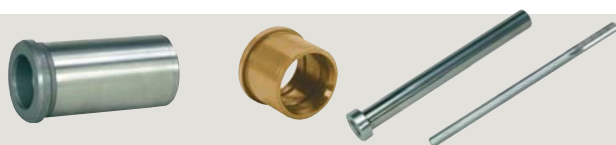


# TOOLING & POSITIONING COMPONENTS



## Die & Mold Components

450 - 455



## Locating & Positioning Components

387 - 422



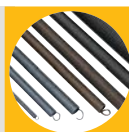
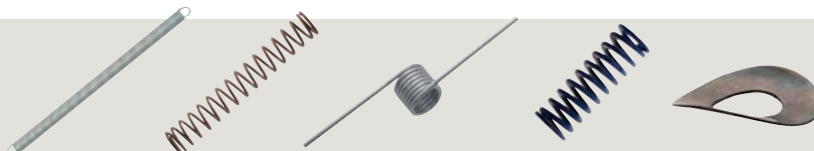
## Setup Clamps & Accessories

423 - 426, 432 - 440



## Springs

441 - 449



## Work Supports, Grippers, Rests & Stops

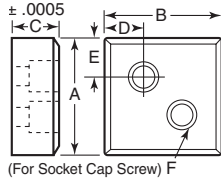
382 - 386, 420, 427 - 431





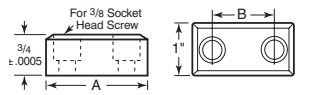
Made of cold finished steel, carburized and hardened. Thickness ground to size +/- .0005. Black oxide finish. Many applications on jig and fixture work.

**Rest Pads  
Standard Duty**

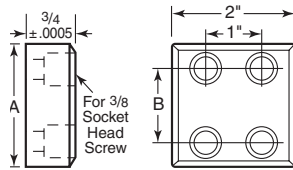


Item No.	A	B	C	D	E	F	Pack Qty.
JRP-1	1	1	.3125	5/16	5/16	#10	1
JRP-2	1 1/4	1 1/4	.3750	3/8	3/8	1/4	1
JRP-3	1 1/2	1 1/2	.4375	7/16	7/16	1/4	1
JRP-4	1 3/4	1 3/4	.5000	1/2	1/2	5/16	1

**Rest Pads  
Standard Duty**



JRP-5 thru JRP-10

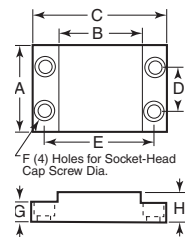


JRP-11\* thru JRP-16

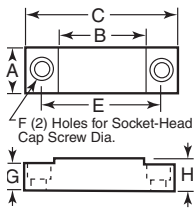
Item No.	A	B	Pack Qty.	Item No.	A	B	Pack Qty.
JRP-5	2	1 1/4	1	JRP-11*	2	1 1/4	1
JRP-6	2 3/8	1 5/8	1	JRP-12	3	2 1/4	1
JRP-7	3	2 1/4	1	JRP-13	3 3/8	2 5/8	1
JRP-8	4	3 1/4	1	JRP-14	4	3 1/4	1
JRP-9	5	4 1/4	1	JRP-15	5	4 1/4	1
JRP-10	6	5 1/4	1	JRP-16	6	5 1/4	1

\*JRP-11 has two diagonal holes upper right and lower left.

**Rest Pads  
Heavy Duty**



Square



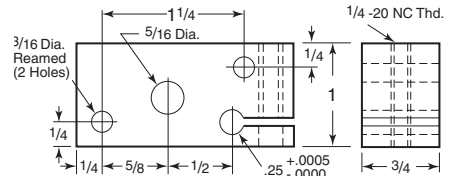
Rectangular

These rest pads have a large surface plate to support heavy work pieces. Many applications for heavy duty jig and fixture work. Made of 10-18 steel, carburized and hardened, with black oxide finish.

Item No.	A	B	C	D	E	F	G	+ .0005/ - .0000	H	Pack Qty.
<b>Square</b>										
JRP-20	2	2	3 1/4	1	2 1/2	1/4-20 or M6	1/2	.7500		1
<b>Rectangle</b>										
JRP-21	1	2	3 1/2	—	2 3/4	5/16-18 or M8	5/8	.7500		1
JRP-22	1	3	4 1/2	—	3 3/4	5/16-18 or M8	5/8	.7500		1
JRP-23	1	4	5 1/2	—	4 3/4	5/16-18 or M8	5/8	.7500		1

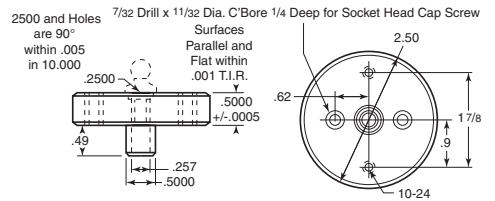
Designed for easy insertion and removal of shoulderless tooling balls. Tooling ball can be adjusted to exact position desired and locked securely in place by cap screw lock without marring shank. Pad is drilled for mounting by cap screw and dowels.

**Rectangular Tooling Pad**



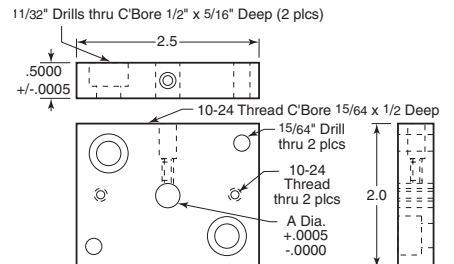
Item No.	Description	Pack Qty.
TCB-19075	Rectangular Tooling Pad	1

**Round Tooling Pad**



Item No.	Description	Pack Qty.
UB-7825	Round Tooling Pad	1

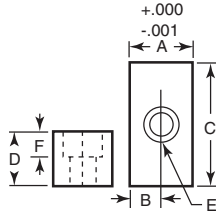
**Square Tooling Pads**



Item No.	A	Pack Qty.
UB-7625	.2500	1
UB-7637	.3750	1



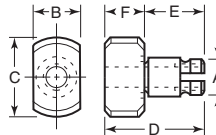
**Fixture Keys Plain**



These fixture keys are hardened and precision ground. Made of cold finished steel with black oxide finish. Many applications on jig and fixture work.

Item No.	+0.000/-0.001 A	B	C	D	Screw Size E	F	Pack Qty.
FK-1	.5000	1/4	3/4	1/2	#10	7/32	1
FK-2	.5625	9/32	3/4	1/2	1/4	9/32	1
FK-3	.6250	5/16	3/4	1/2	1/4	9/32	1
FK-3L	.6250	5/16	1	1/2	1/4	9/32	1
FK-4	.6875	11/32	1	1/2	1/4	9/32	1
FK-4L	.6875	11/32	1 1/4	1/2	1/4	9/32	1
FK-5	.7500	3/8	1 1/4	5/8	5/16	3/8	1
FK-6	.8125	13/32	1 1/4	5/8	5/16	3/8	1

**Interchangeable Sine Fixture Keys**



A fixture can be used on different machines with varying machine table slot widths by simply interchanging sine fixture keys. They are locked into the fixture by turning the set screw (5/32 hex key) inserted from the top or bottom of the key. Both inch and metric are made from 4140 steel. Inch are heat treated to 30-34 RC. Metric are heat treated to 28-32 RC. Concentricity within .0005" T.I.R.

See page 558 for hex keys.

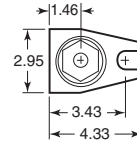
Item No.	A	Slot Size B	C	D	E	F	Pack Qty.
<b>Inch Slot / Inch Shank</b>							
SFK-825	.625	1/2	1	1 1/16	3/4	7/16	1
SFK-830	.625	9/16	1	1 1/16	3/4	7/16	1
SFK-835	.625	5/8	1	1 1/16	3/4	7/16	1
SFK-840	.625	11/16	1	1 1/16	3/4	7/16	1
SFK-845	.625	3/4	1 1/8	1 1/16	3/4	7/16	1
SFK-850	.625	13/16	1 1/8	1 1/16	3/4	7/16	1
SFK-855	.625	7/8	1 1/8	1 1/16	3/4	7/16	1
<b>Metric Slot / Metric Shank</b>							
SFK-860	16	12	25	30	19	11	1
SFK-865	16	14	25	30	19	11	1
SFK-875	16	18	29	30	19	11	1
SFK-885	16	22	29	30	19	11	1
<b>Metric Slot / Inch Shank</b>							
SFK-905	.625	14	1	30	19	11	1
SFK-910	.625	16	1	30	19	11	1
SFK-915	.625	18	1 1/8	30	19	11	1
SFK-920	.625	20	1 1/8	30	19	11	1
SFK-925	.625	22	1 1/8	30	19	11	1

**Note:** Diameter A must correspond with diameter of bored hole in your fixture base. Dimension B must correspond with the width of your machine table slots. Hex key not included. Tolerances on A and B dimensions are +.000/-.0005 for the inch sizes. Tolerances on A and B dimensions are +.00/-0.01mm for the metric sizes and metric slot/inch shank sizes. Metric dimensions are in millimeters.

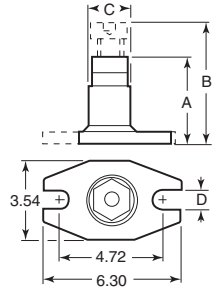
**Jack Screws Extra Height**



Type A



Type B

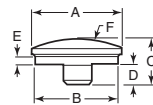


Used to support items where extended height would be a factor. Spindle is tempered steel with trapezoidal thread and varnished finish. Housing is cast iron with varnished finish. Centering hole hole diameter is 12mm with a counter nut.

Item No.	Type	A	B	C	D	Max. Load Lbs.	Pack Qty.
AMF-49	A	5.51	7.87	1.97	.71	13,488	1
AMF-50	B	7.87	12.60	1.97	.87	8,992	1

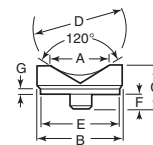
Used to adjust items being held in place by jack screws. Pad is held on jack screw by a 12mm dia. centering hole. Pads are tempered steel with a burnished finish.

**Jack Screw Accessories Ball Pad**



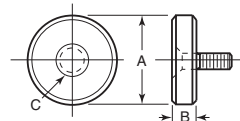
Item No.	A	B	C	D	E	F	Pack Qty.
AMF-51	1.46	1.38	.71	.32	.12	1.97	1

**Jack Screw Accessories Vee Pad**



Item No.	A	B	C	D		E	F	G	Pack Qty.
				Min.	Max.				
AMF-52	1.26	1.77	.91	.39	1.97	1.65	.32	.12	1

**Flat Feet**



Perfect for many jig and fixture applications because of their large diameter and thin cross section. Made of ledloy and heat treated. Cap screw included. Metric dimensions are in millimeters.

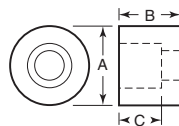
Item No.	A	B	Screw C	Pack Qty.	Item No.	A	B	Screw C	Pack Qty.
<b>Inch</b>					<b>Metric</b>				
JFF-19301	1/2	1/8	8-32 x 3/8	1	JFF-19351	13	3	M4 x 10	1
JFF-19302	1/2	1/4	8-32 x 1/2	1	JFF-19352	13	6	M4 x 12	1
JFF-19303	5/8	1/4	10-32 x 5/8	1	JFF-19353	16	6	M5 x 16	1
JFF-19304	7/8	3/8	1/4-20 x 3/4	1	JFF-19354	22	10	M6 x 20	1
JFF-19305	1 1/4	3/8	5/16-18 x 3/4	1	JFF-19355	31	10	M8 x 20	1
JFF-19306	1 5/8	3/8	5/16-18 x 3/4	1					

**Note:** Inch tolerance for dimension "B" is +.0005/-.000. Metric tolerance for dimension "B" is +.013/-.000



# REST BUTTONS

## Rest Buttons Circular Type - Inch and Metric



Used for locating parts in jigs and fixtures.

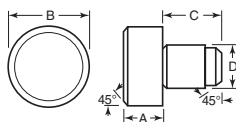
See page 766 for inch socket head cap screws.

Item No.	Screw Size	A	B	C	Pack Qty.	Item No.	Screw Size	A	B	C	Pack Qty.
<b>Inch</b>						<b>Metric</b>					
RB-1	#10	1/2	.3125	7/32	1	RB-15	M6 x 1.00	16	10	7	1
RB-1L	#10	1/2	.5000	7/32	1	RB-16	M6 x 1.00	16	12	7	1
RB-2	1/4	5/8	.4375	9/32	1	RB-17	M6 x 1.00	16	20	7	1
RB-2L	1/4	5/8	.6250	9/32	1	RB-18	M8 x 1.25	22	12	9	1
RB-3	5/16	3/4	.5000	3/8	1	RB-19	M8 x 1.25	22	20	9	1
RB-3L	5/16	3/4	.7500	3/8	1	RB-20	M8 x 1.25	22	24	9	1
RB-4	3/8	15/16	.6250	7/16	1	RB-21	M10 x 1.50	31	25	11	1
RB-5	1/2	1 1/4	.8750	9/16	1						
RB-6	5/8	3/4	.6250	3/8	1						
RB-7	3/8	15/16	.7500	7/16	1						
RB-8	3/8	15/16	.8750	7/16	1						
RB-9	3/8	15/16	1.0000	7/16	1						

**Note:** Inch sizes are made of cold finished steel, carburized and hardened with black oxide finish. "B" dimension on the inch sizes is ground top and bottom +.001/-.000

**Note 2:** Metric sizes are made of low carbon steel, case hardened with black oxide finish. Tolerance on "B" dimension of metric sizes is +.013/-.000 mm. Socket head cap screw is included with metric sizes only. Metric dimensions are in millimeters.

## Rest Buttons Press Fit Type - Inch

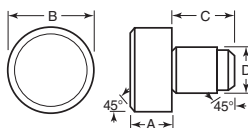


Made of cold finished steel. Carburized, hardened. Black oxide finish. Many applications on jig and fixture work.

Item No.	A	B	C	+ .001/- .0005 D	Pack Qty.
PF-1T	1/4	3/8	3/8	.1885	1
PF-2T	3/8	3/8	3/8	.1885	1
PF-3T	1/2	3/8	3/8	.1885	1
PF-1S	3/4	1/2	1/2	.2510	1
PF-2S	3/8	1/2	1/2	.2510	1
PF-3S	1/2	1/2	1/2	.2510	1
PF-1	1/4	5/8	1/2	.3760	1
PF-2	3/8	5/8	1/2	.3760	1
PF-3	1/2	5/8	1/2	.3760	1
PF-4	5/8	5/8	1/2	.3760	1
PF-5	3/4	5/8	1/2	.3760	1
PF-6	1	5/8	1/2	.3760	1
PF-7*	1 1/4	5/8	1/2	.3760	1
PF-8*	1 1/2	3/4	1/2	.5010	1

\* Tolerance on "D" dimension for PF-7 and PF-8 is +/- .0005".

## Rest Buttons Press Fit Type - Metric

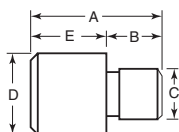


Item No.	A	B	C	+ .013/-.000 D	Pack Qty.
PF-20	6	10	6	5	1
PF-21	6	13	12	6	1
PF-22	6	16	12	10	1
PF-23	10	16	12	10	1
PF-24	12	16	12	10	1
PF-25	16	22	14	12	1

**Note:** Dimensions are in millimeters.

Made of 52100 steel, case hardened with black oxide finish. "A" dimension is +.25/+ .38mm so that it can be ground after fixture is assembled.

## Rest Buttons Press Fit Type - Stainless Steel

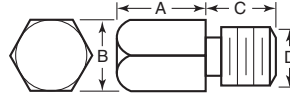


Made from 303 stainless steel.

Item No.	A	B	C	D	E	Pack Qty.
PF-105	1/2	1/4	3/16	3/8	1/4	1
PF-110	5/8	1/4	3/16	3/8	3/8	1
PF-115	3/4	1/4	3/16	3/8	1/2	1
PF-120	9/16	3/16	1/4	1/2	1/4	1
PF-125	1 1/16	3/16	1/4	1/2	3/8	1
PF-130	1 3/16	3/16	3/16	1/2	1/2	1
PF-135	1 1/16	3/16	3/16	1/2	3/4	1
PF-140	1 3/16	3/16	3/16	1/2	1	1



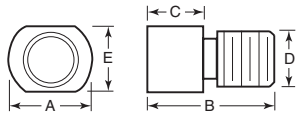
**Rest Buttons**  
Hex Head Threaded Type - Inch



Easy to install. Body length held. Shoulder is square with threads. Improves appearance of jig or fixture on which they are used. Cold finished steel, hardened and black oxide coated.

Item No.	A	B	C	D	Pack Qty.	Item No.	A	B	C	D	Pack Qty.
<b>Fine Thread - Class 2A Fit</b>						<b>Coarse Thread - Class 1A Fit</b>					
JF-1	1/2	3/8	3/8	1/4-28	1	JF-13	3/4	3/8	3/8	1/4-20	1
JF-2	3/4	3/8	3/8	1/4-28	1	JF-14	1	3/8	3/8	1/4-20	1
JF-3	1	3/8	3/8	1/4-28	1	JF-15	1/4	1/2	1/2	3/8-16	1
JF-4	1/2	1/2	1/2	3/8-24	1	JF-16	3/8	1/2	1/2	3/8-16	1
JF-5	3/4	1/2	1/2	3/8-24	1	JF-17	3/2	1/2	1/2	3/8-16	1
JF-6	1	1/2	1/2	3/8-24	1	JF-18	3/4	1/2	1/2	3/8-16	1
JF-7	1/2	5/8	1/2	1/2-20	1	JF-19	1	1/2	1/2	3/8-16	1
JF-8	3/4	5/8	1/2	1/2-20	1	JF-20	1/4	5/8	5/8	1/2-13	1
JF-9	1	5/8	1/2	1/2-20	1	JF-21	3/8	5/8	5/8	1/2-13	1
<b>Coarse Thread - Class 1A Fit</b>						<b>JF-22</b>					
JF-10	1/4	3/8	3/8	1/4-20	1	JF-22	1/2	5/8	5/8	1/2-13	1
JF-11	3/8	3/8	3/8	1/4-20	1	JF-23	5/8	5/8	5/8	1/2-13	1
JF-12	1/2	3/8	3/8	1/4-20	1	JF-24	3/4	5/8	5/8	1/2-13	1
						JF-25	1	5/8	5/8	1/2-13	1

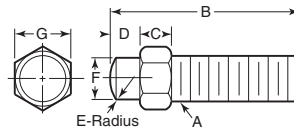
**Rest Buttons**  
Flat Head Threaded Type - Metric



Made of low carbon steel, case hardened and black oxide coated. Class 6g thread. "C" dimension left with .25mm to .38mm for finishing after assembly. Dimensions are in millimeters.

Item No.	A mm	B mm	C mm	D mm	Across Flats E mm	Pack Qty.
JF-30	9	14	6	M6 x 1.00	8	1
JF-35	13	17	6	M10 x 1.50	10	1
JF-40	16	24	10	M12 x 1.75	14	1
JF-45	25	30	12	M16 x 2.0	20	1

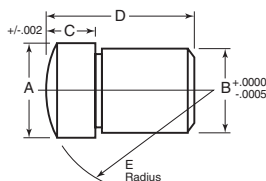
**Locating Screws**  
Threaded Adjustable



Item No.	A	B	C	D	E	F	G	Pack Qty.
ALB-575	10-32	1	1/8	1/8	1/8	3/16	1/4	1
ALB-580	1/4-28	1 1/2	3/16	3/16	3/16	1/4	3/8	1
ALB-585	3/8-24	2	1/4	1/4	1/4	3/8	1/2	1
ALB-590	1/2-20	2 1/2	5/16	5/16	5/16	1/2	5/8	1
ALB-595	5/8-18	3	3/8	3/8	3/8	5/8	3/4	1

Adjustable locating screws are used together or in combination with fixed locating pins to accurately position work piece in jig or fixture. Heat treated steel. Black oxide finish.

**Locating Buttons**  
Spherical - Press Fit



Provides a single point contact for support of surfaces that are not perpendicular to vertical axis of button. Heat treated and ground. Black oxide finish.

Item No.	A	B	C	D	E	Pack Qty.
SLB-25	3/16	.1890	1/8	3/8	1/2	1
SLB-27	3/8	.2515	3/16	1/2	3/8	1
SLB-29	1/2	.3765	3/16	3/4	1	1
SLB-31	1/2	.3765	1/4	5/8	3/4	1
SLB-33	1/2	.3765	3/8	3/4	3/4	1
SLB-35	1/2	.3765	1/2	7/8	3/4	1

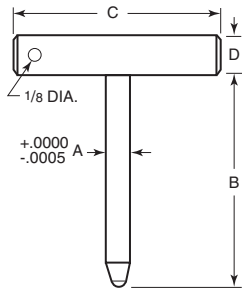




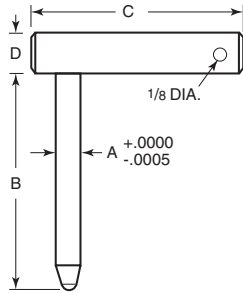
**T And L Pins**



**T-Pin**



**L-Pin**



T-Pins and L-Pins are designed to be used as a removable locating device for precision alignment of work piece in jigs and fixtures. Heat treated steel. Black oxide finish.

**Steel cable assemblies available; see page 748.**

T-Pin	L-Pin	+.0000/-.0005				Pack Qty.
Item No.	Item No.	A	B	C	D	
PNT-1	PNL-1	.1250	2½	1½	¼	1
PNT-2	PNL-2	.1875	3	2½	5/16	1
PNT-3	PNL-3	.1875	6	2½	5/16	1
PNT-7	PNL-7	.2500	3	2½	3/8	1
—	PNL-8	.2500	4	2½	3/8	1
PNT-9	PNL-9	.2500	6	2½	3/8	1
PNT-11	PNL-11	.3125	3½	3	7/16	1
PNT-12	PNL-12	.3125	6	3	7/16	1
PNT-14	PNL-14	.3750	6	3½	½	1
PNT-15	PNL-15	.4375	4	3½	9/16	1
PNT-16	PNL-16	.4375	6	3½	9/16	1
PNT-17	PNL-17	.5000	4	3½	5/8	1
PNT-18	PNL-18	.5000	6	3½	5/8	1
—	PNL-19	.5625	4	3½	5/8	1
PNT-21	PNL-21	.6250	6	3½	7/8	1
PNT-22	PNL-22	.7500	6	3½	7/8	1

**Threaded Retainers**

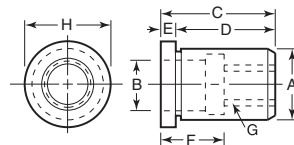


**Finished**



**Oversized**

Used with threaded locating pins and rest buttons. Heat treated and ground. OD is either ground oversize or finished.

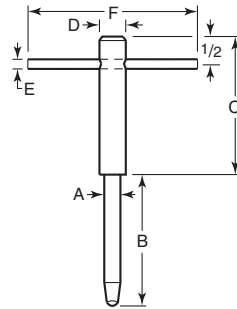


Item No.	A	B	C	D	E	F	G	H	Pack Qty.
<b>Oversized</b>									
ATR-005	.457/.452	.3126/.3128	¾	2 1/32	3/32	½	¼-28	9/16	1
ATR-015	.707/.702	.4376/.4378	1	7/8	1/8	5/8	¾-24	7/8	1
<b>Finished</b>									
ATR-010	.4392/.4389	.3126/.3128	¾	2 1/32	3/32	½	¼-28	9/16	1
ATR-020	.6893/.6890	.4376/.4378	1	7/8	1/8	5/8	¾-24	7/8	1
ATR-030	.8143/.8140	.5626/.5629	1 1/16	1 3/32	5/32	¾	½-20	1	1
ATR-040	1.2522/1.2518	.8751/.8754	1 ¾	1 ½	¼	1 ½	¾-16	1 1/16	1

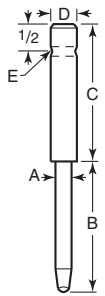
**Jig Pins**



**With Handle**



**Without Handle**



Used for accurately aligning holes on mating pieces. Black oxide finish. Handle version converts to T or L handle.

Item No.	+.0000/-.0005 A	B	C	D	E	F	Pack Qty.
<b>w/ Handle</b>							
JGP-210	.2500	2.5	2 5/8	½	¼	2	1
JGP-220	.3125	2.5	2 5/8	9/16	¼	3	1
JGP-330	.5000	3.0	2 5/8	¾	5/16	3	1
<b>w/o Handle</b>							
JGP-110	.2500	2.5	2 5/8	½	¼	—	1
JGP-120	.3125	2.5	2 5/8	9/16	¼	—	1
JGP-130	.3750	4	2 5/8	5/8	¼	—	1
JGP-140	.5000	3.0	2 5/8	¾	5/16	—	1

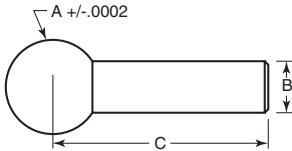
# TOOLING & CONSTRUCTION BALLS



These high quality tooling and construction balls provide a precise reference point for critical machining operations. The standard and shoulder type listed below are available with slip fit or light press fit shank diameters. Slip fit shank tolerance is  $\pm .0000$ -.0004". Press fit shank tolerance is  $\pm .0003$ -.0000". Ball and shank are concentric within .0002" T.I.R.

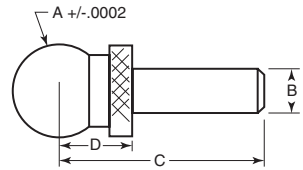
Hardened ground steel. Shoulder tooling balls have a knurled shoulder. The weld between the ball and the shank is designed so the ball will fall off if subject to unusually heavy lateral force. This prevents set up and inspection errors that may occur because of a bent shank.

## Standard Tooling Balls Two Piece Construction



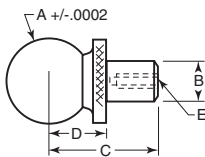
Press-Fit		Slip-Fit		+/- .0002 A	B	C	Pack Qty.
Item No.	Item No.						
<b>Steel</b>							
UB-705	UB-706	.2500	.1250	.563			1
UB-710	UB-711	.3750	.1875	.750			1
UB-715	UB-716	.5000	.2500	.940			1
UB-720	UB-721	.5000	.2500	1.500			1
—	UB-725	.5000	.2500	2.875			1
—	UB-727	.5000	.3125	1.500			1
UB-735	UB-736	.6250	.3125	1.063			1
UB-740	UB-741	.7500	.3750	1.250			1
UB-745	—	.8750	.4375	1.440			1
UB-750	UB-751	1.0000	.5000	1.625			1

## Shoulder Tooling Balls Two Piece Construction



Press-Fit		Slip-Fit		+/- .0002 A	B	C	D	Pack Qty.
Item No.	Item No.							
<b>Steel</b>								
UB-805	UB-806	.2500	.1250	.560	.2000			1
UB-810	UB-811	.3750	.1875	.750	.3000			1
UB-815	UB-816	.5000	.2500	.940	.4000			1
UB-818	UB-819	.5000	.2500	1.125	.5000			1
UB-820	UB-821	.5000	.2500	1.375	.5000			1
UB-822	UB-823	.5000	.2500	1.625	1.0000			1
—	UB-977	.5000	.2500	.6250	.3125			1
—	UB-981	.5000	.2500	1.5000	.5000			1
—	UB-825	.5000	.2500	1.875	1.2500			1
—	UB-982	.5000	.3125	1.5000	.5000			1
—	UB-983	.5000	.3750	1.5000	.5000			1
UB-826	UB-827	.6250	.3125	1.050	.4500			1
UB-830	UB-831	.7500	.3750	1.250	.5000			1
UB-835	UB-836	1.0000	.5000	1.625	.7000			1

## Construction Tooling Balls Two Piece Construction



Construction balls can be pulled into a hole or bushing from below without applying pressure on the ball by using a cap screw in the internally tapped shank.

Item No.	A	+ .0000/- .0004 B	C	D	E	Pack Qty.
<b>Steel</b>						
UB-875	.5000	.2500	.6250	.3125	6-32 x 1/4	1
UB-979	.5000	.3125	.9400	.5000	6-32 x 5/16	1
UB-870	.5000	.2500	.8750	.5000	6-32 x 1/4	1
UB-984	.5000	.2500	.9400	.5000	6-32 x 5/16	1

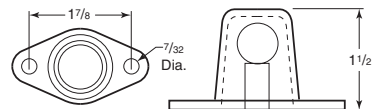
## Tooling Ball Covers



Zinc



Plastic



Protects tooling balls. Made of die cast zinc alloy or plastic. Plastic covers have a smooth, attractive finish and are available in black, red and yellow.

Item No.	Material	Color	Pack Qty.
UB-653041	Zinc	Silver Metallic	1
CTM-22	Plastic	Black	1
CTM-33	Plastic	Red	1
CTM-66	Plastic	Yellow	1

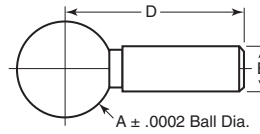




These high quality tooling and construction balls provide a precise reference point for critical machining operations. The standard and shoulder type listed below are available with slip fit or light press fit shank diameters. Slip fit shank tolerance is  $+0.0000/-0.0004$ ". Press fit shank tolerance is  $+0.0003/-0.0000$ ". Ball and shank are concentric within  $.0002$ " T.I.R.

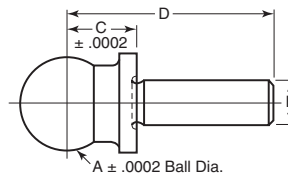
The steel type are made of 1144 steel and heat treated to 53-57 RC. The stainless type are 440-C and heat treated to 55-58 RC.

**Standard Tooling Balls**  
**One Piece Construction**



Slip-Fit Item No.	Press-Fit Item No.	$\pm 0.0002$ A	B	D	Pack Qty.
<b>Steel</b>					
TCB-26705	TCB-26706	.2500	.1250	.5630	1
TCB-26710	TCB-26711	.3750	.1875	.7500	1
TCB-26715	TCB-26716	.5000	.2500	.9400	1
TCB-26720	TCB-26721	.5000	.2500	1.5000	1
TCB-26730	TCB-26731	.5000	.3750	1.5000	1
<b>Stainless Steel</b>					
STB-26705	STB-26706	.2500	.1250	.5630	1
STB-26710	STB-26711	.3750	.1875	.7500	1

**Shoulder Tooling Balls**  
**One Piece Construction**

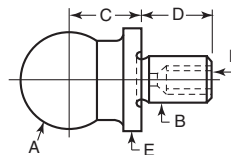


Precision ground shoulder provides precise "C" dimension to facilitate locating ball center line.

Slip-Fit Item No.	Press-Fit Item No.	$\pm 0.0002$ A	B	$\pm 0.0002$ C	D	Pack Qty.
<b>Inch - Steel</b>						
TCB-26805	TCB-26806	.2500	.1250	.2000	.5630	1
TCB-26810	TCB-26811	.3750	.1875	.3000	.7500	1
TCB-26815	TCB-26816	.5000	.2500	.4000	.9400	1
TCB-26820	TCB-26821	.5000	.2500	.5000	1.3750	1
TCB-26830	TCB-26831	.7500	.3750	.5000	1.2500	1
<b>Inch - Stainless Steel</b>						
STB-26805	STB-26806	.2500	.1250	.2000	.5630	1
STB-26810	STB-26811	.3750	.1875	.3000	.7500	1
STB-26815	STB-26816	.5000	.2500	.4000	.9400	1
STB-26820	STB-26821	.5000	.2500	.5000	1.3750	1
<b>Metric - Steel</b>						
MTB-826807	MTB-826808	6	3	6	10	1

**Note:** Metric dimensions are in millimeters.

**Construction Tooling Balls**  
**One Piece Construction**



One size fits majority of applications. Available with tapped hole for screw mounting. Shoulder provides precise  $.3125$  ( $\pm 0.0002$ ) shoulder base to center line dimension to facilitate locating ball center line. Ball and shank are concentric within  $.0002$  T.I.R.

Solid Item No.	Tapped Item No.	F	A	B	C	D	E	Pack Qty.
<b>Inch - Steel</b>								
TCB-26877	TCB-26875	6-32	.500	.2500	.3125	5/16	.49	1
<b>Inch - Stainless Steel</b>								
STB-26877	STB-26875	6-32	.500	.2500	.3125	5/16	.49	1
<b>Metric - Steel</b>								
MTB-826887	MTB-826885	6-32	12	6	12	22	12.5	1

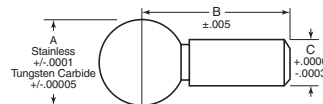


Stainless steel is 440-C and hardened to RC 55-58. Tungsten carbide has only 1/3 the thermal expansion and is ten points harder than stainless steel. The weld or brazing between the ball and shank is designed so the ball will fall off if subjected to an unusually heavy lateral force. This prevents set up and inspection errors that may occur because of a bent shank. Maximum eccentricity, ball to shank, is .0002" T.I.R.

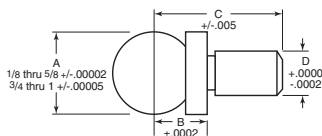
**Fixture Balls - Plain Shank  
 Two Piece Welded Construction**



Stainless	Tungsten Carbide				Pack Qty.
Item No.	Item No.	A	B	C	
JFB-29001	TTB-5	.250	.56	.1247	1
JFB-29002	TTB-10	.375	.75	.1872	1
JFB-29003	—	.500	.94	.2497	1
JFB-29004	—	.625	1.06	.3122	1
JFB-29005	—	.750	1.25	.3747	1
JFB-29007	—	1.000	1.62	.4997	1



**Checking Balls with Reference Shoulder  
 Two Piece Welded Construction**



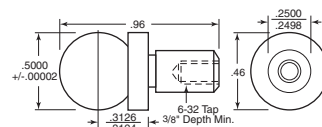
Stainless	Tungsten Carbide					Pack Qty.
Item No.	Item No.	A	B	C	D	
JFB-29010*	—	.125	.0938	.375	.1255	1
JFB-29011	TTB-40	.250	.2000	.560	.1247	1
JFB-29012	TTB-45	.375	.3000	.750	.1872	1
JFB-29013	TTB-50	.500	.4000	.940	.2497	1
JFB-29014	—	.625	.4500	1.060	.3122	1
JFB-29015	—	.750	.5000	1.250	.3747	1
JFB-29016	—	.875	.6000	1.440	.4372	1
JFB-29017	—	1.000	.7000	1.620	.4997	1

\*Shoulder diameter is 1/4 inch.

**Checking Ball with Reference Shoulder and Tapped Shank  
 Two Piece Welded Construction**



This checking ball can be pulled into a hole without applying pressure on the ball. This is done by using a cap screw in the tapped hole in the shank.

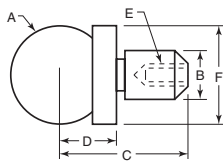


Item No.	Description	Pack Qty.
JFB-29021	Checking Ball w/Reference Shoulder & Tapped Shank	1

**Inspection Balls  
 One Piece Construction**



These premium short shank inspection balls are used as reference points for inspection applications in conjunction with coordinate measuring machines to accurately measure the work piece. One piece construction. Made of 8620 steel, case hardened. Concentricity of ball to shank is .0001 T.I.R.



Item No.	+0.0000/ -0.0002	+0.0000/ -0.0002	C	D	Thread	F	Pack Qty.
PIB-10601	.2500	.1247	.58	.2000	—	1/4	1
PIB-10602	.3750	.1872	.74	.3000	—	3/8	1
PIB-10603	.3750	.3125	.74	.3000	8-32	1/2	1
PIB-10604	.5000	.2497	.63	.3125	6-32	1/2	1
PIB-10605	.5000	.2497	.93	.4000	6-32	1/2	1
PIB-10606	.5000	.2497	.88	.5000	6-32	1/2	1
PIB-10607	.5000	.3750	1.31	.3750	10-24	3/8	1
PIB-10608	.6250	.3122	1.08	.4500	8-32	3/8	1
PIB-10609	.6250	.3750	1.42	.4500	10-24	3/8	1
PIB-10611	.7500	.3750	1.53	.5625	10-24	3/4	1
PIB-10612	1.0000	.5000	1.64	.7000	10-24	1	1

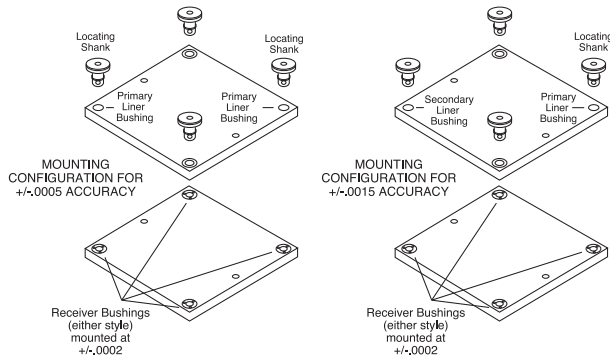


# TOOLING & POSITIONING COMPONENTS

## BALL LOCK MOUNTING SYSTEM

Buy One or  
Buy Bulk & SAVE

	Material	Heat Treat	Finish
Shanks	4340	RC 40-45	Black Oxide
Bushings	4340	RC 50-54	Black Oxide
Liners	52100	RC 62-64	Black Oxide

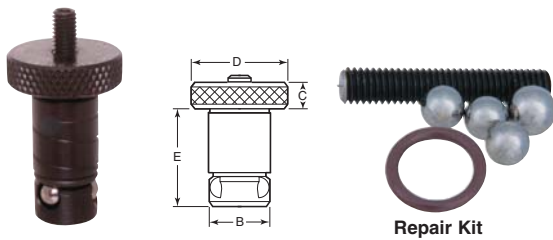


Designed to speed accurate locating and locking of fixture plates and subplates. The system consists of three parts: a locating shank, a liner bushing (either primary or secondary) and a receiver bushing (either back mount or face mount). Once installed, tightening the locking shank provides considerable holding power and up to +/-0.0005" repeatability.

Each top plate should have one ball lock mount as a primary reference point and one as a secondary point spaced as far apart as possible. Additional shanks can be added to provide additional hold down force, however, omit the liner bushing in these holes. For repeatability of +/-0.0005", both of the liner bushings in the fixture plate should be primary liners. The center distance of the reliever bushings in the subplate should be +/-0.0002". For repeatability of .0015", use one primary and one secondary liner bushing. The center distance tolerance should be +/-0.001".

Installation instructions are included with bushings.

### Ball Lock Shanks



Ball Lock Shank

Ball Lock Shanks	Fixture Plate Thick.	Shank Dia. (mm)	Max. Working Load (Lbs.)	Rec. Torque (Ft./Lbs.)	Hex Key Size	Pack Qty.	Repair Kits Item No.		
JBL-605	.50	13	.25	.87	1.08	750	1.2 3/32	1	JBL-905
JBL-606	.75	13	.25	.87	1.33	750	1.2 3/32	1	JBL-906
JBL-607	.50	16	.32	1.50	1.15	1,200	3.0 1/8	1	JBL-907
JBL-608	.75	16	.32	1.50	1.40	1,200	3.0 1/8	1	JBL-908
JBL-601	.75	20	.38	1.75	1.53	3,000	4.0 1/8	1	JBL-901
JBL-602	1.00	20	.38	1.75	1.78	3,000	4.0 1/8	1	JBL-902
JBL-611	.75	25	.38	2.00	1.70	7,000	9.0 5/32	1	JBL-911
JBL-612	1.00	25	.38	2.00	1.95	7,000	9.0 5/32	1	JBL-912

Note: Fixture plate thickness is +/-0.005

Note 2: Repair kits include replacement screw, locking balls, drive ball and O-ring

### Ball Lock Receiver Bushings



Bolt-In Recessed



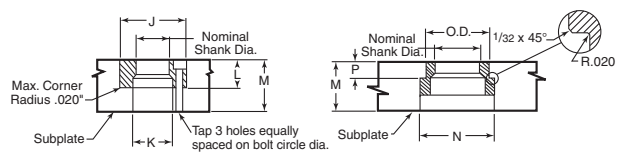
Reverse Mount Bushing

### Ball Lock Liners



Secondary liner has an oversized ID to accommodate the wider center distance tolerance on your fixture.

Primary Liner Item No.	Secondary Liner Item No.	Fixture Plate Thickness +/-0.005	Shank Dia. (mm)	Liner OD +/-0.000/-0.004	Pack Qty.
JBL-705	JBL-805	.50	13	.7518	1
JBL-706	JBL-806	.75	13	.7518	1
JBL-707	JBL-807	.50	16	1.0018	1
JBL-708	JBL-808	.75	16	1.0018	1
JBL-701	JBL-801	.75	20	1.3772	1
JBL-702	JBL-802	1.00	20	1.3772	1
JBL-711	JBL-811	.75	25	1.3772	1
JBL-712	JBL-812	1.00	25	1.3772	1



Two styles of receiver bushings are available. Generally, the bolt-in recessed receiver bushing is utilized in blind hole applications (slip fit). The reverse mount receiver bushing is used in through hole applications (light press fit). Installed bushings should be approximately .012" below subplate surface. To avoid binding on the back mount style, the maximum interference fit between the bore and bushing OD should not exceed .0005". Three Grade 8 mounting bolts are included with the bolt-in recessed bushing. Installation instructions are included with both styles.

Item No.	Shank Dia. mm	+0.0000/-0.0004 OD	+0.0000/-0.0005 Bore J	Drill Dia. K	+0.002/-0.000 Depth L	Min. Thickness M	Tap/Depth	Bolt Circle Dia.	Max. Mounting Screw Torque In./Lbs.	Pack Qty.
<b>Bolt-In</b>										
JBL-506	13	1.3750	1.3750	11/16	.469	3/4	8-32 x 1/4	.984	36	1
JBL-507	16	1.4370	1.4370	13/16	.469	3/4	8-32 x 1/4	1.125	55	1
JBL-501	20	1.6873	1.6873	13/16	.637	1	10-32 x 3/16	1.362	55	1
JBL-502	25	2.0623	2.0623	1	.799	1 1/4	1/4-28 x 1/16	1.644	140	1

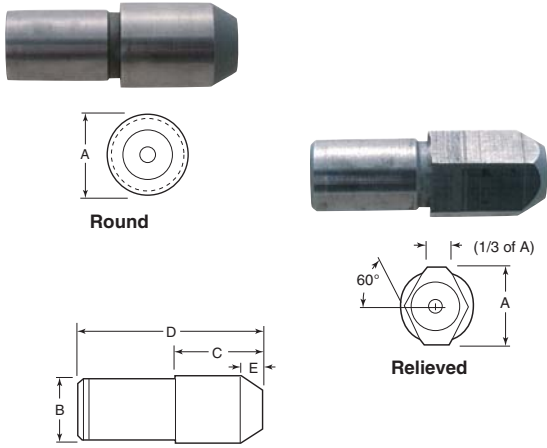
Note: Bolt circle diameter has three holes, equally spaced.

Item No.	Shank Dia. mm	+0.0000/-0.0004 OD	Min. Thickness M	+/-0.005 C-Bore N	+0.000/-0.002 P	Pack Qty.
<b>Reverse</b>						
JBL-516	13	.7870	3/4	1.000	.277	1
JBL-517	16	.8760	3/4	1.155	.285	1
JBL-511	20	1.0950	7/8	1.280	.345	1
JBL-512	25	1.3763	1	1.593	.416	1

**PINS, BUSHING & LINERS**



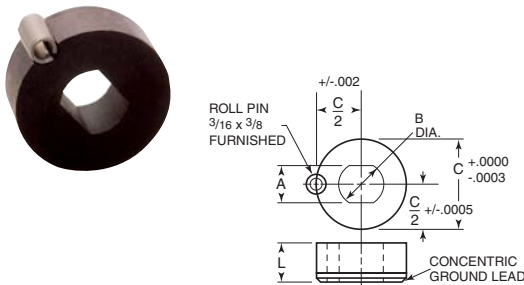
**Locating Pins  
Press Fit - Flangeless**



Made in round and relieved styles for locating. Do not require bushings or counterboring. Round pins are used to locate from hole to hole in workpiece. Relieved pins locate radially around the hole or round pin and avoid binding when loading or unloading while still maintaining accurate locations. Made from stress proof C1144 steel, hardened to RC-60-64.

Item No.	Nominal A	Actual A	Nominal B	Actual B	C	D	E	Pack Qty.
<b>Round</b>								
UB-500	1/4	.2495 - .2492	3/16	.1878 - .1876	11/32	3/4	3/32	1
UB-501	5/16	.3120 - .3117	1/4	.2503 - .2501	13/32	7/8	3/32	1
UB-502	3/8	.3745 - .3742	5/16	.3128 - .3126	1/2	1	1/8	1
UB-503	7/16	.4370 - .4367	3/8	.3753 - .3751	19/32	1 1/4	5/32	1
UB-504	1/2	.4995 - .4992	7/16	.4378 - .4376	21/32	1 3/4	5/32	1
UB-506	5/8	.6240 - .6237	9/16	.5628 - .5626	27/32	1 3/4	7/32	1
UB-508	3/4	.7490 - .7487	1 1/16	.6885 - .6880	1	2 1/8	1/4	1
<b>Relieved</b>								
UB-521	1/4	.2493 - .2490	3/16	.1878 - .1876	11/32	3/4	3/32	1
UB-522	5/16	.3118 - .3115	1/4	.2503 - .2501	13/32	7/8	3/32	1
UB-523	3/8	.3743 - .3740	5/16	.3128 - .3126	1/2	1	1/8	1
UB-524	7/16	.4368 - .4365	3/8	.3753 - .3751	19/32	1 1/4	5/32	1
UB-525	1/2	.4993 - .4990	7/16	.4378 - .4376	21/32	1 3/4	5/32	1
UB-527	5/8	.6240 - .6235	9/16	.5628 - .5626	27/32	1 3/4	7/32	1
UB-529	3/4	.7490 - .7485	1 1/16	.6885 - .6880	1	2 3/8	1/4	1

**Locating Washers  
Slotted Hole - For use with T-Pins and L-Pins  
Press Fit For Metal Tooling**

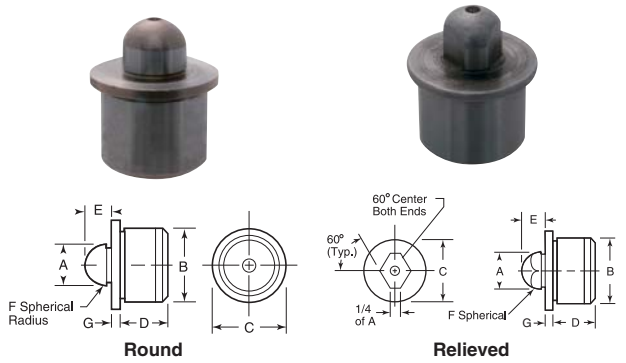


Used with T-pins and L-pins, for aligning two holes without binding. Roll pin is furnished. To install, drill and ream 3/16" hole for the supplied roll pin. Bore large hole for the bushing for light press fit (.003 to .005). Press pin and bushing together.

Item No.	A	B	C	L	Pack Qty.
SHL-942	.1876 - .1882	.312	.7504	.400	1
SHL-943	.2501 - .2507	.375	.7504	.400	1
SHL-945	.3126 - .3132	.437	1.0004	.400	1
SHL-946	.3751 - .3757	.500	1.0004	.400	1
SHL-948	.5001 - .5007	.625	1.0004	.400	1
SHL-048	.5001 - .5007	.625	1.0004	.900	1
SHL-054	.6251 - .6257	.750	1.2504	.900	1
SHL-056*	.7501 - .7510	.812	1.5004	1.000	1
SHL-068*	1.0001 - 1.0010	1.062	1.5004	1.000	1

\*Axial float +/- .030

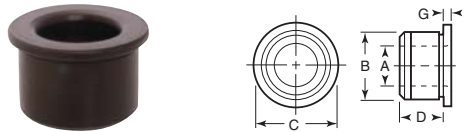
**Bullet Nose Pins**



The round and relieved pins are used together, along with matching bushings, to align two pieces of a fixture. The pin shank diameters and the bushing OD's are the same size so the fixture pieces can be drilled at the same time for greater accuracy. Heat treated and ground.

