.63	#808	.984	.35	2.36	3,700	5,400
23	12.00					3.78							
24	9.25					3.19							
25	10.63	1.2205	2.5197	1.3745	4.65	3.78	.63	#808	1.260	.43	3.11	3,700	5,400
26	12.00					3.78							
27	10.00					3.19							
28	11.50	.9449	2.7559	1.8745	5.67	4.13	.63	#1011	.984	.35	2.36	3,900	4,800
29	13.00					4.13							
30	10.00					3.19							
31	11.50	1.2205	2.7559	1.8745	5.67	4.13	.63	#1011	1.260	.43	3.11	3,900	4,800
32	13.00					4.13							

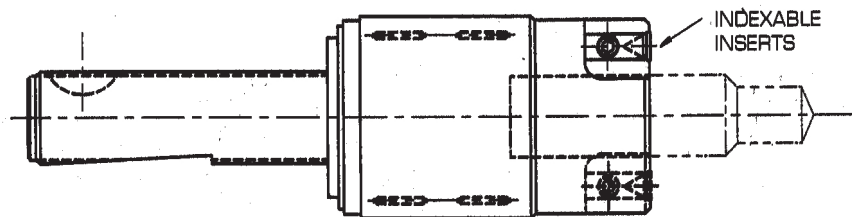
# TYPICAL TOOLHOLDER APPLICATIONS

**Gatco Rotary Toolholders** can be designed to suit any application. In addition to our four standard series, **Gatco** can design and build specials, incorporating coolant inducers, float mechanisms and insert pockets. Rotary Toolholders can normally be incorporated into an existing machine requiring no modifications to the machine itself. Contact **Gatco's** Engineering Department with your specifications.



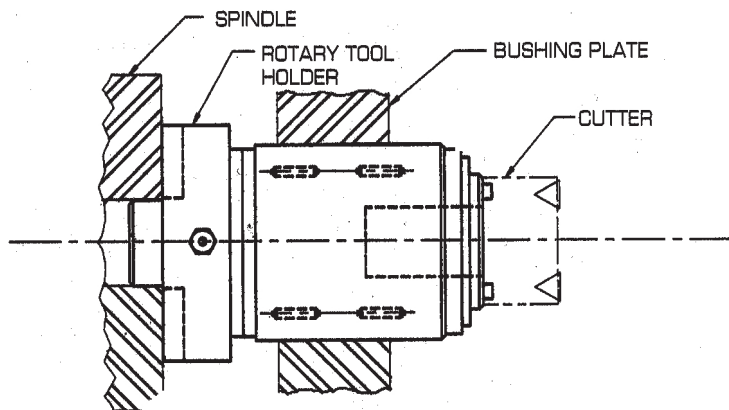
## FLOATING ROTARY TOOLHOLDER

Rotary Toolholders can be designed to float, to allow for spindle misalignment. They allow the cutting tool to rotate on an offset centerline from the spindle. The float mechanism compensates for misalignment between the spindle and bushing plate. The anti-friction bearings provide rigid friction free support during the cut.



## INDEXABLE ROTARY TOOLHOLDER

Rotary Toolholders can be provided with the cutting inserts mounted directly in the holder. They are commonly used in combination with other cutting tools such as drills or spot facers as shown above.



## STUB ROTARY TOOLHOLDER

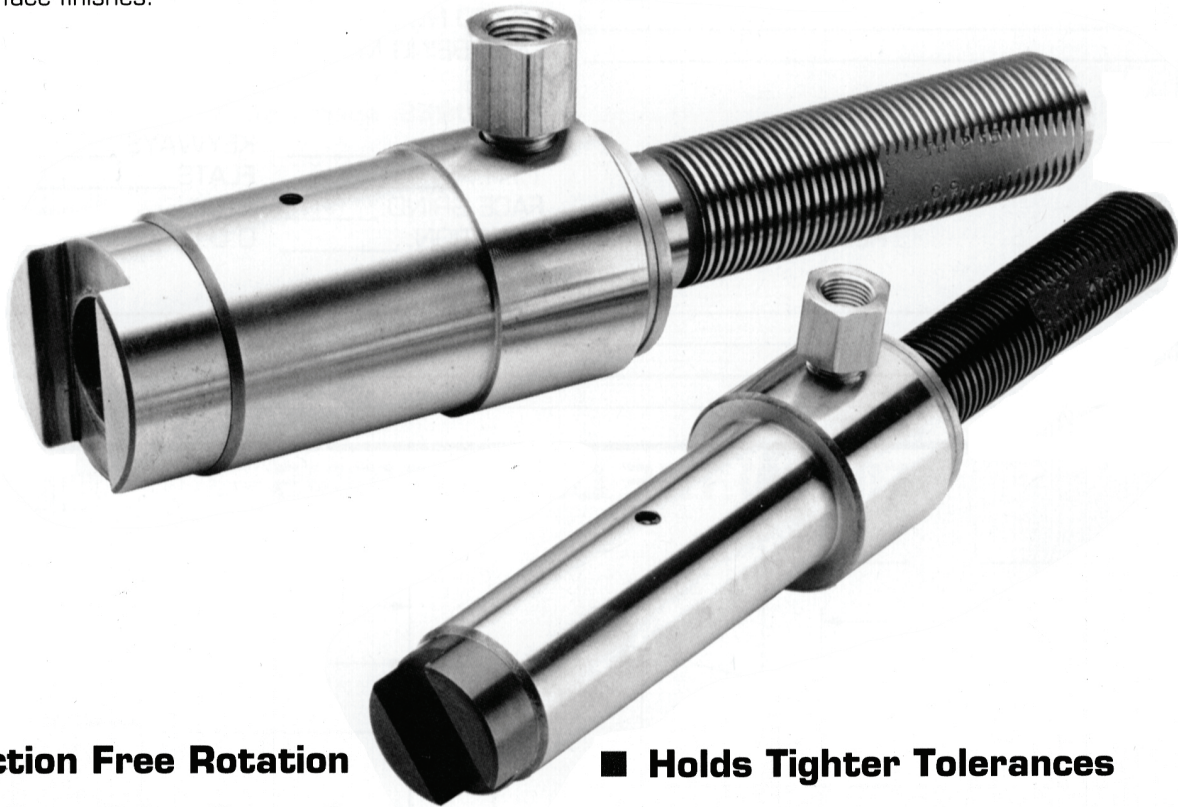
Stub Rotary Toolholders are commonly used when maximum support is required near the cut. They are compact, allowing minimum distance between the spindle and the part being cut.