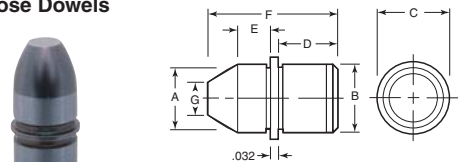
Round Item No.	Relieved Item No.	+ .0000/- .0003 A	+ .0000/- .0003 B	C	D	E	F	G	Pack Qty.
ABN-005	ABN-006	.2499	.4078	9/16	3/8	7/32	1/8	1/16	1
ABN-010	ABN-011	.3124	.5017	3/4	3/8	7/32	5/32	1/16	1
ABN-015	ABN-016	.3748	.6267	3/4	1/2	11/32	3/16	1/16	1
ABN-020	ABN-021	.4998	.7518	7/8	1/2	13/32	3/4	1/16	1
ABN-023	ABN-024	.7498	1.0018	1 1/8	3/4	3/16	3/8	1/8	1
ABN-025	ABN-026	.9998	1.3771	1 1/2	3/4	3/4	1/2	1/8	1

**Bullet Nose Liners**



Item No.	+ .0004/- .0000 A	+ .0000/- .0003 B	C	D	G	Pack Qty.
ABN-055	.2501	.4078	9/16	7/16	1/16	1
ABN-060	.3126	.5017	3/8	7/16	1/16	1
ABN-065	.3751	.6267	3/4	7/16	1/16	1
ABN-070	.5001	.7518	7/8	1/2	1/16	1
ABN-073	.7502	1.0018	1 1/8	1/2	1/8	1
ABN-075	1.0002	1.3771	1 1/2	1 1/16	1/8	1

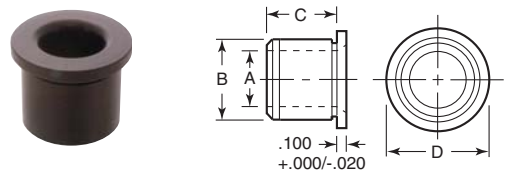
**Bullet Nose Dowels**



Used with a matching bushing to align two pieces of a fixture. Heat treated and ground.

Item No.	+ .0000/- .0005 A	+ .0000/- .0003 B	C	D	E	F	G	Use Liner	Pack Qty.
BND-130	.2499	.2516	.280	1/2	.125	.907	1/8	BND-180	1
BND-135	.3124	.3141	.344	1/2	.157	.939	5/32	BND-185	1
BND-140	.3749	.3766	.407	1/2	.187	1.032	3/16	BND-190	1
BND-145	.4999	.5017	.532	1/2	.187	1.094	1/4	BND-195	1

**Bullet Nose Liners**



Item No.	+ .0004/- .0000 A	+ .0000/- .0003 B	C	D	Pack Qty.
BND-180	.2501	.5017	3/8	.625	1
BND-185	.3126	.5017	3/8	.625	1
BND-190	.3751	.6267	1/2	.750	1
BND-195	.5001	.7518	3/8	.875	1



# LOCATING PINS & LINERS

Buy One or Buy Bulk & SAVE

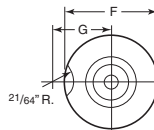
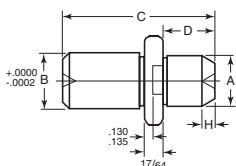
## Locating Pins Slip Fit - Lock Screw Type



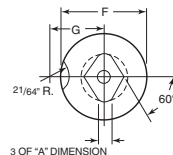
Round



Relieved



Round

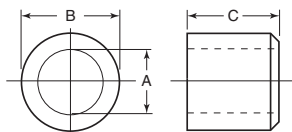


Relieved

Made in relieved and round styles for locating, as well as resting shoulder to act as rest pad. Suggested lock screw, is LO-705. Made from SAE 52100 steel. Through hardened to RC-58-62.

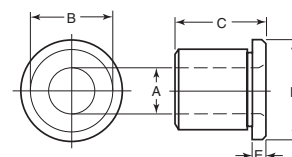
Round Item No.	Relieved Item No.	A	B	C	D	F	G	H	Pack Qty.	Round Item No.	Relieved Item No.	A	B	C	D	F	G	H	Pack Qty.
LO-301	LO-401	.1235	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-322	LO-422	.4355	1/2	1 1/2	3/2	7/8	41/64	1/8	1
—	LO-202	.1245	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-144	LO-244	.4365	1/2	1 1/2	3/2	7/8	41/64	1/8	1
LO-104	—	.1401	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-323	LO-423	.4511	1/2	1 1/2	3/2	7/8	41/64	1/8	1
LO-303	—	.1548	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-146	LO-246	.4521	1/2	1 1/2	3/2	7/8	41/64	1/8	1
—	LO-206	.1558	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-324	LO-424	.4668	1/2	1 1/2	3/2	7/8	41/64	1/8	1
LO-305	LO-405	.1860	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-148	LO-248	.4678	1/2	1 1/2	3/2	7/8	41/64	1/8	1
LO-110	LO-210	.1870	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-325	LO-425	.4824	1/2	1 1/2	3/2	7/8	41/64	1/8	1
LO-306	LO-406	.2016	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-152	LO-252	.4980	1/2	1 1/2	3/2	7/8	41/64	1/8	1
LO-112	LO-212	.2026	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-154	LO-254	.4980	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-307	—	.2173	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-327	LO-427	.4990	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
—	LO-214	.2183	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-328	LO-428	.5136	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-308	—	.2329	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-156	LO-256	.5293	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-116	LO-216	.2339	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-330	LO-430	.5303	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-309	LO-409	.2485	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-331	—	.5449	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-118	LO-218	.2495	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-158	LO-258	.5605	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-310	LO-410	.2641	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-334	LO-434	.5761	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-120	LO-220	.2651	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-160	LO-260	.5918	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-311	LO-411	.2798	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-336	—	.5928	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-122	LO-222	.2808	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-338	—	.6084	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-312	—	.2954	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-162	LO-262	.6230	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-124	LO-224	.2964	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-339	LO-439	.6240	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
—	LO-413	.3110	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-340	LO-440	.6386	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-126	LO-226	.3120	5/16	1 3/16	7/16	5/8	33/64	9/32	1	LO-164	LO-264	.6543	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-314	LO-414	.3105	1/2	1 1/2	1/2	7/8	41/64	1/8	1	LO-166	LO-266	.6855	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-128	LO-228	.3115	1/2	1 1/2	1/2	7/8	41/64	1/8	1	LO-168	—	.7168	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-315	LO-415	.3261	1/2	1 1/2	1/2	7/8	41/64	1/8	1	LO-170	LO-270	.7480	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-130	LO-230	.3271	1/2	1 1/2	1/2	7/8	41/64	1/8	1	LO-351	LO-451	.7490	3/4	1 15/16	1 1/2	1 1/8	49/64	3/16	1
LO-316	LO-416	.3418	1/2	1 1/2	1/2	7/8	41/64	1/8	1	LO-172	LO-272	.7480	1	2 5/8	1	1 1/2	61/64	9/32	1
LO-132	LO-232	.3428	1/2	1 1/2	1/2	7/8	41/64	1/8	1	LO-352	LO-452	.7490	1	2 5/8	1	1 1/2	61/64	9/32	1
LO-317	LO-417	.3574	1/2	1 1/2	1/2	7/8	41/64	1/8	1	LO-174	LO-274	.7793	1	2 5/8	1	1 1/2	61/64	9/32	1
LO-134	LO-234	.3584	1/2	1 1/2	1/2	7/8	41/64	1/8	1	LO-176	LO-276	.8105	1	2 5/8	1	1 1/2	61/64	9/32	1
LO-318	LO-418	.3730	1/2	1 1/2	1/2	7/8	41/64	1/8	1	LO-358	LO-458	.8115	1	2 5/8	1	1 1/2	61/64	9/32	1
LO-136	LO-236	.3740	1/2	1 1/2	1/2	7/8	41/64	1/8	1	LO-180	—	.8730	1	2 5/8	1	1 1/2	61/64	9/32	1
LO-319	—	.3886	1/2	1 1/2	1/2	7/8	41/64	1/8	1	LO-364	LO-464	.8740	1	2 5/8	1	1 1/2	61/64	9/32	1
LO-138	LO-238	.3896	1/2	1 1/2	1/2	7/8	41/64	1/8	1	—	LO-286	.9668	1	2 5/8	1	1 1/2	61/64	9/32	1
LO-320	LO-420	.4043	1/2	1 1/2	1/2	7/8	41/64	1/8	1	LO-375	LO-475	.9834	1	2 5/8	1	1 1/2	61/64	9/32	1
LO-140	LO-240	.4053	1/2	1 1/2	1/2	7/8	41/64	1/8	1	LO-188	LO-288	.9980	1	2 5/8	1	1 1/2	61/64	9/32	1
LO-321	LO-421	.4199	1/2	1 1/2	1/2	7/8	41/64	1/8	1	LO-376	LO-476	.9990	1	2 5/8	1	1 1/2	61/64	9/32	1
LO-142	LO-242	.4209	1/2	1 1/2	1/2	7/8	41/64	1/8	1										

## Locating Pin Liners Plain



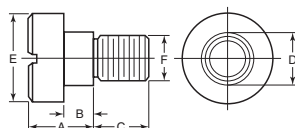
Item No.	A	B	C	Pack Qty.
LO-505	.3129 - .3126	.5017 - .5014	1/2	1
LO-510	.5005 - .5002	.7518 - .7515	3/4	1
LO-515	.7506 - .7503	1.0018 - 1.0015	1	1
LO-520	1.0007 - 1.0004	1.3772 - 1.3768	1 1/8	1

## Locating Pin Liners With Shoulder



Item No.	A	B	C	D	E	F	Pack Qty.
LO-605	.3129 - .3126	.5017 - .5014	1/2	5/8	3/32	1	1
LO-610	.5005 - .5002	.7518 - .7515	3/4	7/8	3/32	1	1
LO-615	.7506 - .7503	1.0018 - 1.0015	1	1 1/8	1/8	1	1
LO-620	1.0007 - 1.0004	1.3772 - 1.3768	1 1/8	1 1/2	1/8	1	1

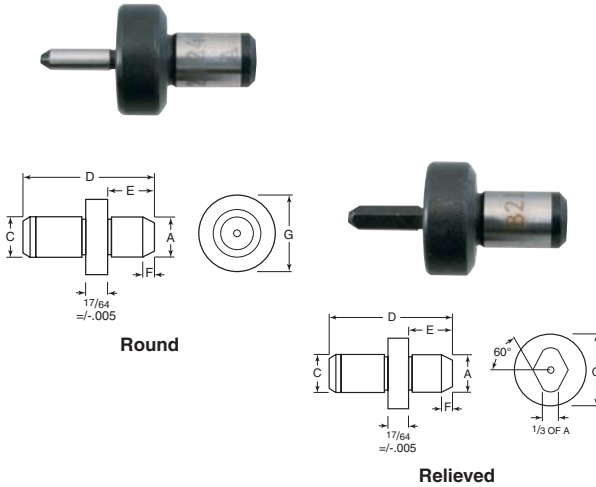
## Lock Screws



Item No.	A	B	C	D	E	F	Pack Qty.
<b>Inch</b>							
LO-700	3/16	.096	1/4	3/16	5/16	8-32	1
LO-703	1/4	.130	1/4	1/4	3/8	10-32	1
LO-705	1/4	.135	3/8	3/8	3/8	5/16-18	1
LO-710	3/8	.197	3/8	3/8	3/8	3/16-18	1
LO-715	3/8	.197	1/2	7/16	3/4	3/8-16	1
LO-720	7/16	.228	5/8	7/16	3/4	3/8-16	1
LO-725	1/2	.260	5/8	7/16	3/4	3/8-16	1
<b>Metric</b>							
LO-727	6	3.0	9	7.5	13	M5 x .8	1
LO-728	9	6.0	9	7.5	13	M5 x .8	1
LO-729	8	4.0	10	9.5	16	M6 x 1.0	1
LO-730	12	8.0	10	9.5	16	M6 x 1.0	1
LO-731	10	5.5	12	12.0	20	M8 x 1.25	1
LO-732	15	10.5	12	12.0	20	M8 x 1.25	1



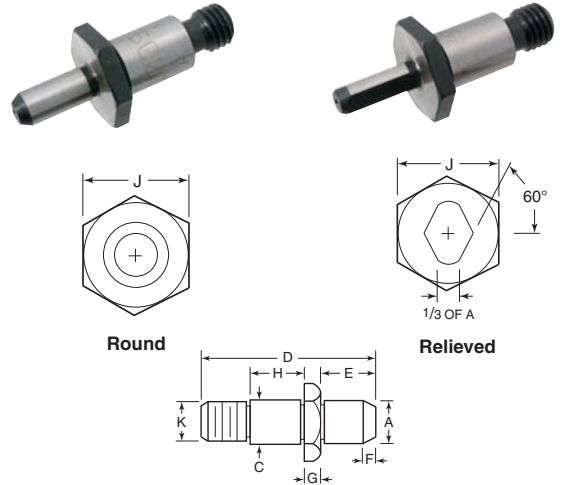
Locating Pins  
Press Fit



Made in relieved and round styles for locating as well as resting shoulder to act as rest pad. Shanks are precision ground for press fit mounting. Heat treated and finished ground. Made from SAE 52100 steel. Through hardened to RC 58-62.

Round Item No.	Relieved Item No.	+ .0000/ - .0002	+ .0000/ - .0003	A	C	D	E	F	G	Pack Qty.
LPP-2001	—	.1245	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-2008	LPP-1008	.1860	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-6112	LPP-5112	.1870	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-2009	LPP-1009	.2016	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-2010	LPP-1010	.2026	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-2011	LPP-1011	.2173	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-2012	—	.2329	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-2013	LPP-1013	.2339	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-2014	LPP-1014	.2485	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-6116	LPP-5116	.2495	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-2015	LPP-1015	.2641	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-2016	LPP-1016	.2651	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-2017	LPP-1017	.2798	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-6118	LPP-5118	.2808	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-2019	LPP-1019	.2964	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-2020	LPP-1020	.3110	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-6120	LPP-5120	.3120	.3135	1 3/16	7/16	3/32	5/8	1	1	1
LPP-2021	LPP-1021	.3105	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-6220	LPP-5220	.3115	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2022	LPP-1022	.3261	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2023	—	.3271	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2024	LPP-1024	.3418	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-6222	LPP-5222	.3428	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2025	LPP-1025	.3574	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2026	LPP-1026	.3584	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2027	LPP-1027	.3730	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-6224	LPP-5224	.3740	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2028	LPP-1028	.3886	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2029	LPP-1029	.3896	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2030	LPP-1030	.4043	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-6226	LPP-5226	.4053	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2031	—	.4199	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2032	LPP-1032	.4209	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2033	LPP-1033	.4355	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-6228	LPP-5228	.4365	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2034	LPP-1034	.4511	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2035	LPP-1035	.4521	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2036	—	.4668	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-6230	LPP-5230	.4678	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2037	LPP-1037	.4824	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2039	LPP-1039	.4980	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-6232	LPP-5232	.4990	.5010	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2040	LPP-1040	.4980	.7510	1 1/2	1/2	1/2	7/8	1	1	1
LPP-6332	LPP-5332	.4990	.7510	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2041	LPP-1041	.5136	.7510	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2042	LPP-1042	.5146	.7510	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2043	LPP-1043	.5293	.7510	1 1/2	1/2	1/2	7/8	1	1	1
—	LPP-5334	.5303	.7510	1 1/2	1/2	1/2	7/8	1	1	1
LPP-6336	LPP-5336	.5615	.7510	1 1/2	1/2	1/2	7/8	1	1	1
—	LPP-1050	.5928	.7510	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2053	LPP-1053	.6230	.7510	1 1/2	1/2	1/2	7/8	1	1	1
LPP-6340	LPP-5340	.6240	.7510	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2056	—	.6543	.7510	1 1/2	1/2	1/2	7/8	1	1	1
—	LPP-1057	.6699	.7510	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2064	—	.7324	.7510	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2066	LPP-1066	.7480	.7510	1 1/2	1/2	1/2	7/8	1	1	1
LPP-6348	LPP-5348	.7490	.7510	1 1/2	1/2	1/2	7/8	1	1	1
LPP-2067	—	.7480	1.0010	2 5/8	1	1	1 1/2	1	1	1
LPP-6448	LPP-5448	.7490	1.0010	2 5/8	1	1	1 1/2	1	1	1
—	LPP-1082	.8730	1.0010	2 5/8	1	1	1 1/2	1	1	1
LPP-2085	—	.8896	1.0010	2 5/8	1	1	1 1/2	1	1	1
LPP-2098	LPP-1098	.9980	1.0010	2 5/8	1	1	1 1/2	1	1	1
LPP-6464	—	.9990	1.0010	2 5/8	1	1	1 1/2	1	1	1

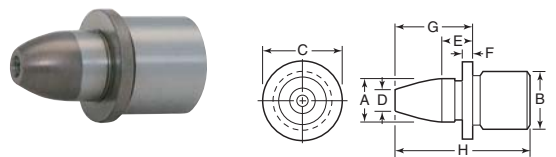
Locating Pins  
Threaded



These locating pins are designed for threaded hole mounting using the threaded retainers shown. Made from SAE 52100 steel. Case hardened .060" to RC 58-62.

Item No.	+ .0000/ - .0002	+ .0000/ - .0003	A	C	D	E	F	G	H	J	K	Pack Qty.
<b>Round</b>												
TLP-5005	.1235	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-5007	.1245	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-5015	.1558	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-3112	.1870	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-5023	.2016	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-5025	.2026	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-5027	.2173	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-5029	.2183	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-5035	.2485	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-3116	.2495	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-5039	.2651	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-3120	.3120	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-3220	.3115	.4375	1 1/2	1/2	1/2	1/2	1/2	1 1/16	3/4-24	1	1	1
TLP-5057	.3418	.4375	1 1/2	1/2	1/2	1/2	1/2	1 1/16	3/4-24	1	1	1
TLP-5059	.3428	.4375	1 1/2	1/2	1/2	1/2	1/2	1 1/16	3/4-24	1	1	1
TLP-5065	.3730	.4375	1 1/2	1/2	1/2	1/2	1/2	1 1/16	3/4-24	1	1	1
TLP-3224	.3740	.4375	1 1/2	1/2	1/2	1/2	1/2	1 1/16	3/4-24	1	1	1
TLP-5071	.4043	.4375	1 1/2	1/2	1/2	1/2	1/2	1 1/16	3/4-24	1	1	1
TLP-5073	.4053	.4375	1 1/2	1/2	1/2	1/2	1/2	1 1/16	3/4-24	1	1	1
TLP-5079	.4355	.4375	1 1/2	1/2	1/2	1/2	1/2	1 1/16	3/4-24	1	1	1
TLP-5083	.4365	.5625	2 1/8	1 1/16	3/16	5/32	5/8	7/8	1/2-20	1	1	1
TLP-5097	.4980	.5625	2 1/8	1 1/16	3/16	5/32	5/8	7/8	1/2-20	1	1	1
TLP-3332	.4990	.5625	2 1/8	1 1/16	3/16	5/32	5/8	7/8	1/2-20	1	1	1
TLP-3336	.5615	.5625	2 1/8	1 1/16	3/16	5/32	5/8	7/8	1/2-20	1	1	1
TLP-5133	.6230	.8750	2 3/8	1	1	1	1 1/4	1 1/4	3/4-16	1	1	1
TLP-3440	.6240	.8750	2 3/8	1	1	1	1 1/4	1 1/4	3/4-16	1	1	1
TLP-5163	.7480	.8750	2 3/8	1	1	1	1 1/4	1 1/4	3/4-16	1	1	1
TLP-3448	.7490	.8750	2 3/8	1	1	1	1 1/4	1 1/4	3/4-16	1	1	1
TLP-3464	.9990	.8750	2 3/8	1	1	1	1 1/4	1 1/4	3/4-16	1	1	1
<b>Relieved</b>												
TLP-2112	.1870	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-2116	.2495	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-4039	.2651	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-2120	.3120	.3125	1 1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	1	1	1
TLP-2220	.3115	.4375	1 1/2	1/2	1/2	1/2	1/2	1 1/16	3/4-24	1	1	1
TLP-4063	.3584	.4375	1 1/2	1/2	1/2	1/2	1/2	1 1/16	3/4-24	1	1	1
TLP-4065	.3730	.4375	1 1/2	1/2	1/2	1/2	1/2	1 1/16	3/4-24	1	1	1
TLP-4087	.4521	.5625	2 1/8	1 1/16	3/16	5/32	5/8	7/8	1/2-20	1	1	1
TLP-4097	.4980	.5625	2 1/8	1 1/16	3/16	5/32	5/8	7/8	1/2-20	1	1	1
TLP-2336	.5615	.5625	2 1/8	1 1/16	3/16	5/32	5/8	7/8	1/2-20	1	1	1
TLP-2448	.7490	.8750	2 3/8	1	1	1	1 1/4	1 1/4	3/4-16	1	1	1
TLP-2464	.9990	.8750	2 3/8	1	1	1	1 1/4	1 1/4	3/4-16	1	1	1

Locating Pins  
Press Fit - Pilot



Heat treated and finished ground.

Item No.	+ .000/ - .001	+ .0000/ - .0003	A	B	C	D	E	F	G	H	Pack Qty.
APP-250	.249	.4078	9/16	5/32	9/32	9/32	15/32	27/32	1	1	1
APP-255	.312	.5017	5/8	3/16	9/32	9/32	15/32	27/3			



# SPRING PLUNGERS

Buy One or Buy Bulk & SAVE

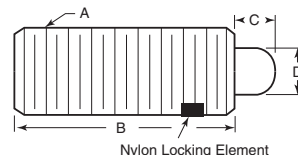
## Spring Plungers Inch and Metric



Steel



Stainless Steel



Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Steel Body</b>								
<b>Steel Nose - Heavy End Pressure - Inch</b>								
SL-1A	SL-1AN*	6-32	3/8	1/16	.045	1.0	1.6	1
SL-1	SL-1N*	6-32	17/32	1/16	.045	1.5	4.5	1
SL-2	SL-2N*	8-32	5/8	3/32	.069	2.7	7.3	1
SL-3	SL-3N*	10-32	3/4	1/8	.092	2.9	11.1	1
SL-4	SL-4N	1/4-20	1	3/16	.118	3.0	13.0	1
SL-4A	SL-4AN	1/4-20	3/4	1/8	.118	2.0	9.0	1
SL-5	SL-5N	1/4-28	1	3/16	.118	3.0	13.0	1
SL-6	SL-6N	3/16-18	1	3/16	.134	3.0	15.0	1
SL-7	SL-7N	3/16-16	1 1/8	3/16	.186	5.5	14.5	1
SL-8	SL-8N	1/2-13	1 1/4	1/4	.247	6.6	17.4	1
SL-9	SL-9N	3/8-11	1 1/2	5/16	.309	10.5	25.5	1
SL-10	SL-10N	3/4-10	1 3/4	5/16	.373	6.7	37.3	1
SL-11	SL-11N	1-8	2 1/32	1/2	.498	16.0	68.0	1

Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Metric</b>								
SM-6A	SM-6AN	M6 x 1.0	20	2.5	2.7	18	50	1
SM-8A	SM-8AN	M8 x 1.25	22	3.0	3.5	25	70	1
SM-10A	SM-10AN	M10 x 1.5	22	3.0	4.0	25	70	1
SM-12A	SM-12AN	M12 x 1.75	28	4.0	6.0	45	110	1

Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Steel Nose - Light End Pressure - Inch</b>								
ST-1	ST-1N*	6-32	17/32	1/16	.045	.5	1.5	1
ST-2	ST-2N*	8-32	3/4	3/32	.069	.7	2.3	1
ST-3	ST-3N*	10-32	3/4	1/8	.092	1.3	2.7	1
ST-4	ST-4N	1/4-20	1	3/16	.118	1.0	4.0	1
ST-5	ST-5N	1/4-28	1	3/16	.118	1.0	4.0	1
ST-6	ST-6N	3/16-18	1	3/16	.134	1.5	4.5	1
ST-7	ST-7N	3/16-16	1 1/8	3/16	.186	2.8	7.2	1
ST-8	ST-8N	1/2-13	1 1/4	1/4	.247	2.7	9.3	1
ST-9	ST-9N	3/8-11	1 1/2	5/16	.309	3.5	10.5	1
ST-11	ST-11N	1-8	2 1/32	1/2	.498	4.0	31.0	1

Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Metric</b>								
SML-6A	SML-6AN	M6 x 1.0	20	2.5	2.7	7	20	1
SML-8A	SML-8AN	M8 x 1.25	22	3.0	3.5	9	35	1
SML-10A	SML-10AN	M10 x 1.5	20	3.0	4.0	9	35	1
SML-12A	SML-12AN	M12 x 1.75	28	4.0	6.0	10	55	1

Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Steel Nose - Light End Pressure - Inch</b>								
LHN-1	LHN-1N	1/4-20	1	3/16	1/8	1.0	4.0	1
LHN-2	LHN-2N	3/16-18	1	3/16	3/8	1.5	4.5	1
LHN-3	LHN-3N	3/16-16	1 1/8	3/16	3/16	2.8	7.2	1
LHN-4	LHN-4N	1/2-13	1 1/4	1/4	1/4	2.7	9.3	1
LHN-5	LHN-5N	3/8-11	1 1/2	5/16	3/16	3.5	10.5	1

Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Delrin Nose - Heavy End Pressure - Inch</b>								
DN-1	DN-1N*	8-32	3/4	3/32	.069	2.7	7.3	1
DN-2	DN-2N*	10-32	3/4	1/8	.091	2.9	11.1	1
DN-3	DN-3N	1/4-20	1	3/16	.117	3.0	13.0	1
DN-4	—	1/4-28	1	3/16	.117	3.0	13.0	1
DN-4	DN-4N	3/16-18	1	3/16	.134	3.0	15.0	1
DN-5	DN-5N	3/16-16	1 1/8	3/16	.186	5.5	14.5	1
DN-6	DN-6N	1/2-13	1 1/4	1/4	.247	6.6	17.4	1
DN-7	—	3/8-11	1 1/2	5/16	.309	10.5	25.5	1

Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Delrin Nose - Light End Pressure - Inch</b>								
LDN-1	LDN-1N*	8-32	3/4	3/32	.069	.7	2.3	1
LDN-2	LDN-2N*	10-32	3/4	1/8	.091	1.3	2.7	1
LDN-3	LDN-3N*	1/4-20	1	3/16	.117	1.0	4.0	1
LDN-4	LDN-4N	3/16-18	1	3/16	.134	1.5	4.5	1
LDN-5	LDN-5N	3/16-16	1 1/8	3/16	.186	2.8	7.2	1
LDN-6	LDN-6N	1/2-13	1 1/4	1/4	.247	2.7	9.3	1
LDN-7	LDN-7N	3/8-11	1 1/2	5/16	.309	3.5	10.5	1
LDN-8	LDN-8N	1/4-28	1	3/16	.117	1.0	4.0	1

Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Plastic Nose - Heavy End Pressure - Inch</b>								
PN-1	PN-1N*	8-32	3/4	3/32	.067	2.7	7.3	1
PN-2	PN-2N*	10-32	3/4	1/8	.091	2.9	11.1	1
PN-3	PN-3N*	1/4-20	1	3/16	.117	3.0	13.0	1
—	PN-8N	1/4-28	1	3/16	.117	3.0	13.0	1
PN-4	PN-4N	3/16-18	1	3/16	.133	3.0	15.0	1
PN-5	PN-5N	3/16-16	1 1/8	3/16	.185	5.5	14.5	1
PN-6	PN-6N	1/2-13	1 1/4	1/4	.246	6.6	17.4	1
PN-7	PN-7N	3/8-11	1 1/2	5/16	.308	10.5	25.5	1

Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Plastic Nose - Light End Pressure - Inch</b>								
LPN-1	LPN-1N	8-32	3/4	3/32	.067	.7	2.3	1
LPN-2	LPN-2N	10-32	3/4	1/8	.091	1.3	2.7	1
LPN-3	LPN-3N	1/4-20	1	3/16	.117	1.0	4.0	1
—	LPN-8N	1/4-28	1	3/16	.117	1.0	4.0	1
LPN-4	LPN-4N	3/16-18	1	3/16	.133	1.5	4.5	1
LPN-5	LPN-5N	3/16-16	1 1/8	3/16	.185	2.8	7.2	1
LPN-6	LPN-6N	1/2-13	1 1/4	1/4	.246	6.6	17.4	1
LPN-7	LPN-7N	3/8-11	1 1/2	5/16	.308	3.5	10.5	1

\*Nylon Patch

Note: Plungers with nylon locking element are not recommended for use in aluminum applications.

Note 2: End force for Inch is in Lbs. End force for Metric is in Newtons.

Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Stainless Steel Body</b>								
<b>Stainless Steel Nose - Heavy End Pressure - Inch</b>								
SLS-1A	SLS-1AN*	6-32	3/8	1/16	.045	1.0	1.6	1
SLS-1	SLS-1N*	6-32	17/32	1/16	.045	1.5	4.5	1
SLS-2	SLS-2N*	8-32	5/8	3/32	.069	2.7	7.3	1
SLS-3	SLS-3N*	10-32	3/4	1/8	.092	2.9	11.1	1
SLS-4	SLS-4N	1/4-20	1	3/16	.118	3.0	13.0	1
SLS-4A	SLS-4AN	1/4-20	3/4	1/8	.118	2.0	9.0	1
SLS-5	SLS-5N	1/4-28	1	3/16	.118	3.0	13.0	1
SLS-6	SLS-6N	3/16-18	1	3/16	.134	3.0	15.0	1
SLS-8	SLS-8N	1/2-13	1 1/4	1/4	.247	6.6	17.4	1
SLS-7	SLS-7N	3/16-16	1 1/8	3/16	.186	5.5	14.5	1
SLS-9	SLS-9N	3/8-11	1 1/2	5/16	.309	10.5	25.5	1
SLS-10	SLS-10N	3/4-10	1 3/4	5/16	.373	6.7	37.3	1
SLS-11	—	1-8	2 1/32	1/2	.498	16.0	68.0	1

Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Metric</b>								
SSM-6A	SSM-6AN	M6 x 1.0	20	2.5	2.7	18	50	1
SSM-8A	SSM-8AN	M8 x 1.25	22	3.0	3.5	25	70	1
SSM-10A	SSM-10AN	M10 x 1.5	22	3.0	4.0	25	70	1
SSM-12A	SSM-12AN	M12 x 1.75	28	4.0	6.0	45	110	1

Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Stainless Steel Nose - Light End Pressure - Inch</b>								
STS-1	STS-1N*	6-32	17/32	1/16	.045	.5	1.5	1
STS-2	STS-2N*	8-32	3/4	3/32	.069	.7	2.3	1
STS-3	STS-3N*	10-32	3/4	1/8	.092	1.3	2.7	1
STS-4	STS-4N	1/4-20	1	3/16	.118	1.0	4.0	1
STS-5	STS-5N	1/4-28	1	3/16	.118	1.0	4.0	1
STS-6	STS-6N	3/16-18	1	3/16	.134	1.5	4.5	1
STS-7	STS-7N	3/16-16	1 1/8	3/16	.186	2.8	7.2	1
STS-8	STS-8N	1/2-13	1 1/4	1/4	.247	2.7	9.3	1
STS-9	STS-9N	3/8-11	1 1/2	5/16	.309	3.5	10.5	1
STS-11	STS-11N	1-8	2 1/32	1/2	.498	4.0	31.0	1

Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Metric</b>								
SSML-6A	SSML-6AN	M6 x 1.0	20	2.5	2.7	7	20	1
SSML-8A	SSML-8AN	M8 x 1.25	22	3.0	3.5	9	35	1
—	SSML-10AN	M10 x 1.5	20	3.0	4.0	9	35	1
SSML-12A	—	M12 x 1.75	28	4.0	6.0	10	55	1

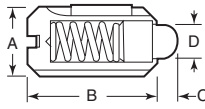
Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Delrin Nose - Heavy End Pressure - Inch</b>								
SDH-2	SDH-2N*	8-32	3/4	3/32	.069	2.7	7.3	1
SDH-3	SDH-3N*	10-32	3/4	1/8	.092	2.9	11.1	1
SDH-4A	—	1/4-20	1	3/16	.118	2.0	9.0	1
SDH-4	SDH-4N	1/4-20	1	3/16	.118	3.0	13.0	1
SDH-5	—	1/4-28	1	3/16				

SPRING PLUNGERS



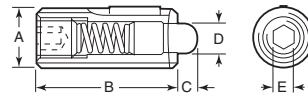
The Long-Lok thread lock provides additional resistance to vibration. The resilient nylon insert is squeezed like a wedge between the thread of the plunger and the fastening component, providing extremely high loosening torque. The Long-Lok thread lock does not require initial tension or any defined position so that it is secure in every position. All plungers are pressure and function tested. The steel plungers have a black oxide finish. Steel noses are made of hardened steel. Stainless steel plungers have a natural finish. Stainless noses are made of hardened stainless steel. Metric dimensions are in millimeters. Metric end pressures are in Newtons.

Spring Plungers  
With Long-Lok Thread Lock  
Slotted Style



Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.	Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Steel Body</b>								<b>Stainless Steel Body</b>							
<b>Steel Nose - Standard End Pressure - Inch</b>								<b>Stainless Steel Nose - Standard End Pressure - Inch</b>							
KBP-93	8-36	.35	.06	.07	1.35	4.50	1	KBP-102	8-36	.35	.06	.07	1.35	4.50	1
KBP-94	8-32	.35	.06	.07	1.35	4.50	1	KBP-103	8-32	.35	.06	.07	1.35	4.50	1
KBP-95	10-32	.47	.08	.09	1.35	4.50	1	KBP-104	10-32	.47	.08	.09	1.35	4.50	1
KBP-96	1/4-28	.55	.08	.11	1.57	4.50	1	KBP-105	1/4-28	.55	.08	.11	1.57	4.50	1
KBP-97	1/4-20	.55	.08	.11	1.57	4.50	1	KBP-106	1/4-20	.55	.08	.11	1.57	4.50	1
KBP-98	3/16-18	.63	.08	.16	3.37	6.74	1	KBP-107	3/16-18	.63	.08	.16	3.37	6.74	1
KBP-99	3/16-16	.75	.10	.18	4.50	7.87	1	KBP-108	3/16-16	.75	.10	.18	4.50	7.87	1
KBP-100	1/2-13	.87	.14	.24	6.74	10.60	1	KBP-109	1/2-13	.87	.14	.24	6.74	10.60	1
KBP-101	3/8-11	.94	.18	.33	10.12	22.48	1	KBP-110	3/8-11	.94	.18	.33	10.12	22.48	1
<b>Metric</b>								<b>Metric</b>							
KBP-79	M4	9	1.5	1.8	6	20	1	KBP-86	M4	9	1.5	1.8	6	20	1
KBP-80	M5	12	2.0	2.4	6	20	1	KBP-87	M5	12	2.0	2.4	6	20	1
KBP-81	M6	14	2.0	2.7	7	20	1	KBP-88	M6	14	2.0	2.7	7	20	1
KBP-82	M8	16	2.0	4.0	15	30	1	KBP-89	M8	16	2.0	4.0	15	30	1
KBP-83	M10	19	2.5	4.5	20	35	1	KBP-90	M10	19	2.5	4.5	20	35	1
KBP-84	M12	22	3.5	6.0	30	55	1	KBP-91	M12	22	3.5	6.0	30	55	1
KBP-85	M16	24	4.5	8.5	45	100	1	KBP-92	M16	24	4.5	8.5	45	100	1
<b>Steel Nose - Light End Pressure - Inch</b>								<b>Stainless Steel Nose - Light End Pressure - Inch</b>							
KBP-125	8-36	.35	.06	.07	.45	1.57	1	KBP-134	8-36	.35	.06	.07	.45	1.57	1
KBP-126	8-32	.35	.06	.07	.45	1.57	1	KBP-135	8-32	.35	.06	.07	.45	1.57	1
KBP-127	10-32	.47	.08	.09	.67	2.25	1	KBP-136	10-32	.47	.08	.09	.67	2.25	1
KBP-128	1/4-28	.55	.08	.11	.67	2.02	1	KBP-137	1/4-28	.55	.08	.11	.67	2.02	1
KBP-129	1/4-20	.55	.08	.11	.67	2.02	1	KBP-138	1/4-20	.55	.08	.11	.67	2.02	1
KBP-130	3/16-18	.63	.08	.16	.90	3.60	1	KBP-139	3/16-18	.63	.08	.16	.90	3.60	1
KBP-131	3/16-16	.75	.10	.18	.90	3.60	1	KBP-140	3/16-16	.75	.10	.18	.90	3.60	1
KBP-132	1/2-13	.87	.14	.24	1.12	6.07	1	KBP-141	1/2-13	.87	.14	.24	1.12	6.07	1
KBP-133	3/8-11	.94	.18	.33	4.50	10.12	1	KBP-142	3/8-11	.94	.18	.33	4.50	10.12	1
<b>Metric</b>								<b>Metric</b>							
KBP-111	M4	9	1.5	1.8	2	7	1	KBP-118	M4	9	1.5	1.8	2	7	1
KBP-112	M5	12	2.0	2.4	3	10	1	KBP-119	M5	12	2.0	2.4	3	10	1
KBP-113	M6	14	2.0	2.7	3	9	1	KBP-120	M6	14	2.0	2.7	3	9	1
KBP-114	M8	16	2.0	4.0	4	16	1	KBP-121	M8	16	2.0	4.0	4	16	1
KBP-115	M10	19	2.5	4.5	4	16	1	KBP-122	M10	19	2.5	4.5	4	16	1
KBP-116	M12	22	3.5	6.0	5	27	1	KBP-123	M12	22	3.5	6.0	5	27	1

Spring Plungers  
With Long-Lok Thread Lock  
Hexagon Socket Style



Item No.	A	B	C	D	E	Initial End Force	Final End Force	Pack Qty.	Item No.	A	B	C	D	E	Initial End Force	Final End Force	Pack Qty.
<b>Steel Body</b>									<b>Plastic Nose - Light End Pressure</b>								
<b>Steel Nose - Standard End Pressure</b>									<b>Plastic Nose - Standard End Pressure</b>								
KBP-403	10-32	.71	.09	.09	1/16	1.35	4.5	1	KBP-72	10-32	.71	.09	.09	1/16	.67	2.25	1
KBP-404	1/4-28	.79	.10	.11	3/64	1.57	4.50	1	KBP-73	1/4-28	.79	.10	.11	3/64	.67	2.02	1
KBP-405	1/4-20	.79	.10	.11	3/64	1.57	4.50	1	KBP-74	1/4-20	.79	.10	.11	3/64	.67	2.02	1
KBP-28	3/16-18	.87	.12	.14	3/32	2.02	7.87	1	KBP-75	3/16-18	.87	.12	.14	3/32	.90	3.60	1
KBP-406	3/16-16	.87	.12	.16	1/8	2.25	12.36	1	KBP-76	3/16-16	.87	.12	.16	1/8	.90	3.60	1
KBP-407	1/2-13	1.10	.16	.24	3/32	2.25	12.36	1	KBP-77	1/2-13	1.10	.16	.24	3/32	1.12	6.07	1
KBP-408	3/8-11	1.26	.20	.30	1/16	10.01	22.48	1	KBP-78	3/8-11	1.26	.20	.30	3/16	4.50	10.12	1
KBP-1	M5	20	2.5	2.7	2.0	7	20	1	KBP-60	M6	20	2.5	2.7	2.0	3	9	1
KBP-2	M6	20	2.5	2.7	2.0	9	35	1	KBP-61	M8	20	3.0	3.5	2.5	4	16	1
KBP-3	M8	22	3.0	3.5	2.5	9	35	1	KBP-62	M10	22	3.0	4.0	3.0	4	16	1
KBP-4	M10	22	4.0	6.0	4.0	10	55	1	KBP-63	M12	28	4.0	6.0	4.0	5	27	1
KBP-5	M12	28	4.0	6.0	4.0	10	55	1	<b>Stainless Steel Body</b>								
KBP-6	M16	32	5.0	7.5	5.0	45	100	1	<b>Stainless Steel Nose - Standard End Pressure</b>								
<b>Steel Nose - Light End Pressure</b>									<b>Plastic Nose - Standard End Pressure</b>								
KBP-65	10-32	.71	.09	.09	1/16	.67	2.25	1	KBP-416	10-32	.71	.09	.09	1/16	1.12	3.82	1
KBP-66	1/4-28	.79	.10	.11	3/64	.67	2.02	1	KBP-417	1/4-28	.79	.10	.11	3/64	1.35	3.82	1
KBP-67	1/4-20	.79	.10	.11	3/64	.67	2.02	1	KBP-418	1/4-20	.79	.10	.11	3/64	1.35	3.82	1
KBP-68	3/16-18	.87	.12	.14	3/32	.90	3.60	1	KBP-419	3/16-18	.87	.12	.14	3/32	1.80	6.97	1
KBP-69	3/16-16	.87	.12	.16	1/8	.90	3.60	1	KBP-420	3/16-16	.87	.12	.16	1/8	1.80	6.97	1
KBP-70	1/2-13	1.10	.16	.24	3/32	1.12	6.07	1	KBP-421	1/2-13	1.10	.16	.24	3/32	2.25	10.57	1
KBP-71	3/8-11	1.26	.20	.30	1/16	4.50	10.12	1	KBP-13	M5	18	2.3	2.4	1.5	5	17	1
KBP-53	M5	18	2.3	2.4	1.5	3	10	1	KBP-14	M6	20	2.5	2.7	2.0	6	17	1
KBP-54	M6	20	2.5	2.7	2.0	3	9	1	KBP-15	M8	22	3.0	3.5	2.5	7	29	1
KBP-55	M8	20	3.0	3.5	2.5	4	16	1	KBP-16	M10	22	3.0	4.0	3.0	8	31	1
KBP-56	M10	22	3.0	4.0	3.0	4	16	1	KBP-17	M12	28	4.0	6.0	4.0	10	47	1
KBP-57	M12	28	4.0	6.0	4.0	5	27	1	KBP-18	M16	32	5.0	7.5	5.0	45	100	1
KBP-58	M16	32	5.0	7.5	5.0	20	45	1	<b>Plastic Nose - Standard End Pressure</b>								
<b>Plastic Nose - Standard End Pressure</b>									<b>Plastic Nose - Standard End Pressure</b>								
KBP-409	10-32	.71	.09	.09	1/16	1.35	4.5	1	KBP-422	10-32	.71	.09	.09	1/16	1.12	3.82	1
KBP-410	1/4-28	.79	.10	.11	3/64	1.57	4.50	1	KBP-47	1/4-28	.79	.10	.11	3/64	1.35	3.82	1
KBP-411	1/4-20	.79	.10	.11	3/64	1.57	4.50	1	KBP-423	1/4-20	.79	.10	.11	3/64	1.35	3.82	1
KBP-412	3/16-18	.87	.12	.14	3/32	2.02	7.87	1	KBP-49	3/16-18	.87	.12	.14	3/32	1.80	6.97	1
KBP-413	3/16-16	.87	.12	.16	1/8	2.25	12.36	1	KBP-50	3/16-16	.87	.12	.16	1/8	1.80	6.97	1
KBP-414	1/2-13	1.10	.16	.24	3/32	2.25	12.36	1	KBP-51	1/2-13	1.10	.16	.24	3/32	2.25	10.57	1
KBP-8	M6	20	2.5	2.7	2.0	9	35	1	KBP-52	3/8-11	1.26	.20	.30	1/16	10.12	22.48	1
KBP-9	M8	22	3.0	3.5	2.5	9	35	1	KBP-19	M5	18	2.3	2.4	1.5	5	17	1
KBP-10	M10	28	4.0	6.0	4.0	10	55	1	KBP-20	M6	20	2.5	2.7	2.0	6	17	1
KBP-12	M16	32	5.0	7.5	5.0	45	100	1	KBP-400	M10	22	3.0	4.0	3.0	8	31	1
									KBP-402	M16	32	5.0	7.5	5.0	45	100	1





# STUBBY SPRING PLUNGERS

Buy One or Buy Bulk & SAVE

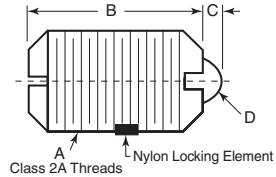
## Stubby Spring Plungers Inch and Metric



Steel



Stainless Steel



Combines the short body of a ball plunger with the long nose of a spring plunger. Used where space is restricted, but where appreciable plunger travel and high end pressures are required. Plunger telescopes completely. Class 2A threads. Permits use where mating surfaces must be flush. Steel noses are case hardened. Stainless passivated. Delrin nose offers long life and high resistance to repeated impacts, moisture and solvents and heat up to 190 degree Fahrenheit. Delrin plunger has electrical insulating properties and will not mar soft metals such as brass and aluminum. Self-lubricating surface. Metric dimensions are in millimeters. Metric end forces are shown in Newtons.

Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Steel Body</b>								
<b>Steel Nose - Heavy End Pressure - Inch</b>								
JP-1	JP-1N*	6-32	.375	.063	.046	1/2	3 1/2	1
K-1A	K1A-N*	8-32	.437	.052	.070	1 1/2	4 1/4	1
K-1	K1-N*	8-36	.437	.052	.070	1 1/2	4 1/4	1
K-2	K2-N*	10-32	.468	.065	.093	1 3/4	6 1/4	1
K-3	K3-N	1/4-20	.531	.078	.119	3	10 1/2	1
K-4	K4-N	5/16-18	.562	.084	.135	3 3/4	15 1/2	1
K-5	K5-N	3/8-16	.625	.110	.186	4 1/2	18 1/2	1
K-6	K6-N	1/2-13	.750	.151	.248	5	28	1
K-7	K7-N	5/8-11	1.062	.215	.310	7	50	1
<b>Metric</b>								
—	JP-770N	M4 x .7	13.0	2.5	1.78	2.25	17.75	1
—	JP-771N	M5 x .8	14.5	3.0	2.36	2.25	22.26	1
—	JP-772N	M6 x 1.0	16.0	4.0	3.02	2.25	26.67	1
—	JP-773N	M8 x 1.25	16.0	5.0	3.43	2.25	44.52	1
—	JP-774N	M10 x 1.5	17.5	5.5	4.72	4.51	53.35	1
—	JP-775N	M12 x 1.75	20.5	6.5	6.30	11.08	66.68	1
—	JP-777N	M16 x 2.0	28.5	8.0	7.87	15.59	115.62	1
<b>Steel Nose - Light End Pressure - Inch</b>								
JP-2	JP-2N*	6-32	.375	.063	.046	1/2	1 1/2	1
LK-1A	LK1A-SN*	8-32	.437	.052	.070	1 1/2	1 1/2	1
LK-1	LK1-N*	8-36	.437	.052	.070	1 1/2	1 1/2	1
LK-2	LK2-SN*	10-32	.468	.065	.093	3/4	2 1/2	1
LK-3	LK3-SN	1/4-20	.531	.078	.119	1	3 1/2	1
LK-4	LK4-SN	5/16-18	.562	.084	.135	1 1/4	4	1
LK-5	LK5-SN	3/8-16	.625	.110	.186	1 1/2	5	1
LK-6	LK6-SN	1/2-13	.750	.151	.248	1 3/4	5 1/2	1
LK-7	LK7-SN	5/8-11	1.062	.215	.310	2	8 1/2	1
<b>Metric</b>								
—	JP-170N	M4 x .7	13.0	2.5	1.78	2.25	8.92	1
—	JP-171N	M5 x .8	14.5	3.0	2.36	1.37	13.34	1
—	JP-172N	M6 x 1.0	16.0	4.0	3.02	1.37	15.59	1
—	JP-173N	M8 x 1.25	16.0	5.0	3.43	2.25	20.00	1
—	JP-174N	M10 x 1.5	17.5	5.5	4.72	6.67	33.34	1
—	JP-175N	M12 x 1.75	20.5	6.5	6.30	7.57	37.85	1
<b>Delrin Nose - Heavy End Pressure - Inch</b>								
JP-7	JP-5N*	6-32	.375	.063	.046	1/2	3 1/2	1
NK-1A	NK1A-SN*	8-32	.437	.052	.070	1 1/2	4 1/4	1
NK-1	NK1-N*	8-36	.437	.052	.070	1 1/2	4 1/4	1
NK-2	NK2-SN*	10-32	.468	.065	.093	1 3/4	6 1/4	1
NK-3	NK3-SN	1/4-20	.531	.078	.119	3	10 1/2	1
NK-4	NK4-SN	5/16-18	.562	.084	.135	3 3/4	15 1/2	1
NK-5	NK5-SN	3/8-16	.625	.110	.186	4 1/2	18 1/2	1
NK-6	NK6-SN	1/2-13	.750	.151	.248	5	28	1
—	NK-7S	5/8-11	1.062	.215	.310	7	50	1
—	NK7-SN	5/8-11	1.062	.215	.310	7	50	1
<b>Metric</b>								
—	JP-370N	M4 x .7	13.0	2.5	1.78	2.25	17.75	1
—	JP-371N	M5 x .8	14.5	3.0	2.36	2.25	22.26	1
—	JP-372N	M6 x 1.0	16.0	4.0	3.02	2.25	26.67	1
—	JP-373N	M8 x 1.25	16.0	5.0	3.43	2.25	44.52	1
—	JP-377N	M16 x 2.0	28.5	8.0	7.87	15.59	115.62	1

\*Nylon Plunger

Note: Plungers with nylon locking element are not recommended for aluminum applications.

Note 2: End force for inch is in Lbs. End force for Metric is in Newtons.

Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Delrin Nose - Light End Pressure - Inch</b>								
JP-5	JP-7N*	6-32	.375	.063	.046	1/2	1 1/2	1
LNK-1A	LNK1A-SN*	8-32	.437	.052	.070	1 1/2	1 1/2	1
LNK-1	LNK1-SN*	8-36	.437	.052	.070	1 1/2	1 1/2	1
LNK-2	LNK2-SN*	10-32	.468	.065	.093	3/4	2 1/2	1
LNK-3	LNK3-SN	1/4-20	.531	.078	.119	1	3 1/2	1
LNK-4	LNK4-SN	5/16-18	.562	.084	.135	1 1/4	4	1
LNK-5	LNK5-SN	3/8-16	.625	.110	.186	1 1/2	5	1
LNK-6	LNK6-SN	1/2-13	.750	.151	.248	1 3/4	5 1/2	1
LNK-7	LNK7-SN	5/8-11	1.062	.215	.310	2	8 1/2	1
<b>Metric</b>								
—	JP-270N	M4 x .7	13.0	2.5	1.78	2.25	8.92	1
—	JP-271N	M5 x .8	14.5	3.0	2.36	1.37	13.34	1
—	JP-272N	M6 x 1.0	16.0	4.0	3.02	1.37	15.59	1
—	JP-273N	M8 x 1.25	16.0	5.0	3.43	2.25	20.00	1
<b>Stainless Steel Body</b>								
<b>Stainless Steel Nose - Heavy End Pressure - Inch</b>								
K-1AS	K1A-SN*	8-32	.437	.052	.070	1 1/2	4 1/4	1
K-1S	K1-SN*	8-36	.437	.052	.070	1 1/2	4 1/4	1
K-2S	K2-SN*	10-32	.468	.065	.093	1 1/4	6 1/4	1
K-3S	K3-SN	1/4-20	.531	.078	.119	3	10 1/2	1
K-4S	K4-SN	5/16-18	.562	.084	.135	3 3/4	15 1/2	1
K-5S	K5-SN	3/8-16	.625	.110	.186	4 1/2	18 1/2	1
K-6S	K6-SN	1/2-13	.750	.151	.248	5	28	1
K-7S	K7-SN	5/8-11	1.062	.215	.310	7	50	1
<b>Stainless Steel Nose - Light End Pressure - Inch</b>								
LK-1AS	LK1A-SN*	8-32	.437	.052	.070	1 1/2	1 1/2	1
LK-1S	LK1-SN*	8-36	.437	.052	.070	1 1/2	1 1/2	1
LK-2S	LK2-SN*	10-32	.468	.065	.093	3/4	2 1/2	1
LK-3S	LK3-SN	1/4-20	.531	.078	.119	1	3 1/2	1
LK-4S	LK4-SN	5/16-18	.562	.084	.135	1 1/4	4	1
LK-5S	LK5-SN	3/8-16	.625	.110	.186	1 1/2	5	1
LK-6S	LK6-SN	1/2-13	.750	.151	.248	1 3/4	5 1/2	1
LK-7S	LK7-SN	5/8-11	1.062	.215	.310	2	8 1/2	1
<b>Delrin Nose - Heavy End Pressure - Inch</b>								
NK-1AS	NK1A-SN*	8-32	.437	.052	.070	1 1/2	4 1/4	1
NK-1S	NK1-SN*	8-36	.437	.052	.070	1 1/2	4 1/4	1
NK-2S	NK2-SN*	10-32	.468	.065	.093	1 3/4	6 1/4	1
NK-3S	NK3-SN	1/4-20	.531	.078	.119	3	10 1/2	1
NK-4S	NK4-SN	5/16-18	.562	.084	.135	3 3/4	15 1/2	1
NK-5S	NK5-SN	3/8-16	.625	.110	.186	4 1/2	18 1/2	1
NK-6S	NK6-SN	1/2-13	.750	.151	.248	5	28	1
—	NK-7S	5/8-11	1.062	.215	.310	7	50	1
—	NK7-SN	5/8-11	1.062	.215	.310	7	50	1
<b>Delrin Nose - Light End Pressure - Inch</b>								
LNK-1AS	LNK1A-SN*	8-32	.437	.052	.070	1 1/2	1 1/2	1
LNK-1S	LNK1-SN*	8-36	.437	.052	.070	1 1/2	1 1/2	1
LNK-2S	LNK2-SN*	10-32	.468	.065	.093	3/4	2 1/2	1
LNK-3S	LNK3-SN	1/4-20	.531	.078	.119	1	3 1/2	1
LNK-4S	LNK4-SN	5/16-18	.562	.084	.135	1 1/4	4	1
LNK-5S	LNK5-SN	3/8-16	.625	.110	.186	1 1/2	5	1
LNK-6S	LNK6-SN	1/2-13	.750	.151	.248	1 3/4	5 1/2	1
LNK-7S	LNK7-SN	5/8-11	1.062	.215	.310	2	8 1/2	1



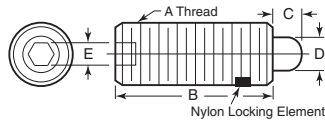
Posi Hex Spring Plungers  
Inch and Metric



Steel



Stainless Steel



Posi-hex plungers allow for easy installation and removal from the back side using a hex wrench. Plunger assembly will not come apart under critical applications because the hex plug is permanently installed and cannot break loose upon installation or removal. Posi-hex is recommended for use in high torque applications. Metric dimensions are in millimeters. Metric end pressures are in Newtons.

Standard Item No.	Locking Element Item No.	A	B	C	D	E	Initial End Force	Final End Force	Pack Qty.
<b>Steel Body</b>									
<b>Steel Nose - Heavy End Pressure - Inch</b>									
PH-48B	PH-48BN*	6-32	1/2	1/16	.044	.050	1.0	1.6	1
PH-48	PH-48N*	6-32	17/32	1/16	.044	.050	1.5	4.5	1
PH-50	PH-50N*	8-32	5/8	3/32	.069	.063	2.7	7.3	1
PH-52	PH-52N*	10-32	3/4	1/8	.091	.063	2.9	11.1	1
PH-54B	PH-54BN	1/4-20	3/4	1/8	.117	.079	2.0	9.0	1
PH-54	PH-54N	1/4-20	1	3/16	.117	.079	3.0	13.0	1
PH-54A	PH-54AN	1/4-28	1	3/16	.117	.079	3.0	13.0	1
PH-56	—	5/16-18	1	3/16	.133	.093	3.0	15.0	1
<b>Metric</b>									
JP-570	—	M4 x .7	16	2.5	1.78	2	11.96	41.09	1
JP-571	—	M5 x .8	19	3.0	2.36	2.5	12.85	49.03	1
JP-572	—	M6 x 1.0	25	5.0	3.02	3	13.24	57.37	1
JP-573	—	M8 x 1.25	25	5.0	3.43	4	13.24	66.20	1
JP-574	—	M10 x 1.5	29	5.0	4.72	5	24.32	64.04	1
JP-575	—	M12 x 1.75	32	6.0	6.30	6	29.13	76.78	1
JP-577	—	M16 x 2.0	38	8.0	7.87	8	46.39	112.58	1
<b>Steel Nose - Light End Pressure - Inch</b>									
PH-49	PH-49N*	6-32	17/32	1/16	.044	.050	0.5	1.5	1
PH-51	PH-51N*	8-32	5/8	3/32	.069	.063	0.7	2.3	1
PH-53	PH-53N*	10-32	3/4	1/8	.091	.063	1.3	2.7	1
PH-55	PH-55N	1/4-20	1	3/16	.117	.079	1.0	4.0	1
PH-55A	PH-55AN	1/4-28	1	3/16	.117	.079	1.0	4.0	1
PH-57	PH-57N	5/16-18	1	3/16	.133	.093	1.5	4.5	1
<b>Metric</b>									
JP-670	—	M4 x .7	16	2.5	1.78	2	3.14	10.20	1
JP-672	—	M6 x 1.0	25	5.0	3.02	3	4.41	17.65	1
JP-671	—	M5 x .8	19	3.0	2.36	2.5	5.79	11.96	1
JP-673	—	M8 x 1.25	25	5.0	3.43	4	6.67	19.91	1
JP-674	—	M10 x 1.5	29	5.0	4.72	5	12.36	31.77	1
JP-675	—	M12 x 1.75	32	6.0	6.30	6	11.96	41.09	1
JP-677	—	M16 x 2.0	38	8.0	7.87	8	15.49	46.39	1
<b>Metric</b>									
JP-470	—	M4 x .7	16	2.5	1.78	2	11.96	41.09	1
JP-471	—	M5 x .8	19	3.0	2.36	2.5	12.85	49.03	1
JP-472	—	M6 x 1.0	25	5.0	3.02	3	13.24	57.37	1
JP-473	—	M8 x 1.25	25	5.0	3.43	4	13.24	66.20	1
JP-478	—	M20 x 2.5	44	8.0	9.50	10	29.91	166.23	1
<b>Metric</b>									
JP-870	—	M4 x .7	16	2.5	1.78	2	3.14	10.20	1
JP-871	—	M5 x .8	19	3.0	2.36	2.5	5.79	11.96	1
JP-872	—	M6 x 1.0	25	5.0	3.02	3	4.41	17.65	1
JP-873	—	M8 x 1.25	25	5.0	3.43	4	6.67	19.91	1
JP-875	—	M12 x 1.75	32	6.0	6.30	6	11.96	41.09	1
<b>Stainless Steel Body</b>									
<b>Stainless Steel Nose - Heavy End Pressure - Inch</b>									
SSPH-48B	SSPH-48BN*	6-32	1/2	1/16	.044	.050	1.0	1.6	1
SSPH-48	SSPH-48N*	6-32	17/32	1/16	.044	.050	1.5	4.5	1
SSPH-50	SSPH-50N*	8-32	5/8	3/32	.069	.063	2.7	7.3	1
SSPH-52	SSPH-52N*	10-32	3/4	1/8	.091	.063	2.9	11.1	1
SSPH-54B	SSPH-54BN	1/4-20	3/4	1/8	.117	.079	2.0	9.0	1
SSPH-54	SSPH-54N	1/4-20	1	3/16	.117	.079	3.0	13.0	1
SSPH-54A	SSPH-54AN	1/4-28	1	3/16	.117	.079	3.0	13.0	1
SSPH-56	SSPH-56N	5/16-18	1	3/16	.133	.093	3.0	15.0	1
<b>Stainless Steel Nose - Light End Pressure - Inch</b>									
SSPH-49	SSPH-49N	6-32	17/32	1/16	.044	.050	0.5	1.5	1
SSPH-51	SSPH-51N	8-32	5/8	3/32	.069	.063	0.7	2.3	1
SSPH-53	SSPH-53N	10-32	3/4	1/8	.091	.063	1.3	2.7	1
SSPH-55	SSPH-55N	1/4-20	1	3/16	.117	.079	1.0	4.0	1
SSPH-55A	SSPH-55AN	1/4-28	1	3/16	.117	.079	1.0	4.0	1
SSPH-57	SSPH-57N	5/16-18	1	3/16	.133	.093	1.5	4.5	1

\*Nylon patch

Note: Plungers with nylon locking elements are not recommended for aluminum applications.

Note 2: End force for inch is in Lbs. End force for Metric is in Newtons.

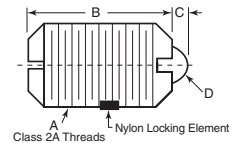
Spring Plungers  
Inch and Metric  
Short with Extended Travel



Steel Nose



Delrin Nose



The "short" spring plunger with extended travel provides the space saving features of a short body, along with the added nose travel of the standard length plunger. The nose travel (C column) and the diameter (D column) are identical to the standard spring plunger, with spring pressures mid range between the light and heavy "short" spring plunger. All "short" style plungers have the solid screw driver slot.

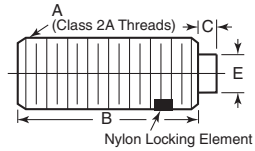
Standard Item No.	Locking Element Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Steel Body</b>								
<b>Steel Nose</b>								
NSP-1	NSP-1N	8-32	7/16	.093	.070	1.0	3.25	1
NSP-2	NSP-2N	8-36	7/16	.093	.070	1.0	3.25	1
NSP-3	NSP-3N	10-32	15/32	.125	.093	1.25	4.25	1
NSP-4	NSP-4N	1/4-20	17/32	.187	.119	2.0	7.0	1
NSP-5	NSP-5N	5/16-18	9/16	.187	.135	2.5	10.5	1
NSP-6	NSP-6N	5/16-18	5/8	.187	.186	3.0	12.5	1
NSP-7	NSP-7N	1/4-13	3/4	.250	.248	3.5	19.0	1
NSP-8	NSP-8N	5/16-11	1 1/16	.312	.310	4.5	33.5	1
<b>Delrin Nose</b>								
NSP-9	NSP-9N	8-32	7/16	.093	.070	1.0	3.25	1
NSP-10	NSP-10N	8-36	7/16	.093	.070	1.0	3.25	1
NSP-11	NSP-11N	10-32	15/32	.125	.093	1.25	4.25	1
NSP-12	NSP-12N	1/4-20	17/32	.187	.119	2.0	7.0	1
NSP-13	NSP-13N	5/16-18	9/16	.187	.135	2.5	10.5	1
NSP-14	NSP-14N	5/16-18	5/8	.187	.186	3.0	12.5	1
NSP-15	NSP-15N	1/4-13	3/4	.250	.248	3.5	19.0	1
NSP-16	NSP-16N	5/16-11	1 1/16	.312	.310	4.5	33.5	1
<b>Stainless Steel Body</b>								
<b>Stainless Steel Nose</b>								
NSP-17	NSP-17N	8-32	7/16	.093	.070	1.0	3.25	1
NSP-18	NSP-18N	8-36	7/16	.093	.070	1.0	3.25	1
NSP-19	NSP-19N	10-32	15/32	.125	.093	1.25	4.25	1
NSP-20	NSP-20N	1/4-20	17/32	.187	.119	2.0	7.0	1
NSP-21	NSP-21N	5/16-18	9/16	.187	.135	2.5	10.5	1
NSP-22	NSP-22N	5/16-18	5/8	.187	.186	3.0	12.5	1
NSP-23	NSP-23N	1/4-13	3/4	.250	.248	3.5	19.0	1
<b>Delrin Nose</b>								
NSP-24	NSP-24N	8-32	7/16	.093	.070	1.0	3.25	1
NSP-25	NSP-25N	8-36	7/16	.093	.070	1.0	3.25	1
NSP-26	NSP-26N	10-32	15/32	.125	.093	1.25	4.25	1
NSP-27	NSP-27N	1/4-20	17/32	.187	.119	2.0	7.0	1
NSP-28	NSP-28N	5/16-18	9/16	.187	.135	2.5	10.5	1
NSP-29	NSP-29N	5/16-18	5/8	.187	.186	3.0	12.5	1
NSP-30	NSP-30N	1/4-13	3/4	.250	.248	3.5	19.0	1

Note: Plungers with nylon locking element are not recommended for aluminum applications.

Note 2: End force is in Lbs. for inch plungers.



**Hi-Life Flat Hexagonal Nose  
Steel Body and Steel Nose**

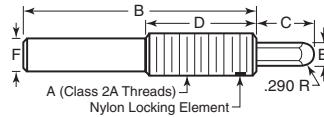


Guaranteed for 10 million cycles. Built to take the tough abuse of high speed, long run stamping operations. Flat hexagonal nose design makes them ideal for use as parts lifters in dies, or other applications requiring exceptionally long life. Special long life springs. Bodies black oxide finish. Nylon locking element. Not recommended in aluminum applications.

Item No.	A	B	C	E	Initial End Force	Final End Force	Pack Qty.
HL-1	1/4-20	1.343	.078	1/8	1/2	6 1/2	1
HL-2	5/16-18	1.406	.088	1/8	1/2	8	1
HL-3	3/8-16	1.532	.097	3/16	1/2	9 3/8	1
HL-4	1/2-13	1.718	.105	1/4	1/2	16	1

Note: End force for inch is in Lbs.

**Long Travel - Hex Nose  
Steel Body**

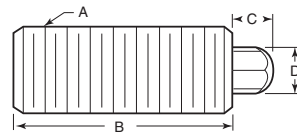
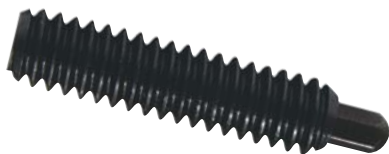


For use in large sheet metal forming dies. The long plunger stroke lifts the formed sheet clear of the permit access for easy removal. Hexagonal shaped plungers provide for easy insertion, adjustment or removal with a standard wrench. Plungers are case hardened. Bodies and heavy end pressure plunger noses have a black oxide finish. Light end pressure plunger noses have a zinc plated finish. All bodies have a nylon locking element and are not recommended in aluminum applications.

Item No.	A	B	C	D	E	F	Initial End Force	Final End Force	Pack Qty.
<b>Heavy End Pressure</b>									
LTP-00	5/8-11	3 1/8	1	1 1/4	5/16	.510	4	20	1
LTP-0	3/4-10	3 3/4	1	1 1/2	3/8	.623	4	35	1

Note: End force for inch is in Lbs.

**Hex Nose  
Steel Body  
Heavy End Pressure**



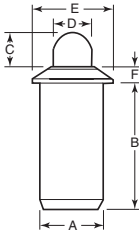
For use in fixtures, jigs, detents, dies and other tooling applications. They give sure and positive spring tension. Black oxide finish. Accurate spring pressures. Nose ends accurately radiused. Has self-lubricating surface.

Standard	Locking Element		A	B	C	D	Initial End Force Lbs.	Final End Force Lbs.	Pack Qty.
HN-1	HN-1N		1/4-20	1	3/16	1/8	3.0	13.0	1
HN-2	HN-2N		5/16-18	1	3/16	1/8	3.0	15.0	1
HN-3	HN-3N		3/8-16	1 1/8	3/16	3/16	5.5	14.5	1
HN-4	HN-4N		1/2-13	1 1/4	1/4	1/4	6.6	17.4	1
HN-5	HN-5N		5/8-11	1 1/2	5/16	5/16	10.5	25.5	1
HN-6	HN-6N		3/4-10	1 3/4	5/16	3/8	6.7	37.3	1
HN-7	HN-7N		1-8	2 13/32	1/2	1/2	16.0	68.0	1

Note: Plungers with nylon locking element are not recommended for use in aluminum applications



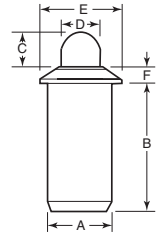
**Steel or Stainless Steel Body  
 With Steel or Stainless Steel Nose**



Easy installation for use in wood, soft plastic or aluminum. No thread adjustment. Withstands high temperature. Longer travel. Steel body and plunger are made from 12L14 steel. Plunger is case hardened to Rc 50-55. Stainless body and plunger are 300 series. Spring is 17-7 stainless for both styles.

Steel Item No.	Stainless Item No.	Initial Force Lbs.	Final Force Lbs.	+0.002/-0.000 A	B	C	D	E	F	Pack Qty.
PFP-51	SPFP-51	.75	2.00	.188	.441	.094	.121	.250	.044	1
PFP-52	SPFP-52	1.50	4.50	.188	.441	.094	.121	.250	.044	1
PFP-53	SPFP-53	1.25	3.00	.250	.521	.125	.168	.312	.055	1
PFP-54	SPFP-54	2.50	6.00	.250	.521	.125	.168	.312	.055	1
PFP-57	SPFP-57	2.50	7.00	.375	.788	.187	.234	.500	.096	1
PFP-58	SPFP-58	5.00	14.00	.375	.788	.187	.234	.500	.096	1
PFP-59	SPFP-59	4.00	9.00	.500	1.100	.250	.332	.688	.134	1
PFP-60A	SPFP-60	8.00	18.00	.500	1.100	.250	.332	.688	.134	1

**Steel or Stainless Steel Body  
 With Delrin Nose**

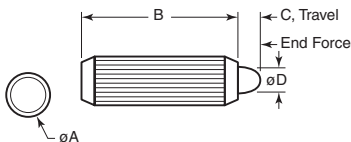


Steel Item No.	Stainless Item No.	Initial Force Lbs.	Final Force Lbs.	A	B	C	D	E	F	Pack Qty.
<b>Light Pressure - White Delrin Nose</b>										
PFP-86	SPFP-86	.50	1.0	.125	.252	.062	.070	.187	.032	1
PFP-87	SPFP-87	.75	2.5	.188	.405	.094	.121	.250	.035	1
PFP-88	SPFP-88	1.5	3.0	.250	.481	.125	.168	.312	.044	1
PFP-89	SPFP-89	2.0	5.0	.312	.643	.151	.186	.375	.045	1
PFP-90	SPFP-90	2.5	7.0	.375	.785	.187	.234	.500	.078	1
PFP-91	SPFP-91	4.0	9.0	.500	1.13	.250	.332	.688	.088	1
<b>Heavy Pressure - Brown Delrin Nose</b>										
PFP-80	SPFP-80	1.0	2.0	.125	.252	.062	.070	.187	.032	1
PFP-81	SPFP-81	1.5	4.5	.188	.405	.094	.121	.250	.035	1
PFP-82	SPFP-82	2.5	6.0	.250	.481	.125	.168	.312	.044	1
PFP-83	SPFP-83	4.0	10.0	.312	.643	.151	.186	.375	.045	1
PFP-84	SPFP-84	5.0	14.0	.375	.785	.187	.234	.500	.078	1
PFP-85	SPFP-85	8.0	18.0	.500	1.13	.250	.332	.688	.088	1

**Shoulderless Knurled Press-Fit  
 Steel and Stainless Steel Bodies  
 Stainless Steel and Nylon Noses**



These plungers are designed for simple, easy installation into wood, soft plastic or aluminum. Ideal where a threaded plunger is impractical or when threaded adjustments are not required. Nylon nose resists marring. Designed without a shoulder for insertion from either end.



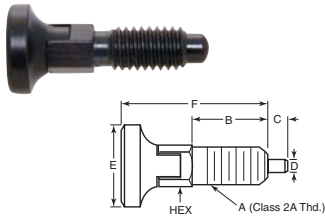
Steel Item No.	Stainless Item No.	A	B	C	D	Initial End Force	Final End Force	Pack Qty.
<b>Nylon Ball</b>								
<b>Light Pressure</b>								
WBP-5	WBP-45	.215	.485	.094	.121	.75	2	1
WBP-15	WBP-55	.259	.576	.125	.168	1.25	3	1
WBP-25	WBP-65	.384	.882	.187	.234	2.5	7	1
WBP-35	WBP-75	.509	1.234	.250	.332	4	9	1
<b>Heavy Pressure</b>								
WBP-10	WBP-50	.215	.485	.094	.121	1.5	4.5	1
WBP-20	WBP-60	.259	.576	.125	.168	2.5	6	1
WBP-30	WBP-70	.384	.882	.187	.234	5	14	1
WBP-40	WBP-80	.509	1.234	.250	.332	8	18	1
<b>Stainless Steel Ball</b>								
<b>Light Pressure</b>								
WBP-85	WBP-125	.215	.485	.094	.121	.75	2	1
WBP-95	WBP-135	.259	.576	.125	.168	1.25	3	1
WBP-105	WBP-145	.384	.882	.187	.234	2.5	7	1
WBP-115	WBP-155	.509	1.234	.250	.332	4	9	1
<b>Heavy Pressure</b>								
WBP-90	WBP-130	.215	.485	.094	.121	1.5	4.5	1
WBP-100	WBP-140	.259	.576	.125	.168	2.5	6	1
WBP-110	WBP-150	.384	.882	.187	.234	5	14	1
WBP-120	WBP-160	.509	1.234	.250	.332	8	18	1



# HAND RETRACTABLE SPRING PLUNGERS

Hand retractable spring plungers permit the plunger to be easily withdrawn and re-engaged by pulling on the handle. Hardened plunger permits greater side loading and the tapered end on the plunger allows for easy alignment. Used on original equipment and machining applications as positioners, locating pins, indexing devices, etc. Steel are zinc plated and stainless is Type 303 or equivalent. On ring handle stainless models, all parts are stainless except the ring handle which is nickel plated steel. Locking types have a rest position where the plunger can stay in the retracted position. Nylon locking element not recommended for aluminum applications. Metric dimensions are in millimeters. Metric end forces shown in Newtons.

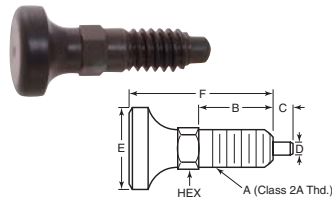
## Black Delrin® Plastic Handle - Locking Steel Body and Plunger



Standard Item No.	Locking Element Item No.	Initial End Force Lbs./Newtons	Final End Force Lbs./Newtons	A	B	C	D	E	F	Hex	Pack Qty.
<b>Inch</b>											
PRT-11	PRT-11N	.12	.36	¼-20	.50	.130	.156	.50	.97	¼	1
PRT-13	PRT-13N	.25	2.00	¾-16	.75	.187	.248	.75	1.44	¾	1
PRT-12	PRT-12N	.50	1.75	½-13	1.00	.250	.312	1.00	1.90	½	1
<b>Metric</b>											
PRT-14*	PRT-14N*	.50	1.5	M6 x 1.00	13	3	3	12	25	6	1
PRT-15	PRT-15N	1.00	9.0	M10 x 1.50	20	5	6	19	38	10	1
PRT-16	—	2.50	8.0	M12 x 1.75	25	6	8	25	47	12	1

\*No thread relief on M6 thread size

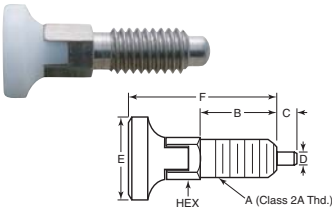
## Black Delrin® Plastic Handle - Non-Locking Steel Body and Plunger



Standard Item No.	Locking Element Item No.	Initial End Force Lbs./Newtons	Final End Force Lbs./Newtons	A	B	C	D	E	F	Hex	Pack Qty.
<b>Inch</b>											
PRT-1	PRT-1N	.12	.36	¼-20	.50	.130	.156	.50	.97	¼	1
PRT-3	PRT-3N	.25	2.00	¾-16	.75	.187	.248	.75	1.44	¾	1
PRT-2	PRT-2N	.50	1.75	½-13	1.00	.250	.312	1.00	1.90	½	1
<b>Metric</b>											
PRT-4*	—	.50	1.5	M6 x 1.00	13	3	3	12	25	6	1
PRT-5	PRT-5N	1.00	9.0	M10 x 1.50	20	5	6	19	38	10	1
PRT-6	—	2.50	8.0	M12 x 1.75	25	6	8	25	47	12	1

\*No thread relief on M6 thread size

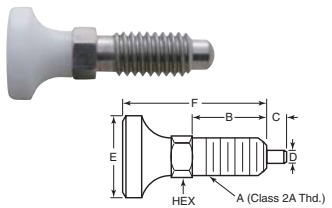
## White Delrin® Plastic Handle - Locking Stainless Steel Body and Plunger



Standard Item No.	Locking Element Item No.	Initial End Force Lbs./Newtons	Final End Force Lbs./Newtons	A	B	C	D	E	F	Hex	Pack Qty.
<b>Inch</b>											
PRT-26	PRT-26N	.12	.36	¼-20	.50	.130	.156	.50	.97	¼	1
PRT-27	PRT-27N	.25	2.00	¾-16	.75	.187	.248	.75	1.44	¾	1
PRT-28	PRT-28N	.50	1.75	½-13	1.00	.250	.312	1.00	1.90	½	1
<b>Metric</b>											
PRT-29*	—	.50	1.5	M6 x 1.00	13	3	3	12	25	6	1
PRT-30	PRT-30N	1.00	9.0	M10 x 1.50	20	5	6	19	38	10	1
PRT-31	—	2.50	8.0	M12 x 1.75	25	6	8	25	47	12	1

\*No thread relief on M6 thread size

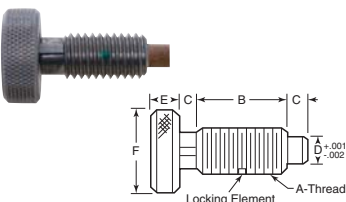
## White Delrin® Plastic Handle - Non-Locking Stainless Steel Body and Plunger



Standard Item No.	Locking Element Item No.	Initial End Force Lbs./Newtons	Final End Force Lbs./Newtons	A	B	C	D	E	F	Hex	Pack Qty.
<b>Inch</b>											
PRT-20	PRT-20N	.12	.36	¼-20	.50	.130	.156	.50	.97	¼	1
PRT-21	PRT-21N	.25	2.00	¾-16	.75	.187	.248	.75	1.44	¾	1
PRT-22	PRT-22N	.50	1.75	½-13	1.00	.250	.312	1.00	1.90	½	1
<b>Metric</b>											
PRT-23*	—	.50	1.5	M6 x 1.00	13	3	3	12	25	6	1
PRT-24	—	1.00	9.0	M10 x 1.50	20	5	6	19	38	10	1
PRT-25	PRT-25N	2.50	8.0	M12 x 1.75	25	6	8	25	47	12	1

\*No thread relief on M6 thread size

## Knurled Handle Locking



Steel Item No.	Stainless Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	C	D	E	F	Pack Qty.
<b>Light End Pressure</b>										
PHR-79	PHR-83	.750	3.000	⅜-18	⅝	⅜	.155	⅝	⅝	1
PHR-80	PHR-84	.750	4.000	⅜-16	¾	⅜	.186	⅝	¾	1
PHR-81	PHR-85	1.250	5.000	½-13	⅞	¼	.249	⅝	1	1
<b>Heavy End Pressure</b>										
—	PHR-74	1.000	5.000	¼-20	½	⅜	.124	¼	½	1
PHR-71	PHR-75	1.500	6.000	⅜-18	⅝	⅜	.155	⅝	⅝	1
PHR-72	PHR-76	1.500	8.000	⅜-16	¾	⅜	.186	⅝	¾	1
PHR-73	PHR-77	2.500	10.000	½-13	⅞	¼	.249	⅝	1	1

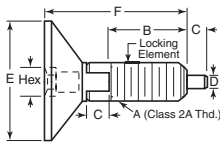
Note: Nose Diameter D tolerance +.001/-.002.

# HAND RETRACTABLE SPRING PLUNGERS



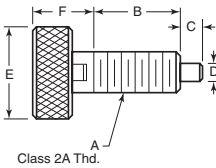
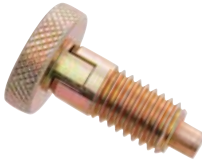
Hand retractable spring plungers permit the plunger to be easily withdrawn and re-engaged by pulling on the handle. Hardened plunger permits greater side loading and the tapered end on the plunger allows for easy alignment. Used on original equipment and machining applications as positioners, locating pins, indexing devices, etc. Steel are zinc plated and stainless is Type 303 or equivalent. On ring handle stainless models, all parts are stainless except the ring handle which is nickel plated steel. Locking types have a rest position where the plunger can stay in the retracted position. Nylon locking element not recommended for aluminum applications. Metric dimensions are in millimeters. Metric end forces shown in Newtons.

## Hex Drive Handle - Locking Steel and Stainless Steel



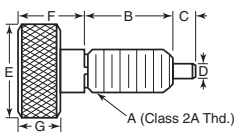
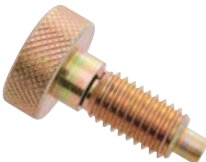
Standard Item No.	Locking Element Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	C	+0.000/-0.001 D	E	F	Hex	Pack Qty.
<b>Steel</b>											
<b>Inch</b>											
FHR-11	FHR-1	1.0	4.0	1/4-20	.400	3/8	.123	3/4	.805	1/8	1
FHR-22	FHR-2	1.0	6.0	5/16-18	.530	3/16	.154	7/8	1.070	1/8	1
FHR-33	FHR-3	1.0	8.0	3/8-16	.750	7/32	.185	1	1.260	7/32	1
FHR-44	FHR-4	1.0	10.0	1/2-13	.650	1/4	.248	1 1/4	1.380	1/4	1
<b>Metric</b>											
FHR-50	FHR-50N	4.45	18.0	M6 x 1.00	10	3.2	3.0	19	20	3	1
FHR-55	FHR-55N	4.45	27.0	M8 x 1.25	13.5	4.8	4	22	27	3	1
FHR-60	FHR-60N	4.45	36.0	M10 x 1.50	19	5.6	4.7	25	32	5	1
FHR-65	FHR-65N	4.45	44.5	M12 x 1.75	16.5	6.5	6.5	32	35	6	1
<b>Stainless Steel</b>											
<b>Inch</b>											
SPHR-635	SPHR-635N	1.0	4.0	1/4-20	.4	.125	.123	.75	.805	.125	1
SPHR-640	SPHR-640N	1.0	6.0	5/16-18	.53	.187	.154	.875	1.07	.125	1
SPHR-645	SPHR-645N	1.0	8.0	3/8-16	.75	.22	.185	1	1.26	.218	1
SPHR-650	SPHR-650N	1.0	10.0	1/2-13	.65	.25	.248	1.25	1.38	.25	1
<b>Metric</b>											
SPHR-615	SPHR-615N	4.45	18.0	M6 x 1.00	10	3.2	3.0	19	20	3	1
SPHR-620	SPHR-620N	4.45	27.0	M8 x 1.25	13.5	4.8	4	22	27	3	1
SPHR-625	SPHR-625N	4.45	36.0	M10 x 1.50	19	5.6	4.7	25	32	5	1
SPHR-630	SPHR-630N	4.45	44.5	M12 x 1.75	16.5	6.5	6.5	32	35	6	1

## Knurled Handle - Locking Steel and Stainless Steel



Standard Item No.	Locking Element Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	C	+0.000/-0.001 D	E	F	Pack Qty.
<b>Steel</b>										
<b>Inch</b>										
PHR-250	PHR-250N	.50	2.0	1/4-20	.40	.125	.124	.50	.405	1
PHR-375	PHR-375N	.50	3.0	3/8-16	.75	.220	.186	.75	.510	1
PHR-500	PHR-500N	.50	4.0	1/2-13	.65	.250	.249	1.00	.730	1
<b>Metric</b>										
PHR-600	PHR-600N	2.2	8.9	M6 x 1.00	10	3.2	3.0	13	10.7	1
PHR-605	PHR-605N	2.2	13.3	M10 x 1.50	19	5.6	4.7	19	13	1
PHR-610	PHR-610N	2.2	17.8	M12 x 1.75	17	6.4	6.3	25	18	1
<b>Stainless Steel</b>										
<b>Inch</b>										
SPHR-250	SPHR-250N	.50	2.0	1/4-20	.40	.125	.124	.50	.405	1
SPHR-375	SPHR-375N	.50	3.0	3/8-16	.75	.220	.186	.75	.510	1
SPHR-500	SPHR-500N	.50	4.0	1/2-13	.65	.250	.249	1.00	.730	1
<b>Metric</b>										
SPHR-600	SPHR-600N	2.2	8.9	M6 x 1.00	10	3.2	3.0	13	10.7	1
SPHR-605	SPHR-605N	2.2	13.3	M10 x 1.50	19	5.6	4.7	19	13	1
SPHR-610	SPHR-610N	2.2	17.8	M12 x 1.75	17	6.4	6.3	25	18	1

## Knurled Handle - Non Locking Steel and Stainless Steel



Standard Item No.	Locking Element Item No.	A	B	C	D	E	F	G	Initial End Force	Final End Force	Pack Qty.
<b>Steel</b>											
<b>Inch</b>											
PHR-00*	PHR-0*	10-32	.400	3/32	.104	3/8	1/4	.19	.50	3.0	1
PHR-11	PHR-1	1/4-20	.500	1/8	.124	1/2	3/16	.19	1.0	4.0	1
PHR-22	PHR-2	5/16-18	.625	3/16	.155	5/8	3/8	.25	1.0	6.0	1
PHR-33	PHR-3	3/8-16	.750	7/32	.186	3/4	1/2	.31	1.0	8.0	1
PHR-44	PHR-4	1/2-13	.875	1/4	.249	1	5/8	.38	1.0	10.0	1
<b>Metric</b>											
PHR-50	PHR-50N	M5 x .8	10	2	2.5	9	6	4	2.22	13.34	1
PHR-60	PHR-60N	M6 x 1.0	13	3	3	13	8	5	4.45	17.80	1
PHR-100	PHR-100N	M10 x 1.5	19	6	5	19	13	8	4.45	35.60	1
PHR-120	PHR-120N	M12 x 1.75	23	6	6	25	16	10	4.45	44.5	1
<b>Stainless Steel</b>											
<b>Inch</b>											
PHR-44SS	PHR-4SS	1/2-13	.875	1/4	.249	1	5/8	.38	1.0	10.0	1
PHR-00SS*	PHR-0SS*	10-32	.400	3/32	.104	3/8	1/4	.19	.50	3.0	1
PHR-11SS	PHR-1SS	1/4-20	.500	1/8	.124	1/2	3/16	.19	1.0	4.0	1
PHR-22SS	PHR-2SS	5/16-18	.625	3/16	.155	5/8	3/8	.25	1.0	6.0	1
PHR-33SS	PHR-3SS	3/8-16	.750	7/32	.186	3/4	1/2	.31	1.0	8.0	1
<b>Metric</b>											
SPHR-50	—	M5 x .8	10	2	2.5	9	6	4	2.22	13.34	1
SPHR-60	SPHR-60N	M6 x 1.0	13	3	3	13	8	5	4.45	17.80	1
SPHR-100	SPHR-100N	M10 x 1.5	19	6	5	19	13	8	4.45	35.60	1
SPHR-120	—	M12 x 1.75	23	6	6	25	16	10	4.45	44.5	1

\* .052 radius nose

Note: End force for inch is in Lbs. End force for Metric is in Newtons.



# HAND RETRACTABLE SPRING PLUNGERS

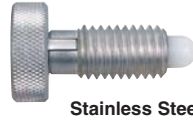
Buy One or Buy Bulk & SAVE

Hand retractable spring plungers permit the plunger to be easily withdrawn and re-engaged by pulling on the handle. Hardened plunger permits greater side loading and the tapered end on the plunger allows for easy alignment. Used on original equipment and machining applications as positioners, locating pins, indexing devices, etc. Steel are zinc plated and stainless is Type 303 or equivalent. On ring handle stainless models, all parts are stainless except the ring handle which is nickel plated steel. Locking types have a rest position where the plunger can stay in the retracted position. Nylon locking element not recommended for aluminum applications. Metric dimensions are in millimeters. Metric end forces shown in Newtons.

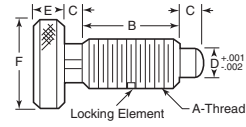
## Knurled Handle Steel and Stainless Steel With Radiused Delrin Nose Locking



Steel

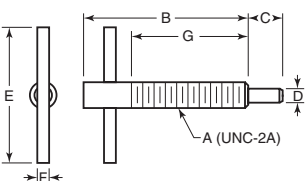


Stainless Steel



Standard	Locking Element							Initial	Final	Pack
Item No.	Item No.	A	B	C	D	E	F	End Force	End Force	Qty.
<b>Steel Body</b>										
<b>Light Pressure - Inch</b>										
NKP-11	NKP-11N	1/4-20	1/2	3/8	.144	1/4	1/2	.50	2.5	1
NKP-12	NKP-12N	5/16-18	5/8	3/16	.179	5/32	5/8	.75	3.0	1
NKP-13	NKP-13N	3/8-16	3/4	7/32	.216	9/16	3/4	.75	4.0	1
NKP-14	NKP-14N	1/2-13	7/8	1/4	.310	3/8	1	1.25	5.0	1
NKP-15	NKP-15N	5/8-11	1	5/16	.373	19/32	1 1/8	3.0	6.0	1
<b>Metric</b>										
NKPM-11	NKPM-11N	M6 x 1.00	12.7	3.17	3.65	6.3	12.7	2.0	11.0	1
NKPM-12	NKPM-12N	M8 x 1.25	15.8	4.75	4.54	7.0	15.8	3.0	13.0	1
NKPM-13	NKPM-13N	M10 x 1.50	19.0	5.50	5.48	7.9	19.0	3.0	18.0	1
NKPM-14	NKPM-14N	M12 x 1.75	22.2	6.35	7.87	9.4	25.4	5.5	22.0	1
NKPM-15	NKPM-15N	M16 x 2.00	25.4	7.92	9.47	10.3	28.6	13.0	26.5	1
<b>Heavy Pressure - Inch</b>										
NKP-1	NKP-1N	1/4-20	1/2	3/8	.144	1/4	1/2	1.0	5.0	1
NKP-2	NKP-2N	5/16-18	5/8	3/16	.179	5/32	5/8	1.5	6.0	1
NKP-3	NKP-3N	3/8-16	3/4	7/32	.216	9/16	3/4	1.5	8.0	1
NKP-4	NKP-4N	1/2-13	7/8	1/4	.310	3/8	1	2.5	10.0	1
NKP-5	NKP-5N	5/8-11	1	5/16	.373	19/32	1 1/8	5.0	10.0	1
<b>Metric</b>										
NKPM-1	NKPM-1N	M6 x 1.00	12.7	3.17	3.65	6.3	12.7	4.5	22.0	1
NKPM-2	NKPM-2N	M8 x 1.25	15.8	4.75	4.54	7.0	15.8	6.5	26.5	1
NKPM-3	NKPM-3N	M10 x 1.50	19.0	5.50	5.48	7.9	19.0	6.5	35.5	1
NKPM-4	NKPM-4N	M12 x 1.75	22.2	6.35	7.87	9.4	25.4	11.0	44.5	1
NKPM-5	NKPM-5N	M16 x 2.00	25.4	7.92	9.47	10.3	28.6	22.0	44.5	1
<b>Stainless Steel Body</b>										
<b>Light Pressure - Inch</b>										
NKP-16	NKP-16N	1/4-20	1/2	3/8	.144	1/4	1/2	.50	2.5	1
NKP-17	NKP-17N	5/16-18	5/8	3/16	.179	5/32	5/8	.75	3.0	1
NKP-18	NKP-18N	3/8-16	3/4	7/32	.216	9/16	3/4	.75	4.0	1
NKP-19	NKP-19N	1/2-13	7/8	1/4	.310	3/8	1	1.25	5.0	1
NKP-20	NKP-20N	5/8-11	1	5/16	.373	19/32	1 1/8	3.0	6.0	1
<b>Metric</b>										
NKPM-16	NKPM-16N	M6 x 1.00	12.7	3.17	3.65	6.3	12.7	2.0	11.0	1
NKPM-17	NKPM-17N	M8 x 1.25	15.8	4.75	4.54	7.0	15.8	3.0	13.0	1
NKPM-18	NKPM-18N	M10 x 1.50	19.0	5.50	5.48	7.9	19.0	3.0	18.0	1
NKPM-19	NKPM-19N	M12 x 1.75	22.2	6.35	7.87	9.4	25.4	5.5	22.0	1
NKPM-20	NKPM-20N	M16 x 2.00	25.4	7.92	9.47	10.3	28.6	13.0	26.5	1
<b>Heavy Pressure - Inch</b>										
NKP-6	NKP-6N	1/4-20	1/2	3/8	.144	1/4	1/2	1.0	5.0	1
NKP-7	NKP-7N	5/16-18	5/8	3/16	.179	5/32	5/8	1.5	6.0	1
NKP-8	NKP-8N	3/8-16	3/4	7/32	.216	9/16	3/4	1.5	8.0	1
NKP-9	NKP-9N	1/2-13	7/8	1/4	.310	3/8	1	2.5	10.0	1
NKP-10	NKP-10N	5/8-11	1	5/16	.373	19/32	1 1/8	5.0	10.0	1
<b>Metric</b>										
NKPM-6	NKPM-6N	M6 x 1.00	12.7	3.17	3.65	6.3	12.7	4.5	22.0	1
NKPM-7	NKPM-7N	M8 x 1.25	15.8	4.75	4.54	7.0	15.8	6.5	26.5	1
NKPM-8	NKPM-8N	M10 x 1.50	19.0	5.50	5.48	7.9	19.0	6.5	35.5	1
NKPM-9	NKPM-9N	M12 x 1.75	22.2	6.35	7.87	9.4	25.4	11.0	44.5	1
NKPM-10	NKPM-10N	M16 x 2.00	25.4	7.92	9.47	10.3	28.6	22.0	44.5	1

## T-Handle - Locking Steel and Stainless Steel



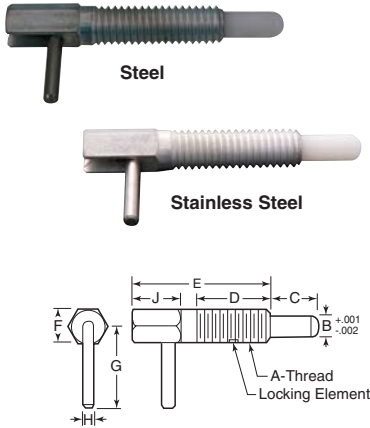
Standard	Locking Element	Initial	Final							Pack	
Item No.	Item No.	End Force Lbs.	End Force Lbs.	A	B	C	D	E	F	G	Qty.
<b>Steel</b>											
<b>Inch</b>											
FRT-25	FRT-250	1.0	2.5	1/4-20	1.14	.250	.155	1.13	.13	.80	1
FRT-37	FRT-375	2.0	4.0	5/16-18	1.68	.375	.233	1.50	.13	1.20	1
FRT-50	FRT-500	2.5	5.0	1/2-13	2.00	.500	.312	2.00	.16	1.40	1
FRT-62	FRT-625	2.5	5.0	5/8-11	2.38	.625	.375	2.50	.19	1.70	1
<b>Metric</b>											
FRT-700	FRT-700N	4.4	11	M6 x 1.00	29	6.4	4	29	3.3	20.3	1
FRT-705	FRT-705N	9	17.8	M10 x 1.50	43	9.5	6	38	3.3	30.5	1
FRT-710	FRT-710N	11	22	M12 x 1.75	51	12.7	8	51	4	35.5	1
FRT-715	—	11	22	M16 x 2.00	60	16	10	64	4.8	43	1
<b>Stainless Steel</b>											
<b>Inch</b>											
SSFRT-25	SSFRT-250	1.0	2.5	1/4-20	1.14	.250	.155	1.13	.13	.80	1
SSFRT-37	SSFRT-375	2.0	4.0	5/16-18	1.68	.375	.233	1.50	.13	1.20	1
SSFRT-50	SSFRT-500	2.5	5.0	1/2-13	2.00	.500	.312	2.00	.16	1.40	1
SSFRT-62	SSFRT-625	2.5	5.0	5/8-11	2.38	.625	.375	2.50	.19	1.70	1
<b>Metric</b>											
FRT-720	FRT-720N	4.4	11	M6 x 1.00	29	6.4	4	29	3.3	20.3	1
FRT-725	FRT-725N	9	17.8	M10 x 1.50	43	9.5	6	38	3.3	30.5	1
FRT-730	FRT-730N	11	22	M12 x 1.75	51	12.7	8	51	4	35.5	1
FRT-735	—	11	22	M16 x 2.00	60	16	10	64	4.8	43	1

# HAND RETRACTABLE SPRING PLUNGERS



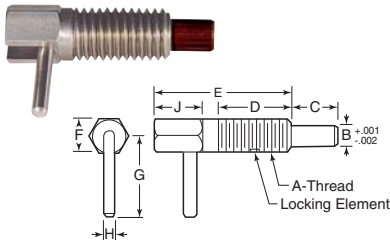
Hand retractable spring plungers permit the plunger to be easily withdrawn by pulling on the handle. Used in machining applications as positioners, leading pins and indexing devices. Threaded end is designed to accept any internally threaded knob or handle. Locking plunger can be withdrawn completely into the body and locked in a fully retractable position. To engage the plunger, simply turn the end knob to line up with the slot in the body. Radiused delrin and phenolic noses prevent marring of aluminum, brass or other soft materials. Available in zinc plated steel or stainless steel. Metric dimensions are in millimeters, except for dimension E. Metric end forces are in Newtons.