# Coolant Induced Rotary Toolholders Reduce Cost and Increase Tool Performance

**GATCO** Precision Coolant-Induced Rotary Toolholders enhance the performance of cutting tools through their unique design. Anti-friction bearing rotation maintains tighter tolerances while the high pressure coolant flow produces better surface finishes. Commonly used for drilling, milling, boring, and porting operations, the toolholders may be adapted to any operation which can benefit from coolant being channelled to the cutting edge. With the high speeds necessary to cut certain materials, there is a need to blast chips from the cut with high pressure coolant. Pressurized coolant prevents tool breakage, dissipates heat and breaks chips as well as producing better surface finishes.

**GATCO** Toolholders also reduce costs by eliminating the need to modify or replace existing machines to obtain the benefits of coolant-induced machining. Many machine tool spindles such as multiple drill heads often cannot accommodate coolant through the spindle due to gearing or other obstructions. The **Gatco** Toolholder adapts to these machines easily for coolant delivery. Coolant-Induced Rotary Toolholders' compact design allows for minimal centerline distances between spindles. They are commonly used to replace solid holders and holders with wear strips.



- Friction Free Rotation
- Flushes Chips From Cut
- Improves Surface Finish
- Reduces Downtime
- Holds Tighter Tolerances
- Replaces Conventional Toolholders
- Ideal For Multiple Spindle Applications

## UNIQUE CONSTRUCTION

Coolant-Induced Rotary Toolholders consist of a rotating shaft in which the cutting tool is mounted, and an outer shell which houses precision bearings, providing support and friction-free rotation for the shaft. In operation, the shell pilots in a guide bushing, coolant flows through the inducer into the rotating shaft and out through the pores in the cutting tool.

The use of bearings not only eliminates friction and allows for higher rotational speeds, but also allows the shaft to rotate concentrically true to the seals in the coolant inducer. This design concept prevents premature failure of the inducer seals due to misalignment as well as distortion caused by excessive starts and stops. All radial forces are absorbed by the bearings rather than the seals.



# We invite inquiries on Special Sizes and Shapes to Meet Your Requirements!

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Shown above is a recent sampling of customized anti-friction rotary bushings and toolholders designed and built to meet our customers special requirements.

Since its beginning, Gatco, Inc. has gone to great lengths to provide "special" Rotary Bushings of all shapes and sizes. Some of these are shown in the photo above. We have always felt that satisfied customers are important to us, and lead to repeat business. Consequently, we have never turned down a single request for a special type of rotary bushing or toolholder, no

matter how tough the application. If you have an application which cannot be filled with one of our standard series, don't hesitate to tell us about your problem. Send us a dimensioned sketch of the proposed application, and we will be glad to quote you on a rotary bushing or toolholder to satisfy your needs, at no obligation to you.

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# RECOMMENDED USAGE

BUSHING SERIES	PRECISION LINE BORING	MILLING	DRILLING	REAMING	SPOT-FACING	RECESSING	GUN DRILLING	BORING	FLOATING HOLDERS	INSPECTION FIXTURES
NUMBER SERIES		X	X		X			X		
G SERIES	X	X	X	X	X		X	X	X	X
GTR & GTRS SERIES		X	X	X	X		X	X	X	X
GNT SERIES		X	X	X	X			X		
GB SERIES	X		X	X				X		X
GN & N SERIES		X	X	X	X		X	X		
RECESSING BUSHINGS						X				

## CUSTOM FEATURES AVAILABLE ON REQUEST

- STRAIGHT FLATS
- RADIUS FLATS
- SPECIAL I.D.
- SPECIAL O.D.
- HARDENED O.D.
- KEY

- SPECIAL TOLERANCE
- O.D. GRINDING
- ETCH
- COUNTER-CLOCKWISE  
ROTATION
- KEYWAY