## L-Handle - Standard or Short Length Locking with Radiused Delrin Nose



Standard Item No.	Locking Element Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	C	D	E	F	G	H	J	Pack Qty.
<b>Standard Length</b>													
<b>Steel</b>													
FRD-1	FRD-1N	.500	2.500	1/4-20	.156	3/8	5/8	1 1/4	1/4	5/8	3/32	1/2	1
FRD-2	FRD-2N	.750	3.750	3/8-16	.25	9/16	1 1/8	2	3/8	1 1/8	9/64	1 1/8	1
FRD-3	FRD-3N	1.000	5.000	1/2-13	.312	3/4	1 1/2	2 1/2	1/2	1 1/4	3/16	3/4	1
FRD-4	FRD-4N	1.000	5.000	3/8-11	.375	1	1 1/4	3	5/8	1 1/8	3/16	1 1/8	1
<b>Stainless Steel</b>													
FRD-5	FRD-5N	.500	2.500	1/4-20	.156	3/8	5/8	1 1/4	1/4	5/8	3/32	1/2	1
FRD-6	FRD-6N	.750	3.750	3/8-16	.25	9/16	1 1/8	2	3/8	1 1/8	9/64	1 1/8	1
FRD-7	FRD-7N	1.000	5.000	1/2-13	.312	3/4	1 1/2	2 1/2	1/2	1 1/4	3/16	3/4	1
FRD-8	FRD-8N	1.000	5.000	3/8-11	.375	1	1 1/4	3	5/8	1 1/8	3/16	1 1/8	1
<b>Short Length</b>													
<b>Steel</b>													
FRD-9	FRD-9N	.125	.500	1/4-20	.156	3/16	7/16	3/4	1/4	9/16	3/32	1/4	1
FRD-10	FRD-10N	.250	1.250	3/8-16	.25	5/16	5/8	1 1/2	3/8	3/4	9/64	3/8	1
FRD-11	FRD-11N	.500	2.000	1/2-13	.312	13/32	7/8	1 1/2	1/2	1	3/16	1/2	1
FRD-12	FRD-12N	.750	2.500	3/8-11	.375	1/2	1 1/8	1 7/8	5/8	1 1/8	3/16	5/8	1
<b>Stainless Steel</b>													
FRD-13	FRD-13N	.125	.500	1/4-20	.156	3/16	7/16	3/4	1/4	9/16	3/32	1/4	1
FRD-14	FRD-14N	.250	1.250	3/8-16	.25	5/16	5/8	1 1/2	3/8	3/4	9/64	3/8	1
FRD-15	FRD-15N	.500	2.000	1/2-13	.312	13/32	7/8	1 1/2	1/2	1	3/16	1/2	1
FRD-16	FRD-16N	.750	2.500	3/8-11	.375	1/2	1 1/8	1 7/8	5/8	1 1/8	3/16	5/8	1

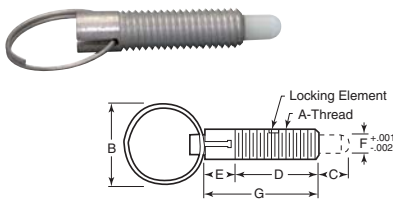
## L-Handle Locking with Phenolic Nose Nylon Locking Element



Steel Item No.	Stainless Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	C	D	E	F	G	H	J	Pack Qty.
FR-9	FR-13	.125	.500	1/4-20	.156	3/16	7/16	3/4	1/4	9/16	3/32	1/4	1
FR-10	FR-14	.250	1.250	3/8-16	.25	5/16	5/8	1 1/2	3/8	3/4	9/64	3/8	1
FR-11	FR-15	.500	2.000	1/2-13	.312	13/32	7/8	1 1/2	1/2	1	3/16	1/2	1
FR-12	FR-16	.750	2.500	3/8-11	.375	1/2	1 1/8	1 7/8	5/8	1 1/8	3/16	5/8	1
FR-2	FR-6	.750	3.750	3/8-16	.25	9/16	1 1/8	2	3/8	1 1/8	9/64	3/8	1
FR-3	FR-7	1.000	5.000	1/2-13	.312	3/4	1 1/2	2 1/2	1/2	1 1/4	3/16	1/2	1
FR-4	FR-8	1.000	5.000	3/8-11	.375	1	1 1/4	3	5/8	1 1/8	3/16	3/8	1
—	FR-5	.500	2.500	1/4-20	.156	3/8	5/8	1 1/4	1/4	5/8	3/32	1/4	1

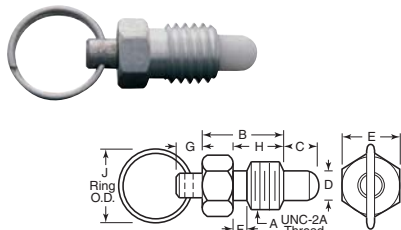
Note: Nose Diameter B tolerance +.001/-.002

## Pull Ring - Standard Length Locking with Radiused Delrin Nose



Standard Item No.	Locking Element Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	C	D	E	F	G	Pack Qty.
<b>Steel</b>											
PR-10	PR-10N	1.000	2.500	1/4-20	1	1/4	13/16	5/16	.156	1 1/8	1
PR-11	PR-11N	2.000	4.000	3/8-16	1 1/4	3/8	1 1/4	7/16	.25	1 1/8	1
PR-12	PR-12N	2.500	5.000	1/2-13	1 3/8	1/2	1 7/16	9/16	.312	2	1
<b>Stainless Steel</b>											
PR-13	PR-13N	1.000	2.500	1/4-20	1	1/4	13/16	5/16	.156	1 1/8	1
PR-14	PR-14N	2.000	4.000	3/8-16	1 1/4	3/8	1 1/4	7/16	.25	1 1/8	1
PR-15	PR-15N	2.500	5.000	1/2-13	1 3/8	1/2	1 7/16	9/16	.312	2	1

## Pull Ring - Short Length Non-Locking with Radiused Delrin Nose



Standard Item No.	Locking Element Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	C	D	E	F	G	H	J	Pack Qty.
<b>Steel</b>													
PRSN-10	PRSN-10N	.500	2.000	1/4-20	7/16	3/16	.156	1/4	1/32	5/32	3/32	3/4	1
PRSN-11	PRSN-11N	.750	3.000	3/8-16	5/8	3/32	.25	3/8	1/8	3/16	7/16	3/4	1
PRSN-12	PRSN-12N	1.000	4.000	1/2-13	13/16	3/8	.312	1/2	5/32	1/4	9/16	1	1
PRSN-13	PRSN-13N	1.250	5.000	3/8-11	1	7/16	.375	5/8	5/32	5/16	1 1/16	1	1
<b>Stainless Steel</b>													
PRSN-14	PRSN-14N	.500	2.000	1/4-20	7/16	3/16	.156	1/4	1/32	5/32	3/32	3/4	1
PRSN-15	PRSN-15N	.750	3.000	3/8-16	5/8	3/32	.25	3/8	1/8	3/16	7/16	3/4	1
PRSN-16	PRSN-16N	1.000	4.000	1/2-13	13/16	3/8	.312	1/2	5/32	1/4	9/16	1	1
PRSN-17	PRSN-17N	1.250	5.000	3/8-11	1	7/16	.375	5/8	5/32	5/16	1 1/16	1	1



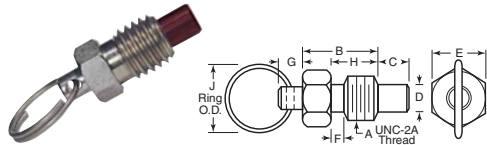


# HAND RETRACTABLE SPRING PLUNGERS

Buy One or Buy Bulk & SAVE

Hand retractable spring plungers permit the plunger to be easily withdrawn and re-engaged by pulling on the handle. Hardened plunger permits greater side loading and the tapered end on the plunger allows for easy alignment. Used on original equipment and machining applications as positioners, locating pins, indexing devices, etc. Steel are zinc plated and stainless is Type 303 or equivalent. On ring handle stainless models, all parts are stainless except the ring handle which is nickel plated steel. Locking types have a rest position where the plunger can stay in the retracted position. Nylon locking element not recommended for aluminum applications. Metric dimensions are in millimeters. Metric end forces shown in Newtons.

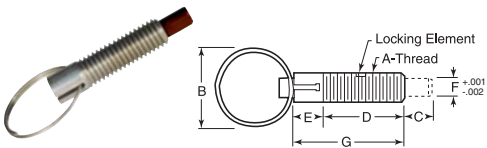
## Stubby Ring Handle Non-Locking Phenolic Nose and Nylon Locking Element



Steel Item No.	Stainless Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	C	D	E	F	G	H	J	Pack Qty.
<b>Inch</b>													
PRSN-1	PRSN-5	.500	2.000	1/4-20	7/16	3/16	.156	1/4	1/32	5/32	3/32	3/4	1
PRSN-2	PRSN-6	.750	3.000	3/8-16	5/8	9/32	.25	3/8	1/8	3/16	7/16	3/4	1
PRSN-3	PRSN-7	1.000	4.000	1/2-13	13/16	5/8	.312	1/2	5/32	1/4	9/16	1	1
PRSN-4	PRSN-8	1.250	5.000	3/4-11	1	7/16	.375	5/8	3/32	5/16	11/16	1	1

Note: Nose Diameter D tolerance +.001/-0.002.

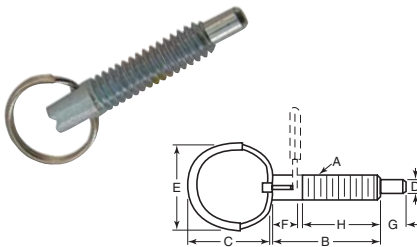
## Ring Handle Locking Phenolic Nose and Nylon Locking Element



Steel Item No.	Stainless Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	C	D	E	F	G	Pack Qty.
PR-1	PR-4	1.000	2.500	1/4-20	1	1/4	13/16	5/16	.156	1 1/8	1
PR-2	PR-5	2.000	4.000	3/8-16	1 1/4	3/8	1 1/4	7/16	.25	1 11/16	1
PR-3	PR-6	2.500	5.000	1/2-13	1 3/8	1/2	1 1/2	3/8	.312	2	1

Note: Nose Diameter F tolerance +.001/-0.002.

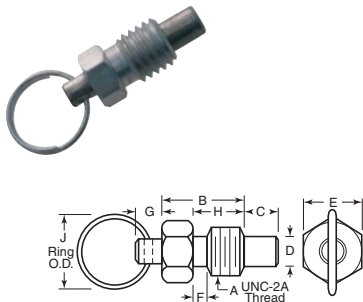
## Ring Handle - Locking Steel and Stainless Steel Phenolic Nose and Nylon Locking Element



Standard Item No.	Locking Element Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	C	D	E	F	G	H	Pack Qty.
<b>Steel</b>												
<b>Inch</b>												
PR-250	PR-250N	1.0	2.5	1/4-20	1.14	1.08	.155	.62	.23	.250	.8	1
PR-375	PR-375N	2.0	4.0	3/8-16	1.68	1.19	.233	.98	.35	.375	1.2	1
PR-500	PR-500N	2.5	5.0	1/2-13	2.00	1.33	.312	1.26	.46	.50	1.4	1
<b>Metric</b>												
PRM-10	PRM-10N	4.4	11	M6 x 1.00	29	16	4	16	8.7	6.4	20.3	1
PRM-15	PRM-15N	9	17.8	M10 x 1.50	43	25	6	25	12.5	9.5	30.5	1
PRM-20	PRM-20N	11	22	M12 x 1.75	51	25	8	25	15.5	12.7	35.5	1
PRM-25	PRM-25N	11	22	M16 x 2.00	60	25	10	25	17	16	43	1
<b>Stainless Steel</b>												
<b>Inch</b>												
SPR-375	SPR-375N	2.0	4.0	3/8-16	1.68	1.19	.233	.98	.35	.375	1.2	1
SPR-500	SPR-500N	2.5	5.0	1/2-13	2.00	1.33	.312	1.26	.46	.50	1.4	1
SPR-250	SPR-250N	1.0	2.5	1/4-20	1.14	1.08	.155	.62	.23	.250	.8	1
<b>Metric</b>												
SPR-600	SPR-600N	4.4	11	M6 x 1.00	29	16	4	16	8.7	6.4	20.3	1
SPR-605	SPR-605N	9	17.8	M10 x 1.50	43	25	6	25	12.5	9.5	30.5	1
SPR-610	SPR-610N	11	22	M12 x 1.75	51	25	8	25	15.5	12.7	35.5	1
SPR-615	SPR-615N	11	22	M16 x 2.00	60	25	10	25	17	16	43	1

Designed to function where space is limited. Easy to grasp ring handle allows the plunger to be withdrawn completely into the fully retracted position.

## Stubby Ring Handle - Non-Locking Steel and Stainless Steel



Standard Item No.	Locking Element Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	C	D	E Hex	F	G	H	J	Pack Qty.
<b>Steel</b>													
<b>Inch</b>													
PRSN-250*	PRSN-250N*	.50	2.0	1/4-20	.44	.19	.16	.25	—	.13	.31	.62	1
PRSN-250A*	PRSN-250AN*	.50	2.0	1/4-20	.44	.19	.16	.25	—	.13	.31	.75	1
PRSN-375	PRSN-375N	.75	3.0	3/8-16	.63	.28	.25	.38	.13	.19	.44	.75	1
PRSN-500	PRSN-500N	1.00	4.0	1/2-13	.81	.38	.31	.50	.13	.25	.56	1.00	1
PRSN-625	PRSN-625N	1.25	5.0	3/4-11	1.00	.44	.38	.62	.13	.31	.69	1.00	1
<b>Metric</b>													
PRSN-700*	PRSN-700N*	2.2	8.9	M6 x 1.00	11	5	4	6	3	4.6	8	19	1
PRSN-705	PRSN-705N	3.3	13.3	M10 x 1.50	16	7	6	10	3	4.8	11	19	1
PRSN-710	PRSN-710N	4.4	17.8	M12 x 1.75	21	10	8	12	3	6.4	14	25	1
PRSN-715	PRSN-715N	5.6	22.2	M16 x 2.00	25	11	10	16	3	8	18	25	1
<b>Stainless Steel</b>													
<b>Inch</b>													
PRSN-250S*	PRSN-250SN*	.50	2.0	1/4-20	.44	.19	.16	.25	—	.13	.31	.62	1
PRSN-250AS*	PRSN-250ASN*	.50	2.0	1/4-20	.44	.19	.16	.25	—	.13	.31	.75	1
PRSN-375S	PRSN-375SN	.75	3.0	3/8-16	.63	.28	.25	.38	.13	.19	.44	.75	1
PRSN-500S	PRSN-500SN	1.00	4.0	1/2-13	.81	.38	.31	.50	.13	.25	.56	1.00	1
PRSN-625S	PRSN-625SN	1.25	5.0	3/4-11	1.00	.44	.38	.62	.13	.31	.69	1.00	1
<b>Metric</b>													
SPR-620*	SPR-620N*	2.2	8.9	M6 x 1.00	11	5	4	6	3	4.6	8	19	1
SPR-625	SPR-625N	3.3	13.3	M10 x 1.50	16	7	6	10	3	4.8	11	19	1
SPR-630	SPR-630N	4.4	17.8	M12 x 1.75	21	10	8	12	3	6.4	14	25	1
SPR-635	SPR-635N	5.6	22.2	M16 x 2.00	25	11	10	16	3	8	18	25	1

Plunger does not lock in fully retracted position. On stainless models, all parts are stainless steel except for the ring which is nickel plated steel.

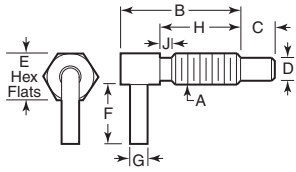
\*No thread relief

# HAND RETRACTABLE SPRING PLUNGERS



Hand retractable spring plungers permit the plunger to be easily withdrawn by pulling on the handle. Used in machining applications as positioners, leading pins and indexing devices. Threaded end is designed to accept any internally threaded knob or handle. Locking plunger can be withdrawn completely into the body and locked in a fully retractable position. To engage the plunger, simply turn the end knob to line up with the slot in the body. Metric dimensions are in millimeters, except for dimension E. Metric end forces are in Newtons.

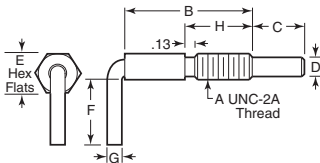
## L-Handle - Locking Steel and Stainless Steel



Standard	Locking Element														
Item No.	Item No.	Initial End Force	Final End Force	A	B	C	D	Hex E	F	G	H	J	Pack Qty.		
<b>Steel</b>															
<b>Inch</b>															
FRS-25*	FRS-250*	.12	.50	1/4-20	.75	.20	.16	.25	.40	.09	.50	—	1		
FRS-37	FRS-375	.25	1.25	3/8-16	1.13	.30	.25	.38	.56	.14	.75	.13	1		
FR-25*	FR-250*	.50	2.50	1/4-20	1.25	.38	.16	.25	.50	.09	.80	—	1		
FRS-50	FRS-500	.50	2.00	1/2-13	1.50	.40	.31	.50	.75	.19	1.00	.13	1		
FR-37	FR-375	.75	3.75	3/8-16	2.00	.56	.25	.38	.75	.14	1.31	.13	1		
FRS-62	FRS-625	.75	2.50	3/8-11	1.88	.50	.38	.62	.88	.19	1.25	.13	1		
FR-50	FR-500	1.00	5.00	1/2-13	2.11	.75	.31	.50	1.00	.19	1.25	.13	1		
FR-62	FR-625	1.00	5.00	3/8-11	3.05	1.00	.38	.62	1.00	.19	2.00	.13	1		
<b>Metric</b>															
FRS-800	FRS-800N	.5	2.2	M6 x 1.00	19	5.0	4.0	6	10.0	2.3	12.7	—	1		
FRS-805	FRS-805N	1.1	5.6	M10 x 1.50	29	7.6	6.0	10	14.0	3.6	19.0	3.3	1		
FRM-6*	FRM-6N*	2.2	11.1	M6 x 1.00	32	10.0	4.0	6	12.7	2.3	20.0	—	1		
FRS-810	FRS-810N	2.2	8.9	M12 x 1.75	38	10.0	8.0	12	19.0	4.8	25.0	3.8	1		
FRM-10	FRM-10N	3.3	16.7	M10 x 1.50	51	14.0	6.0	10	19.0	3.5	33.0	3.3	1		
FRS-815	FRS-815N	3.3	11.1	M16 x 2.00	48	13.0	9.7	16	22.0	4.8	32.0	4.6	1		
FRM-12	FRM-12N	4.5	22.3	M12 x 1.75	54	19.0	7.0	12	25.4	4.8	32.0	3.8	1		
<b>Stainless Steel</b>															
<b>Inch</b>															
FRS-920	FRS-920N	.12	.50	1/4-20	.75	.20	.16	.25	.40	.09	.50	—	1		
FRS-925	FRS-925N	.25	1.25	3/8-16	1.13	.30	.25	.38	.56	.14	.75	.13	1		
SSFR-25*	SSFR-250*	.50	2.50	1/4-20	1.25	.38	.16	.25	.50	.09	.80	—	1		
FRS-930	FRS-930N	.50	2.00	1/2-13	1.50	.40	.31	.50	.75	.19	1.00	.13	1		
SSFR-37	SSFR-375	.75	3.75	3/8-16	2.00	.56	.25	.38	.75	.14	1.31	.13	1		
FRS-935	FRS-935N	.75	2.50	3/8-11	1.88	.50	.38	.62	.88	.19	1.25	.13	1		
SSFR-50	SSFR-500	1.00	5.00	1/2-13	2.11	.75	.31	.50	1.00	.19	1.25	.13	1		
SSFR-62	SSFR-625	1.00	5.00	3/8-11	3.05	1.00	.38	.62	1.00	.19	2.00	.13	1		
<b>Metric</b>															
FRS-840	FRS-840N	.5	2.2	M6 x 1.00	19	5.0	4.0	6	10.0	2.3	12.7	—	1		
FRS-845	FRS-845N	1.1	5.6	M10 x 1.50	29	7.6	6.0	10	14.0	3.6	19.0	3.3	1		
SFRM-6*	SFRM-6N*	2.2	11.1	M6 x 1.00	32	10.0	4.0	6	12.7	2.3	20.0	—	1		
FRS-850	FRS-850N	2.2	8.9	M12 x 1.75	38	10.0	8.0	12	19.0	4.8	25.0	3.8	1		
SFRM-10	SFRM-10N	3.3	16.7	M10 x 1.50	51	14.0	6.0	10	19.0	3.5	33.0	3.3	1		
FRS-855	FRS-855N	3.3	11.1	M16 x 2.00	48	13.0	9.7	16	22.0	4.8	32.0	4.6	1		
SFRM-12	SFRM-12N	4.5	22.3	M12 x 1.75	54	19.0	7.0	12	25.4	4.8	32.0	3.8	1		

\*No thread relief

## L-Handle - Non-Locking Steel and Stainless Steel



Standard	Locking Element														
Item No.	Item No.	Initial End Force	Final End Force	A	B	C	D	Hex E	F	G	H	Pack Qty.			
<b>Steel</b>															
<b>Inch</b>															
FRSN-25*	FRSN-250*	.12	.50	1/4-20	.75	.20	.16	.25	.40	.09	.50	1			
FRSN-37	FRSN-375	.25	1.25	3/8-16	1.13	.30	.25	.38	.56	.14	.75	1			
FRN-25	FRN-250	.50	2.00	1/2-13	1.50	.40	.31	.50	.75	.19	1.00	1			
FRN-25	FRN-250	.50	2.50	1/4-20	1.25	.38	.16	.25	.50	.09	.80	1			
FRSN-62	FRSN-625	.75	2.50	3/8-11	1.88	.50	.38	.62	.88	.19	1.25	1			
FRN-37	FRN-375	.75	3.75	3/8-16	2.00	.56	.25	.38	.75	.14	1.31	1			
FRN-50	FRN-500	1.00	5.00	1/2-13	2.11	.75	.31	.50	1.00	.19	1.25	1			
FRN-62	FRN-625	1.00	5.00	3/8-11	3.05	1.00	.38	.62	1.00	.19	2.00	1			
<b>Metric</b>															
FRS-820	FRS-820N	.5	2.2	M6 x 1.00	19	5.0	4.0	6	10	2.3	12.7	1			
FRS-825	FRS-825N	1.1	5.6	M10 x 1.50	29	7.6	6.0	10	14	3.6	19.0	1			
FRS-830	FRS-830N	2.2	8.9	M12 x 1.75	38	10.0	8.0	12	19	4.8	25.0	1			
FRS-835	FRS-835N	3.3	11.1	M16 x 2.00	48	13.0	9.7	16	22	4.8	32.0	1			
<b>Stainless Steel</b>															
<b>Inch</b>															
FRS-940	FRS-940N	.12	.50	1/4-20	.75	.20	.16	.25	.40	.09	.50	1			
FRS-945	FRS-945N	.25	1.25	3/8-16	1.13	.30	.25	.38	.56	.14	.75	1			
FRS-950	FRS-950N	.50	2.00	1/2-13	1.50	.40	.31	.50	.75	.19	1.00	1			
FRS-880	FRS-880N	.50	2.50	1/4-20	1.25	.38	.16	.25	.50	.09	.80	1			
FRS-955	FRS-955N	.75	2.50	3/8-11	1.88	.50	.38	.62	.88	.19	1.25	1			
FRS-885	FRS-885N	.75	3.75	3/8-16	1.13	.56	.25	.38	.75	.14	1.31	1			
FRS-890	FRS-890N	1.00	5.00	1/2-13	1.50	.75	.31	.50	1.00	.19	1.25	1			
FRS-895	FRS-895N	1.00	5.00	3/8-11	1.88	1.00	.38	.62	1.00	.19	2.00	1			
<b>Metric</b>															
FRS-860	FRS-860N	.5	2.2	M6 x 1.00	19	5.0	4.0	6	10	2.3	12.7	1			
FRS-865	FRS-865N	1.1	5.6	M10 x 1.50	29	7.6	6.0	10	14	3.6	19.0	1			
FRS-900	FRS-900N	2.0	11.0	M6 x 1.00	19	5.0	4.0	6	13	2.0	20.0	1			
FRS-870	FRS-870N	2.2	8.9	M12 x 1.75	38	10.0	8.0	12	19	4.8	25.0	1			
FRS-905	FRS-905N	3.0	17.0	M10 x 1.50	29	7.6	6.0	10	19	4.0	33.0	1			
FRS-875	FRS-875N	3.3	11.1	M16 x 2.00	48	13.0	9.7	16	22	4.8	32.0	1			
FRS-915	FRS-915N	4.5	22.0	M16 x 2.00	48	13.0	10.0	16	25	5.0	51.0	1			
FRS-910	FRS-910N	4.5	22.0	M12 x 1.75	38	10.0	8.0	12	25	5.0	32.0	1			

\*No thread relief

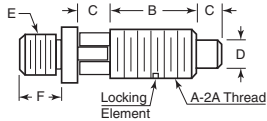


# HAND RETRACTABLE SPRING PLUNGERS

Buy One or Buy Bulk & SAVE

Hand retractable spring plungers permit the plunger to be easily withdrawn by pulling on the handle. Used in machining applications as positioners, leading pins and indexing devices. Threaded end is designed to accept any internally threaded knob or handle. Locking plunger can be withdrawn completely into the body and locked in a fully retractable position. To engage the plunger, simply turn the end knob to line up with the slot in the body. Metric dimensions are in millimeters, except for dimension E. Metric end forces are in Newtons.

**Threaded Adapter**  
For Use with Knob or Handle  
**Locking**  
Steel and Stainless Steel

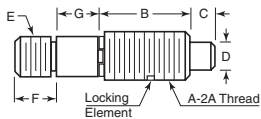


See page 20 for knobs.

Standard		Locking Element						Initial End Force	Final End Force	Pack Qty.
Item No.	Item No.	A	B	C	D	E	F			
<b>Steel</b>										
<b>Light End Pressure - Inch</b>										
NRP-1	NRP-1N	10-32	13/32	3/32	.104	10-32	15/64	.50	1.50	1
NRP-2	NRP-2N	1/4-20	1/2	1/8	.124	10-32	15/64	.50	2.50	1
NRP-3	NRP-3N	5/16-18	5/8	3/16	.155	1/4-20	11/32	.75	3.00	1
NRP-4	NRP-4N	3/8-16	3/4	7/32	.186	5/16-18	19/32	.75	4.00	1
NRP-5	NRP-5N	1/2-13	7/8	1/4	.249	3/8-16	7/16	1.25	5.00	1
NRP-33	NRP-33N	5/8-11	1	5/16	.311	1/2-13	7/16	3.00	6.00	1
<b>Metric</b>										
NRP-11	NRP-11N	M6 x 1.0	12.7	3.17	3	10-32	5.9	2.0	11.0	1
NRP-12	NRP-12N	M8 x 1.25	15.8	4.75	4	1/4-20	8.7	3.0	13.0	1
NRP-13	NRP-13N	M10 x 1.5	19.0	5.50	5	5/16-18	10.3	3.0	18.0	1
NRP-14	NRP-14N	M12 x 1.75	22.2	6.35	6	3/8-16	11.0	5.5	22.0	1
<b>Heavy End Pressure - Inch</b>										
NRP-15	NRP-15N	10-32	13/32	3/32	.104	10-32	15/64	1.00	3.00	1
NRP-16	NRP-16N	1/4-20	1/2	1/8	.124	10-32	15/64	1.00	5.00	1
NRP-17	NRP-17N	5/16-18	5/8	3/16	.155	1/4-20	11/32	1.50	6.00	1
NRP-18	NRP-18N	3/8-16	3/4	7/32	.186	5/16-18	19/32	1.50	8.00	1
NRP-19	NRP-19N	1/2-13	7/8	1/4	.249	3/8-16	7/16	2.50	10.00	1
NRP-31	NRP-31N	5/8-11	1	5/16	.311	1/2-13	7/16	5.00	10.00	1
<b>Metric</b>										
NRP-25	NRP-25N	M6 x 1.0	12.70	3.17	3	10-32	5.9	4.5	22.0	1
NRP-26	NRP-26N	M8 x 1.25	15.80	4.75	4	1/4-20	8.7	6.5	26.5	1
NRP-27	NRP-27N	M10 x 1.5	19.00	5.50	5	5/16-18	10.3	6.5	35.5	1
NRP-28	NRP-28N	M12 x 1.75	22.20	6.35	6	3/8-16	11.0	11.0	44.5	1
<b>Stainless Steel</b>										
<b>Light End Pressure - Inch</b>										
NRP-6	NRP-6N	10-32	13/32	3/32	.104	10-32	15/64	.50	1.50	1
NRP-7	NRP-7N	1/4-20	1/2	1/8	.124	10-32	15/64	.50	2.50	1
NRP-8	NRP-8N	5/16-18	5/8	3/16	.155	1/4-20	11/32	.75	3.00	1
NRP-9	NRP-9N	3/8-16	3/4	7/32	.186	5/16-18	19/32	.75	4.00	1
NRP-10	NRP-10N	1/2-13	7/8	1/4	.249	3/8-16	7/16	1.25	5.00	1
NRP-34	NRP-34N	5/8-11	1	5/16	.311	1/2-13	7/16	3.00	6.00	1
<b>Heavy End Pressure - Inch</b>										
NRP-20	NRP-20N	10-32	13/32	3/32	.104	10-32	15/64	1.00	3.00	1
NRP-21	NRP-21N	1/4-20	1/2	1/8	.124	10-32	15/64	1.00	5.00	1
NRP-22	NRP-22N	5/16-18	5/8	3/16	.155	1/4-20	11/32	1.50	6.00	1
NRP-23	NRP-23N	3/8-16	3/4	7/32	.186	5/16-18	19/32	1.50	8.00	1
NRP-24	NRP-24N	1/2-13	7/8	1/4	.249	3/8-16	7/16	2.50	10.00	1
NRP-32	NRP-32N	5/8-11	1	5/16	.311	1/2-13	7/16	5.00	10.00	1

Note: Nose Diameter D Inch tolerance +.001/-.002. Metric tolerance +.025/- .050  
Note 2: Inch tolerance +.001/-.002 Metric tolerance +.025/- .050

**Threaded Adapter**  
For Use with Knob or Handle  
**Non-Locking**  
Steel and Stainless Steel



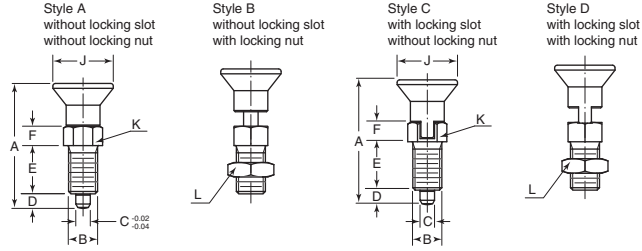
Standard		Locking Element						Initial End Force	Final End Force	Pack Qty.
Item No.	Item No.	A	B	C	D	E	F			
<b>Steel</b>										
<b>Light End Pressure - Inch</b>										
NRP-63	NRP-63N	10-32	13/32	3/32	.104	10-32	15/64	.50	2.00	1
NRP-64	NRP-64N	1/4-20	1/2	1/8	.124	10-32	15/64	.50	2.50	1
NRP-65	NRP-65N	5/16-18	5/8	3/16	.155	1/4-20	11/32	.75	3.00	1
NRP-66	NRP-66N	3/8-16	3/4	7/32	.186	5/16-18	19/32	.75	4.00	1
NRP-67	NRP-67N	1/2-13	7/8	1/4	.249	3/8-16	7/16	1.25	5.00	1
NRP-68	NRP-68N	5/8-11	1	5/16	.311	1/2-13	7/16	3.00	6.00	1
<b>Metric</b>										
NRPM-75	NRPM-75N	M5 x .80	10.3	2.36	2	10-32	5.9	2.0	9.0	1
NRPM-76	NRPM-76N	M6 x 1.00	12.7	3.17	3	10-32	5.9	2.0	11.0	1
NRPM-77	—	M8 x 1.25	15.8	4.75	4	1/4-20	8.7	3.0	13.0	1
NRPM-78	NRPM-78N	M10 x 1.50	19.0	5.50	5	5/16-18	10.3	3.0	18.0	1
NRPM-79	NRPM-79N	M12 x 1.75	22.2	6.35	6	3/8-16	11.1	5.5	22.0	1
NRPM-80	NRPM-80N	M16 x 2.00	25.4	7.92	8	1/2-13	11.1	13.0	26.5	1
<b>Heavy End Pressure - Inch</b>										
NRP-51	NRP-51N	10-32	13/32	3/32	.104	10-32	15/64	1.00	3.50	1
NRP-52	NRP-52N	1/4-20	1/2	1/8	.124	10-32	15/64	1.00	5.00	1
NRP-53	NRP-53N	5/16-18	5/8	3/16	.155	1/4-20	11/32	1.50	6.00	1
NRP-54	NRP-54N	3/8-16	3/4	7/32	.186	5/16-18	19/32	1.50	8.00	1
NRP-55	NRP-55N	1/2-13	7/8	1/4	.249	3/8-16	7/16	2.50	10.00	1
NRP-56	NRP-56N	5/8-11	1	5/16	.311	1/2-13	7/16	5.00	10.00	1
<b>Metric</b>										
NRPM-81	NRPM-81N	M5 x .80	10.3	2.36	2	10-32	5.9	4.5	15.5	1
NRPM-82	NRPM-82N	M6 x 1.00	12.7	3.17	3	10-32	5.9	4.5	22.0	1
NRPM-83	NRPM-83N	M8 x 1.25	15.8	4.75	4	1/4-20	8.7	6.5	26.5	1
NRPM-84	NRPM-84N	M10 x 1.50	19.0	5.50	5	5/16-18	10.3	6.5	35.5	1
NRPM-85	NRPM-85N	M12 x 1.75	22.2	6.35	6	3/8-16	11.1	11.0	44.5	1
NRPM-86	NRPM-86N	M16 x 2.00	25.4	7.92	8	1/2-13	11.1	22.0	44.5	1
<b>Stainless Steel</b>										
<b>Light End Pressure - Inch</b>										
NRP-69	NRP-69N	10-32	13/32	3/32	.104	10-32	15/64	.50	2.00	1
NRP-70	NRP-70N	1/4-20	1/2	1/8	.124	10-32	15/64	.50	2.50	1
NRP-71	NRP-71N	5/16-18	5/8	3/16	.155	1/4-20	11/32	.75	3.00	1
NRP-72	NRP-72N	3/8-16	3/4	7/32	.186	5/16-18	19/32	.75	4.00	1
NRP-73	NRP-73N	1/2-13	7/8	1/4	.249	3/8-16	7/16	1.25	5.00	1
NRP-74	NRP-74N	5/8-11	1	5/16	.311	1/2-13	7/16	3.00	6.00	1
<b>Heavy End Pressure - Inch</b>										
NRP-57	NRP-57N	10-32	13/32	3/32	.104	10-32	15/64	1.00	3.50	1
NRP-58	NRP-58N	1/4-20	1/2	1/8	.124	10-32	15/64	1.00	5.00	1
NRP-59	NRP-59N	5/16-18	5/8	3/16	.155	1/4-20	11/32	1.50	6.00	1
NRP-60	NRP-60N	3/8-16	3/4	7/32	.186	5/16-18	19/32	1.50	8.00	1
NRP-61	NRP-61N	1/2-13	7/8	1/4	.249	3/8-16	7/16	2.50	10.00	1
NRP-62	NRP-62N	5/8-11	1	5/16	.311	1/2-13	7/16	5.00	10.00	1

# INDEXING PLUNGERS



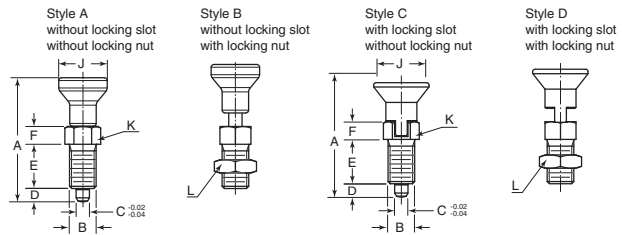
Indexing plungers are used to prevent any change in locking position due to lateral forces. A new locking position can only be set after the bolt has been manually disengaged. Style C is recommended for applications in which gradual disengagement of the locking bolt is desired, without any relocking of the locking pin.

## Pull Knobs Steel and Stainless Steel - Type 303 With Thermoplastic Knob



Steel	Stainless	Item No.	Style	Initial Force Lbs./ Newtons	End Force Lbs./ Newtons	A	B	-0.02/-0.04 C	D	E	F	J	K	L	Pack Qty.
<b>Inch - Without Locking Nut</b>															
		KBP-500	A	1.12	2.69	1.712	3/8-24	.196	.196	.669	.275	.826	.511	—	1
		KBP-501	A	1.34	3.14	2.035	1/2-13	.236	.236	.787	.314	.984	.551	—	1
		KBP-502	A	3.37	7.86	2.677	3/4-11	.314	.314	1.023	.393	1.299	.748	—	1
		KBP-503	A	3.37	8.99	2.913	3/4-10	.393	.393	1.102	.472	1.299	.866	—	1
		KBP-540	C	1.12	2.69	1.712	3/8-24	.196	.196	.669	.275	.826	.511	—	1
		KBP-541	C	1.34	3.14	2.035	1/2-13	.236	.236	.787	.314	.984	.551	—	1
		KBP-542	C	3.37	7.86	2.677	3/4-11	.314	.314	1.023	.393	1.299	.748	—	1
		KBP-543	C	3.37	8.99	2.913	3/4-10	.393	.393	1.102	.472	1.299	.866	—	1
<b>Metric - Without Locking Nut</b>															
		KBP-516	A	4.5	11	31.5	M6 x .75	3	3.5	12	5	14	8	—	1
		KBP-509	A	6	12	38.5	M8 x 1.00	4	4	15	6	18	10	—	1
		KBP-510	A	5	12	43.5	M10 x 1.00	5	5	17	7	21	13	—	1
		KBP-511	A	6	14	51.7	M12 x 1.50	6	6	20	8	25	14	—	1
		KBP-512	A	15	35	68	M16 x 1.50	8	8	26	10	33	19	—	1
		KBP-513	A	15	34	74	M20 x 1.50	10	10	28	12	33	22	—	1
		KBP-514	A	15	39	78	M20 x 1.50	12	12	28	14	33	22	—	1
		KBP-515	A	20	46	96	M24 x 2.00	16	16	32	18	40	27	—	1
		KBP-548	C	4.5	11	31.5	M6 x .75	3	3.5	12	5	14	8	—	1
		KBP-549	C	6	12	38.5	M8 x 1.00	4	4	15	6	18	10	—	1
		KBP-550	C	5	12	43.5	M10 x 1.00	5	5	17	7	21	13	—	1
		KBP-551	C	6	14	51.7	M12 x 1.50	6	6	20	8	25	14	—	1
		KBP-552	C	15	35	68	M16 x 1.50	8	8	26	10	33	19	—	1
		KBP-553	C	15	34	74	M20 x 1.50	10	10	28	12	33	22	—	1
		KBP-554	C	15	39	78	M20 x 1.50	12	12	28	14	33	22	—	1
		KBP-555	C	20	46	96	M24 x 2.00	16	16	32	18	40	27	—	1
<b>Metric - With Locking Nut</b>															
		KBP-524	B	4.5	11	31.5	M6 x .75	3	3.5	12	5	14	8	10	1
		KBP-525	B	6	12	38.5	M8 x 1.00	4	4	15	6	18	10	13	1
		KBP-526	B	5	12	43.5	M10 x 1.00	5	5	17	7	21	13	17	1
		KBP-527	B	6	14	51.7	M12 x 1.50	6	6	20	8	25	14	19	1
		KBP-528	B	15	35	68	M16 x 1.50	8	8	26	10	33	19	24	1
		KBP-529	B	15	34	74	M20 x 1.50	10	10	28	12	33	22	30	1
		KBP-530	B	15	39	78	M20 x 1.50	12	12	28	14	33	22	30	1
		KBP-531	B	20	46	96	M24 x 2.00	16	16	32	18	40	27	36	1
		KBP-564	D	4.5	11	31.5	M6 x .75	3	3.5	12	5	14	8	10	1
		KBP-565	D	6	12	38.5	M8 x 1.00	4	4	15	6	18	10	13	1
		KBP-566	D	5	12	43.5	M10 x 1.00	5	5	17	7	21	13	17	1
		KBP-567	D	6	14	51.7	M12 x 1.50	6	6	20	8	25	14	19	1
		KBP-568	D	15	35	68	M16 x 1.50	8	8	26	10	33	19	24	1
		KBP-569	D	15	34	74	M20 x 1.50	10	10	28	12	33	22	30	1
		KBP-570	D	15	39	78	M20 x 1.50	12	12	28	14	33	22	30	1
		KBP-571	D	20	46	96	M24 x 2.00	16	16	32	18	40	27	36	1

## Pull Knobs Stainless Steel - Type 303



Item No.	Style	Initial Force Newtons	End Force Newtons	A	B	-0.02/-0.04 C	D	E	F	J	K	L	Pack Qty.
<b>Metric - Without Locking Nut</b>													
KBP-580	A	6	12	43	M8 x 1.00	4	4	15	6	18	10	—	1
KBP-581	A	5	12	50	M10 x 1.00	5	5	17	7	21	13	—	1
KBP-582	A	6	14	59	M12 x 1.50	6	6	20	8	25	14	—	1
KBP-583	A	15	35	77	M16 x 1.50	8	8	26	10	33	19	—	1
KBP-584	A	15	34	83	M20 x 1.50	10	10	28	12	33	22	—	1
KBP-590	C	6	12	43	M8 x 1.00	4	4	15	6	18	10	—	1
KBP-591	C	5	12	50	M10 x 1.00	5	5	17	7	21	13	—	1
KBP-592	C	6	14	59	M12 x 1.50	6	6	20	8	25	14	—	1
KBP-593	C	15	35	77	M16 x 1.50	8	8	26	10	33	19	—	1
KBP-594	C	15	34	83	M20 x 1.50	10	10	28	12	33	22	—	1
<b>Metric - With Locking Nut</b>													
KBP-585	B	6	12	43	M8 x 1.00	4	4	15	6	18	10	13	1
KBP-586	B	5	12	50	M10 x 1.00	5	5	17	7	21	13	17	1
KBP-587	B	6	14	59	M12 x 1.50	6	6	20	8	25	14	19	1
KBP-588	B	15	35	77	M16 x 1.50	8	8	26	10	33	19	24	1
KBP-589	B	15	34	83	M20 x 1.50	10	10	28	12	33	22	30	1
KBP-595	D	6	12	43	M8 x 1.00	4	4	15	6	18	10	13	1
KBP-596	D	5	12	50	M10 x 1.00	5	5	17	7	21	13	17	1
KBP-597	D	6	14	59	M12 x 1.50	6	6	20	8	25	14	19	1
KBP-598	D	15	35	77	M16 x 1.50	8	8	26	10	33	19	24	1
KBP-599	D	15	34	83	M20 x 1.50	10	10	28	12	33	22	30	1

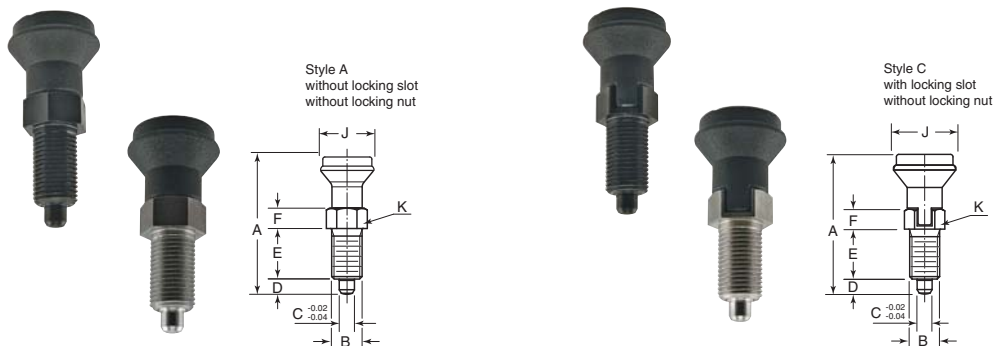


# INDEXING PLUNGERS

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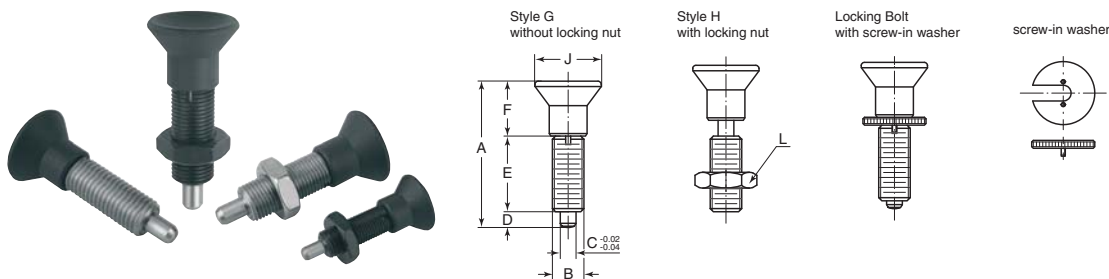
Indexing plungers are used to prevent any change in locking position due to lateral forces. A new locking position can only be set after the bolt has been manually disengaged. Style C is recommended for applications in which gradual disengagement of the locking bolt is desired, without any relocking of the locking pin.

## Pull Knobs Steel and Stainless Steel - Type 303 With Thermoplastic Knob



Steel	Stainless		Initial End Force Newtons	Final End Force Newtons	A	B	-0.02/-0.04 C	D	E	F	J	K	Pack Qty.
<b>Metric - Without Locking Nut</b>													
KBP-600	KBP-604	A	5	12	47	M10 x 1.00	5	5	17	7	21	13	1
KBP-601	KBP-605	A	6	14	56	M12 x 1.50	6	6	20	8	25	14	1
KBP-602	KBP-606	A	15	35	74	M16 x 1.50	8	8	26	10	33	19	1
KBP-603	KBP-607	A	15	34	80	M20 x 1.50	10	10	28	12	33	22	1
KBP-608	KBP-612	C	5	12	47	M10 x 1.00	5	5	17	7	21	13	1
KBP-609	KBP-613	C	6	14	56	M12 x 1.50	6	6	20	8	25	14	1
KBP-610	KBP-614	C	15	35	74	M16 x 1.50	8	8	26	10	33	19	1
KBP-611	KBP-615	C	15	34	80	M20 x 1.50	10	10	28	12	33	22	1

## Pull Knobs Steel and Stainless Steel - Type 303 Without Collar and Locking Nut With Thermoplastic Knob



Steel	Stainless		Initial End Force Newtons	Final End Force Newtons	A	B	-0.02/-0.04 C	D	E	F	J	L	Pack Qty.	Washer (Sold Separately)	
<b>Metric - Without Locking Nut</b>															
KBP-626	KBP-633	G	6	12	38.5	M8 x 1.00	4	4	21	13.5	18	—	1	KBP-664	
KBP-627	KBP-634	G	5	12	43.5	M10 x 1.00	5	5	24	14.5	21	—	1	KBP-665	
KBP-628	KBP-635	G	6	14	51.7	M12 x 1.50	6	6	28	17.7	25	—	1	KBP-666	
KBP-629	KBP-636	G	15	35	68	M16 x 1.50	8	8	36	24	33	—	1	KBP-667	
KBP-630	KBP-637	G	15	34	74	M20 x 1.50	10	10	40	24	33	—	1	KBP-668	
KBP-631	KBP-638	G	15	39	78	M20 x 1.50	12	12	42	24	33	—	1	KBP-668	
KBP-632	KBP-639	G	20	46	96	M24 x 2.00	16	16	50	30	40	—	1	KBP-669	
<b>Metric - With Locking Nut</b>															
KBP-640	KBP-647	H	6	12	38.5	M8 x 1.00	4	4	21	13.5	18	13	1	KBP-664	
KBP-641	KBP-648	H	5	12	43.5	M10 x 1.00	5	5	24	14.5	21	17	1	KBP-665	
KBP-642	KBP-649	H	6	14	51.7	M12 x 1.50	6	6	28	17.7	25	19	1	KBP-666	
KBP-643	KBP-650	H	15	35	68	M16 x 1.50	8	8	36	24	33	24	1	KBP-667	
KBP-644	KBP-651	H	15	34	74	M20 x 1.50	10	10	40	24	33	30	1	KBP-668	
KBP-645	KBP-652	H	15	39	78	M20 x 1.50	12	12	42	24	33	30	1	KBP-668	
KBP-646	KBP-653	H	20	46	96	M24 x 2.00	16	16	50	30	40	36	1	KBP-669	

## Indexing Plunger Washers



Item No.	Pack Qty.
KBP-664	1
KBP-665	1
KBP-666	1
KBP-667	1
KBP-668	1
KBP-669	1

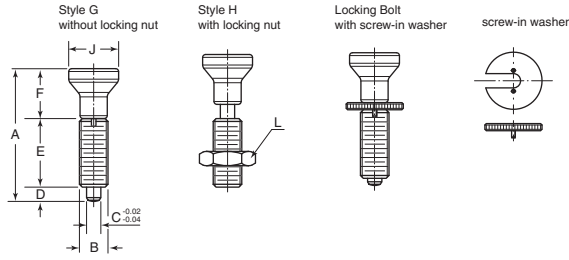


The washer is slid beneath the disengaged pull knob so that the follower pins engage in the slot. Only one washer is needed for any quantity ordered of indexing plungers with the same washer part number.

# INDEXING PLUNGERS

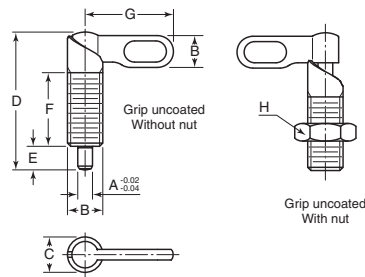


## Pull Knobs Without Collar Stainless Steel - Type 303



Item No.	Style	Initial End Force Newtons	Final End Force Newtons	A	B	-0.02/-0.04 C	D	E	F	J	L	Pack Qty.	Washer (Sold Separately)
<b>Metric - Without Locking Nut</b>													
KBP-654	G	6	12	43	M8 x 1.00	4	4	21	18	18	—	1	KBP-664
KBP-655	G	5	12	50	M10 x 1.00	5	5	24	21	21	—	1	KBP-665
KBP-656	G	6	14	59	M12 x 1.50	6	6	28	25	25	—	1	KBP-666
KBP-657	G	15	35	77	M16 x 1.50	8	8	36	33	33	—	1	KBP-667
KBP-658	G	15	34	83	M20 x 1.50	10	10	40	33	33	—	1	KBP-668
<b>Metric - With Locking Nut</b>													
KBP-659	H	6	12	43	M8 x 1.00	4	4	21	18	18	13	1	KBP-664
KBP-660	H	5	12	50	M10 x 1.00	5	5	24	21	21	17	1	KBP-665
KBP-661	H	6	14	59	M12 x 1.50	6	6	28	25	25	19	1	KBP-666
KBP-662	H	15	35	77	M16 x 1.50	8	8	36	33	33	24	1	KBP-667
KBP-663	H	15	34	83	M20 x 1.50	10	10	40	33	33	30	1	KBP-668

## Locking Bolts with Grip Stainless Steel - Type 303



Locking bolts with grip are used when the locking pin should not project at certain times. Turning the bolt through 180° pulls in the locking pin. A locking notch ensures that the locking bolt is held in this position.

Without Nut Item No.	With Nut Item No.	Initial End Force Lbs./Newtons	Final End Force Lbs./Newtons	-0.02/-0.04 A	B	C	D	E	F	G	H	Pack Qty.
<b>Inch</b>												
KBP-766	KBP-790	1.79	3.14	4	3/8-16	10	38	6	20	25	9/16	1
KBP-767	KBP-791	1.79	3.14	5	3/8-16	10	38	6	20	25	9/16	1
KBP-768	KBP-792	1.79	3.14	6	3/8-16	10	38	6	20	25	9/16	1
KBP-769	KBP-793	1.79	3.14	4	3/8-24	10	38	6	20	25	9/16	1
KBP-770	KBP-794	1.79	3.14	5	3/8-24	10	38	6	20	25	9/16	1
KBP-771	KBP-795	1.79	3.14	6	3/8-24	10	38	6	20	25	9/16	1
KBP-772	KBP-796	1.79	3.37	5	1/2-13	12	46.8	8	25	30	3/4	1
KBP-773	KBP-797	1.79	3.37	6	1/2-13	12	46.8	8	25	30	3/4	1
KBP-774	KBP-798	1.79	3.37	8	1/2-13	12	46.8	8	25	30	3/4	1
KBP-775	KBP-799	1.79	3.37	5	1/2-20	12	46.8	8	25	30	3/4	1
KBP-776	KBP-800	1.79	3.37	6	1/2-20	12	46.8	8	25	30	3/4	1
KBP-777	KBP-801	1.79	3.37	8	1/2-20	12	46.8	8	25	30	3/4	1
KBP-778	KBP-802	3.37	7.86	6	3/8-11	16	60.4	10	32	40	15/16	1
KBP-779	KBP-803	3.37	7.86	8	3/8-11	16	60.4	10	32	40	15/16	1
KBP-780	KBP-804	3.37	7.86	10	3/8-11	16	60.4	10	32	40	15/16	1
KBP-781	KBP-805	3.37	7.86	6	3/8-18	16	60.4	10	32	40	15/16	1
KBP-782	KBP-806	3.37	7.86	8	3/8-18	16	60.4	10	32	40	15/16	1
KBP-783	KBP-807	3.37	7.86	10	3/8-18	16	60.4	10	32	40	15/16	1
KBP-784	KBP-808	4.49	13.48	8	3/4-10	20	70	12	35	50	1 1/8	1
KBP-785	KBP-809	4.49	13.48	10	3/4-10	20	70	12	35	50	1 1/8	1
KBP-786	KBP-810	4.49	13.48	12	3/4-10	20	70	12	35	50	1 1/8	1
KBP-787	KBP-811	4.49	13.48	8	3/4-16	20	70	12	35	50	1 1/8	1
KBP-788	KBP-812	4.49	13.48	10	3/4-16	20	70	12	35	50	1 1/8	1
KBP-789	KBP-813	4.49	13.48	12	3/4-16	20	70	12	35	50	1 1/8	1
<b>Metric</b>												
KBP-814	KBP-838	8	14	4	M10	10	38	6	20	25	14	1
KBP-815	KBP-839	8	14	5	M10	10	38	6	20	25	14	1
KBP-816	KBP-840	8	14	6	M10	10	38	6	20	25	14	1
KBP-817	KBP-841	8	14	4	M10 x 1.00	10	38	6	20	25	14	1
KBP-818	KBP-842	8	14	5	M10 x 1.00	10	38	6	20	25	14	1
KBP-819	KBP-843	8	14	6	M10 x 1.00	10	38	6	20	25	14	1
KBP-820	KBP-844	8	15	5	M12	12	46.8	8	25	30	15	1
KBP-821	KBP-845	8	15	6	M12	12	46.8	8	25	30	15	1
KBP-822	KBP-846	8	15	8	M12	12	46.8	8	25	30	15	1
KBP-823	KBP-847	8	15	5	M12 x 1.50	12	46.8	8	25	30	15	1
KBP-824	KBP-848	8	15	6	M12 x 1.50	12	46.8	8	25	30	15	1
KBP-825	KBP-849	8	15	8	M12 x 1.50	12	46.8	8	25	30	15	1
KBP-826	KBP-850	15	35	6	M16	16	60.4	10	32	40	35	1
KBP-827	KBP-851	15	35	8	M16	16	60.4	10	32	40	35	1
KBP-828	KBP-852	15	35	10	M16	16	60.4	10	32	40	35	1
KBP-829	KBP-853	15	35	6	M16 x 1.50	16	60.4	10	32	40	35	1
KBP-830	KBP-854	15	35	8	M16 x 1.50	16	60.4	10	32	40	35	1
KBP-831	KBP-855	15	35	10	M16 x 1.50	16	60.4	10	32	40	35	1
KBP-832	KBP-856	20	60	8	M20	20	70	12	35	50	60	1
KBP-833	KBP-857	20	60	10	M20	20	70	12	35	50	60	1
KBP-834	KBP-858	20	60	12	M20	20	70	12	35	50	60	1
KBP-835	KBP-859	20	60	8	M20 x 1.50	20	70	12	35	50	60	1
KBP-836	KBP-860	20	60	10	M20 x 1.50	20	70	12	35	50	60	1
KBP-837	KBP-861	20	60	12	M20 x 1.50	20	70	12	35	50	60	1

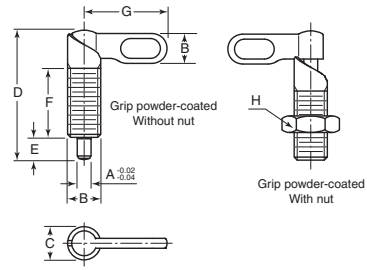


INDEXING PLUNGERS

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Locking Bolts with Grip Steel



Locking bolts with grip are used when the locking pin should not project at certain times. Turning the bolt through 180° pulls in the locking pin. A locking notch ensures that the locking bolt is held in this position.

Without Nut Item No.	With Nut Item No.	Initial End Force Lbs./Newtons	Final End Force Lbs./Newtons	-0.02/-0.04 A	B	C	D	E	F	G	H	Pack Qty.
<b>Inch</b>												
KBP-670	KBP-694	1.79	3.14	.157	3/8-16	.393	1.496	.236	.787	.984	9/16	1
KBP-671	KBP-695	1.79	3.14	.196	3/8-16	.393	1.496	.236	.787	.984	9/16	1
KBP-672	KBP-696	1.79	3.14	.236	3/8-16	.393	1.496	.236	.787	.984	9/16	1
KBP-673	KBP-697	1.79	3.14	.157	3/8-24	.393	1.496	.236	.787	.984	9/16	1
KBP-674	KBP-698	1.79	3.14	.196	3/8-24	.393	1.496	.236	.787	.984	9/16	1
KBP-675	KBP-699	1.79	3.14	.236	3/8-24	.393	1.496	.236	.787	.984	9/16	1
KBP-676	KBP-700	1.79	3.37	.196	1/2-13	.472	1.842	.314	.984	1.181	3/4	1
KBP-677	KBP-701	1.79	3.37	.236	1/2-13	.472	1.842	.314	.984	1.181	3/4	1
KBP-678	KBP-702	1.79	3.37	.314	1/2-13	.472	1.842	.314	.984	1.181	3/4	1
KBP-679	KBP-703	1.79	3.37	.196	1/2-20	.472	1.842	.314	.984	1.181	3/4	1
KBP-680	KBP-704	1.79	3.37	.236	1/2-20	.472	1.842	.314	.984	1.181	3/4	1
KBP-681	KBP-705	3.37	7.86	.314	1/2-20	.629	2.377	.393	1.259	1.574	19/16	1
KBP-682	KBP-706	3.37	7.86	.236	5/8-11	.629	2.377	.393	1.259	1.574	19/16	1
KBP-683	KBP-707	3.37	7.86	.314	5/8-11	.629	2.377	.393	1.259	1.574	19/16	1
KBP-684	KBP-708	3.37	7.86	.393	5/8-11	.629	2.377	.393	1.259	1.574	19/16	1
KBP-685	KBP-709	3.37	7.86	.236	5/8-18	.629	2.377	.393	1.259	1.574	19/16	1
KBP-686	KBP-710	1.79	3.37	.314	5/8-18	.629	2.377	.314	1.250	1.574	19/16	1
KBP-687	KBP-711	3.37	7.86	.393	5/8-18	.629	2.377	.393	1.259	1.574	1 1/8	1
KBP-688	KBP-712	4.49	13.48	.314	3/4-10	.787	2.755	.472	1.377	1.968	1 1/8	1
KBP-689	KBP-713	4.49	13.48	.393	3/4-10	.787	2.755	.472	1.377	1.968	1 1/8	1
KBP-690	KBP-714	4.49	13.48	.472	3/4-10	.787	2.755	.472	1.377	1.968	1 1/8	1
KBP-691	KBP-715	4.49	13.48	.314	3/4-16	.787	2.755	.472	1.377	1.968	1 1/8	1
KBP-692	KBP-716	4.49	13.48	.393	3/4-16	.787	2.755	.472	1.377	1.968	1 1/8	1
KBP-693	KBP-717	4.49	13.48	.472	3/4-16	.787	2.755	.472	1.377	1.968	1 1/8	1
<b>Metric</b>												
KBP-718	KBP-742	8	14	4	M10	10	38	6	20	25	17	1
KBP-719	KBP-743	8	14	5	M10	10	38	6	20	25	17	1
KBP-720	KBP-744	8	14	6	M10	10	38	6	20	25	17	1
KBP-721	KBP-745	8	14	4	M10 x 1.00	10	38	6	20	25	17	1
KBP-722	KBP-746	8	14	5	M10 x 1.00	10	38	6	20	25	17	1
KBP-723	KBP-747	8	14	6	M10 x 1.00	10	38	6	20	25	17	1
KBP-724	KBP-748	8	15	5	M12	12	46.8	8	25	30	19	1
KBP-725	KBP-749	8	15	6	M12	12	46.8	8	25	30	19	1
KBP-726	KBP-750	8	15	8	M12	12	46.8	8	25	30	19	1
KBP-727	KBP-751	8	15	5	M12 x 1.50	12	46.8	8	25	30	19	1
KBP-728	KBP-752	8	15	6	M12 x 1.50	12	46.8	8	25	30	19	1
KBP-729	KBP-753	15	35	8	M12 x 1.50	16	60.4	10	32	40	19	1
KBP-730	KBP-754	15	35	6	M16	16	60.4	10	32	40	24	1
KBP-731	KBP-755	15	35	8	M16	16	60.4	10	32	40	24	1
KBP-732	KBP-756	15	35	10	M16	16	60.4	10	32	40	24	1
KBP-733	KBP-757	15	35	6	M16 x 1.50	16	60.4	10	32	40	24	1
KBP-734	KBP-758	8	15	8	M16 x 1.50	12	46.8	8	25	30	24	1
KBP-735	KBP-759	15	35	10	M16 x 1.50	16	60.4	10	32	40	24	1
KBP-736	KBP-760	20	60	8	M20	20	70	12	35	50	30	1
KBP-737	KBP-761	20	60	10	M20	20	70	12	35	50	30	1
KBP-738	KBP-762	20	60	12	M20	20	70	12	35	50	30	1
KBP-739	KBP-763	20	60	8	M20x1.5	20	70	12	35	50	30	1
KBP-740	KBP-764	20	60	10	M20x1.5	20	70	12	35	50	30	1
KBP-741	KBP-765	20	60	12	M20x1.5	20	70	12	35	50	30	1

TOGGLE CLAMPS

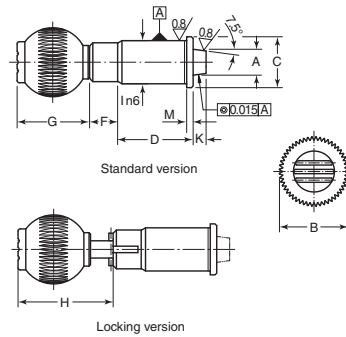
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# INDEXING PLUNGERS



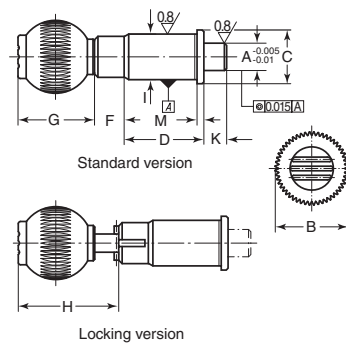
The locking bolts with sleeves are a perfect combination for rapid positioning and fixing. The precise finish of both the locking bolt and the sleeve guarantees high repeating accuracy when assembling two elements.

## Precision Locking Bolts Steel with Thermoplastic Ball Grip With Tapered Support Metric



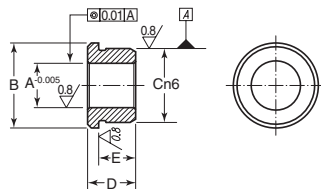
Standard		Locking		Initial End Force Newtons	Final End Force Newtons	A	B	C	D	F	G	I	K (min.)	M	Grip Ball Internal Thread	Pack Qty.
Item No.	Item No.	H														
KBP-862	KBP-867	32.5	19	29	10	25	19	31	13	25	16	6	2.5	M6	1	
KBP-863	KBP-868	40.5	22	35	12	32	23	35	13	33	20	6	3	M8	1	
KBP-864	KBP-869	49	30	50	16	40	28	42	13	41.5	25	6	3	M10	1	
KBP-865	KBP-870	49	46	63	20	40	33	50	13	41.5	30	6	3	M10	1	
KBP-866	KBP-871	58.5	39	73	25	50	42	60	13	51	38	6	3	M10	1	

## Precision Locking Bolts Steel with Thermoplastic Ball Grip With Cylindrical Support Metric



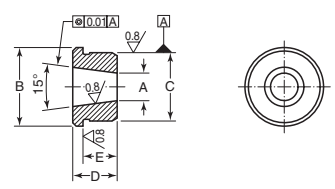
Standard		Locking		Initial End Force Newtons	Final End Force Newtons	A	B	C	D	F	G	I	K	M	Grip Ball Internal Thread	Pack Qty.
Item No.	Item No.	H														
KBP-877	KBP-882	36.5	15	30	10	25	19	31	13	25	16	10	2.5	M6	1	
KBP-878	KBP-883	44.5	15	35	12	32	23	35	13	33	20	10	3	M8	1	
KBP-879	KBP-884	53	20	50	16	40	28	42	13	41.5	25	10	3	M10	1	
KBP-880	KBP-885	53	36	63	20	40	33	50	13	41.5	30	10	3	M10	1	
KBP-881	KBP-886	62.5	20	73	25	50	42	60	13	51	38	10	3	M10	1	

## Cylindrical Sleeves Use with Precision Locking Bolts Metric



Item No.	A	B	C	D	E	Pack Qty.
KBP-887	10	42	19	11	8.5	1
KBP-888	12	20	23	13	10	1
KBP-889	16	25	28	17	14	1
KBP-890	20	30	33	16	13	1
KBP-891	25	38	42	19	16	1

## Tapered Sleeves Use with Precision Locking Bolts Metric



Item No.	A	B	C	D	E	Pack Qty.
KBP-872	7.1	19	16	11	8.5	1
KBP-873	8.28	23	20	13	10	1
KBP-874	11.52	28	25	17	14	1
KBP-875	15.49	33	30	16	13	1
KBP-876	19.7	42	38	19	16	1



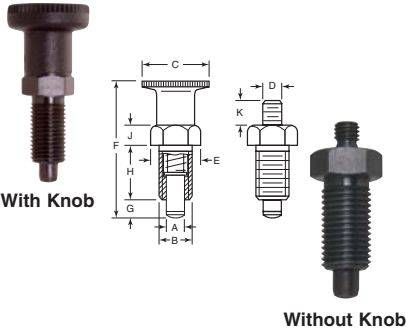


# INDEXING PLUNGERS

Buy One or Buy Bulk & SAVE

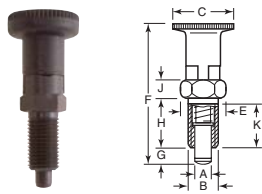
These indexing plungers are spring loaded to work in a wide variety of uses in both tooling and equipment. The body is steel with black oxide finish. Plunger is hardened and ground. The knob is black matte plastic. Stainless is Type 303. Locking types have rest position where the plunger can stay in retracted position. Lock nuts sold separately. Metric dimensions are in millimeters, metric end forces are shown in Newtons.

## Indexing Plungers Non-Locking Type with Shoulder Steel and Stainless Steel



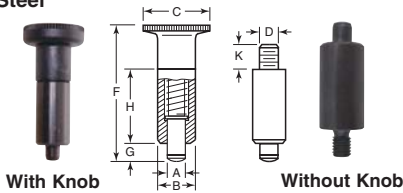
Item No.	Initial Force Lbs./Newtons	Final Force Lbs./Newtons	A	B	C	D mm	E	F	G	H	J	K	Pack Qty.
<b>w/ Knob</b>													
<b>Inch - Steel</b>													
WIP-10	1.5	3.5	.197	3/8-24	.83	—	.54	1.77	.20	.67	.20	—	1
WIP-15	1.5	3.5	.236	1/2-13	.98	—	.64	2.15	.24	.79	.24	—	1
WIP-20	2.7	7	.315	3/8-11	1.22	—	.86	2.72	.31	1.02	.31	—	1
<b>Metric - Steel</b>													
WIP-110	7	16	5	M10 x 1.00	21	—	13.8	45	5	17	5	—	1
WIP-115	7	16	6	M12 x 1.50	25	—	16.2	45	6	20	6	—	1
WIP-1	7	19	6	M12 x 1.50	25	—	19.6	45	6	10	5	—	1
WIP-2	14	24	8	M16 x 1.50	31	—	21.9	54	8	12	6	—	1
WIP-120	12	31	8	M16 x 1.50	31	—	21.9	69	8	26	8	—	1
<b>Metric - Stainless Steel</b>													
WIP-210	5.5	12.5	5	M10 x 1.00	21	—	13.8	45	5	17	5	—	1
WIP-215	5	11	6	M12 x 1.50	25	—	16.2	54.5	6	20	6	—	1
WIP-220	11	26	8	M16 x 1.50	31	—	21.9	69	8	26	8	—	1
<b>w/o Knob</b>													
<b>Inch - Steel</b>													
WIP-25	1.5	3.5	.197	3/8-24	—	M5	.54	1.77	.20	.67	.20	.24	1
WIP-30	1.5	3.5	.236	1/2-13	—	M6	.64	2.15	.24	.79	.24	.39	1
WIP-35	2.7	7	.315	3/8-11	—	M8	.86	2.72	.31	1.02	.31	.47	1
<b>Metric - Steel</b>													
WIP-130	7	16	7	M12 x 1.50	—	M6	16.2	45	6	20	6	10	1

## Indexing Plungers Locking Type with Shoulder Steel and Stainless Steel



Item No.	Initial Force Lbs./Newtons	Final Force Lbs./Newtons	A	B	C	E	F	G	H	J	K	Pack Qty.
<b>Inch - Steel</b>												
WIP-510	1.5	3.5	.197	3/8-24	.83	.54	2.01	.20	.67	.20	.59	1
WIP-515	1.5	3.5	.236	1/2-13	.98	.64	2.40	.24	.79	.24	.67	1
WIP-520	2.7	7	.315	3/8-11	1.22	.86	2.97	.28	1.02	.31	.91	1
<b>Metric - Steel</b>												
WIP-610	7	16	5	M10 x 1.00	21	13.8	51	5	17	5	15	1
WIP-5	7	19	6	M12 x 1.50	25	19.6	45	6	10	5	—	1
WIP-615	7	16	6	M12 x 1.50	25	16.2	61	6	20	6	17	1
WIP-6	14	24	8	M16 x 1.50	31	21.9	54	8	12	6	—	1
WIP-620	12	31	8	M16 x 1.50	31	21.9	75.5	7	26	8	23	1
<b>Metric - Stainless Steel</b>												
WIP-710	5.5	12.5	5	M10 x 1.00	21	13.8	51	5	17	5	15	1
WIP-715	5	11	6	M12 x 1.50	25	16.2	61	6	20	6	17	1
WIP-720	11	26	8	M16 x 1.50	31	21.9	75.5	7	26	8	23	1

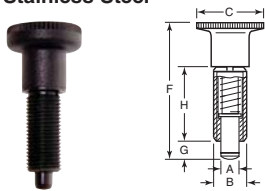
## Indexing Plungers Non-Locking Type without Threads Steel



For use where application calls for plunger to be welded or bonded.

Item No.	Initial Force Lbs./Newtons	Final Force Lbs./Newtons	A mm	B mm	C mm	D mm	F mm	G mm	H mm	K mm	Pack Qty.
<b>Metric - Steel</b>											
<b>w/ Knob</b>											
WIP-810	7	16	5	12	21	—	45	5	22	—	1
WIP-815	7	16	6	14	25	—	54.5	6	26	—	1
WIP-820	12	31	8	18	31	—	69	8	34	—	1
<b>w/o Knob</b>											
WIP-835	12	31	8	18	—	M8	69	8	34	12	1

## Indexing Plungers Non-Locking Type without Shoulder Steel and Stainless Steel



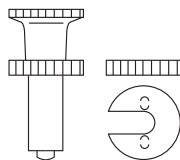
Installation tool required.

Item No.	Initial Force Lbs./Newtons	Final Force Lbs./Newtons	A mm	B mm	C mm	F mm	G mm	H mm	Pack Qty.	Installation Tool
<b>Metric - Steel</b>										
WIP-310	7	16	5	M10 x 1.00	21	45	5	22	1	WIP-5005
WIP-315	7	16	6	M12 x 1.50	25	54.5	6	26	1	WIP-5010
WIP-320	12	31	8	M16 x 1.50	31	69	8	34	1	WIP-5015
WIP-325	20	45	10	M20 x 1.50	31	80	10	43	1	WIP-5020
<b>Metric - Stainless Steel</b>										
WIP-410	5.5	12.5	5	M10 x 1.00	21	45	5	22	1	WIP-5005
WIP-425	18	45	10	M20 x 1.50	31	80	10	43	1	WIP-5020

## Indexing Plunger Installation Tool

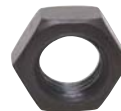


For use with indexing plungers without shoulders. Two slots are provided in the upper end of the body and are accessible when the knob is in the retracted position.



Item No.	Description	Pack Qty.	Item No.	Description	Pack Qty.
WIP-5005	For 5mm Plungers	1	WIP-5015	For 8mm Plungers	1
WIP-5010	For 6mm Plungers	1	WIP-5020	For 10mm Plungers	1

## Lock Nuts



For use with indexing plungers. Steel have black oxide finish. Stainless are Type 303.

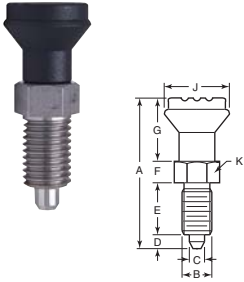
Item No.	Thread	Pack Qty.
<b>Steel - Inch</b>		
WIP-6050	3/8-24	1
WIP-6055	1/2-13	1
WIP-6060	3/8-11	1
<b>Steel - Metric</b>		
WIP-6005	M10 x 1.00	1
WIP-6010	M12 x 1.50	1
WIP-6015	M16 x 1.50	1
WIP-6020	M20 x 1.50	1
<b>Stainless Steel - Metric</b>		
WIP-6025	M10 x 1.00	1

# INDEXING PLUNGERS



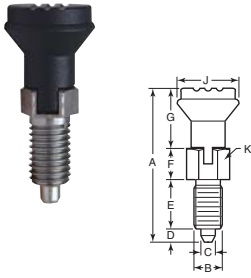
Used to prevent any change in locking position due to shearing force. These are spring loaded for use in fastening, locating and indexing on equipment, tooling and other applications. The plunger can be easily withdrawn by pulling on the handle. Locking types have a rest position where the plunger will stay in the retracted position. The knob is black thermoplastic. Steel type has a black oxide finish. Stainless is Type 303 or equivalent.

## Indexing Plungers Non-Locking Type with Knob Steel and Stainless Steel



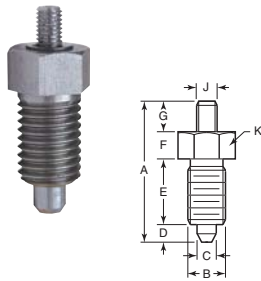
Steel Item No.	Stainless Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	+0.000/-0.002 C	D	E	F	G	J	K	Pack Qty.
GIP-5	GIP-30	1.12	2.70	1.85	3/8-16	.197(5mm)	.20	.67	.28	.71	.83	.51	1
GIP-10	—	1.12	2.70	1.85	3/8-24	.197(5mm)	.20	.67	.28	.71	.83	.51	1
GIP-15	GIP-40	1.35	3.15	2.20	1/2-13	.236(6mm)	.24	.79	.31	.87	.98	.55	1
GIP-20	GIP-45	3.37	7.87	2.91	5/8-11	.315(8mm)	.31	1.02	.39	1.18	1.30	.75	1
GIP-25	GIP-50	4.50	8.99	3.15	3/4-10	.394(10mm)	.39	1.10	.47	1.18	1.30	.87	1

## Indexing Plungers Locking Type with Knob Steel and Stainless Steel



Steel Item No.	Stainless Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	+0.000/-0.002 C	D	E	F	G	J	K	Pack Qty.
GIP-55	GIP-80	1.12	2.70	1.85	3/8-16	.197(5mm)	.20	.67	.28	.71	.83	.51	1
GIP-60	GIP-85	1.12	2.70	1.85	3/8-24	.197(5mm)	.20	.67	.28	.71	.83	.51	1
GIP-65	GIP-90	1.35	3.15	2.20	1/2-13	.236(6mm)	.24	.79	.31	.87	.98	.55	1
GIP-70	GIP-95	3.37	7.87	2.91	5/8-11	.315(8mm)	.31	1.02	.39	1.18	1.30	.75	1
GIP-75	—	4.50	8.99	3.15	3/4-10	.394(10mm)	.39	1.10	.47	1.18	1.30	.87	1

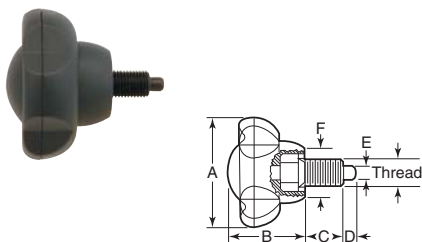
## Indexing Plungers Non-Locking Type without Knob Steel and Stainless Steel



Special handle/grips can be fitted on these plungers. Also suitable for actuation with the aid of a pneumatic cylinder, remote control, cable, etc.

Steel Item No.	Stainless Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	+0.000/-0.002 C	D	E	F	G	J	K	Pack Qty.
GIP-105	GIP-130	1.12	2.70	1.46	3/8-16	.197(5mm)	.20	.67	.28	.31	M4	.51	1
GIP-110	—	1.12	2.70	1.46	3/8-24	.197(5mm)	.20	.67	.28	.31	M4	.51	1
GIP-115	GIP-140	1.35	3.15	1.69	1/2-13	.236(6mm)	.24	.79	.31	.35	M6	.55	1
GIP-120	GIP-145	3.37	7.87	2.20	5/8-11	.315(8mm)	.31	1.02	.39	.47	M8	.75	1
GIP-125	GIP-150	4.50	8.99	2.44	3/4-10	.394(10mm)	.39	1.10	.47	.47	M8	.87	1

## Non-Locking Type with Large Knob



These indexing plungers feature an extra large, fluted handle for quick and easy plunger retraction. The plunger can be fully retracted into the body by pulling up on the handle. Handle is made of black thermoplastic. Body and pin are made from steel with black oxide finish.

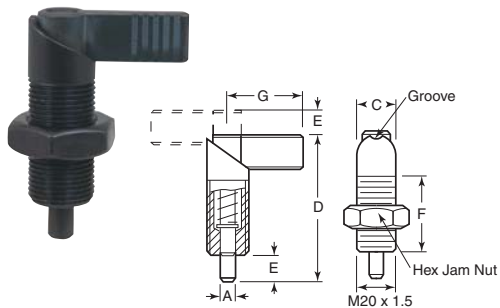
Item No.	A	Thread	B	C	D	E	F	Pack Qty.	Item No.	A	Thread	B	C	D	E	F	Pack Qty.
GK-750	1.97	3/8-24	1.37	.51	.20	.197(5mm)	0.87	1	GK-765	2.48	5/8-11	1.73	.87	.31	.315(8mm)	1.10	1
GK-755	1.97	3/8-16	1.37	.51	.20	.197(5mm)	0.87	1	GK-770	2.48	3/4-10	1.73	.94	.39	.394(10mm)	1.10	1
GK-760	1.97	1/2-13	1.37	.67	.24	.236(6mm)	0.87	1									



# CAM ACTION INDEXING PLUNGERS

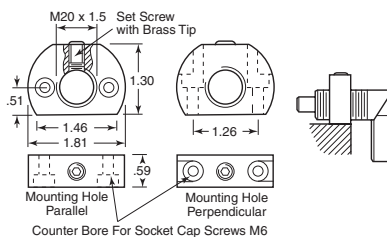
These spring loaded action indexing plungers are used in many tooling applications as well as on many types of machinery and equipment. The plunger is retracted as the handle is turned on the cam of the body. A groove on the top of the cam locks the plunger into the retracted position. The body of the plunger is made of steel with black oxide finish. The plunger is made of steel, ground and nitrided. The mounting block is made from steel with black oxide finish and allows for greater mounting flexibility.

## Plungers



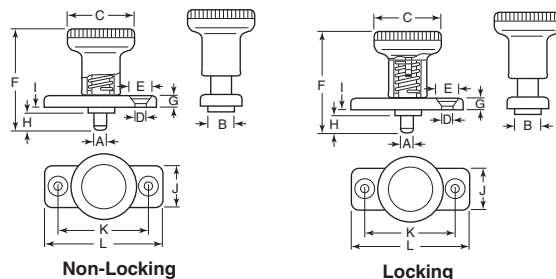
w/ Hex Nut		w/o Hex Nut									Initial End Force	Final End Force	Pack Qty.
Item No.	Item No.	-.001/-.002		A	C	D	E	F	G				
WCP-25	WCP-10	.31(8mm)		.79	2.72	.47	1.42	1.46	21	58	1		
WCP-30	WCP-15	.39(10mm)		.79	2.72	.47	1.42	1.46	21	58	1		
WCP-35	WCP-20	.47(12mm)		.79	2.72	.47	1.42	1.46	21	58	1		

## Mounting Block with Plunger



Item No.	Description	Pack Qty.
WCP-40	Parallel Hole Mounting Block	1
WCP-45	Perpendicular Hole Mounting Block	1

## Indexing Plungers with Mounting Plate Locking and Non-Locking



These indexing plungers are spring loaded to work in a variety of applications on both tooling and equipment that require surface mounting. The body is steel with black oxide finish. Plunger is hardened and ground. The knob is black matte plastic and the mounting plate is zinc die cast and zinc plated. Locking types have a rest position where the plunger will stay in the retracted position. Metric dimensions are in millimeters, metric end forces are shown in Newtons.

Item No.	Initial End Force Newtons	Final End Force Newtons	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	J mm	K mm	L mm	Pack Qty.
<b>Non-Locking Type</b>															
WIP-1000	8.5	22	6	10	25	4.3	8.3	37	4.5	6	2.5	18	30	40	1
WIP-1005	15.5	28	8	12	31	5.3	10.4	44	5.5	8	2.5	20	34	46	1
<b>Locking Type</b>															
WIP-1010	8.5	22	6	10	25	4.3	8.3	37	4.5	6	2.5	18	30	40	1
WIP-1015	15.5	28	8	12	31	5.3	10.4	44	5.5	8	2.5	20	34	46	1

## Wrenches for Spring and Ball Plungers



Item No.	For Thread Size		Pack Qty.
	inch	mm	
VW-48	—	6-32	1
VW-50	—	8-32, 8-36	1
VW-52	M4, M5	10-32, M4, M5	1
VW-54	M6	¼-20, ¼-28, M6	1
VW-56	M8	¾-18, M8	1
VW-58	M10	¾-8, M10	1
VW-60	M12	¾-13, M12	1
VW-62	M16	¾-11, M16	1
VW-64	M10	¾-10, M10	1
VW-66	—	1-8	1

Provides fast installation or removal of spring, ball or stubby spring plungers (including metric). Prevents spring damage that can result when a screwdriver is used on the ball or plunger end. A real convenience and time saver.

# PUSH-FIT BALL PLUNGERS



Push fit ball plungers can be used when a threaded ball plunger is impractical or when threaded adjustments are not required for detent. Easy installation for use in wood, soft plastic or aluminum. Steel are made 12L14 steel with black oxide finish. Stainless bodies are Type 303, stainless balls are Type 440.

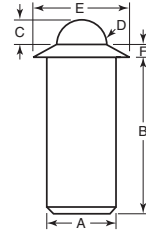
## Push-Fit Light and Heavy Pressure Ball Plungers Steel or Stainless Steel Body With Delrin, Nylon or Stainless Steel Balls



Light Pressure

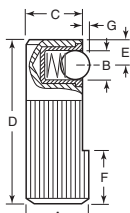


Heavy Pressure

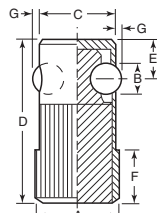


Steel Item No.	Stainless Item No.	+ .002/ -.000 A	B	C	D	E	F	Initial End Force Lbs.	Final End Force Lbs.	Pack Qty.
<b>Light Pressure</b>										
<b>Nylon Ball</b>										
PFB-147	SPFB-147	.125	.252	.035	.094	.187	.032	.40	1.3	1
PFB-148	SPFB-148	.125	.252	.035	.094	.187	.032	.75	2.5	1
PFB-151	SPFB-151	.188	.394	.058	.156	.250	.040	1.00	2.5	1
PFB-152	SPFB-152	.188	.394	.058	.156	.250	.040	2.00	5.0	1
PFB-153	SPFB-153	.250	.471	.070	.187	.312	.045	1.50	3.5	1
PFB-154	SPFB-154	.250	.471	.070	.187	.312	.048	3.00	7.0	1
PFB-155	—	.312	.643	.090	.250	.375	.045	2.00	5.0	1
PFB-156	—	.312	.643	.090	.250	.375	.045	4.00	10.0	1
PFB-157	SPFB-157	.375	.786	.110	.312	.500	.078	2.50	7.0	1
PFB-158	SPFB-158	.375	.786	.110	.312	.500	.081	5.00	14.0	1
PFB-160	—	.500	1.100	.161	.437	.688	.110	8.00	18.0	1
<b>Stainless Steel Ball</b>										
PFB-60	SPFB-60	.500	1.210	.161	.437	.688	.110	8.00	18.0	1
PFB-47	SPFB-47	.125	.252	.035	.094	.187	.032	.40	1.3	1
PFB-48	SPFB-48	.125	.252	.035	.094	.187	.032	.75	2.5	1
PFB-51	SPFB-51	.188	.405	.058	.156	.250	.035	1.00	2.5	1
PFB-52	SPFB-52	.188	.394	.058	.156	.250	.040	2.00	5.0	1
PFB-53	SPFB-53	.250	.481	.070	.187	.312	.044	1.50	3.5	1
PFB-54	SPFB-54	.250	.471	.070	.187	.312	.048	3.00	7.0	1
PFB-55	SPFB-55	.312	.643	.090	.250	.375	.045	2.00	5.0	1
PFB-56	SPFB-56	.312	.643	.090	.250	.375	.045	4.00	10.0	1
PFB-57	SPFB-57	.375	.785	.110	.312	.500	.078	2.50	7.0	1
PFB-58	SPFB-58	.375	.786	.110	.312	.500	.081	5.00	14.0	1
PFB-59	SPFB-59	.500	1.130	.161	.437	.688	.088	4.00	9.0	1
<b>Heavy Pressure</b>										
<b>Delrin Ball</b>										
PFB-206	SPFB-206	.125	.252	.035	.093	.187	.032	2.0	5.0	1
PFB-207	SPFB-207	.188	.405	.058	.156	.250	.035	4.0	10.0	1
PFB-208	SPFB-208	.250	.481	.070	.187	.312	.044	6.0	13.0	1
PFB-209	SPFB-209	.312	.643	.090	.250	.375	.045	8.0	16.0	1
PFB-210	SPFB-210	.375	.785	.110	.312	.500	.078	10.0	18.0	1
PFB-211	SPFB-211	.500	1.13	.161	.437	.688	.088	12.0	23.0	1
<b>Stainless Steel Ball</b>										
PFB-200	SPFB-200	.125	.252	.035	.093	.187	.032	2.0	5.0	1
PFB-201	SPFB-201	.188	.405	.058	.156	.250	.035	4.0	10.0	1
PFB-202	SPFB-202	.250	.481	.070	.187	.312	.044	6.0	13.0	1
PFB-203	SPFB-203	.312	.643	.090	.250	.375	.045	8.0	16.0	1
PFB-204	SPFB-204	.375	.785	.110	.312	.500	.078	10.0	18.0	1
PFB-205	SPFB-205	.500	1.13	.161	.437	.688	.088	12.0	23.0	1

## Side Thrust Pins



Single Sided

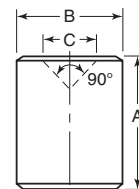


Double Sided

Side thrust pins are used primarily to hold, position and clamp work pieces. The body is made from steel with black oxide finish.

Item No.	A	B	C	D	E	F	G	Initial Load Rating Lbs.	Final Load Rating Lbs.	Pack Qty.
<b>Single Sided, Stainless Ball, Stainless Spring</b>										
WST-5	.31	.12	.26	.98	.14	.24	.04	.56	1.46	1
WST-10	.39	.16	.32	1.18	.17	.28	.04	1.01	2.02	1
WST-15	.47	.20	.40	1.38	.19	.35	.06	1.46	2.92	1
WST-20	.55	.26	.42	1.57	.23	.39	.07	1.80	4.05	1
<b>Single Sided, Plastic Ball, Stainless Spring</b>										
WST-25	.31	.12	.26	.98	.14	.24	.04	.56	1.46	1
WST-30	.39	.16	.32	1.18	.17	.28	.04	1.01	2.02	1
WST-35	.47	.20	.40	1.38	.19	.35	.06	1.46	2.92	1
WST-40	.55	.26	.42	1.57	.23	.39	.07	1.80	4.05	1
<b>Single Sided, Steel Ball, Elasticized Spring</b>										
WST-45	.39	.22	.36	1.18	.28	.31	.04	11.24	35.97	1
<b>Double Sided, Steel Ball, Elasticized Spring</b>										
WST-60	.63	.22	.59	1.38	.28	.43	.06	8.09	42.71	1
WST-65	.71	.26	.67	1.57	.31	.47	.07	8.54	60.70	1

## Ball Buttons Stainless Steel



The perfect mating detent for ball plungers or for other similar applications. Hardened and ground. Materials is 440C stainless steel.

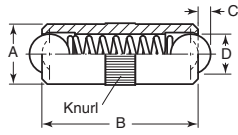
Item No.	For Use with Ball Diameter	A	+ .0002/- .0000 B	C	Pack Qty.
VD-1	.0620	3/16	.1075	.056	1
VD-3	.0938	3/16	.1614	.069	1



**PUSH-FIT & PRESS-FIT BALL PLUNGERS**

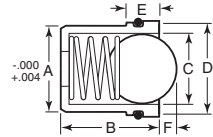
Buy One or Buy Bulk & SAVE

**Brass Body  
Stainless Steel Balls  
Double-Sided  
Metric**



Item No.	Initial Force Newtons	Final Force Newtons	A	B	C	D	Pack Qty.
<b>BPFP-10</b>	3	7	4	10	.9	3	1
<b>BPFP-15</b>	4	8	5	12	1.2	4	1
<b>BPFP-20</b>	6	10	6	16	1.6	5	1
<b>BPFP-25</b>	8	12	8	20	2.0	6	1
<b>BPFP-30</b>	10	16	10	24	2.9	8	1

**Stainless Steel Body  
Stainless Steel Ball  
O-Ring Seal  
Metric**



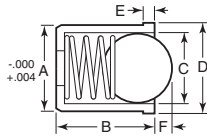
Item No.	A	B	C	D	E	F	Initial End Force Lbs.	Final End Force Lbs.	Pack Qty.
<b>SPFP-300</b>	4	5	3	4.95	2.3	.8	3	7	1
<b>SPFP-305</b>	5	6	4	5.95	2.3	1	4	7	1
<b>SPFP-310</b>	6	7	5	7.95	3.7	1.5	6	12	1
<b>SPFP-315</b>	8	9	6.5	9.95	4.2	1.8	6	12	1
<b>SPFP-320</b>	10	13.5	8	11.95	5.3	2.7	10	20	1
<b>SPFP-325</b>	12	16	10	13.95	5.5	3.5	15	25	1

For use in vertical and overhead applications. The unique o-ring design holds the plunger in place and can be easily inserted by hand or assembly tool. Body, spring and ball are stainless steel. The o-ring is Nitrile butadiene rubber (NBR).

**Plastic or Stainless Steel Body  
With Stainless Steel or Plastic Ball**



Small and lightweight for use in sensitive and light duty applications. Available with black thermoplastic or stainless steel bodies. The spring and ball are stainless steel or white plastic.

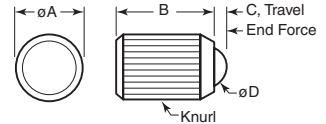


Plastic		Stainless						Initial Force Lbs.	Final Force Lbs.	Pack Qty.
Item No.	Item No.	A	B	C	D	E	F			
<b>Stainless Steel Ball</b>										
<b>PFP-10</b>	—	.158(4mm)	.197	.118	.181	.04	.028	.67	1.57	1
—	<b>PFP-50</b>	.158(4mm)	.197	.118	.181	.04	.032	.67	1.57	1
<b>PFP-15</b>	<b>PFP-55</b>	.197(5mm)	.236	.157	.220	.04	.039	.90	1.57	1
<b>PFP-20</b>	<b>PFP-60</b>	.236(6mm)	.276	.197	.256	.04	.059	1.35	2.70	1
<b>PFP-25</b>	<b>PFP-65</b>	.318(8mm)	.354	.256	.335	.04	.071	1.35	2.70	1
—	<b>PFP-70</b>	.391(10mm)	.532	.315	.472	.098	.106	2.25	4.50	1
—	<b>PFP-75</b>	.472(12mm)	.63	.398	.551	.098	.138	3.37	5.62	1
<b>Plastic Ball</b>										
<b>PFP-106</b>	—	.158(4mm)	.197	.118	.181	.04	.028	.67	1.57	1
—	<b>PFP-100</b>	.158(4mm)	.197	.118	.181	.04	.032	.67	1.57	1
<b>PFP-107</b>	<b>PFP-101</b>	.197(5mm)	.236	.157	.220	.04	.039	.90	1.57	1
<b>PFP-108</b>	<b>PFP-102</b>	.236(6mm)	.276	.197	.256	.04	.059	1.35	2.70	1
<b>PFP-109</b>	<b>PFP-103</b>	.318(8mm)	.354	.256	.335	.04	.071	1.35	2.70	1

**Shoulderless Knurled Press-Fit  
Steel and Stainless Steel Bodies  
Stainless Steel and Nylon Balls**



These plungers are designed for simple, easy installation into wood, soft plastic or aluminum. Ideal where a threaded plunger is impractical or when threaded adjustments are not required. Nylon ball resists marring. Designed without a shoulder for insertion from either end.



Steel Item No.	Stainless Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	C	D	Pack Qty.
<b>Nylon Ball</b>								
<b>Light Pressure</b>								
<b>WBP-165</b>	<b>WBP-225</b>	4	1.3	.134	.287	.035	.0937	1
<b>WBP-175</b>	<b>WBP-235</b>	1	2.5	.197	.434	.058	.1562	1
<b>WBP-185</b>	<b>WBP-245</b>	1.5	3.5	.259	.519	.07	.1875	1
<b>WBP-195</b>	<b>WBP-255</b>	2	5	.321	.693	.09	.25	1
<b>WBP-205</b>	<b>WBP-265</b>	2.5	7	.384	.866	.11	.3125	1
<b>WBP-215</b>	<b>WBP-275</b>	4	9	.509	1.213	.161	.4375	1
<b>Heavy Pressure</b>								
<b>WBP-180</b>	<b>WBP-240</b>	2	5	.197	.434	.058	.1562	1
<b>WBP-200</b>	<b>WBP-260</b>	4	10	.321	.693	.09	.25	1
<b>WBP-170</b>	<b>WBP-230</b>	.75	2.5	.134	.287	.035	.0937	1
<b>WBP-210</b>	<b>WBP-270</b>	5	14	.384	.866	.11	.3125	1
<b>WBP-190</b>	<b>WBP-250</b>	3	7	.259	.519	.07	.1875	1
<b>WBP-220</b>	<b>WBP-280</b>	8	18	.509	1.213	.161	.4375	1

Steel Item No.	Stainless Item No.	Initial End Force Lbs.	Final End Force Lbs.	A	B	C	D	Pack Qty.
<b>Stainless Steel Ball</b>								
<b>Light Pressure</b>								
<b>WBP-285</b>	<b>WBP-345</b>	4	1.3	.153	.287	.035	.0937	1
<b>WBP-295</b>	<b>WBP-355</b>	1	2.5	.215	.434	.058	.1562	1
<b>WBP-305</b>	<b>WBP-365</b>	1.5	3.5	.259	.519	.07	.1875	1
<b>WBP-315</b>	<b>WBP-375</b>	2	5	.321	.693	.09	.25	1
<b>WBP-325</b>	<b>WBP-385</b>	2.5	7	.384	.866	.11	.3125	1
<b>WBP-335</b>	<b>WBP-395</b>	4	9	.509	1.213	.161	.4375	1
<b>Heavy Pressure</b>								
<b>WBP-300</b>	<b>WBP-360</b>	2	5	.215	.434	.058	.1562	1
<b>WBP-320</b>	<b>WBP-380</b>	4	10	.321	.693	.09	.25	1
<b>WBP-290</b>	<b>WBP-350</b>	.75	2.5	.153	.284	.035	.0937	1
<b>WBP-330</b>	<b>WBP-390</b>	5	14	.384	.864	.11	.312	1
<b>WBP-310</b>	<b>WBP-370</b>	3	7	.259	.519	.07	.1875	1
<b>WBP-340</b>	<b>WBP-400</b>	8	18	.509	1.21	.161	.437	1

# BALL PLUNGERS



Ball plungers are compact units ideally suited for many locating or positioning applications in dies, special tooling, automatic feed devices, etc., where controlled end pressure is required. Nylon balls offer resistance to repeated impacts, moisture and solvents. Also resists heat up to 190 degrees Fahrenheit and offers electrical insulating properties. Will not mar soft surfaces such as brass or aluminum. Stainless type have stainless bodies and are available with stainless steel or nylon balls. End pressures are shown in pounds for inch sizes and Newtons for metric sizes. Metric dimensions are shown in millimeters. Steel bodies are coded to indicate end force; silver = light end force; black = standard end force; gold = heavy end force. Stainless steel bodies are color coded on the rear of the assembly to indicate end forces; plain = light end force; black = standard end force; orange = heavy end force.

## Ball Plungers

**Steel Bodies**  
Stainless Steel or Nylon Ball With Locking Element  
Inch or Metric



Standard Item No.	Locking Element Item No.	Initial Force Lbs./ Newtons	Final Force Lbs./ Newtons	A	B	C	D	Pack Qty.
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### Stainless Steel Balls

#### Inch

W-23	W-23N*	1/8	1/2	4-48	.0620	.187	.020	1
W-24	W-24N*	1/4	3/4	5-40	.0620	.250	.020	1
W-25	W-25N*	1/2	1	6-40	.0780	.312	.023	1
W-26A	W-26AN*	1/2	1 1/4	8-32	.0937	.344	.025	1
W-26	W-26N*	1/2	1 1/4	8-36	.0937	.344	.025	1
W-14	W-14N*	1/2	1 1/2	10-32	.0937	.513	.025	1
W-13	W-13N*	1 1/2	3	10-32	.0937	.513	.025	1
W-15	W-15N*	2	5	10-32	.0937	.513	.025	1
W-17	W-17N	2	4	1/4-20	.1250	.531	.035	1
W-16	W-16N	3	7	1/4-20	.1250	.531	.035	1
W-18	W-18N	4	12	1/4-20	.1250	.531	.035	1
W-2	W-2N	2	4 1/2	3/16-18	.1560	.578	.040	1
W-1	W-1N	4	9	3/16-18	.1560	.578	.040	1
W-3	W-3N	6	17	3/16-18	.1560	.578	.040	1
W-5	W-5N	2 1/2	5	3/8-16	.1875	.625	.048	1
W-4	W-4N	5	10	3/8-16	.1875	.625	.048	1
W-6	W-6N	6	21	3/8-16	.1875	.625	.048	1
W-8	W-8N	3	6	1/2-13	.2813	.750	.072	1
W-7	W-7N	6	12	1/2-13	.2813	.750	.072	1
W-9	W-9N	6	30	1/2-13	.2813	.750	.072	1
W-11	W-11N	4 1/2	9	3/8-11	.3750	.984	.096	1
W-12	W-12N	7	50	3/8-11	.3750	.984	.096	1
W-10	W-10N	9	18	3/8-11	.3750	.984	.096	1

#### Metric

—	BM-195N	4.5	3	M3 x 0.5	1.50	7	.4	1
—	JP-972N	2.25	5.49	M5 x .8	2.38	13	.6	1
—	JP-973N	6.67	13.25	M5 x .8	2.38	13	.6	1
—	JP-974N	8.83	22.06	M5 x .8	2.38	13	.6	1
BM-120	BM-120N	4	10	M4 x .7	2.50	9	.8	1
BM-130	BM-130N	2	6	M6 x 1.0	3.50	14	1.0	1
BM-125	BM-125N	9	13	M6 x 1.0	3.50	14	1.0	1
BM-200	BM-200N	14	8	M5 x 0.8	3.50	12	.9	1
BM-210	BM-210N	22	15	M5 x 0.8	3.50	12	.9	1
BM-135	BM-135N	28	40	M6 x 1.0	3.50	14	1.0	1
BM-145	BM-145N	5	10	M8 x 1.25	5.00	16	1.5	1
BM-140	BM-140N	15	30	M8 x 1.25	5.00	16	1.5	1
BM-150	BM-150N	40	60	M8 x 1.25	5.00	16	1.5	1
BM-160	BM-160N	8	15	M10 x 1.50	6.00	19	2.0	1
BM-155	BM-155N	20	35	M10 x 1.50	6.00	19	2.0	1
BM-165	BM-165N	60	90	M10 x 1.50	6.00	19	2.0	1
BM-170	BM-170N	30	55	M12 x 1.75	8.00	22	2.5	1
BM-175	BM-175N	75	20	M12 x 1.75	8.00	22	2.5	1
BM-180	BM-180N	75	115	M12 x 1.75	8.00	22	2.5	1
BM-190	BM-190N	86	41	M16 x 2.0	10	24	3.50	1
BM-205	BM-205N	142	68	M16 x 2.0	10	24	3.50	1

### Nylon Balls

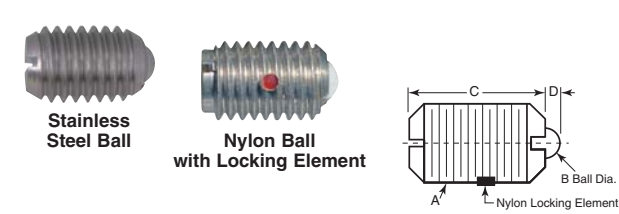
#### Inch

W-40	W-40N	1/8	1/2	4-48	.0620	.187	.020	1
W-42	W-42N*	1/4	3/4	5-40	.0620	.250	.020	1
W-44	W-44N*	1/2	1	6-40	.0780	.312	.023	1
W-46	W-46N*	1/2	1 1/4	8-32	.0937	.344	.025	1
W-48	W-48N*	1/2	1 1/4	8-36	.0937	.344	.025	1
W-50	W-50N*	1/2	1 1/2	10-32	.0937	.513	.025	1
W-52	W-52N*	1 1/2	3	10-32	.0937	.513	.025	1
W-54	W-54N*	2	5	10-32	.0937	.513	.025	1
W-56	W-56N	2	4	1/4-20	.1250	.531	.035	1
W-58	W-58N	3	7	1/4-20	.1250	.531	.035	1
W-60	W-60N	4	12	1/4-20	.1250	.531	.035	1
W-62	W-62N	2	4 1/2	3/16-18	.1560	.578	.040	1
W-64	W-64N	4	9	3/16-18	.1560	.578	.040	1
W-66	—	6	17	3/16-18	.1560	.578	.040	1
W-68	W-68N	2 1/2	5	3/8-16	.1875	.625	.048	1
W-70	W-70N	5	10	3/8-16	.1875	.625	.048	1
W-72	—	6	21	3/8-16	.1875	.625	.048	1
W-74	W-74N	3	6	1/2-13	.2813	.750	.072	1
W-76	W-76N	6	12	1/2-13	.2813	.750	.072	1
W-78	W-78N	6	30	1/2-13	.2813	.750	.072	1
—	W-80N	4 1/2	9	3/8-11	.3750	.984	.096	1
W-84	W-84N	7	50	3/8-11	.3750	.984	.096	1
W-82	W-82N	9	18	3/8-11	.3750	.984	.096	1

#### Metric

BM-220	BM-220N	4.5	3	M3 X 0.5	1.50	7	.4	1
BM-225	BM-225N	14	8	M5 X 0.8	3.50	12	.9	1
BM-235	BM-235N	22	15	M5 X 0.8	3.50	12	.9	1
BM-215	BM-215N	86	41	M16 x 2.0	10	24	3.50	1
BM-230	BM-230N	142	68	M16 X 2.0	10	24	3.50	1

**Ball Plungers**  
Stainless Steel Bodies  
Stainless Steel or Nylon Ball With Locking Element  
Inch or Metric



Standard Item No.	Locking Element Item No.	Initial Force Lbs./ Newtons	Final Force Lbs./ Newtons	A	B	C	D	Pack Qty.
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### Stainless Steel Balls

#### Inch

X-1	X1-N*	1/8	1/2	4-48	.0620	.187	.020	1
X-2	X2-N*	1/4	3/4	5-40	.0620	.250	.020	1
X-3	X3-N*	1/2	1	6-40	.0780	.312	.023	1
X-4A	X4A-N*	1/2	1 1/4	8-32	.0937	.344	.025	1
X-4	X4-N*	1/2	1 1/4	8-36	.0937	.344	.025	1
X-11	X11-N*	1/2	1 1/2	10-32	.0937	.513	.025	1
X-5	X5-N*	1 1/2	3	10-32	.0937	.513	.025	1
X-12	X12-N*	2	5	10-32	.0937	.513	.025	1
X-13	X13-N	2	4	1/4-20	.1250	.531	.035	1
X-6	X6-N	3	7	1/4-20	.1250	.531	.035	1
X-14	X14-N	4	12	1/4-20	.1250	.531	.035	1
X-15	X15-N	2	4 1/2	3/16-18	.1560	.578	.040	1
X-7	X7-N	4	9	3/16-18	.1560	.578	.040	1
X-16	X16-N	6	17	3/16-18	.1560	.578	.040	1
X-17	X17-N	2 1/2	5	3/8-16	.1875	.625	.048	1
X-8	X8-N	5	10	3/8-16	.1875	.625	.048	1
X-18	X18-N	6	21	3/8-16	.1875	.625	.048	1
X-19	X19-N	3	6	1/2-13	.2813	.750	.072	1
X-9	X9-N	6	12	1/2-13	.2813	.750	.072	1
X-20	X20-N	6	30	1/2-13	.2813	.750	.072	1
X-21	X21-N	4 1/2	9	3/8-11	.3750	.984	.096	1
X-22	X22-N	7	50	3/8-11	.3750	.984	.096	1
X-10	X10-N	9	18	3/8-11	.3750	.984	.096	1

#### Metric

BM-265	BM-265N	4.5	3	M3 X 0.5	1.50	7	.4	1
SBM-120	SBM-120N	4	10	M4 x .7	2.50	9	.8	1
SBM-130	SBM-130N	2	6	M6 x 1.0	3.50	14	1.0	1
SBM-125	SBM-125N	9	13	M6 x 1.0	3.50	14	1.0	1
BM-270	BM-270N	14	8	M5 X 0.8	3.50	12	.9	1
BM-280	BM-280N	22	15	M5 X 0.8	3.50	12	.9	1
SBM-135	SBM-135N	28	40	M6 x 1.0	3.50	14	1.0	1
SBM-145	SBM-145N	5	10	M8 x 1.25	5.00	16	1.5	1
SBM-140	SBM-140N	15	30	M8 x 1.25	5.00	16	1.5	1
SBM-150	SBM-150N	40	60	M8 x 1.25	5.00	16	1.5	1
SBM-160	SBM-160N	8	15	M10 x 1.50	6.00	19	2.0	1
SBM-155	SBM-155N	20	35	M10 x 1.50	6.00	19	2.0	1
SBM-165	SBM-165N	60	90	M10 x 1.50	6.00	19	2.0	1
SBM-170	SBM-170N	30	55	M12 x 1.75	8.00	22	2.5	1
SBM-175	SBM-175N	75	20	M12 x 1.75	8.00	22	2.5	1
SBM-180	SBM-180N	75	115	M12 x 1.75	8.00	22	2.5	1
BM-260	BM-260N	86	41	M16 X 2.0	10	24	3.50	1
BM-275	BM-275N	142	68	M16 X 2.0	10	24	3.50	1

### Nylon Balls

#### Inch

Y-1	Y-1N*	1/8	1/2	4-48	.0620	.187	.020	1
Y-2	Y-2N*	1/4	3/4	5-40	.0620	.250	.020	1
Y-3	Y-3N*	1/2	1	6-40	.0780	.312	.023	1
Y-4A	Y-4AN*	1/2	1 1/4	8-32	.0937	.344	.025	1
Y-4	Y-4N*	1/2	1 1/4	8-36	.0937	.344	.025	1
Y-11	Y-11N*	1/2	1 1/2	10-32	.0937	.513	.025	1
Y-5	Y-5N*	1 1/2	3	10-32	.0937	.513	.025	1
Y-12	Y-12N*	2	5	10-32	.0937	.513	.025	1
Y-13	Y-13N	2	4	1/4-20	.1250	.531	.035	1
Y-6	Y-6N	3	7	1/4-20	.1250	.531	.035	1
Y-14	Y-14N	4	12	1/4-20	.1250	.531	.035	1
Y-15	Y-15N	2	4 1/2	3/16-18	.1560	.578	.040	1
Y-7	Y-7N	4	9	3/16-18	.1560	.578	.040	1
Y-16	Y-16N	6	17	3/16-18	.1560	.578	.040	1
Y-17	Y-17N	2 1/2	5	3/8-16	.1875	.625	.048	1
Y-8	Y-8N	5	10	3/8-16	.1875	.625	.048	1
Y-18	Y-18N	6	21	3/8-16	.1875	.625	.048	1
—	Y-19N	3	6	1/2-13	.2813	.750	.072	1
Y-9	Y-9N	6	12	1/2-13	.2813	.750	.072	1
Y-20	Y-20N	6	30	1/2-13	.2813	.750	.072	1
Y-21	—	4 1/2	9	3/8-11	.3750	.984	.096	1
Y-22	Y-22N	7	50	3/8-11	.3750	.984	.096	1

#### Metric

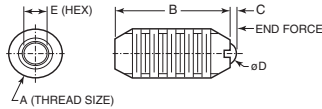
BM-240	BM-240N	4.5	3	M3 X 0.5	1.50	7	.4	1
BM-245	BM-245N	14	8	M5 X 0.8	3.50	12	.9	1
BM-250	BM-250N	22	15	M5 X 0.8	3.50			



# BALL PLUNGERS

Buy One or Buy Bulk & SAVE

## Posi-Hex Steel and Stainless Steel



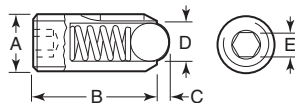
Posi-hex plungers allow for easy installation and removal from the back side using a hex wrench. Plunger assembly will not come apart under critical applications because the hex plug is permanently installed and cannot break loose upon installation or removal. Posi-hex is recommended for use in high torque applications.

Standard	Locking Element	Initial End Force Lbs.	Final End Force Lbs.	A	+/- .010 B	C	D	E	Pack Qty.
<b>Steel</b>									
W-101	W-101N*	.50	1.25	8-32	.445	.025	.094	.063	1
W-102	W-102N*	1.5	3.0	10-32	.570	.025	.094	.079	1
W-103	W-103N	3.0	7.0	1/4-20	.675	.035	.125	.079	1
W-104	W-104N	4.0	9.0	5/16-18	.720	.040	.156	.095	1
W-105	W-105N	5.0	10.0	3/8-16	.800	.048	.188	.156	1
W-106	W-106N	6.0	12.0	1/2-13	1.05	.072	.281	.219	1
W-107	W-107N	9.0	18.0	5/8-11	1.25	.096	.375	.253	1
<b>Stainless Steel</b>									
W-111	W-111N	.50	1.25	8-32	.445	.025	.094	.063	1
W-112	W-112N	1.5	3.0	10-32	.570	.025	.094	.079	1
W-113	W-113N	3.0	7.0	1/4-20	.675	.035	.125	.079	1
W-114	W-114N	4.0	9.0	5/16-18	.720	.040	.156	.095	1
W-115	W-115N	5.0	10.0	3/8-16	.800	.048	.188	.156	1
W-116	W-116N	6.0	12.0	1/2-13	1.05	.072	.281	.219	1
W-117	W-117N	9.0	18.0	5/8-11	1.25	.096	.375	.253	1

\*Nylon patch

The Long-Lok thread lock provides additional resistance to vibration. A resilient nylon insert is squeezed like a wedge between the thread of the plunger and the fastening component, providing extremely high loosening torque. The Long-Lok thread lock does not require initial tension or any defined position so that it is secure in every position. All plungers are pressure and function tested. The steel plungers have a black oxide finish. Steel noses are made of hardened steel. Stainless plungers have a natural finish. Stainless noses are hardened. Metric dimensions are in millimeters. Metric end pressures are in Newtons.

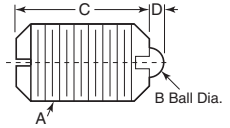
## Ball Plungers Hexagon Socket Style With Long-Lok Thread Lock Inch or Metric



Steel	Stainless	Initial End Force	Final End Force	A	B	C	D	E	Pack Qty.
<b>Inch - Standard End Pressure</b>									
KBP-153	KBP-159	2.02	2.92	1/4-28	.59	.04	.14	1/8	1
KBP-154	KBP-160	2.02	2.92	1/4-20	.59	.04	.14	1/8	1
KBP-155	KBP-161	3.37	6.74	5/16-18	.71	.06	.20	3/16	1
KBP-156	KBP-162	4.50	7.87	3/8-16	.91	.08	.24	1/4	1
KBP-157	KBP-163	6.74	12.36	1/2-13	1.02	.10	.31	7/16	1
KBP-158	KBP-164	14.61	28.10	5/8-11	1.30	.14	.39	1/2	1
<b>Metric - Standard End Pressure</b>									
KBP-143	KBP-148	9	13	M6	15	1.0	3.5	3	1
KBP-144	KBP-149	15	30	M8	18	1.5	5.0	4	1
KBP-145	KBP-150	20	35	M10	23	2.0	6.0	5	1
KBP-146	KBP-151	30	55	M12	26	2.5	8.0	6	1
KBP-147	KBP-152	65	125	M16	33	3.5	10.0	8	1
<b>Inch - Heavy End Pressure</b>									
KBP-175	KBP-181	6.29	8.99	1/4-28	.59	.04	.14	1/8	1
KBP-176	KBP-182	6.29	8.99	1/4-20	.59	.04	.14	1/8	1
KBP-177	KBP-183	10.57	16.41	5/16-18	.71	.06	.20	3/16	1
KBP-178	KBP-184	14.84	22.48	3/8-16	.91	.08	.24	1/4	1
KBP-179	KBP-185	14.84	26.98	1/2-13	1.02	.10	.31	7/16	1
KBP-180	KBP-186	20.23	40.46	5/8-11	1.30	.14	.39	1/2	1
<b>Metric - Heavy End Pressure</b>									
KBP-165	KBP-170	28	40	M6	15	1.0	3.5	3	1
KBP-166	KBP-171	47	73	M8	18	1.5	5.0	4	1
KBP-167	KBP-172	66	100	M10	23	2.0	6.0	5	1
KBP-168	KBP-173	66	120	M12	26	2.5	8.0	6	1
KBP-169	KBP-174	90	180	M16	33	3.5	10.0	8	1

Note: End force for inch is in Lbs. End force for Metric is in Newtons.

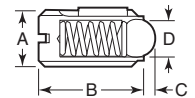
## Delrin Body Stainless Steel and Nylon Ball



For use in plastic applications or when situation requires as few metal parts as possible. Excellent when electrical isolation is necessary. Highly durable Delrin body and stainless steel spring allows use in corrosive environments. Plunger wrenches will not work with this style.

Stainless Ball	Nylon Ball	Item No.	Item No.	Color	Initial End Force	Final End Force	A	B	C	D	Pack Qty.
DL54	NDL54	Blue	1.0	2.5	1/4-20	.125	.531	.027	1		
D54	ND54	White	2.0	5.0	1/4-20	.125	.531	.027	1		
DL56	NDL56	Blue	2.0	4.5	5/16-18	.156	.578	.039	1		
D56	ND56	White	4.0	9.0	5/16-18	.156	.578	.039	1		
DL58	NDL58	Blue	2.5	5.0	3/8-16	.187	.625	.053	1		
D58	ND58	White	5.0	10.0	3/8-16	.187	.625	.053	1		

## Ball Plungers Slotted Style With Long-Lok Thread Lock Inch or Metric

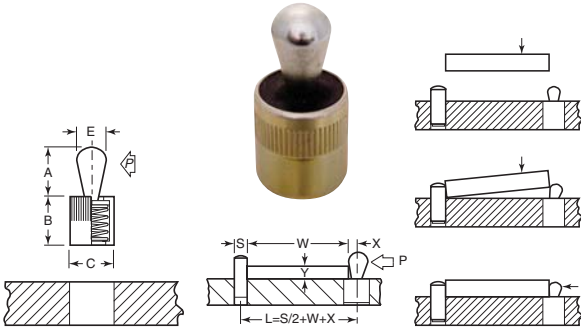


Steel	Stainless	Item No.	Item No.	Initial End Force	Final End Force	A	B	C	D	Pack Qty.
<b>Inch - Standard End Pressure</b>										
KBP-203	KBP-213	.33	.67	6-32	.28	.02	.06	1		
KBP-204	KBP-214	90	2.25	8-36	.35	.03	.10	1		
KBP-205	KBP-215	90	2.25	8-32	.35	.03	.10	1		
KBP-206	KBP-216	1.35	2.47	10-32	.47	.04	.12	1		
KBP-207	KBP-217	2.02	2.92	1/4-28	.55	.04	.14	1		
KBP-208	KBP-218	2.02	2.92	1/4-20	.55	.04	.14	1		
KBP-209	KBP-219	3.37	6.74	5/16-18	.63	.06	.20	1		
KBP-210	KBP-220	4.50	7.87	3/8-16	.75	.08	.24	1		
KBP-211	KBP-221	6.74	12.36	1/2-13	.87	.10	.31	1		
KBP-212	KBP-222	14.61	28.10	5/8-11	.94	.14	.39	1		
<b>Metric - Standard End Pressure</b>										
KBP-187	KBP-195	1.5	3	M3	7	.50	1.5	1		
KBP-188	KBP-196	4	10	M4	9	.80	2.5	1		
KBP-189	KBP-197	6	11	M5	12	.90	3.0	1		
KBP-190	KBP-198	9	13	M6	14	1.0	3.5	1		
KBP-191	KBP-199	15	30	M8	16	1.5	5.0	1		
KBP-192	KBP-200	20	35	M10	19	2.0	6.0	1		
KBP-193	KBP-201	30	55	M12	22	2.5	8.0	1		
KBP-194	KBP-202	65	125	M16	24	3.5	10.0	1		
<b>Inch - Heavy End Pressure</b>										
KBP-235	KBP-242	4.27	6.74	10-32	.47	.04	.12	1		
KBP-236	KBP-243	6.29	8.99	1/4-28	.55	.04	.14	1		
KBP-237	KBP-244	6.29	8.99	1/4-20	.55	.04	.14	1		
KBP-238	KBP-245	10.57	16.41	5/16-18	.63	.06	.20	1		
KBP-239	KBP-246	14.84	22.48	3/8-16	.75	.08	.24	1		
KBP-240	KBP-247	14.84	26.98	1/2-13	.87	.10	.31	1		
KBP-241	KBP-248	20.23	40.46	5/8-11	.94	.14	.39	1		
<b>Metric - Heavy End Pressure</b>										
KBP-223	KBP-229	19	30	M5	12	.90	3.0	1		
KBP-224	KBP-230	28	40	M6	14	1.0	3.5	1		
KBP-225	KBP-231	47	73	M8	16	1.5	5.0	1		
KBP-226	KBP-232	66	100	M10	19	2.0	6.0	1		
KBP-227	KBP-233	66	120	M12	22	2.5	8.0	1		
KBP-228	KBP-234	90	180	M16	24	3.5	10.0	1		



# SPRING LOCATING PINS

To determine mounting hole locations, use the following formula:  $L = S/2+W+X$   
 To determine the proper thickness of the workpiece, use the following formula:  $Y > (C-B/2)$   
**L** = Location  
**S** = Diameter of locating pin  
**W** = Width of workpiece  
**X** = See chart  
**Y** = Height of workpiece



These spring locating pins are used for positioning parts against fixed locators to insure proper contact. Their compact design makes them especially helpful when clamping small parts or for use in tight spaces. They also help hold the part during the set up operation. The sleeve is aluminum, spring is steel and the pressure pin is steel or plastic. The seal helps keep out coolant and other contaminants. Metric dimensions are in millimeters.

## Spring Locating Pins Inch

Item No.	A	B	C	E	P (Lbs.)	X Dimension When Y Equals							Pack Qty.
						Y=.063	Y=.125	Y=.188	Y=.25	Y=.313	Y=.375	Y=.438	
<b>w/ Seal</b>													
KSP-100	.158	.295	.250	.118	2.2	.022	.024	.024	.024	.024	.024	.024	1
KSP-105	.158	.295	.250	.118	4.5	.022	.024	.024	.024	.024	.024	.024	1
KSP-110	.158	.295	.250	.118	9	.022	.024	.024	.024	.024	.024	.024	1
KSP-115	.236	.452	.438	.197	4.5	—	.055	.055	.055	.055	.055	.055	1
KSP-120	.236	.452	.438	.197	11.2	—	.055	.055	.055	.055	.055	.055	1
KSP-125	.236	.452	.438	.197	22.5	—	.055	.055	.055	.055	.055	.055	1
KSP-130	.394	.452	.438	.236	9	—	.049	.059	.059	.059	.059	.059	1
KSP-135	.394	.452	.438	.236	17	—	.049	.059	.059	.059	.059	.059	1
KSP-140	.394	.452	.438	.236	34	—	.049	.059	.059	.059	.059	.059	1
KSP-145	.512	.532	.500	.315	11.2	—	—	.077	.087	.087	.087	.087	1
KSP-150	.512	.532	.500	.315	22.5	—	—	.077	.087	.087	.087	.087	1
KSP-155	.512	.532	.500	.315	45	—	—	.077	.087	.087	.087	.087	1
KSP-160	.630	.689	.625	.394	22.5	—	—	—	.098	.107	.110	.110	1
KSP-165	.630	.689	.625	.394	45	—	—	—	.098	.107	.110	.110	1
KSP-170	.630	.689	.625	.394	67.5	—	—	—	.098	.107	.110	.110	1

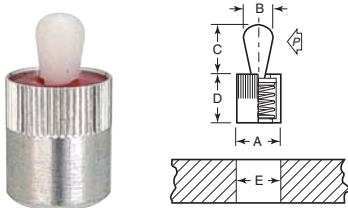
Note: Dimension C mounting hole +.004 or .1mm  
 Y = Height of the Workpiece

## Spring Locating Pins Metric

Item No.	A	B	C	E	P (Newtons)		X Dimension When Y Equals							Pack Qty.
					Steel Pins	Plastic Pins	Y=1	Y=2	Y=3	Y=4.5	Y=6	Y=8		
<b>Steel Pin - No Seal</b>														
KSP-5	4.0	7	6	3	20	—	.8	1.0	—	—	—	—	1	
KSP-10	6.7	11	10	5	50	—	—	1.5	1.7	—	—	—	1	
KSP-15	10.7	11	10	6	75	—	—	—	—	1.7	1.9	—	1	
<b>Steel Pin - w/ Seal</b>														
KSP-30	4.0	7	6	3	20	—	.8	1.0	—	—	—	—	1	
KSP-35	6.0	12	10	5	50	—	—	1.5	1.7	—	—	—	1	
KSP-40	10.0	12	10	6	75	—	—	—	—	1.7	1.9	—	1	
KSP-45	13.0	14	12	8	100	—	—	—	—	—	2.5	2.7	1	

Note: Dimension C mounting hole +.004 or .1mm  
 Y = Height of the Workpiece

## Spring Locating Pins With Steel Plastic or Stainless Pin



These spring locating pins are designed for fixturing small parts in tight or compact space. Ideal for positioning and chucking flat parts and round parts for profile clamping. Bodies are made of aluminum and are available with steel, stainless steel or plastic pins. Steel pins are case hardened and zinc coated. Plastic pins are made of delrin. Steel and plastic pin locators with seal have steel springs. Stainless locators with seal have Type 304 stainless pin with cast nylon spring and aluminum body. Available with or without seals. Pins with no seal have neoprene inside rather than a spring. Pins with seal recommended for applications involving any fluid or liquid.

See page 420 for installation tools and liners.

Item No.	Item No.	Item No.	Diameter A	B	C	D	E	Force (Lbs.) P	X	Installation Tool	Pack Qty.
<b>w/ Seal</b>											
JLP-5	JLP-80	—	.250	.118	.158	.276	.250	2.2	.035	JLP-400	1
JLP-10	JLP-85	—	.250	.118	.158	.276	.250	4.5	.035	JLP-400	1
JLP-15	—	—	.250	.118	.158	.276	.250	9	.035	JLP-400	1
JLP-20	JLP-90	—	.438	.197	.236	.472	.438	4.5	.063	JLP-405	1
JLP-25	JLP-95	—	.438	.197	.236	.472	.438	11.2	.063	JLP-405	1
JLP-30	—	—	.438	.197	.236	.472	.438	21.5	.063	JLP-405	1
JLP-35	JLP-100	—	.438	.236	.438	.472	.438	9	.071	JLP-410	1
JLP-40	JLP-105	—	.438	.236	.438	.472	.438	17.0	.071	JLP-410	1
JLP-45	—	—	.438	.236	.438	.472	.438	34.0	.071	JLP-410	1
JLP-50	JLP-110	—	.500	.315	.512	.551	.500	11.2	.102	JLP-415	1
JLP-55	JLP-115	—	.500	.315	.512	.551	.500	22.5	.102	JLP-415	1
JLP-60	—	—	.500	.315	.512	.551	.500	45	.102	JLP-415	1
JLP-65	JLP-120	—	.625	.394	.625	.709	.625	22.5	.126	JLP-420	1
JLP-70	JLP-125	—	.625	.394	.625	.709	.625	45	.126	JLP-420	1
JLP-75	—	—	.625	.394	.625	.709	.625	67.5	.126	JLP-420	1

Item No.	Item No.	Item No.	Diameter A	B	C	D	E	Force (Lbs.) P	X	Installation Tool	Pack Qty.
<b>No Seal</b>											
JLP-130	JLP-195	JLP-255	.250	.118	.146	.295	.250	2.2	.039	JLP-400	1
JLP-135	JLP-200	JLP-260	.250	.118	.146	.295	.250	4.4	.039	JLP-400	1
JLP-140	JLP-205	JLP-265	.438	.197	.287	.354	.438	6.7	.063	JLP-405	1
JLP-145	JLP-210	JLP-270	.438	.197	.287	.354	.438	13.5	.063	JLP-405	1
JLP-150	JLP-215	JLP-275	.438	.197	.287	.354	.438	20.0	.063	JLP-405	1
JLP-155	—	JLP-280	.438	.236	.406	.354	.438	4.4	.075	JLP-410	1
JLP-160	JLP-225	JLP-285	.438	.236	.406	.354	.438	6.7	.075	JLP-410	1
JLP-165	—	JLP-290	.438	.236	.406	.354	.438	13.5	.075	JLP-410	1
JLP-170	—	JLP-295	.438	.236	.406	.354	.438	20.0	.075	JLP-410	1
JLP-175	—	JLP-300	.500	.315	.520	.512	.500	11.1	.106	JLP-415	1
JLP-180	—	JLP-305	.500	.315	.520	.512	.500	22.2	.106	JLP-415	1
JLP-185	JLP-245	JLP-310	.625	.394	.654	.625	.625	17.5	.134	JLP-420	1
JLP-190	JLP-250	JLP-315	.625	.394	.654	.625	.625	35.0	.134	JLP-420	1





**Spring Stops**

**Flat Face**

**With or without Tang**

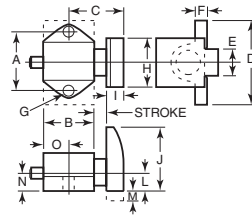
Ideal for holding thin gauge sheet metal in jigs and fixtures during spot welding or machining operations. Aluminum body. Plunger is case hardened. Supplied with or without tang. Tang prevents thin gauge material from sliding under plunger.



**With Tang**



**Without Tang**



Item No.	Body Material	Initial End Force Lbs.	Final End Force Lbs.	Stroke	A	B	C	D	E	F	G	H	I	J	L	M	N	O	Base Style	Pack Qty.
<b>Flat Face w/ Tang</b>																				
DS-4	Aluminum	5.13	14.58	1/8	21/32	11/16	21/32	7/8	1/4	3/16	#29	5/8	3/16	5/8	13/64	1/4	7/32	11/32	Triangular	1
DS-6	Aluminum	2.25	25.75	3/16	1 1/8	1	15/16	1 1/2	3/8	1/4	13/64	7/8	1/4	7/8	19/64	1/4	5/16	1/2	Rectangular	1
DS-8	Aluminum	16.50	47.50	1/4	1 1/2	1 3/8	1 1/16	2	1/2	1/4	17/64	1 1/4	3/8	1 1/4	27/64	1/4	7/16	1 1/16	Rectangular	1
<b>Flat Face w/o Tang</b>																				
DS-5	Aluminum	5.13	14.58	1/8	21/32	11/16	21/32	7/8	—	3/16	#29	5/8	3/16	5/8	—	—	7/32	11/32	Triangular	1
DS-7	Aluminum	2.25	25.75	3/16	1 1/8	1	15/16	1 1/2	—	1/4	13/64	7/8	1/4	7/8	—	—	5/16	1/2	Rectangular	1
DS-9	Aluminum	16.50	47.50	1/4	1 1/2	1 3/8	1 1/16	2	—	1/4	17/64	1 1/4	3/8	1 1/4	—	—	7/16	1 1/16	Rectangular	1

**Spring Stops**

**Round Nose**

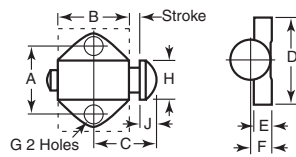
Spring stops are used extensively in the locating of parts in jigs and fixtures, particularly where fixture walls are not available. Plunger is hardened and ground smooth. Properly radiused nose for perfect fit with no wobble. Aluminum body. Steel or delrin nose.



**Delrin Nose**



**Steel Nose**



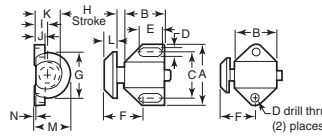
Item No.	Delrin Nose	Item No.	Body Material	Initial End Force Lbs.	Final End Force Lbs.	A	B	C	D	E	F	G	H	J	Base Style	Pack Qty.
DS-1	DS-1N	Aluminum	5.13	14.58	21/32	11/16	19/32	7/8	3/16	7/32	#29	3/8	1/8	1/16	Triangular	1
DS-2	DS-2N	Aluminum	2.25	25.75	1 1/8	1	7/8	1 1/2	1/4	3/16	13/64	9/16	3/16	1/16	Rectangular	1
DS-3	DS-3N	Aluminum	16.50	47.50	1 1/2	1 3/8	1 1/32	2	1/4	7/16	17/64	13/16	9/32	1/16	Rectangular	1

**Spring Stops**

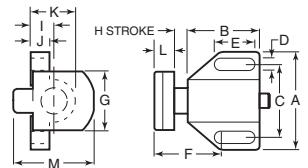
**Flat Button Type**



**Type A**



**Type B**



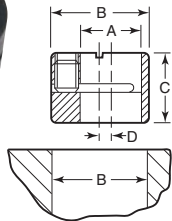
Aluminum alloy body. Plunger is low carbon steel and case hardened.

Item No.	Type	Half-Depressed End Force Lbs.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Pack Qty.
DS-60	A	10	15/16	1 1/16	21/32	.14	.35	21/32	3/4	1/8	7/32	3/16	13/32	3/16	19/32	1/64	1
DS-61	B	14	1 1/2	1	1 1/8	.20	.54	29/32	7/8	3/16	29/32	5/8	3/4	1 1/8	—	—	1
DS-62	A	32	2	1 3/8	1 1/2	1/4	.69	1 1/16	1 1/2	1/4	7/16	1/4	7/8	3/8	1 1/16	1/64	1

**Spring Stop**

**Eccentric Liners**

Eccentric liners can be used when lesser tolerances are acceptable.



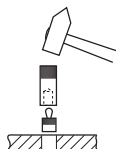
Item No.	A	B	C	D	Pack Qty.
JLP-500	.250	.500	.390	.079	1
JLP-505	.438	.687	.469	.079	1
JLP-510	.500	.750	.547	.079	1
JLP-515	.625	1.000	.705	.118	1

**Spring Stop Installation Tools**



Locating spring pin installation tools are designed to make installation easier.

Item No.	Pack Qty.	Item No.	Pack Qty.
JLP-400	1	JLP-415	1
JLP-405	1	JLP-420	1
JLP-410	1		

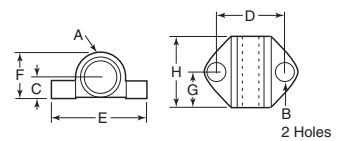


**Spring Stop**

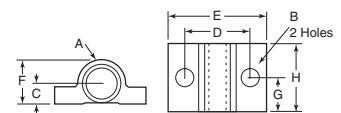
**Tooling Flanges**



**Triangular**



**Rectangular**



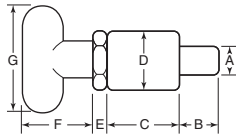
Tooling flanges are compatible with a wide variety of spring loaded devices and tooling components. Ideal for fixtures requiring a horizontal application of a spring plunger.

Item No.	Style	A	B	C	D	E	F	G	H	Pack Qty.
DS-25	Triangular	1/4-20	.136	.22	.66	.88	.41	.34	.69	1
DS-50	Rectangular	1/2-13	.203	.31	1.13	1.50	.63	.50	1.00	1



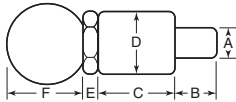
These spring loaded pull pins allow you to quickly retract and engage the plunger for locating, fastening and quick change operations. They consist of two parts which include a housing (barrel) and a plunger assembly. The plunger assembly screws into the housing. The housing is designed to be welded into place for strength. Pulling on the handle of the plunger assembly retracts the plunger into the housing. Releasing the handle allows the spring loaded plunger to extend. The lockout style allows you to pull and rotate the handle 1/4 turn to hold the plunger in the retracted position. The style without handles features a 3/8-16 threaded end so the user can add a different handle or other method of actuation. The zinc plated steel plunger assemblies are made from C1038 steel on all sizes except the 5/8 which is made from 12L15 steel. The steel housing is made from 12L15 steel for welding to the fixture and is not plated. The aluminum housings are made from 6061-T6. The stainless steel models (plunger assembly and housing) are made from Type 303 stainless steel. Pull up force is approximately 5 lbs. Handles are made from black plastic.

**Pull Pins  
T-Handle**



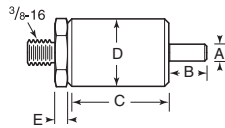
Standard		Lockout							Pack Qty.
Item No.	Item No.	A	B	C	D	E	F	G	
<b>Steel Plunger - Steel Housing</b>									
BSD-50	BSD-50LO	1/4	9/16	1 1/2	1	3/16	1 7/16	2 1/4	1
BSD-55	BSD-55LO	3/8	9/16	1 1/2	1	3/16	1 7/16	2 1/4	1
BSD-60	BSD-60LO	1/2	9/16	1 1/2	1	3/16	1 7/16	2 1/4	1
BSD-65	BSD-65LO	1/2	9/16	2 1/4	1	3/16	1 7/16	2 1/4	1
BSD-70	BSD-70LO	5/8	9/16	2 1/4	1	3/16	1 7/16	2 1/4	1
<b>Steel Plunger - Aluminum Housing</b>									
BSD-50AL	BSD-50LOAL	1/4	9/16	1 1/2	1	3/16	1 7/16	2 1/4	1
BSD-55AL	BSD-55LOAL	3/8	9/16	1 1/2	1	3/16	1 7/16	2 1/4	1
BSD-60AL	BSD-60LOAL	1/2	9/16	1 1/2	1	3/16	1 7/16	2 1/4	1
BSD-65AL	BSD-65LOAL	1/2	9/16	2 1/4	1	3/16	1 7/16	2 1/4	1
BSD-70AL	BSD-70LOAL	5/8	9/16	2 1/4	1	3/16	1 7/16	2 1/4	1
<b>Stainless Steel Plunger - Stainless Steel Housing</b>									
BSD-55SS	BSD-55LOSS	3/8	9/16	1 1/2	1	3/16	1 7/16	2 1/4	1
BSD-60SS	BSD-60LOSS	1/2	9/16	1 1/2	1	3/16	1 7/16	2 1/4	1
BSD-65SS	BSD-65LOSS	1/2	9/16	2 1/4	1	3/16	1 7/16	2 1/4	1

**Pull Pins  
Round Handle**



Standard		Lockout						Pack Qty.
Item No.	Item No.	A	B	C	D	E	F	
<b>Steel Plunger - Steel Housing</b>								
BSD-25	BSD-25LO	1/4	9/16	1 1/2	1	3/16	1 3/8	1
BSD-30	BSD-30LO	3/8	9/16	1 1/2	1	3/16	1 3/8	1
BSD-35	BSD-35LO	1/2	9/16	1 1/2	1	3/16	1 3/8	1
BSD-40	BSD-40LO	1/2	9/16	2 1/4	1	3/16	1 3/8	1
BSD-45	BSD-45LO	5/8	9/16	2 1/4	1	3/16	1 3/8	1
<b>Steel Plunger - Aluminum Housing</b>								
BSD-25AL	BSD-25LOAL	1/4	9/16	1 1/2	1	3/16	1 3/8	1
BSD-30AL	BSD-30LOAL	3/8	9/16	1 1/2	1	3/16	1 3/8	1
BSD-35AL	BSD-35LOAL	1/2	9/16	1 1/2	1	3/16	1 3/8	1
BSD-40AL	BSD-40LOAL	1/2	9/16	2 1/4	1	3/16	1 3/8	1
BSD-45AL	BSD-45LOAL	5/8	9/16	2 1/4	1	3/16	1 3/8	1
<b>Stainless Steel Plunger - Stainless Steel Housing</b>								
BSD-30SS	BSD-30LOSS	3/8	9/16	1 1/2	1	3/16	1 3/8	1
BSD-35SS	BSD-35LOSS	1/2	9/16	1 1/2	1	3/16	1 3/8	1
BSD-40SS	BSD-40LOSS	1/2	9/16	2 1/4	1	3/16	1 3/8	1

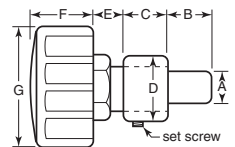
**Pull Pins  
Threaded End - Non-Locking**



Item No.	A	B	C	D	E	Pack Qty.
<b>Steel Plunger - Steel Housing</b>						
BSD-75	1/4	9/16	1 1/2	1	3/16	1
BSD-80	3/8	9/16	1 1/2	1	3/16	1
BSD-85	1/2	9/16	1 1/2	1	3/16	1
BSD-90	1/2	9/16	2 1/4	1	3/16	1
BSD-95	5/8	9/16	2 1/4	1	3/16	1
<b>Steel Plunger - Aluminum Housing</b>						
BSD-75AL	1/4	9/16	1 1/2	1	3/16	1
BSD-80AL	3/8	9/16	1 1/2	1	3/16	1
BSD-85AL	1/2	9/16	1 1/2	1	3/16	1
BSD-90AL	1/2	9/16	2 1/4	1	3/16	1
BSD-95AL	5/8	9/16	2 1/4	1	3/16	1
<b>Stainless Steel Plunger - Stainless Steel Housing</b>						
BSD-80SS	3/8	9/16	1 1/2	1	3/16	1
BSD-85SS	1/2	9/16	1 1/2	1	3/16	1
BSD-90SS	1/2	9/16	2 1/4	1	3/16	1

**Adjustable Clamping Pins  
Spring Loaded**

These spring loaded adjustable clamping pins allow for quick clamping and release. Once the pin is engaged, turning the knob allows the pin to tighten down on the work piece or further extend the plunger in the locating hole. Because it can be quickly adjusted, it is ideal for applications where there is variance in the part being held. Pulling up on the handle retracts the plunger fully into the housing. The set screw on the housing allows you to lock the plunger at a set depth for repeated operations and prevents the mechanism from coming out of the housing. Plunger is made from 1038 steel providing a tensile strength of 90 to 95 KSI. These can be heat treated for greater strength as specials. The housing is made from 12L15 steel for welding to fixture.



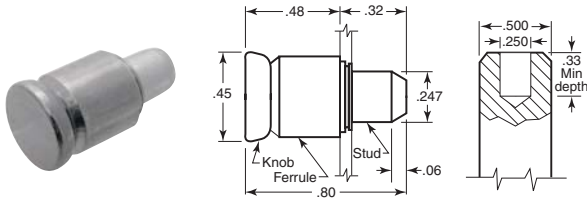
Item No.	A	B	C	D	E	F	G	Adjustment	Pack Qty.
BSD-5	1/4	9/16	3/4	1 1/8	1/2	1 1/8	2 1/4	5/8	1
BSD-15	1/2	9/16	3/4	1 1/8	1/2	1 1/8	2 1/4	5/8	1



# SPRING LOADED CATCHES

Provides quick release of sliding parts. Optional hold open feature available. Hold open feature operates by turning knob 90 degrees and plunger will remain in retracted position. Simply turn knob 90 degrees to release. Working shear loads for all plungers are 400 lbs. when installed in steel panels, 300 lbs. for aluminum panels.

## Spring Loaded Catches Press In



Press in plungers are made of 1006 steel, case hardened, bright nickel plate. Install by pressing knob with approximately 3,000 lbs. for steel and 1,500 lbs. for aluminum panels until ferrule sits flush with panel. A solid back up tool must be used for proper installation.

Item No.	Southco	Pack Qty.
<b>Without Hold Open</b>		
SC-560	56-60	1
<b>With Hold Open</b>		
SC-561	56-61	1

## Spring Loaded Catches Flare In

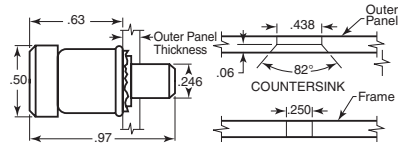
Flare in plungers are made of passivated stainless steel. A flaring tool is available to aid in installation. 82° counter sink is recommended for installation, but not necessary.



Flare In Plunger

Flaring Tool

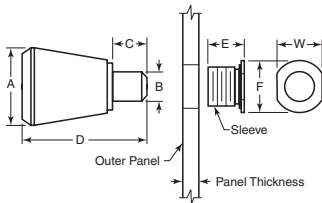
Item No.	Southco	Outer Panel Thickness		Pack Qty.
		w/ Countersink	w/o Countersink	
<b>Without Hold Open</b>				
SC-5611	56-99-192-01	.109 - .141	.063 - .078	1
<b>With Hold Open</b>				
SC-5601	56-10-801-10	.109 - .141	.063 - .078	1
SC-5603	56-10-803-10	.234 - .266	.156 - .203	1
<b>Flaring Tool</b>				
SC-5699	56-0-17355-11	—	—	1



## Spring Loaded Catches Thread In



Thread In Plunger

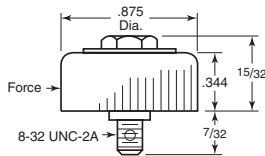


Installation Tool

Thread in plungers are made of 6262-T9 aluminum with low carbon steel stud. Installation tool is available to aid installation.

Item No.	Southco	A	B	C	D	E	F	W	Panel Thickness	Pack Qty.
<b>With Hole Open</b>										
SC-5621	56-10-301-20	.53	.183	.25	.78	.22	.34	.28	.025 - .060	1
SC-5622	56-10-401-20	.69	.245	.31	1.03	.28	.44	.37	.031 - .125	1
<b>Without Hole Open</b>										
SC-5631	56-99-196-20	.53	.183	.25	.78	.22	.34	.28	.025 - .060	1
SC-5632	56-99-197-20	.69	.245	.31	1.03	.28	.44	.37	.031 - .125	1
<b>Installation Tool</b>										
SC-5697	56-0-22041-03	Installation Tool for SC-5631 and SC-5621								1
SC-5698	56-0-22041-04	Installation Tool for SC-5632 and SC-5622								1

## Stock Crowders

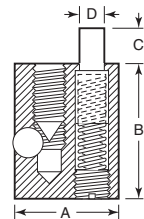


Provides positive alignment of stock in dies and fixtures. Saves pilots and is easily removed when dies are to be sharpened. Handles stock as thin as .010" and width variation up to 1/16". Thinner material can be handled by setting stock pusher in counter bore. Simple to mount - only requires one tapped hole.

Item No.	Force Lbs.	Pack Qty.
PL-4	2 or 4	1
PM-4	3 or 6	1
PH-4	5 or 10	1

**Note:** To assure that the proper force will be applied, locate tapped hole .407 from edge of stock (for 2, 3, and 5 lbs.) or .376 from edge of stock (for 4, 6 and 10 lbs.)

## Gauge Stops Adjustable - Internal Locking



Speeds layout and set up by eliminating exact position locators as well as the need to remove the die or fixture for adjustment. The spring loaded pin completely retracts into the gauge body. Easily installed by drilling at an approximate location and dropping in the stop. Adjusts by rotating. Tightening the set screw forces the ball outward, locking the gauge in position.

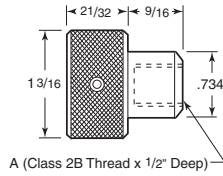
Item No.	Installation Data				Max. Adjustment	D	Pack Qty.
	A	B	Center Dia.	Hole Depth			
GS-1	.748	1	3/4	1 to 1 1/2	3/16	3/16	1
GS-2	.998	1 3/16	1	1 1/16 to 1 1/2	3/16	1/2	1
GS-3	1.248	1 3/16	1 1/4	1 1/16 to 1 1/2	1/2	1/2	1

# TORQUE HANDLES & THUMB SCREWS



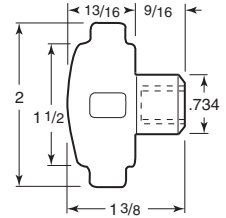
For controlling forward pressures on jigs, fixtures, machinery, etc. End pressure adjustable. Hex wrench adjustment in head permits holding forces to be varied as needed. Instructions supplied with each shipment.

### Adjustable Torque Handles Steel with Black Oxide Finish



Item No.	Adjustable Torque In.-Lbs.	Thread	Pack Qty.
AH-4	3-12	5/16-18	1
AH-5	3-12	3/8-16	1
AH-6	3-12	1/2-13	1

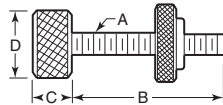
### Adjustable Torque Handles Die Cast Aluminum Hardened Cast Insert



Item No.	Adjustable Torque In.-Lbs.	Thread	Pack Qty.
AH-1	3-12	5/16-18	1
AH-2	3-12	3/8-16	1
AH-3	3-12	1/2-13	1

Torque thumb screws have many holding applications in the construction of jigs, fixtures and other special tooling. They are used extensively in supporting parts against cutting tool thrust. The controlled end pressure prevents over-tightening - the result being that spoilage due to deflection is eliminated. The head of the screw turns freely when the preset end pressure is reached. Backing off action is positive, assuring speedy unloading of fixture or tool. A spring-controlled ball-check design in the head release mechanism is perpendicular to the screw axis assuring accurate end pressures, long life and no wobble. The head design prevents chips and dirt from reaching the working parts. A Truarc retaining ring secures the knurled ring in place. Removal of Truarc ring permits quick disassembly. Check nut furnished with each torque screw. Check nut prevents backing off during operation due to chatter or vibration. Black oxide finish.

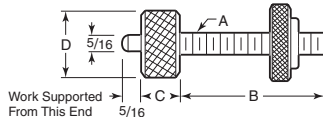
### Torque Thumb Screws Regular Type



For use in all normal supporting operations.

Item No.	A	B	C	D	Estimated End Force Lbs.	Pack Qty.
GA-1	10-32	1 1/4	.47	7/8	8-15	1
GA-2	1/4-20	1 1/4	.47	7/8	9-18	1
GA-3	1/4-20	2 1/2	.47	7/8	9-18	1
GA-4	5/16-18	1 1/4	.47	7/8	10-20	1
GA-5	5/16-18	2 1/4	.47	7/8	10-20	1
GA-6	5/16-18	3	.47	7/8	10-20	1
GA-7	3/8-16	1 1/4	.47	7/8	12-23	1
GA-8	3/8-16	2 1/4	.47	7/8	12-23	1
GA-9	3/8-16	3	.47	7/8	12-23	1
GA-10	1/2-13	1 1/4	.53	1 1/8	13-25	1
GA-11	1/2-13	2 1/4	.53	1 1/8	13-25	1
GA-12	1/2-13	3	.53	1 1/8	13-25	1
GA-13	1/2-13	3 1/2	.53	1 1/8	13-25	1
GA-14	5/8-11	1 1/4	.53	1 1/8	15-28	1
GA-15	5/8-11	3	.53	1 1/8	15-28	1

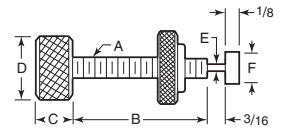
### Torque Thumb Screws Inverted Type



Applies reverse holding support for work pieces. Ideal for use in limited fixture space.

Item No.	A	B	C	D	Estimated End Force Lbs.	Pack Qty.
GB-1	1/4-20	1 1/4	7/16	7/8	9-18	1
GB-2	3/8-16	1 1/4	7/16	7/8	12-23	1
GB-3	1/2-13	1 1/4	1/2	1 1/8	13-25	1
GB-4	5/8-11	1 1/4	1/2	1 1/8	15-28	1

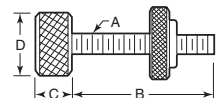
### Torque Thumb Screws T-End Type



For use with sliding V-blocks. T-end fits V-block for forward and reverse motion. Ideal when designing fixtures where parts have arms protruding from a center hub.

Item No.	A	B	C	D	E	F	Estimated End Force Lbs.	Pack Qty.
GC-1	1/4-20	1 1/4	7/16	7/8	.093	.184	13-25	1
GC-2	3/8-16	1 1/4	7/16	7/8	.174	.290	17-33	1
GC-3	1/2-13	1 1/4	1/2	1 1/8	.276	.396	19-35	1

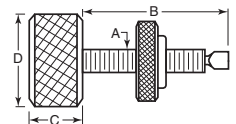
### Torque Thumb Screws Adjustable Type



A simple wrench adjustment in the head permits holding pressures to be varied as needed. Perfect for supporting either fragile or heavy work pieces.

Item No.	A	B	C	D	Adjustable Torque In.-Lbs.	Pack Qty.
GD-1	3/8-16	1 1/4	2 1/2	1 1/8	3-6	1
GD-2	3/8-16	3	2 1/2	1 1/8	3-6	1
GD-3	1/2-13	1 1/4	2 1/2	1 1/8	3-6	1
GD-4	1/2-13	3	2 1/2	1 1/8	3-6	1

### Torque Thumb Screws Swivel Pad Type



Pad on screw and end swivels 7-1/2° in all directions. Holds firmly on irregular surfaces.

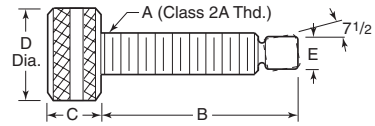
Item No.	A	B	C	D	Estimated End Force Lbs.	Pack Qty.
WS-1	1/4-20	2 1/4	.47	7/8	9-18	1
WS-2	5/16-18	2 1/4	.47	7/8	10-20	1
WS-3	3/8-16	2 1/4	.47	7/8	12-23	1
WS-4	1/2-13	3	.53	1 1/8	13-25	1



**SWIVEL PAD CLAMPS**

Buy One or Buy Bulk & SAVE

**Swivel Pad Clamps  
Knurled Head Steel body  
Steel or Delrin Pads**



Used where fingertip clamping is sufficient. Wide knurled head gives good gripping. Made of heat treated alloy steel. Pad swivels 7½ degrees each side of centerline in all directions. Large, flat pad face assures tighter clamping. Screw torque absorbed by pad. Conical seat distributes clamping pressure uniformly. Ball joint construction provides smooth angle adjustment and rotation of pad under pressure. Black oxide finish. Delrin pads eliminate marring when clamping softer materials and help to eliminate distortion.

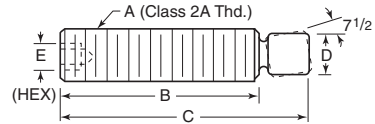
Steel Pad		Delrin Pad		A	B	C	D	E	Pack Qty.
Item No.	Steel Load Lbs.	Item No.							
AM-1	900	CM-1	¼-20	1½	2	¾	1	.185	1
AM-2	900	CM-2	¼-20	2	2	¾	1	.185	1
AM-3	2,290	CM-3	⅜-18	1½	2	7/16	1½	.240	1
AM-4	2,290	CM-4	⅜-18	2	2	7/16	1½	.240	1
AM-5	2,290	CM-5	⅜-18	2½	2	7/16	1½	.240	1
AM-6	3,340	CM-6	⅜-16	1½	2	½	1¼	.293	1
AM-7	3,340	CM-7	⅜-16	2	2	½	1¼	.293	1
AM-8	3,340	CM-8	⅜-16	2½	2	½	1¼	.293	1
AM-9	3,340	CM-9	⅜-16	3	2	½	1¼	.293	1
AM-10	7,300	CM-10	½-13	1½	2	9/16	1¼	.400	1
AM-11	7,300	CM-11	½-13	2	2	9/16	1¼	.400	1
AM-12	7,300	CM-12	½-13	2½	2	9/16	1¼	.400	1
AM-13	7,300	CM-13	½-13	3	2	9/16	1¼	.400	1

Note: Load rating applies to steel pads only

**Swivel Pad Clamps  
Socket Head Steel body  
Steel or Delrin Pads**



Steel Pad		Delrin Pad		A	B	C	D	Hex E	Pack Qty.
Item No.	Steel Load Lbs.	Item No.							
AD-0	500	CD-0	10-32	1½	1½	½	.146	¾	1
AD-1	900	CD-1	¼-20	1½	1½	½	.185	¾	1
AD-2	900	CD-2*	¼-20	19/32	1	¾	.185	¾	1
AD-3	900	CD-3	¼-20	27/32	1	¾	.185	¾	1
AD-4	900	CD-4	¼-20	1½	1½	½	.185	¾	1
AD-5	2,290	CD-5	⅜-18	35/64	1	¾	.240	¾	1
AD-6	2,290	CD-6	⅜-18	51/64	1	¾	.240	¾	1
AD-7	2,290	CD-7	⅜-18	19/64	1½	¾	.240	¾	1
AD-8	2,290	CD-8	⅜-18	151/64	2	¾	.240	¾	1
AD-9	3,340	CD-9	⅜-16	½	1	¾	.293	¾	1
AD-10	3,340	CD-10	⅜-16	¾	1	¾	.293	¾	1
AD-11	3,340	—	⅜-16	1¼	1½	¾	.297	¾	1
AD-12	3,340	CD-12	⅜-16	1¼	2	¾	.293	¾	1
AD-13	7,300	CD-13	½-13	7/16	¾	¾	.400	¾	1
AD-14	7,300	CD-14	½-13	11/16	1	¾	.400	¾	1
AD-15	7,300	CD-15	½-13	13/16	1½	¾	.400	¾	1
AD-16	7,300	CD-16	½-13	111/16	2	¾	.400	¾	1
AD-17	7,300	CD-17	½-13	211/16	3	¾	.400	¾	1
AD-18	11,700	CD-18	5/8-11	5/8	1	¾	.506	¾	1
AD-19	11,700	CD-19*	5/8-11	19/16	2	¾	.506	¾	1
AD-20	11,700	CD-20	5/8-11	29/16	3	¾	.506	¾	1
AD-21	15,000	CD-21	¾-10	1	1½	¾	.625	¾	1
AD-22	15,000	CD-22	¾-10	2	2	¾	.625	¾	1
AD-23	21,000	CD-23	1-8	53/64	1½	¾	.813	¾	1
—	—	CD-11	⅜-16	1¼	1½	¾	.293	¾	1



Same general construction as knurled head swivel pad clamps described at top of page. Used on holding applications where either maximum rigidity is necessary or where space is limited. Strong accurate sockets for maximum clamping leverage.

\*Stainless steel

Note: Load rating applies to steel pads only.

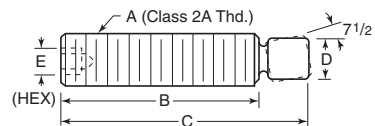
**Swivel Pad Clamps  
Stainless Steel body**



Stainless Steel Pad



Delrin Pad



Stainless Pad		Delrin Pad		A	B	C	D	E	Pack Qty.
Item No.		Item No.							
ADS-0	CDS-0	10-32	1½	1½	½	.146	¾	1	
ADS-2	CDS-2	¼-20	19/32	1	¾	.185	¾	1	
ADS-3	CDS-3	¼-20	27/32	1	¾	.185	¾	1	
ADS-4	CDS-4	¼-20	1½	1½	¾	.185	¾	1	
ADS-5	CDS-5	⅜-18	35/64	1	¾	.240	¾	1	
ADS-6	CDS-6	⅜-18	51/64	1	¾	.240	¾	1	
ADS-7	CDS-7	⅜-18	19/64	1½	¾	.240	¾	1	
ADS-8	CDS-8	⅜-18	151/64	2	¾	.240	¾	1	
ADS-10	CDS-10	⅜-16	¾	1	¾	.293	¾	1	
ADS-11	CDS-11	⅜-16	1¼	1½	¾	.293	¾	1	
ADS-12	CDS-12	⅜-16	1¼	2	¾	.293	¾	1	
ADS-14	CDS-14	½-13	7/16	1	¾	.400	¾	1	
ADS-16	CDS-16	½-13	11/16	2	¾	.400	¾	1	
ADS-22	CDS-22	¾-10	2	2	¾	.625	¾	1	

# TOGGLE SHOE CLAMPS

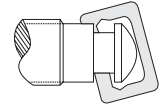
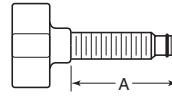


The toggle shoe is held in place with a retaining spring which permits the shoe to adjust itself a full 10 degrees in all directions. The toggle shoes snap on for quick assembly and are small enough to eliminate interference. Both shoe and screw are heat treated. Retaining springs available separately.

## Toggle Shoe Clamps Powdered Metal Hand Knob



Complete Assembly						Toggle Clamps w/o Shoes
Item No.	Thread	A	Toggle Dia.	Shoe Length	Knob Dia.	Pack Qty. / Item No.
TA-141	1/4-20	1 3/16	5/16	3/16	1 1/8	1 T-141
TA-142	1/4-20	1 15/16	5/16	3/16	1 1/8	1 T-142
TA-143	1/4-20	2 11/16	5/16	3/16	1 1/8	1 T-143
TA-144	1/4-20	3 1/16	5/16	3/16	1 1/8	1 T-144
TA-561	5/16-18	1 1/4	3/8	7/32	1 1/2	1 T-561
TA-562	5/16-18	2	3/8	7/32	1 1/2	1 T-562
TA-563	5/16-18	2 3/4	3/8	7/32	1 1/2	1 T-563
TA-564	5/16-18	3 1/2	3/8	7/32	1 1/2	1 T-564
TA-381	3/8-16	1 1/4	7/16	1/4	2	1 T-381
TA-382	3/8-16	2	7/16	1/4	2	1 T-382
TA-383	3/8-16	2 3/4	7/16	1/4	2	1 T-383
TA-384	3/8-16	3 1/2	7/16	1/4	2	1 T-384
TA-385	3/8-16	4 1/4	7/16	1/4	2	1 T-385
TA-121	1/2-13	2	9/16	5/16	2 1/2	1 T-121
TA-122	1/2-13	2 3/4	9/16	5/16	2 1/2	1 T-122
TA-123	1/2-13	3 1/2	9/16	5/16	2 1/2	1 T-123
TA-124	1/2-13	4 1/4	9/16	5/16	2 1/2	1 T-124
TA-125	1/2-13	5	9/16	5/16	2 1/2	1 T-125
TA-581	5/8-11	2 1/4	1 1/16	1 3/32	3	1 T-581
TA-582	5/8-11	3	1 1/16	1 3/32	3	1 T-582
TA-583	5/8-11	3 3/4	1 1/16	1 3/32	3	1 T-583
TA-584	5/8-11	4 1/2	1 1/16	1 3/32	3	1 T-584
TA-585	5/8-11	5 1/4	1 1/16	1 3/32	3	1 T-585



## Retaining Springs for Toggle Shoe Clamp Assemblies



Item No.	For Thread Size	Pack Qty.
TA-98001	1/4	1
TA-98002	5/16	1
TA-98003	3/8	1
TA-98004	1/2	1
TA-98005	5/8	1

## Toggle Shoe Clamps Knurled Head or Socket Head



Knurled Head



Socket Head



Toggle shoes are not included with these styles. Toggle shoes are sold separately below.

Socket Head		Knurled Head		Socket Head		Knurled Head		Pack Qty.							
Item No.	Item No.	Knurled Head Dia.	Thread	A	OAL	Hex	Pack Qty.	Item No.	Item No.	Knurled Head Dia.	Thread	A	OAL	Hex	Pack Qty.
T-1410	T-1411	1 1/16	1/4-20	1 3/8	1 13/16	1/8	1	T-1210	T-1211	1	1/2-13	2 1/2	3 1/8	1/4	1
T-1420	T-1421	1 1/16	1/4-20	2 1/8	2 9/16	1/8	1	T-1220	T-1221	1	1/2-13	3 1/4	3 3/8	1/4	1
T-1430	T-1431	1 1/16	1/4-20	2 7/8	3 5/16	1/8	1	T-1230	T-1231	1	1/2-13	4	4 5/8	1/4	1
T-1440	T-1441	1 1/16	1/4-20	3 3/8	4 1/16	1/8	1	T-1240	T-1241	1	1/2-13	4 3/4	5 3/8	1/4	1
T-5610	T-5611	3/4	5/16-18	1 3/8	2 1/8	5/32	1	T-1250	T-1251	1	1/2-13	5 1/2	6 1/8	1/4	1
T-5620	T-5621	3/4	5/16-18	2 3/8	2 7/8	5/32	1	T-5810	—	—	5/8-11	2 3/4	3 1/2	5/16	1
T-5630	T-5631	3/4	5/16-18	3 1/8	3 3/8	5/32	1	T-5820	T-5821	1 1/8	5/8-11	3 1/2	4 1/4	5/16	1
T-5640	T-5641	3/4	5/16-18	3 7/8	4 3/8	5/32	1	T-5830	—	—	5/8-11	4 1/4	5	5/16	1
T-3810	T-3811	7/8	3/8-16	1 3/4	2 1/4	3/16	1	T-5840	T-5841	1 1/8	5/8-11	5	5 3/4	5/16	1
T-3820	T-3821	7/8	3/8-16	2 1/2	3	3/16	1	T-5850	T-5851	1 1/8	5/8-11	5 3/4	6 1/2	5/16	1
T-3830	T-3831	7/8	3/8-16	3 1/4	3 3/4	3/16	1	T-5850	T-5851	1 1/8	5/8-11	5 3/4	6 1/2	5/16	1
T-3840	T-3841	7/8	3/8-16	4	4 1/2	3/16	1	—	T-5851	1 1/8	5/8-11	5 3/4	6 1/2	5/16	1
T-3850	T-3851	7/8	3/8-16	4 3/4	5 1/4	3/16	1								

## Toggle Shoes



Steel



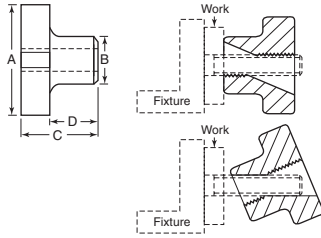
Nylon

Hardened round steel or nylon. Use nylon shoes for clamping soft materials to prevent marring or scratching.

Steel		Nylon		Use w/ Size	Dia.	Lgth.	Pack Qty.
Item No.	Item No.	Item No.	Item No.				
SR-14	SR-14N	SR-14	SR-14N	1/4-20	5/16	3/4	1
LR-14	LR-14N	LR-14	LR-14N	1/4-20	5/8	7/32	1
SR-56	SR-56N	SR-56	SR-56N	5/16-18	3/8	7/32	1
LR-56	LR-56N	LR-56	LR-56N	5/16-18	1 1/16	1/4	1
SR-38	SR-38N	SR-38	SR-38N	3/8-16	7/16	1/4	1
LR-38	LR-38N	LR-38	LR-38N	3/8-16	3/4	5/32	1
SR-12	SR-12N	SR-12	SR-12N	1/2-13	9/16	5/4	1
LR-12	LR-12N	LR-12	LR-12N	1/2-13	7/8	3/8	1
SR-58	SR-58N	SR-58	SR-58N	5/8-11	1 1/16	1 3/32	1
LR-58	LR-58N	LR-58	LR-58N	5/8-11	1	7/16	1



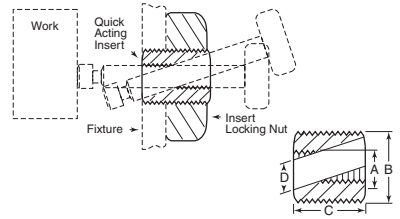
**Quick Acting Knobs - Inch and Metric**



For faster clamping. Tilt knob and it will slide in or out. Straighten knob and threads will engage for clamping. Many tooling applications. Made from powdered metal.

Item No.	Thread Size	A	B	C	D	Pack Qty.
<b>Inch</b>						
QK-1	1/4-20	1 1/8	3/16	5/8	5/16	1
QK-2	5/16-18	1 1/2	1 1/16	7/8	1/2	1
QK-3	3/8-16	2	1 3/16	1	1/2	1
QK-4	1/2-13	2 1/2	1	1 1/8	9/16	1
QK-5	5/8-11	3	1 1/4	1 1/4	5/8	1
QK-6	3/4-10	3	1 1/4	1 1/4	5/8	1
<b>Metric</b>						
QK-20	M6 x 1	1 1/8	3/16	5/8	5/16	1
QK-25	M8 x 1.25	1 1/2	1 1/16	7/8	1/2	1
QK-30	M10 x 1.5	2	1 3/16	1	1/2	1
QK-35	M12 x 1.75	2 1/2	1	1 1/8	9/16	1
QK-40	M16 x 2.00	3	1 1/4	1 1/4	5/8	1

**Quick Acting Inserts**



Heat treated steel. Black oxide finish. Easily installed in fixture by simply drilling and tapping hole at required location. For quick action tilt screw and it will slide in or out. Straighten screw and threads engage for clamping.

Item No.	A	B	C	D	Pack Qty.
QA-1	1/4-20	1/2-20	1/2	17/64	1
QA-2	5/16-18	5/8-18	5/8	21/64	1
QA-3	3/8-16	3/4-16	3/4	25/64	1
QA-4	1/2-13	1-14	1	33/64	1
QA-5	5/8-11	1 1/4-12	1 1/4	41/64	1

**Insert Locking Nuts**

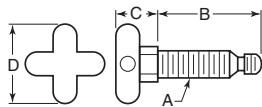


Used for locking quick acting inserts in position. Heat treated steel. Black oxide finish.

Item No.	Thread Size	Hex Size	Thickness	Pack Qty.
QN-1	1/2-20	3/4	3/16	1
QN-2	5/8-18	1 1/16	1/4	1
QN-3	3/4-16	1 1/8	5/16	1
QN-4	1-14	1 1/2	3/8	1
QN-5	1 1/4-12	1 3/4	7/16	1

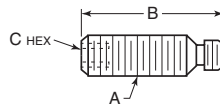
Swivel screw clamps can be constructed by pairing any of the bodies with any of the pads. All pads swivel 10 degrees from vertical and have left hand threads to prevent backout. Clamping screws are made from 12L14 steel with a black oxide finish. Knob style is aluminum with the stud press-fitted in. Pads are case hardened, black oxide finish. Bodies and pads must be ordered separately.

**Swivel Screw Clamp Body - Hand Knob**



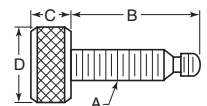
**Hand Knob**

Item No.	A	B	C	D	Pack Qty.
SSC-1121	1/4-20	1 1/32	3/4	1 1/8	1
SSC-1122	1/4-20	1 9/32	3/4	1 1/8	1
SSC-1131	5/16-18	1 1/32	7/8	1 1/2	1
SSC-1133	5/16-18	2 1/32	7/8	1 1/2	1
SSC-1141	3/8-16	1 1/16	1	2	1
SSC-1142	3/8-16	1 15/16	1	2	1
SSC-1144	3/8-16	2 1/16	1	2	1
SSC-1154	1/2-13	2 1/16	1 1/2	2 1/2	1
SSC-1155	1/2-13	3 1/16	1 1/2	2 1/2	1



**Socket Head**

Item No.	A	B	C	Pack Qty.
SSC-1221	1/4-20	1 5/32	3/32	1
SSC-1222	1/4-20	2 3/32	3/32	1
SSC-1223	1/4-20	2 1/32	3/32	1
SSC-1224	1/4-20	1 15/32	3/32	1
SSC-1231	5/16-18	2 3/32	3/32	1
SSC-1232	5/16-18	2 1/32	3/32	1
SSC-1233	5/16-18	1 15/32	3/32	1
SSC-1234	5/16-18	1 31/32	3/32	1
SSC-1242	3/8-16	1 5/16	3/16	1
SSC-1243	3/8-16	1 7/16	3/16	1
SSC-1244	3/8-16	1 15/16	3/16	1
SSC-1253	1/2-13	1 7/16	1/4	1
SSC-1255	1/2-13	2 15/16	1/4	1



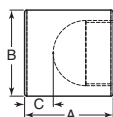
**Knurled Head**

Item No.	A	B	C	D	Pack Qty.
SSC-1321	1/4-20	1 15/32	5/16	1	1
SSC-1322	1/4-20	1 9/32	5/16	1	1
SSC-1331	5/16-18	1 15/32	3/8	1 1/8	1
SSC-1332	5/16-18	1 1/32	3/8	1 1/8	1
SSC-1333	5/16-18	2 1/32	3/8	1 1/8	1
SSC-1341	3/8-16	1 7/16	7/16	1 1/4	1
SSC-1342	3/8-16	1 15/16	7/16	1 1/4	1
SSC-1343	3/8-16	2 7/16	7/16	1 1/4	1
SSC-1344	3/8-16	2 1/16	7/16	1 1/4	1
SSC-1354	1/2-13	2 1/16	7/16	1 1/4	1

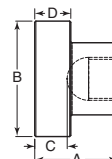
**Swivel Screw Clamp Pads**



**Small Pad**



**Large Pad**

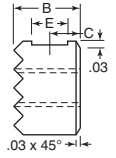
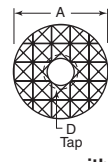
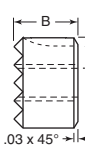
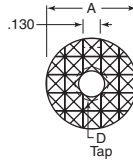
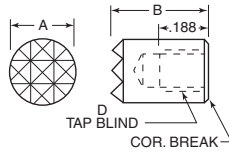


Small Pad			Large Pad				Fits Body Thread Size	Internal Thread Left Hand	Pack Qty.		
Item No.	A	B	Item No.	A	B	C				D	
SSC-1501	.193	3/16	1/16	SSC-1601	5/16	3/8	1/8	1/8	1/4-20	8-36	1
SSC-1502	19/64	1/4	9/64	SSC-1602	23/64	1/2	9/64	9/32	5/16-18	12-28	1
SSC-1503	21/64	19/64	1/16	SSC-1603	7/16	9/16	11/64	3/16	3/8-16	1/4-28	1
SSC-1504	23/64	13/32	1/16	SSC-1604	27/64	3/4	1/8	3/16	1/2-13	3/16-24	1



Eliminates costly maintenance and chuck jaw replacement. After long periods of maintenance-free service these inserts can be quickly replaced at low cost. Replacement can be accomplished right at the machine without costly downtime. Applicable to most chuck jaw designs. Held in place either by being threaded (to be held by screws entered through jaw), or flat on side to be held by set screw pressure. Steel type are made from hardened tool steel.

**Grippers Steel Round**

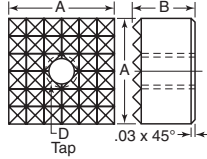


with Keyway

Item No.	+0.000/-0.005 A	+0.000/-0.005 B	C	Thru Hole D	E	Tooth Pattern	Pack Qty.	Item No.	+0.000/-0.005 A	+0.000/-0.005 B	C	Thru Hole D	E	Tooth Pattern	Pack Qty.
RGHS-00*	1/4	3/8	—	8-32	—	Ex-Fine	1	RGHS-275	5/8	1/2	15/64	1/4-28	3/16	Coarse	1
RGHS-0	3/8	3/8	15/64	10-32	3/16	Ex-Fine	1	RGHS-4	3/4	3/8	15/64	1/4-28	3/16	Fine	1
RGHS-210	3/8	1/2	15/64	10-32	3/16	Ex-Fine	1	RGHS-285	3/4	3/8	15/64	1/4-28	3/16	Ex-Fine	1
RGHS-1	1/2	3/8	15/64	10-32	3/16	Fine	1	RGHS-290	3/4	3/8	15/64	1/4-28	3/16	Coarse	1
RGHS-215	1/2	3/8	15/64	10-32	3/16	Ex-Fine	1	RGHS-295	3/4	1/2	15/64	1/4-28	3/16	Fine	1
RGHS-220	1/2	1/2	15/64	10-32	3/16	Coarse	1	RGHS-300	3/4	1/2	15/64	1/4-28	3/16	Ex-Fine	1
RGHS-225*	1/2	1/2	Keyway	10-32	Keyway	Fine	1	RGHS-305	3/4	1/2	15/64	1/4-28	3/16	Coarse	1
RGHS-2	1/2	1/2	15/64	10-32	3/16	Fine	1	RGHS-315	1	3/8	15/64	1/4-28	3/16	Coarse	1
RGHS-235	1/2	1/2	15/64	10-32	3/16	Ex-Fine	1	RGHS-41	1	3/8	15/64	1/4-28	3/16	Fine	1
RGHS-240	1/2	.651	15/64	10-32	3/16	Fine	1	RGHS-330	1	3/8	15/64	1/4-28	3/16	Ex-Fine	1
RGHS-3	3/8	3/8	15/64	1/4-28	3/16	Fine	1	RGHS-335	1	1/2	15/64	1/4-28	3/16	Coarse	1
RGHS-250	3/8	3/8	15/64	1/4-28	3/16	Ex-Fine	1	RGHS-345	1	1/2	15/64	1/4-28	3/16	Fine	1
RGHS-260	3/8	3/8	15/64	1/4-28	3/16	Coarse	1	RGHS-350	1	1/2	15/64	1/4-28	3/16	Ex-Fine	1
RGHS-265	3/8	1/2	15/64	1/4-28	3/16	Fine	1								

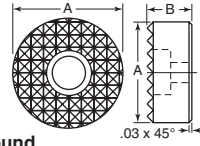
\*No Wrench Flat

**Grippers Steel Square**

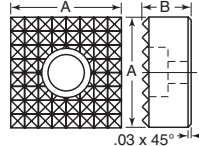


Item No.	+0.000/-0.005 A	+0.000/-0.005 B	D Tap	Tooth Pattern	Pack Qty.	Item No.	+0.000/-0.005 A	+0.000/-0.005 B	D Tap	Tooth Pattern	Pack Qty.
RGHS-360	3/8	3/8	10-32	Ex-Fine	1	RGHS-400	3/4	3/8	10-32	Coarse	1
RGHS-5	1/2	3/8	10-32	Fine	1	RGHS-405	3/4	1/2	10-32	Fine	1
RGHS-370	1/2	3/8	10-32	Ex-Fine	1	RGHS-410	3/4	1/2	10-32	Ex-Fine	1
RGHS-375	1/2	1/2	10-32	Fine	1	RGHS-415	3/4	1/2	10-32	Coarse	1
RGHS-380	1/2	1/2	10-32	Ex-Fine	1	RGHS-7	1	3/8	1/4-28	Fine	1
RGHS-385	1/2	3/8	10-32	Coarse	1	RGHS-420	1	3/8	1/4-28	Ex-Fine	1
RGHS-390	1/2	1/2	10-32	Coarse	1	RGHS-425	1	3/8	1/4-28	Coarse	1
RGHS-6	3/4	3/8	10-32	Fine	1	RGHS-430	1	1/2	1/4-28	Fine	1
RGHS-395	3/4	3/8	10-32	Ex-Fine	1						

**Grippers Steel Round and Square With Counterbore**



Round



Square

Item No.	+0.000/-0.005 A	+0.000/-0.005 B	C/Bore to Fit	Tooth Pattern	Pack Qty.	Item No.	+0.000/-0.005 A	+0.000/-0.005 B	C/Bore to Fit	Tooth Pattern	Pack Qty.
<b>Round</b>						<b>Square</b>					
RGHS-2405	1/2	3/8	#8	Fine	1	RGHS-2485	1/2	3/8	#10	Fine	1
RGHS-2410	1/2	3/8	#8	Ex-Fine	1	RGHS-2490	1/2	3/8	#10	Ex-Fine	1
RGHS-2415	1/2	1/2	#8	Fine	1	RGHS-2495	1/2	1/2	#10	Fine	1
RGHS-2420	1/2	1/2	#8	Ex-Fine	1	RGHS-82	3/4	1/2	1/4	Fine	1
RGHS-2425*	3/8	3/8	#8	Fine	1	RGHS-2505	3/4	1/2	1/4	Ex-Fine	1
RGHS-2430	3/8	3/8	#8	Ex-Fine	1	RGHS-2510	3/4	1/2	1/4	Coarse	1
RGHS-2435	3/8	1/2	#8	Fine	1	RGHS-83	1	1/2	1/4	Fine	1
RGHS-2440	3/8	1/2	#8	Ex-Fine	1	RGHS-2515	1	1/2	1/4	Ex-Fine	1
RGHS-2445	3/4	3/8	#10	Fine	1	RGHS-2520	1	1/2	1/4	Coarse	1
RGHS-80	3/4	1/2	#10	Fine	1						
RGHS-2455	3/4	1/2	#10	Ex-Fine	1						
RGHS-2460	3/4	3/8	#10	Coarse	1						
RGHS-2470	3/4	1/2	#10	Coarse	1						
RGHS-2475	1	1/2	1/4	Coarse	1						
RGHS-81	1	1/2	1/4	Fine	1						
RGHS-2480	1	1/2	1/4	Ex-Fine	1						

\*Socket head cap screw

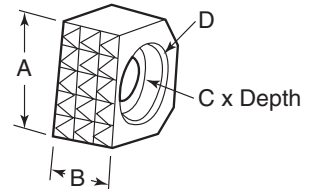
**Grippers Steel Angle Grip**



For use on N.A. Woodworth ball lock chuck.

Item No.	+0.000/-0.005 A	+0.000/-0.005 B	C Tap	Tooth Pattern	Pack Qty.	Item No.	+0.000/-0.005 A	+0.000/-0.005 B	C Tap	Tooth Pattern	Pack Qty.
RGHS-127-4	.562	.375	10-32	4 Point	1	RGHS-560	.562	.375	10-32	Angular	1
RGHS-127-12	.562	.375	10-32	Fine	1	RGHS-128-4	.750	.500	1/4-28	4 Point	1

**Grippers Square Edge Steel**



Items RGHS-20 through RGHS-34 are counterbored for a socket head cap screw and RGHS-35 through RGHS-53 are counterbored for a low head socket cap screw.

Item No.	A	B	C/Bore for x Depth C	Chamfer D (degrees)	Tooth Pattern	Pack Qty.
RGHS-20	3/8	1/4	#6 x .146	1/16 x 45	Ex-Fine	1
RGHS-21	3/8	1/4	#6 x .146	1/16 x 45	Super-Fine	1
RGHS-22	3/8	3/8	#6 x .146	1/16 x 45	Ex-Fine	1
RGHS-23	3/8	3/8	#6 x .146	1/16 x 45	Super-Fine	1
RGHS-26	1/2	1/4	#8 x .170	3/32 x 45	Fine	1
RGHS-27	1/2	1/4	#8 x .170	3/32 x 45	Ex-Fine	1
RGHS-28	1/2	1/4	#8 x .170	3/32 x 45	Super-Fine	1
RGHS-29	1/2	3/8	#8 x .175	3/32 x 45	Fine	1
RGHS-30	1/2	3/8	#8 x .175	3/32 x 45	Ex-Fine	1
RGHS-31	1/2	3/8	#8 x .175	3/32 x 45	Super-Fine	1
RGHS-32	1/2	1/2	#8 x .175	3/32 x 45	Fine	1
RGHS-33	1/2	1/2	#8 x .175	3/32 x 45	Ex-Fine	1
RGHS-35	3/8	1/4	1/4 x .130	1/8 x 45	Fine	1
RGHS-36	3/8	1/4	1/4 x .130	1/8 x 45	Ex-Fine	1
RGHS-37	3/8	3/8	1/4 x .130	1/8 x 45	Fine	1
RGHS-38	3/8	3/8	1/4 x .130	1/8 x 45	Ex-Fine	1
RGHS-39	3/8	1/2	1/4 x .130	1/8 x 45	Fine	1
RGHS-40	3/8	1/2	1/4 x .130	1/8 x 45	Ex-Fine	1
RGHS-42	3/4	1/4	3/16 x .161	1/8 x 45	Fine	1
RGHS-44	3/4	3/8	3/16 x .161	1/8 x 45	Fine	1
RGHS-46	3/4	1/2	3/16 x .161	1/8 x 45	Fine	1
RGHS-47	3/4	1/2	3/16 x .161	1/8 x 45	Ex-Fine	1
RGHS-48	1	1/4	3/8 x .194	1/8 x 45	Fine	1
RGHS-50	1	3/8	3/8 x .194	1/8 x 45	Fine	1
RGHS-52	1	1/2	3/8 x .194	1/8 x 45	Fine	1
RGHS-53	1	1/2	3/8 x .194	1/8 x 45	Ex-Fine	1





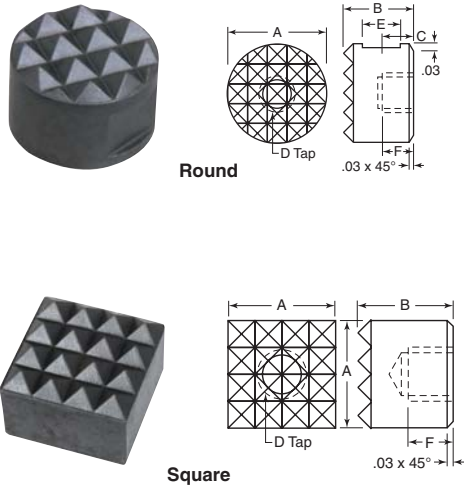
**GRIPPERS**

Buy One or Buy Bulk & SAVE



Eliminates costly maintenance and chuck jaw replacement. After long periods of maintenance-free service these inserts can be quickly replaced at low cost. Replacement can be accomplished right at the machine without costly downtime. Applicable to most chuck jaw designs. Held in place either by being threaded (to be held by screws entered through jaw), or flat on side to be held by set screw pressure. Steel type are made from hardened tool steel.

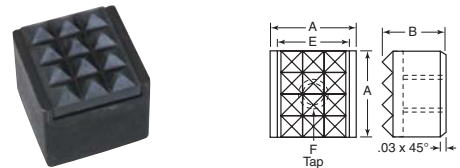
**Grippers Solid Carbide Round and Square**



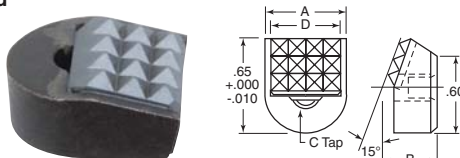
Item No.	+0.000/-0.005 A	+0.000/-0.005 B	Tap C	D	E	F	Tooth Pattern	Pack Qty.
<b>Round</b>								
RGSC-1	1/2	3/8	1 1/64	10-32	3/16	3/16	Fine	1
RGSC-1270	1/2	1/2	1 5/64	10-32	3/16	3/16	4 Point	1
RGSC-2	1/2	1/2	1 5/64	10-32	3/16	3/16	Fine	1
RGSC-3	3/8	3/8	1 1/64	1/4-28	3/16	3/16	Fine	1
RGSC-4	3/4	3/8	1 1/64	1/4-28	3/16	3/16	Fine	1
<b>Square</b>								
RGSC-5	1/2	3/8	—	10-32	—	3/16	Fine	1
RGSC-6	1/2	1/2	—	10-32	—	3/16	Fine	1

**Grippers Carbide Tipped Square**

Item No.	+0.000/-0.005 A	+0.000/-0.005 B	E	Blind Hole Tap F	Tooth Pattern	Pack Qty.
RG-5	1/2	3/8	1 3/32	10-32	Fine	1
RG-250	1/2	3/8	1 3/32	10-32	Ex-Fine	1
RG-255	1/2	1/2	1 3/32	10-32	Fine	1



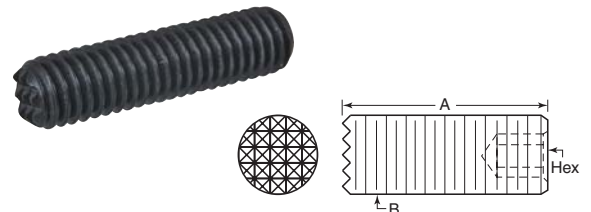
**Grippers Carbide Tipped Angle Grip**



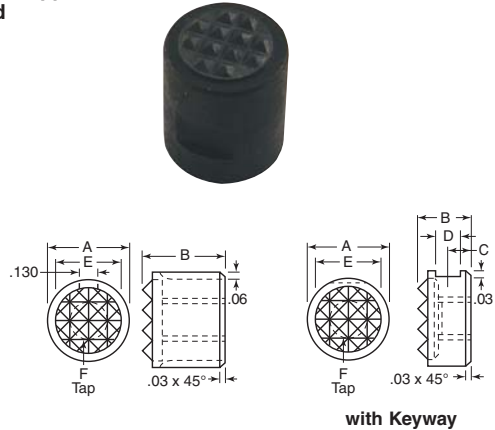
Item No.	+0.000/-0.005 A	+0.000/-0.005 B	Blind Hole Tap C	D	Tooth Pattern	Pack Qty.
RG-270	.562	.375	10-32	1 5/32	4 Point	1
RG-275	.562	.375	10-32	1 5/32	Fine	1

**Grippers Steel - Adjustable**

Item No.	A	B	Hex	Tooth Pattern	Pack Qty.	Item No.	A	B	Hex	Tooth Pattern	Pack Qty.
RGHS-600	1	3/8-24	1/8	Ex-Fine	1	RGHS-91	1 1/2	1/2-13	3/16	Fine	1
RGHS-605	1 1/2	3/8-24	1/8	Ex-Fine	1	RGHS-615	1 1/2	5/8-18	1/4	Fine	1
RGHS-90	1 1/2	3/8-16	1/8	Ex-Fine	1	RGHS-92	1 1/2	5/8-11	1/4	Fine	1
RGHS-610	1 1/2	1/2-20	3/16	Fine	1	RGHS-93	1 1/2	3/4-10	3/16	Fine	1



**Grippers Carbide Tipped Round**

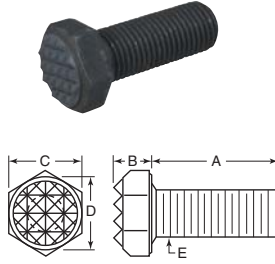


Item No.	+0.000/-0.005 A	+0.000/-0.005 B	C	D	E	Blind Hole Tap F	Tooth Pattern	Pack Qty.
RG-0	3/8	3/8	1 1/64	3/16	3/16	10-32	Ex-Fine	1
RG-200	3/8	1/2	1 5/64	3/16	3/16	10-32	Ex-Fine	1
RG-202	1/2	1/2	1 5/64	3/16	3/8	10-32	Ex-Fine	1
RG-204	1/2	1/2	1 5/64	3/16	3/8	10-32	4 Point	1
RG-230	1/2	3/8	1 1/64	3/16	3/8	10-32	Ex-Fine	1
RG-206	1/2	3/8	1 1/64	3/16	3/8	10-32	4 Point	1
RG-208	1/2	.651	1 5/64	3/16	3/8	10-32	Fine	1
RG-210	1/2	.651	1 5/64	3/16	3/8	10-32	Ex-Fine	1
RG-234	3/8	3/8	1 1/64	3/16	1/2	1/4-28	Ex-Fine	1
RG-218	3/8	1/2	1 5/64	3/16	1/2	1/4-28	Fine	1
RG-224	3/8	5/8	Keyway	—	1/2	1/4-28	Fine	1
RG-4	3/4	3/8	1 1/64	3/16	5/8	1/4-28	Fine	1
RG-236	3/4	3/8	1 1/64	3/16	5/8	1/4-28	Ex-Fine	1
RG-222	3/4	1/2	1 5/64	3/16	5/8	1/4-28	Fine	1
RG-238	3/4	1/2	1 5/64	3/16	5/8	1/4-28	Ex-Fine	1
RG-41	1	3/8	1 1/64	3/16	3/4	1/4-28	Fine	1
RG-240	1	3/8	1 1/64	3/16	3/4	1/4-28	Ex-Fine	1

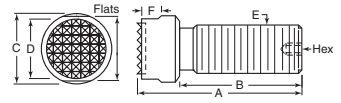


Eliminates costly maintenance and chuck jaw replacement. After long periods of maintenance-free service these inserts can be quickly replaced at low cost. Replacement can be accomplished right at the machine without costly downtime. Applicable to most chuck jaw designs. Held in place either by being threaded (to be held by screws entered through jaw), or flat on side to be held by set screw pressure. Steel type are made from hardened tool steel.

**Grippers  
Carbide Tipped Adjustable**



Hex Type



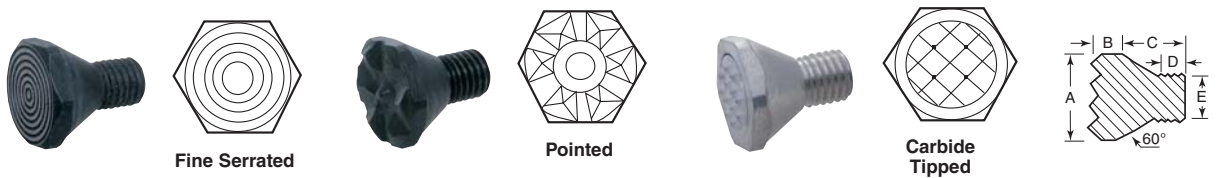
Wrench Flats Type

**Socket Type**

Item No.	A	B	C	D	Hex	Tooth Pattern	Pack Qty.
RG-1000	1/2	1/4	3/6-24	.05	3/16	Ex-Fine	1
RG-1002	1	1/4	3/6-24	.05	3/16	Ex-Fine	1
RG-1004	1 1/2	1/4	3/6-24	.05	3/16	Ex-Fine	1
RG-1006	2	1/4	3/6-24	.05	3/16	Ex-Fine	1
RG-1010	1/2	1/4	3/6-16	.05	3/16	Ex-Fine	1
RG-30	1	1/4	3/6-16	.05	3/16	Ex-Fine	1
RG-1012	2	1/4	3/6-16	.05	3/16	Ex-Fine	1
RG-1014	3	1/4	3/6-16	.05	3/16	Ex-Fine	1
RG-1016	1	3/8	1/2-20	.05	1/4	Fine	1
RG-1018	1	3/8	1/2-20	.05	1/4	Ex-Fine	1
RG-1020	1	3/8	1/2-20	.07	1/4	4 Point	1
RG-1022	2	3/8	1/2-20	.05	1/4	Fine	1
RG-1024	2	3/8	1/2-20	.05	1/4	Ex-Fine	1
RG-1026	2	3/8	1/2-20	.07	1/4	4 Point	1
RG-1028	3	3/8	1/2-20	.05	1/4	Fine	1
RG-31	1	3/8	1/2-13	.05	1/4	Fine	1
RG-1034	1	3/8	1/2-13	.05	1/4	Ex-Fine	1
RG-1036	1	3/8	1/2-13	.07	1/4	4 Point	1
RG-32	2	3/8	1/2-13	.05	1/4	Fine	1
RG-1038	2	3/8	1/2-13	.05	1/4	Ex-Fine	1
RG-1040	2	3/8	1/2-13	.07	1/4	4 Point	1
RG-1042	3	3/8	1/2-13	.05	1/4	Fine	1
RG-1044	3	3/8	1/2-13	.05	1/4	Ex-Fine	1
RG-1048	1	1/2	3/8-18	.05	5/16	Fine	1
RG-33	1	1/2	3/8-11	.05	5/16	Fine	1
RG-34	2	1/2	3/8-11	.05	5/16	Fine	1
RG-1080	3	1/2	3/8-11	.05	5/16	Fine	1
RG-1086	1	1/2	3/8-16	.05	3/8	Fine	1
RG-1092	2	1/2	3/8-16	.05	3/8	Fine	1
RG-35	1	1/2	3/8-10	.05	3/8	Fine	1
RG-1104	1	1/2	3/8-10	.05	3/8	Ex-Fine	1

Item No.	A	B	C	D	E	F	Tooth Pattern	Pack Qty.
RG-825	1/2	13/64	7/16	9/16	1/4-20	7/8	Ex-Fine	1
RG-20	1	13/64	7/16	9/16	1/4-20	7/8	Ex-Fine	1
RG-827*	1 1/2	13/64	7/16	9/16	1/4-20	7/8	Ex-Fine	1
RG-829	1/2	13/64	7/16	9/16	1/4-28	7/8	Ex-Fine	1
RG-831	1	13/64	7/16	9/16	1/4-28	7/8	Ex-Fine	1
RG-835	1/2	1/4	1/2	3/8	5/16-18	1/2	Fine	1
RG-837	1/2	1/4	1/2	3/8	5/16-18	1/2	Ex-Fine	1
RG-21	1	1/4	1/2	3/8	5/16-18	1	Fine	1
RG-839	1	1/4	1/2	3/8	5/16-18	1	Ex-Fine	1
RG-841*	1 1/2	1/4	1/2	3/8	5/16-18	1 1/2	Fine	1
RG-843*	1 1/2	1/4	1/2	3/8	5/16-18	1	Ex-Fine	1
RG-845	1/2	1/4	1/2	3/8	5/16-24	1/2	Fine	1
RG-847	1/2	1/4	1/2	3/8	5/16-24	1/2	Ex-Fine	1
RG-849	1	1/4	1/2	3/8	5/16-24	1	Fine	1
RG-851	1	1/4	1/2	3/8	5/16-24	1	Ex-Fine	1
RG-853*	1 1/2	1/4	1/2	3/8	5/16-24	1	Fine	1
RG-857	1/2	9/32	9/16	1/2	3/8-24	1/2	Fine	1
RG-861	1	9/32	9/16	1/2	3/8-24	1	Fine	1
RG-863	1	9/32	9/16	1/2	3/8-24	1	Ex-Fine	1
RG-865*	1 1/2	9/32	9/16	1/2	3/8-24	1 1/2	Fine	1
RG-869	1/2	9/32	9/16	1/2	3/8-16	1/2	Fine	1
RG-871	1/2	9/32	9/16	1/2	3/8-16	1/2	Ex-Fine	1
RG-22	1	9/32	9/16	1/2	3/8-16	1	Fine	1
RG-873	1	9/32	9/16	1/2	3/8-16	1	Ex-Fine	1
RG-23*	1 1/2	9/32	9/16	1/2	3/8-16	1 1/2	Fine	1
RG-875*	1 1/2	9/32	9/16	1/2	3/8-16	1 1/2	Ex-Fine	1
RG-877	1	23/64	3/4	5/8	1/2-20	1	Fine	1
RG-879	1	23/64	3/4	5/8	1/2-20	1	Ex-Fine	1
RG-881	1 1/2	23/64	3/4	5/8	1/2-20	1 1/2	Fine	1
RG-24	1	23/64	3/4	5/8	1/2-13	1	Fine	1
RG-885	1	23/64	3/4	5/8	1/2-13	1	Ex-Fine	1
RG-25	1 1/2	23/64	3/4	5/8	1/2-13	1 1/2	Fine	1
RG-887	1 1/2	23/64	3/4	5/8	1/2-13	1 1/2	Ex-Fine	1
RG-889	1	7/16	15/16	3/4	5/8-11	1	Fine	1
RG-1086	1	7/16	15/16	3/4	5/8-11	1	Fine	1
RG-26	1	7/16	15/16	3/4	5/8-11	1 1/2	Fine	1
RG-27	2	7/16	15/16	3/4	5/8-11	1 1/2	Fine	1
RG-901	1	1 1/2	1 1/8	1	3/4-16	1	Ex-Fine	1
RG-903	2 1/2	1 1/2	1 1/8	1	3/4-16	1 1/4	Ex-Fine	1

Item No.	A	B	C	D	E	F	Tooth Pattern	Pack Qty.
RG-750	.937	9/16	.500	3/8	3/8-24	.15	Fine	1
RG-752	.937	9/16	.500	3/8	3/8-24	.15	Ex-Fine	1
RG-754	1.375	1	.500	3/8	3/8-24	.15	Fine	1
RG-756	1.375	1	.500	3/8	3/8-24	.15	Ex-Fine	1
RG-770	.937	9/16	.500	3/8	3/8-16	.15	Fine	1
RG-100	1.375	1	.500	3/8	3/8-16	.15	Fine	1
RG-776	1.875	1 1/2	.500	3/8	3/8-16	.15	Fine	1
RG-780	1.375	7/8	.625	1/2	1/2-20	.25	Fine	1
RG-784	2.062	1 1/2	.625	1/2	1/2-20	.25	Fine	1
RG-101	1.375	7/8	.625	1/2	1/2-13	.25	Fine	1
RG-796	2.562	2	.750	5/8	5/8-18	.25	Fine	1
RG-102	2.062	1 1/2	.625	1/2	1/2-13	.25	Fine	1
RG-800	1.562	1	.750	5/8	5/8-11	.25	Fine	1
RG-103	2.562	2	.750	5/8	5/8-11	.25	Fine	1
RG-804	2.562	2	.750	5/8	5/8-11	.25	Ex-Fine	1
RG-814	1.562	1	.875	3/4	3/4-10	.25	Fine	1
RG-818	3.062	2 1/2	.875	3/4	3/4-10	.25	Fine	1



Simply drill, tap and install. These blind hole grippers make it easy to modify soft tip jaws, strap clamps or fixtures. Grippers can be installed from one side using a combination center drill, tap and wrench, eliminating the need to drill through holes. Hardened steel grippers are case hardened with black oxide finish. Carbide tipped grippers have cadmium plated finish.

**Chuck Jaw Grippers  
Hardened Steel**

Serrated		Pointed		Hex A	B	C	D	Thread E	Center Drill	Drill to Dia.	Pack Qty.
Item No.	Item No.	Item No.	Item No.								
JRG-23801	JRG-23811	3/16	.093	.32	.19	8-32	No. 4	.310	1		
JRG-23802	JRG-23812	1/2	.125	.46	.25	1/4-28	No. 6	.498	1		
JRG-23803	JRG-23813	3/4	.187	.70	.38	3/8-16	No. 8	.745	1		

**Chuck Jaw grippers  
Carbide Tipped**

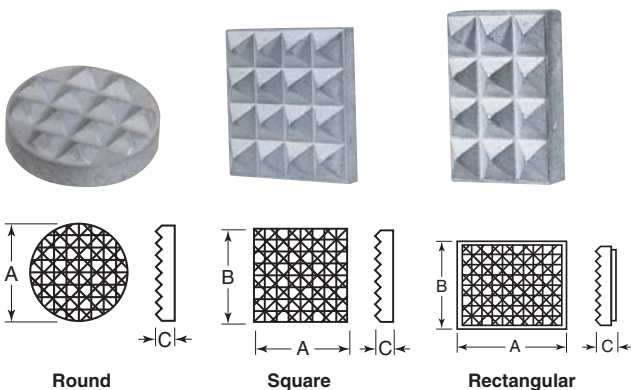
Item No.	Hex A	B	C	D	Thread E	Center Drill	Drill to Dia.	Pack Qty.
JRG-23822	1/2	.125	.46	.25	1/4-28	No. 6	.498	1
JRG-23823	3/4	.187	.70	.38	3/8-16	No. 8	.745	1



# REST PADS

Buy One or Buy Bulk & SAVE

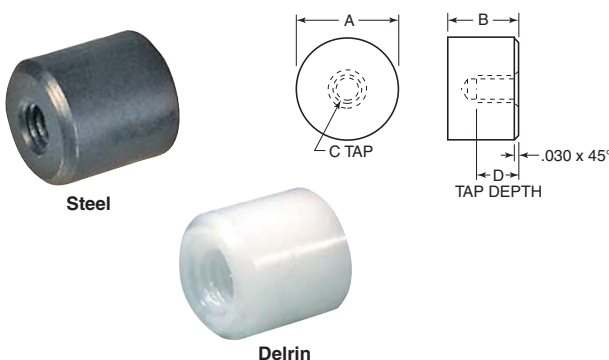
## Rest Pads Solid Carbide Round, Square and Rectangle



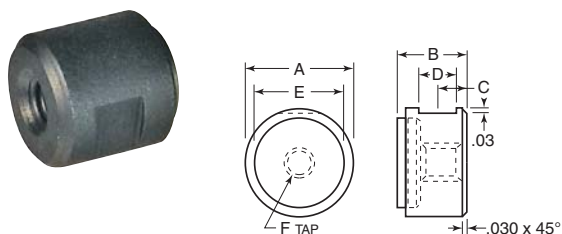
Item No.	+0.00/-0.005 A	C	Tooth Pattern	Pack Qty.	Item No.	+0.00/-0.005 A	+0.05/-0.000 B	C	Tooth Pattern	Pack Qty.
<b>Round</b>					<b>Square</b>					
RGCP-1	1/4	1/8	Ex-Fine	1	RGCP-9	1/2	1/2	1/8	Fine	1
RGCP-2	5/16	1/8	Ex-Fine	1	RGCP-1227	1/2	1/2	1/8	Ex-Fine	1
RGCP-1207	5/16	1/8	4 Point	1	RGCP-1229	5/8	1 1/2	1/8	Ex-Fine	1
RGCP-3	3/8	1/8	Fine	1	RGCP-11	3/4	3/4	5/32	Ex-Fine	1
RGCP-1211	3/8	1/8	Ex-Fine	1	RGCP-12	1	1	5/32	Ex-Fine	1
RGCP-1213	3/8	1/8	4 Point	1	<b>Rectangle</b>					
RGCP-13	3/8	1/8	Flat	1	RGCP-1231	3/8	1/4	1/8	Ex-Fine	1
RGCP-4	7/16	1/8	Fine	1	RGCP-1233	1/2	1 1/2	1/8	Fine	1
RGCP-5	1/2	1/8	Fine	1	RGCP-1239	29/64	1 1/2	1/8	Fine	1
RGCP-1215	1/2	1/8	Ex-Fine	1	RGCP-1245	1	1/2	3/16	Sawtooth	1
RGCP-6	5/8	1/8	Fine	1	RGCP-1247	1	1/2	3/16	Ex-Fine	1
RGCP-7	3/4	1/8	Fine	1	RGCP-1249	1 1/2	3/4	1/4	Sawtooth	1
RGCP-1223	3/4	1/8	Ex-Fine	1						
RGCP-8	1	5/32	Ex-Fine	1						

## Rest Pads Tapped Hole Design Steel and Delrin

Steel	Delrin	A	B	C	D	Pack Qty.
RRP-2S	RRP-2D	3/8	3/8	10-32	3/16	1
RRP-4S	RRP-4D	3/8	1/2	10-32	3/16	1
RRP-6S	—	1/2	3/8	10-32	3/16	1
RRP-8S	—	1/2	1/2	10-32	3/16	1
RRP-10S	RRP-10D	5/8	3/8	1/4-28	3/16	1
RRP-12S	—	5/8	1/2	1/4-28	3/16	1
RRP-14S	—	3/4	3/8	1/4-28	3/16	1
RRP-16S	—	3/4	1/2	1/4-28	3/16	1
RRP-18S	—	1	3/8	1/4-28	3/16	1
RRP-20S	RRP-20D	1	1/2	1/4-28	3/16	1



## Rest Pads Tapped Hole Design Carbide Tipped



Item No.	A	+/-0.001 B	C	D	E	F	Pack Qty.
RRP-22	3/8	3/8	1 1/64	3/16	3/16	10-32	1
RRP-24	3/8	1/2	15/64	3/16	3/16	10-32	1
RRP-26	1/2	3/8	1 1/64	3/16	3/8	10-32	1
RRP-28	1/2	1/2	15/64	3/16	3/8	10-32	1
RRP-30	5/8	3/8	1 1/64	3/16	1/2	1/4-28	1
RRP-36	3/4	1/2	15/64	3/16	3/8	1/4-28	1
RRP-38	1	3/8	1 1/64	3/16	3/4	1/4-28	1

# WE ARE HERE TO HELP!



Our Customer Service team is friendly, knowledgeable, and ready to help you find the right product for your application.

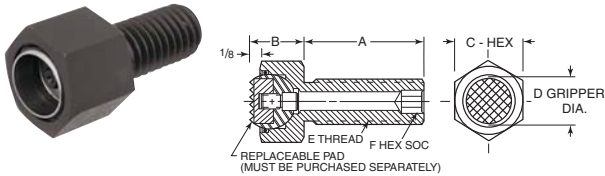


# SWIVEL ACTION GRIPPERS



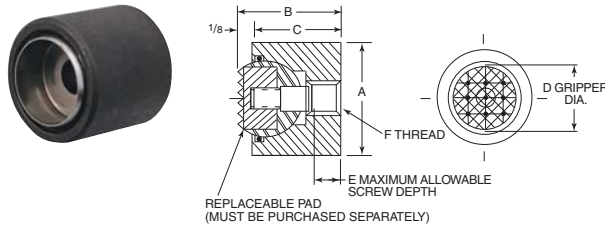
Consists of stainless steel ball with pocket area to accept a replaceable gripper and a socket head cap screw to hold the gripper in place. Ball is retained in the hex head housing by an O-ring that facilitates swiveling action and keeps contaminants out. Housing is heat treated alloy steel. Grippers are not included in assembly and must be purchased separately. Any round style gripper or rest pad with a tapped hole can be used (carbide tipped, high speed steel, solid carbide or Delrin). See "D" dimension for gripper diameter to use.

## Swivel Action Gripper Hex Head Ball Unit



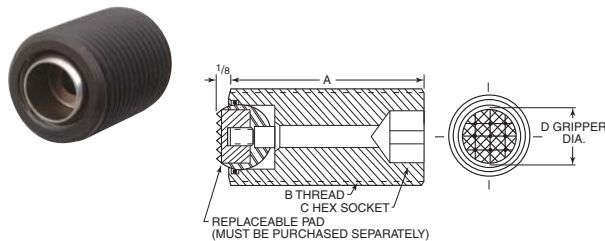
Item No.	A	+/- .005 B	C	D	E	F	Ball Dia.	Pack Qty.
RGBU-200	1/2	5/8	5/8	3/8	3/8-24	1/8	1/2	1
RGBU-205	1	5/8	5/8	3/8	3/8-24	1/8	1/2	1
RGBU-210	1 1/2	5/8	5/8	3/8	3/8-24	1/8	1/2	1
RGBU-215	1/2	5/8	5/8	3/8	3/8-16	1/8	1/2	1
RGBU-220	1	5/8	5/8	3/8	3/8-16	1/8	1/2	1
RGBU-225	1 1/2	5/8	5/8	3/8	3/8-16	1/8	1/2	1
RGBU-230	1	3/4	13/16	1/2	1/2-20	3/16	5/8	1
RGBU-235	1 1/2	3/4	13/16	1/2	1/2-20	3/16	5/8	1
RGBU-240	1	3/4	13/16	1/2	1/2-13	3/16	5/8	1
RGBU-245	1 1/2	3/4	13/16	1/2	1/2-13	3/16	5/8	1
RGBU-255	2	13/16	13/16	5/8	5/8-18	1/4	3/4	1
RGBU-260	1	13/16	13/16	5/8	5/8-11	1/4	3/4	1
RGBU-265	2	13/16	13/16	5/8	5/8-11	1/4	3/4	1
RGBU-270	1	7/8	1 1/8	3/4	3/4-16	5/16	7/8	1
RGBU-275	2 1/2	7/8	1 1/8	3/4	3/4-16	5/16	7/8	1
RGBU-280	1	7/8	1 1/8	3/4	3/4-10	5/16	7/8	1
RGBU-285	2 1/2	7/8	1 1/8	3/4	3/4-10	5/16	7/8	1
RGBU-1307	4	1	1 1/2	1	1-14	3/8	1 1/8	1
RGBU-1309	2	1	1 1/2	1	1-8	3/8	1 1/8	1
RGBU-1311	4	1	1 1/2	1	1-8	3/8	1 1/8	1

## Swivel Action Gripper Base Ball Unit



Item No.	A	+/- .005 B	C	D	+/- .010 E	F	Ball Dia.	Pack Qty.
RGBU-300	5/8	7/8	3/4	3/8	.24	1/4-28	1/2	1
RGBU-305	13/16	1	7/8	1/2	.35	3/16-24	5/8	1
RGBU-310	13/16	1	7/8	5/8	.28	3/8-24	3/4	1
RGBU-315	1 1/8	1 1/16	13/16	3/4	.26	1/2-20	7/8	1
RGBU-1315	1 1/2	1 3/8	1 1/4	1	.44	1/2-20	1 1/8	1

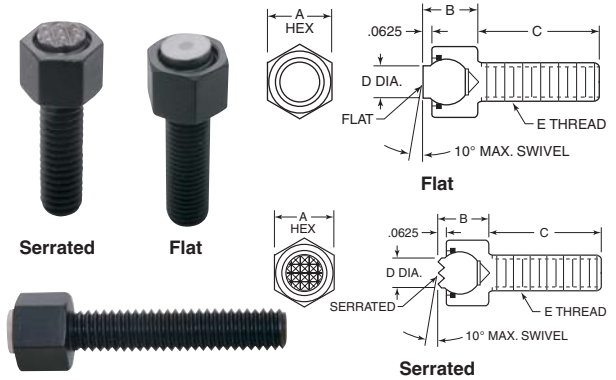
## Swivel Action Gripper Threaded ball Unit



Item No.	A	B	C	D	Ball Dia.	Pack Qty.
RGBU-410	1	3/4-10	3/8	3/8	1/2	1
RGBU-415	2	3/4-10	3/8	3/8	1/2	1
RGBU-1322	3	3/4-10	3/8	3/8	1/2	1
RGBU-1324	2	1-14	3/8	5/8	3/4	1
RGBU-1326	3	1-14	3/8	5/8	3/4	1

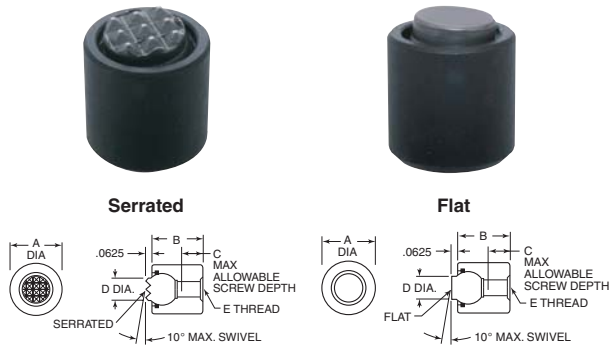
These assemblies are similar to the ball units, however, the pad and ball are one unit and included with the assemblies. The pads are available in high speed steel, (serrated or flat) and delrin (flat only).

## Swivel Action Gripper Hex Head Ball Assemblies



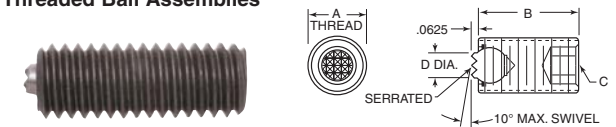
Item No.	Type	A	+/- .005 B	C	D	E	Pack Qty.
RGBA-6S	Serrated	3/8	5/16	1/2	5/32	10-32	1
RGBA-10S	Serrated	7/16	3/8	1/2	1/4	1/4-20	1
RGBA-12S	Serrated	7/16	3/8	1	1/4	1/4-20	1
RGBA-14S	Serrated	7/16	3/8	1 1/2	1/4	1/4-20	1
RGBA-16S	Serrated	7/16	3/8	1/2	1/4	1/4-28	1
RGBA-22S	Serrated	1/2	7/16	1/2	5/16	5/16-18	1
RGBA-24S	Serrated	1/2	7/16	1	5/16	5/16-18	1
RGBA-26S	Serrated	1 1/2	7/16	1 1/2	5/16	5/16-18	1
RGBA-28S	Serrated	1/2	7/16	1/2	5/16	5/16-24	1
RGBA-10F	Flat	7/16	3/8	1/2	1/4	1/4-20	1
RGBA-22F	Flat	1/2	7/16	1/2	5/16	5/16-18	1
RGBA-24F	Flat	1/2	7/16	1	5/16	5/16-18	1
RGBA-30F	Flat	1/2	7/16	1	5/16	5/16-24	1
RGBA-26D	Delrin	1/2	7/16	1 1/2	5/16	5/16-18	1

## Swivel Action Gripper Base Ball Assemblies



Item No.	Type	A	+/- .005 B	+/- .010 C	D	E	Pack Qty.
RGBA-44S	Serrated	1/2	9/16	5/32	5/16	10-32	1
RGBA-44F	Flat	1/2	9/16	5/32	5/16	10-32	1
RGBA-46S	Serrated	1/2	1 1/16	5/8	5/16	10-32	1

## Swivel Action Gripper Threaded Ball Assemblies



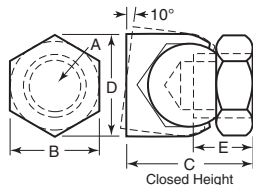
Item No.	Type	A	B	C	D	Pack Qty.
RGBA-50S	Serrated	3/8-24	1/2	3/16	5/32	1
RGBA-52S	Serrated	3/8-24	1	3/16	5/32	1
RGBA-54S	Serrated	3/8-24	2	3/16	5/32	1
RGBA-60S	Serrated	3/8-16	1	3/16	5/32	1
RGBA-62S	Serrated	3/8-16	2	3/16	5/32	1
RGBA-64S	Serrated	3/8-16	3	3/16	5/32	1
RGBA-66S	Serrated	1/2-20	1	1/4	1/4	1
RGBA-70S	Serrated	1/2-20	3	1/4	1/4	1
RGBA-72S	Serrated	1/2-13	1	1/4	1/4	1
RGBA-74S	Serrated	1/2-13	2	1/4	1/4	1
RGBA-76S	Serrated	1/2-13	3	1/4	1/4	1
RGBA-78S	Serrated	5/8-18	1	5/16	5/16	1
RGBA-86S	Serrated	5/8-11	2	5/16	5/16	1



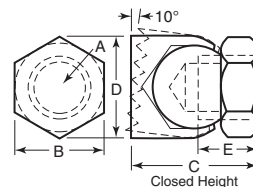
**Toggle or Swivel Pads  
With Flat or Serrated Bottom  
Steel or Stainless Steel Body**



Steel Body



Flat Bottom

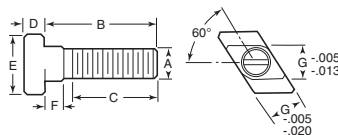


Serrated Bottom

Available with flat or serrated bottom. Flat bottoms are available in zinc plated steel with steel or delrin pads and stainless steel with stainless or delrin pads. Serrated bottoms are available in zinc plated steel with steel pad or stainless steel with stainless pad. The ball portion is hardened. Pad is not heat treated. Stainless is 300 series.

Steel Pad		Delrin Pad		A	B	C	D	E	Pack Qty.
Item No.	Max. Load	Item No.	Max. Load						
<b>Flat Bottom</b>									
RP-1	3,900	RP-1N	360	1/4-20	1/2	5/8	5/8	5/16	1
RP-2	5,900	RP-2N	360	5/16-18	9/16	3/4	11/16	3/8	1
RP-3	6,400	RP-3N	570	3/8-16	5/8	13/16	3/4	3/8	1
RP-4	7,000	RP-4N	570	1/2-13	3/4	15/16	7/8	7/16	1
RP-5	10,000	RP-5N	1,000	5/8-11	7/8	1	1	7/16	1
RP-6	13,500	RP-6N	1,300	3/4-10	1 1/16	1 1/32	1 1/4	5/8	1
RP-7	18,750	RP-7N	1,570	1-8	1 3/8	1 5/8	1 3/8	13/16	1
<b>Serrated Bottom</b>									
RP-20	3,900	—	—	1/4-20	1/2	5/8	5/8	5/16	1
RP-21	5,900	—	—	5/16-18	9/16	3/4	11/16	3/8	1
RP-23	7,000	—	—	1/2-13	3/4	15/16	7/8	7/16	1
RP-25	13,500	—	—	3/4-10	1 1/16	1 1/32	1 1/4	5/8	1
RP-26	18,750	—	—	1-8	1 3/8	1 5/8	1 3/8	13/16	1
RP-22	6,400	—	—	3/8-16	5/8	13/16	3/4	3/8	1
RP-24	10,000	—	—	5/8-11	7/8	1	1	7/16	1

**T-Slot Bolts  
Rotary Type**



Slot on the top of the bolt makes it easy to rotate the head in the T-slot. Extra long threaded shank for versatility. Made of 4140 steel. Heat treated to Grade 5 strength (125,000 psi) with black oxide finish.

Item No.	Thread	A	B	C	D	E	F	G	Pack Qty.
RTSB-5	1/2-13	1 1/2	1	1 1/32	1 1/8	1 1/2	1 1/2	.625	1
RTSB-10	1/2-13	2	1 1/2	1 1/32	1 1/8	1 1/2	1 1/2	.625	1
RTSB-15	1/2-13	2 1/2	2	1 1/32	1 1/8	1 1/2	1 1/2	.625	1
RTSB-20	1/2-13	3	2 1/2	1 1/32	1 1/8	1 1/2	1 1/2	.625	1
RTSB-25	1/2-13	3 1/2	2	1 1/32	1 1/8	1 1/2	1 1/2	.625	1
RTSB-40	1/2-13	5	2 1/2	1 1/32	1 1/8	1 1/2	1 1/2	.625	1
RTSB-55	5/8-11	2	1 1/2	13/32	1 1/4	1 9/32	1 9/32	.750	1
RTSB-65	5/8-11	3	2 1/2	13/32	1 1/4	1 9/32	1 9/32	.750	1
RTSB-75	5/8-11	4	2 1/2	13/32	1 1/4	1 9/32	1 9/32	.750	1
RTSB-85	5/8-11	6	2 1/2	13/32	1 1/4	1 9/32	1 9/32	.750	1

**T-Slot Covers**

Greatly reduces amount of time required to clean T-slots on the machine table. Just cover free slots before starting with machining. T-slot covers can easily be removed after machining. Cover is made of profiled aluminum and is easily cut to size.



Item No.	Size (Square)	Length (Meter)	Pack Qty.
AMF-221	14	1	1
AMF-222	18	1	1
AMF-223	22	1	1

**T-Slot Cleaner**



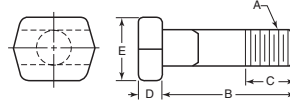
Eliminates the dangers of removing chips with air. Keep one with every machine to save time. Heat treated steel, black oxide finish. 6" long.

Item No.	Description	Pack Qty.
TSC-50	T-Slot Cleaner	1

T-SLOT BOLTS



T-Slot Bolts  
Standard Type  
Inch and Metric

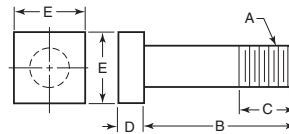


Used for setting up work on planers, shapers, milling machines or similar applications. Heads sized to fit in table slot. Cannot twist or jam in slot. Inch are hot forged from C-1045 steel, Class 3NC threads. T-slot bolt head dimension "D" is undersized to fit machine table slot. Inch dimensions are +/- .015. Metric are forged, with milled T-slot guide and faces, and rolled thread. Sizes M6 - M12 are heat treated to strength Class 10.9, M16 - M24 are heat treated to Class 8.8. Metric dimensions are in millimeters.

See page 435 for flange nuts.

Item No.	Thread	A	B	C	D	E	Table Slot	Pack Qty.	Item No.	Thread	A	B	C	D	E	Table Slot	Pack Qty.
<b>Inch</b>									<b>Inch</b>								
TSB-1	3/8-16	1	5/8	3/16	11/16	3/8	3/8	1	TSB-45	7/8-9	4	2	2	9/16	1 1/2	7/8	1
TSB-2	3/8-16	1 1/2	1	3/16	11/16	3/8	3/8	1	TSB-46	7/8-9	5	2	2	9/16	1 1/2	7/8	1
TSB-3	3/8-16	2	1 1/2	3/16	11/16	3/8	3/8	1	TSB-47	7/8-9	6	2	2	9/16	1 1/2	7/8	1
TSB-4	3/8-16	2 1/2	1 1/2	3/16	11/16	3/8	3/8	1	TSB-48	7/8-9	7	2	2	9/16	1 1/2	7/8	1
TSB-5	3/8-16	3	1 1/2	3/16	11/16	3/8	3/8	1	TSB-49	7/8-9	8	2 1/2	2	9/16	1 1/2	7/8	1
TSB-6	3/8-16	3 1/2	2	3/16	11/16	3/8	3/8	1	TSB-31	1-8	4	2	2	5/8	1 3/4	1	1
TSB-7	3/8-16	4	1 1/4	3/16	11/16	3/8	3/8	1	TSB-32	1-8	5	2	2	5/8	1 3/4	1	1
TSB-36	3/8-16	5	1 1/4	3/16	11/16	3/8	3/8	1	TSB-33	1-8	6	2	2	5/8	1 3/4	1	1
TSB-8	1/2-13	1 1/2	1	9/32	7/8	1/2	1/2	1	TSB-52	1-8	7	2	2	5/8	1 3/4	1	1
TSB-9	1/2-13	2	1 1/2	9/32	7/8	1/2	1/2	1	TSB-54	1-8	8	2 1/2	2	5/8	1 3/4	1	1
TSB-10	1/2-13	2 1/2	1 1/2	9/32	7/8	1/2	1/2	1	TSB-35	1-8	10	2 1/2	2	5/8	1 3/4	1	1
TSB-11	1/2-13	3	1 1/2	9/32	7/8	1/2	1/2	1	TSB-53	1-8	12	3	2	5/8	1 3/4	1	1
TSB-12	1/2-13	3 1/2	2	9/32	7/8	1/2	1/2	1	<b>Metric</b>								
TSB-13	1/2-13	4	2	9/32	7/8	1/2	1/2	1	TSB-100	M6 x 1.00	25	15	4	10	6	1	
TSB-14	1/2-13	5	2	9/32	7/8	1/2	1/2	1	TSB-103	M8 x 1.25	32	22	6	13	8	1	
TSB-15	1/2-13	6	2	9/32	7/8	1/2	1/2	1	TSB-104	M8 x 1.25	50	35	6	13	8	1	
TSB-39	1/2-13	7	2	9/32	7/8	1/2	1/2	1	TSB-106	M10 x 1.50	40	30	6	15	10	1	
TSB-40	1/2-13	8	2 1/2	9/32	7/8	1/2	1/2	1	TSB-107	M10 x 1.50	63	45	6	15	10	1	
TSB-16	5/8-11	1 1/2	1	11/32	1 3/32	5/8	5/8	1	TSB-109	M12 x 1.75	50	35	7	18	12	1	
TSB-17	5/8-11	2	1 1/2	11/32	1 3/32	5/8	5/8	1	TSB-110	M12 x 1.75	63	40	7	18	12	1	
TSB-18	5/8-11	2 1/2	1 1/2	11/32	1 3/32	5/8	5/8	1	TSB-111	M12 x 1.75	80	55	7	18	12	1	
TSB-19	5/8-11	3	1 1/2	11/32	1 3/32	5/8	5/8	1	TSB-165	M12 x 1.75	80	55	22	8	14	1	
TSB-20	5/8-11	3 1/2	2	11/32	1 3/32	5/8	5/8	1	TSB-170	M12 x 1.75	100	65	22	8	14	1	
TSB-21	5/8-11	4	2	11/32	1 3/32	5/8	5/8	1	TSB-175	M12 x 1.75	125	75	22	8	14	1	
TSB-22	5/8-11	5	2	11/32	1 3/32	5/8	5/8	1	TSB-180	M12 x 1.75	160	100	22	8	14	1	
TSB-23	5/8-11	6	2	11/32	1 3/32	5/8	5/8	1	TSB-190	M16 x 2.00	63	45	25	9	16	1	
TSB-24	5/8-11	8	2 1/2	11/32	1 3/32	5/8	5/8	1	TSB-195	M16 x 2.00	80	55	25	9	16	1	
TSB-25	3/4-10	3	1 1/2	7/16	1 1/4	3/4	3/4	1	TSB-200	M16 x 2.00	100	65	25	9	16	1	
TSB-26	3/4-10	3 1/2	2	7/16	1 1/4	3/4	3/4	1	TSB-215	M16 x 2.00	63	45	10	28	18	1	
TSB-27	3/4-10	4	2	7/16	1 1/4	3/4	3/4	1	TSB-130	M16 x 2.00	80	55	10	28	18	1	
TSB-28	3/4-10	5	2	7/16	1 1/4	3/4	3/4	1	TSB-220	M16 x 2.00	100	65	10	28	18	1	
TSB-29	3/4-10	6	2	7/16	1 1/4	3/4	3/4	1	TSB-240	M20 x 2.50	160	110	12	32	20	1	
TSB-42	3/4-10	7	2	7/16	1 1/4	3/4	3/4	1	TSB-144	M20 x 2.50	125	85	14	35	22	1	
TSB-30	3/4-10	8	2 1/2	7/16	1 1/4	3/4	3/4	1	TSB-255	M24 x 3.00	160	110	18	44	28	1	
TSB-43	3/4-10	10	2 1/2	7/16	1 1/4	3/4	3/4	1	TSB-260	M24 x 3.00	200	125	18	44	28	1	
TSB-44	3/4-10	12	3	7/16	1 1/4	3/4	3/4	1									

T-Slot Bolts  
Standard Type



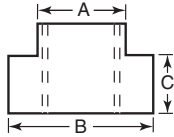
Holds work more securely than ordinary bolts. Eliminates damage to table slots. Made of medium carbon alloy, heat treated, black oxide finish. Threads are Class 2A UNC.

Item No.	Thread	A	B	C	D	E	Table Slot	Pack Qty.	Item No.	Thread	A	B	C	D	E	Table Slot	Pack Qty.
TB-110	3/8-16	1 1/2	1	1/4	11/16	3/8	3/8	1	TB-24	5/8-11	5	2	2	1 3/32	1 1/8	5/8	1
TB-111	3/8-16	2	1 1/2	1/4	11/16	3/8	3/8	1	TB-25	5/8-11	6	2	2	1 3/32	1 1/8	5/8	1
TB-112	3/8-16	2 1/2	2	1/4	11/16	3/8	3/8	1	TB-26	5/8-11	7	2	2	1 3/32	1 1/8	5/8	1
TB-113	3/8-16	3	2	1/4	11/16	3/8	3/8	1	TB-27	5/8-11	8	2	2	1 3/32	1 1/8	5/8	1
TB-114	3/8-16	3 1/2	2	1/4	11/16	3/8	3/8	1	TB-28	5/8-11	10	2	2	1 3/32	1 1/8	5/8	1
TB-115	3/8-16	4	2	1/4	11/16	3/8	3/8	1	TB-32	5/8-11	12	2	2	1 3/32	1 1/8	5/8	1
TB-116	3/8-16	5	2	1/4	11/16	3/8	3/8	1	TB-33	3/4-10	2	1 1/4	1/2	1 1/4	3/4	1	
TB-117	3/8-16	6	2	1/4	11/16	3/8	3/8	1	TB-34	3/4-10	2 1/2	1 1/4	1/2	1 1/4	3/4	1	
TB-118	3/8-16	7	2	1/4	11/16	3/8	3/8	1	TB-35	3/4-10	3	2	2	1 3/32	1 3/8	3/4	1
TB-119	3/8-16	8	2	1/4	11/16	3/8	3/8	1	TB-36	3/4-10	3 1/2	2	2	1 3/32	1 3/8	3/4	1
TB-5	1/2-13	3	2	5/16	7/8	1/2	1/2	1	TB-37	3/4-10	4	2	2	1 3/32	1 3/8	3/4	1
TB-6	1/2-13	4	2	5/16	7/8	1/2	1/2	1	TB-39	3/4-10	5	2	2	1 3/32	1 3/8	3/4	1
TB-7	1/2-13	4 1/2	2	5/16	7/8	1/2	1/2	1	TB-41	3/4-10	6	2	2	1 3/32	1 3/8	3/4	1
TB-8	1/2-13	5	2	5/16	7/8	1/2	1/2	1	TB-42	3/4-10	7	2	2	1 3/32	1 3/8	3/4	1
TB-10	1/2-13	6	2	5/16	7/8	1/2	1/2	1	TB-43	3/4-10	8	2	2	1 3/32	1 3/8	3/4	1
TB-11	1/2-13	7	2	5/16	7/8	1/2	1/2	1	TB-44	3/4-10	10	3	1/2	1 3/8	3/4	1	
TB-12	1/2-13	8	2	5/16	7/8	1/2	1/2	1	TB-45	3/4-10	10	2	2	1 3/32	1 3/8	3/4	1
TB-14	1/2-13	10	2	5/16	7/8	1/2	1/2	1	TB-47	3/4-10	12	2	2	1 3/32	1 3/8	3/4	1
TB-16	1/2-13	12	2	5/16	7/8	1/2	1/2	1	TB-55	1-8	4	2 1/2	2	1 1/16	1 1/16	1	1
TB-17	5/8-11	1 1/2	1	15/32	1 1/8	5/8	5/8	1	TB-56	1-8	5	2 1/2	2	1 1/16	1 1/16	1	1
TB-18	5/8-11	2	1 1/2	15/32	1 1/8	5/8	5/8	1	TB-57	1-8	6	2 1/2	2	1 1/16	1 1/16	1	1
TB-19	5/8-11	2 1/2	2	15/32	1 1/8	5/8	5/8	1	TB-58	1-8	7	2 1/2	2	1 1/16	1 1/16	1	1
TB-20	5/8-11	3	2	15/32	1 1/8	5/8	5/8	1	TB-59	1-8	8	3	2	1 1/16	1 1/16	1	1
TB-21	5/8-11	3 1/2	2	15/32	1 1/8	5/8	5/8	1	TB-60	1-8	9	3	2	1 1/16	1 1/16	1	1
TB-22	5/8-11	4	2	15/32	1 1/8	5/8	5/8	1									



T-SLOT NUTS

T-Slot Nuts  
Standard Type  
Steel or Stainless Steel



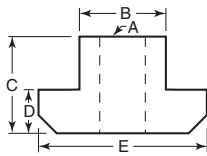
Used for setting up work on machine tools. Also used with stud sets and have many applications on jig and fixture work. Tongue of T-nuts slightly undersize to fit machine table slot-A. Steel type are made of cold finished steel, case hardened, black oxide finish. Stainless is Type 304. The standard T-nuts are threaded completely through. The safety design is tapped one thread short of going through to prevent the stud from being screwed into the table.

Standard		Safety		Table Slot A	Thread	B	C	Overall Length	Overall Height	Pack Qty.
Item No.	Item No.	Item No.	Item No.							
<b>Steel - Threaded</b>										
TN-0	TN-100	3/8	1/4-20	5/8	1/4	7/8	3/8	1		
TN-1	TN-101	3/8	5/16-18	3/4	1/4	7/8	3/8	1		
TN-18	TN-118	7/16	5/16-18	3/4	7/32	1	1/2	1		
TN-2	TN-102	7/16	3/8-16	3/4	7/32	1	1/2	1		
TN-3	TN-103	1/2	3/8-16	7/8	9/32	1	1/2	1		
TN-19	TN-119	9/16	3/8-16	7/8	11/32	1	3/8	1		
TN-4	TN-104	9/16	1/2-13	7/8	11/32	1	3/8	1		
TN-20*	TN-120*	3/8	5/16-18	1	3/8	1	3/8	1		
TN-5*	TN-105*	3/8	1/2-13	1	3/8	1	3/8	1		
TN-16	TN-116	11/16	1/2-13	1 1/8	19/32	1 1/8	3/4	1		
TN-6	TN-106	11/16	5/8-11	1 1/8	19/32	1 1/8	3/4	1		
TN-21*	TN-121*	3/8	3/8-16	1 1/16	7/16	1 1/16	7/8	1		
TN-22*	TN-122*	3/8	1/2-13	1 1/16	7/16	1 1/16	7/8	1		
TN-10	TN-110	19/16	3/4-10	1 1/4	17/32	1 1/2	1	1		
TN-7	TN-107	3/4	5/8-11	1 1/4	1/2	1 1/8	3/4	1		
TN-14	TN-114	19/16	5/8-11	1 3/8	9/16	1 1/2	1	1		
TN-8	TN-108	19/16	3/4-10	1 3/8	9/16	1 1/2	1	1		
TN-15	TN-115	1	3/4-10	1 1/2	3/4	1 1/2	1 1/4	1		

\*Designed for Bridgeport mills

Standard		Safety		Table Slot A	Thread	B	C	Overall Length	Overall Height	Pack Qty.
Item No.	Item No.	Item No.	Item No.							
<b>Steel - Threaded</b>										
TN-9	TN-109	7/8	3/4-10	1 1/2	5/8	1 1/2	1	1		
TN-12	TN-112	1 1/16	7/8-9	1 3/4	3/4	1 1/2	1 1/2	1		
TN-17	TN-117	1 1/8	1-8	1 3/4	3/4	1 3/4	1 1/2	1		
TN-13	TN-113	1	7/8-9	1 3/4	3/4	1 1/2	1 1/2	1		
TN-11	—	1 1/8	7/8-9	1 3/4	3/4	1 1/2	1 1/2	1		
<b>Stainless Steel - Threaded</b>										
—	TN-200	.343	5/16-18	5/8	7/32	3/4	13/32	1		
—	TN-205	.418	5/16-18	11/16	1/4	11/16	9/8	1		
—	TN-210	.430	3/8-16	3/4	7/32	1	1/2	1		
—	TN-215	.490	3/8-16	7/8	1/4	7/8	5/8	1		
—	TN-220	.543	3/8-16	7/8	5/16	1 1/4	5/8	1		
—	TN-225	.555	1/2-13	7/8	11/32	1 1/4	3/4	1		
—	TN-240	.625	1/2-13	1	5/8	1 1/4	3/4	1		
—	TN-250	.665	1/2-13	1 1/8	19/32	1 1/4	3/4	1		
—	TN-260	.687	3/8-11	1 1/4	19/32	1 1/2	1	1		
—	TN-265	.780	3/8-11	1 1/4	17/32	1 1/2	1	1		
—	TN-270	.800	3/4-10	1 3/8	17/32	1 3/4	1 1/8	1		
—	TN-280	.968	3/4-10	1 3/8	9/16	1 3/4	1	1		

Chamfered Type  
Metric - DIN-508



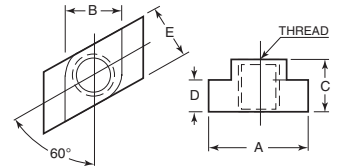
Cold drawn T-nut features unique undercut to prevent interference from T-slot burrs. Stud stays perpendicular to the table. Bottom chamfer (approximately 60° off horizontal) clears chips for easy insertion. Threads are roll formed for more holding power and last thread is incomplete to prevent T-slot or table damage. Made of cold formed steel, case hardened, black oxide finish. Tempered to tensile strength Class 10.

Item No.	Table Slot	Thread A	B	C	D	E	Overall Length	Pack Qty.
TN-25	6	M5 x .80	5.7	8	4	10	10	1
TN-26	8	M6 x 1.00	7.7	10	6	13	13	1
TN-27	10	M8 x 1.25	9.7	12	6	15	15	1
TN-56*	10	M8 x 1.25	9.7	12	6	15	30	1
TN-29	12	M10 x 1.50	11.7	14	7	18	18	1
TN-57*	12	M10 x 1.50	11.7	14	7	18	36	1
TN-58*	14	M12 x 1.75	13.7	16	8	22	44	1
TN-32	14	M12 x 1.75	13.7	16	8	22	22	1
TN-50	16	M12 x 1.75	15.7	18	9	25	25	1
TN-51	18	M12 x 1.75	17.7	20	10	28	28	1
TN-40	18	M16 x 2.0	17.7	20	10	28	28	1
TN-59*	18	M16 x 2.0	17.7	20	10	28	56	1
TN-53	22	M16 x 2.0	21.7	28	14	35	35	1
TN-46	22	M20 x 2.50	21.7	28	14	35	35	1
TN-55	28	M24 x 3.0	27.7	36	18	44	44	1

\*Extended length  
Note: Dimensions are in millimeters.

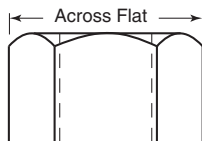
Rotary Type  
Inch and Metric

Item No.	Table Slot	Thread	A	B	C	D	E	Pack Qty.
<b>Inch</b>								
RTN-25	1/2	3/8-16	7/8	.495	1/2	9/32	.495	1
RTN-50	9/16	1/2-13	7/8	.557	3/8	11/32	.557	1
RTN-75	3/4	1/2-13	1	.620	3/8	11/32	.620	1
RTN-100	11/16	1/2-13	1 1/8	.682	3/4	7/16	.682	1
RTN-125	11/16	5/8-11	1 1/8	.682	3/4	7/16	.682	1
RTN-150	3/4	5/8-11	1 1/4	.745	3/4	19/32	.745	1
RTN-175	1	3/4-10	1 1/8	.995	1	5/8	.995	1
<b>Metric</b>								
TN-62	12	M10 x 1.50	18	11.7	14	7	11.7	1
TN-63	14	M12 x 1.75	22	13.7	16	8	13.7	1
TN-64	18	M16 x 2.0	28	17.7	20	10	17.7	1
TN-65	22	M20 x 2.50	35	21.7	28	14	21.7	1



Unique rotary T-nuts allow convenient addition of studs and clamp straps without tearing down previous set ups. Made of cold finished steel, case hardened, black oxide finish. These T-nuts feature a safety design which is tapped one thread short of going through to prevent the stud from being screwed into the table. Metric dimensions are in millimeters. Metric style are chamfered on bottom.

Hardened Hexagon Nuts

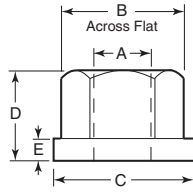


Used extensively on tool, jig and fixture work. Also used with studs, T-bolts, etc. for machine setups. Precision tapped. Case hardened. Black oxide finish. National coarse are heavy pattern. National fine are light pattern.

Item No.	Thread Size	Across Flat	Pack Qty.	Item No.	Thread Size	Across Flat	Pack Qty.
HNC-1	1/4-20	.49	1	HNF-1	1/4-28	.43	1
HNC-2	5/16-18	.55	1	HNF-2	5/16-24	.49	1
HNC-3	3/8-16	.68	1	HNF-3	3/8-24	.55	1
HNC-4	7/16-14	.74	1	HNF-4	7/16-20	.68	1
HNC-5	1/2-13	.86	1	HNF-5	1/2-20	.74	1
HNC-6	5/8-11	1.05	1	HNF-6	5/8-18	.92	1
HNC-7	3/4-10	1.21	1	HNF-7	3/4-16	1.08	1
HNC-8	7/8-9	1.40	1	HNF-8	7/8-14	1.27	1
HNC-9	1-8	1.59	1				



**Collar or Flange Nuts  
Steel and Stainless Steel**



Contact surface of flange is flat. Steel type are made from cold finished steel, case hardened with black oxide finish. Stainless is Type 303. Metric are tempered, tensile strength Class 10. Metric dimensions are in millimeters.

Steel	Stainless						
Item No.	Item No.	A	B	C	D	E	Pack Qty.
<b>Inch</b>							
FNC-1	FNC-101	1/4-20	1/2	5/8	5/16	3/32	1
FNC-1F	—	1/4-28	1/2	5/8	5/16	3/32	1
FNC-2	FNC-102	3/16-18	9/16	3/4	3/8	3/32	1
FNC-2F	FNC-102F	3/16-24	9/16	3/4	3/8	3/32	1
FNC-3	FNC-103	3/8-16	1 1/16	7/8	1/2	1/8	1
FNC-3F	FNC-103F	3/8-24	1 1/16	7/8	1/2	1/8	1
FNC-4	—	7/16-14	3/4	1	9/16	3/32	1
FNC-4F	—	7/16-20	3/4	1	9/16	3/32	1
FNC-5	FNC-105	1/2-13	7/8	1 1/8	1 1/16	3/32	1
FNC-5F	FNC-105F	1/2-20	7/8	1 1/8	1 1/16	3/32	1
FNC-6	FNC-106	3/8-11	1 1/16	1 3/8	1 3/16	3/16	1
FNC-6F	FNC-106F	3/8-18	1 1/16	1 3/8	1 3/16	3/16	1
FNC-7	FNC-107	3/4-10	1 1/4	1 3/4	1	1/4	1
FNC-7F	—	3/4-16	1 1/4	1 3/4	1	1/4	1
FNC-8	—	7/8-9	1 1/16	1 3/4	1 1/8	1/4	1
FNC-8F	—	7/8-14	1 1/16	1 3/4	1 1/8	1/4	1
FNC-9	—	1-8	1 5/8	2	1 1/4	1/4	1
FNC-9F	—	1-14	1 5/8	2	1 1/4	1/4	1
FNC-10	—	1 1/8-7	1 13/16	2 1/4	1 1/4	1/4	1
FNC-11	—	1 1/4-7	1 7/8	2 1/4	1 1/4	1/4	1
FNC-11F	—	1 1/4-12	1 13/16	2 1/4	1 1/4	1/4	1
<b>Metric</b>							
FNC-15	—	M6 x 1.00	10	14	9	3.0	1
FNC-20	—	M8 x 1.25	13	18	12	3.5	1
FNC-25	—	M10 x 1.50	17	22	15	4.0	1
FNC-30	—	M12 x 1.75	19	25	18	4.0	1
FNC-35	—	M16 x 2.00	24	31	24	5.0	1
FNC-40	—	M20 x 2.50	30	37	30	6.0	1
FNC-45	—	M24 x 3.00	36	45	36	6.0	1

**Extension or Coupling Nuts**

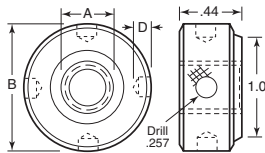
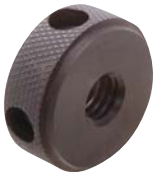


Cold finished steel. Used for setting up work on machine tools. Case hardened, black oxide finish. Hex Size (Width) is measured across flats.

Item No.	Hex Size Across Flats	Thread Size	Overall Length	Pack Qty.	Item No.	Hex Size Across Flats	Thread Size	Overall Length	Pack Qty.
<b>Inch</b>									
CN-0	3/16	1/4-20	7/8	1	<b>Metric</b>				
CN-1	9/16	3/16-18	7/8	1	CN-20	11.5	M6 x 1.00	18	1
CN-2	1 1/16	3/8-16	1 1/8	1	CN-25	15.0	M8 x 1.25	24	1
CN-3	7/8	1/2-13	1 1/2	1	CN-30	19.6	M10 x 1.50	30	1
CN-4	1 1/16	3/4-11	1 3/4	1	CN-35	21.9	M12 x 1.75	36	1
CN-5	1 1/4	3/4-10	2	1	CN-50	34.6	M20 x 2.50	60	1
CN-6	1 3/8	7/8-9	2 1/4	1					
CN-7	1 1/2	1-8	2 1/2	1					

Note: Inch hex size is across flat sides. Metric hex size is point-to-point.

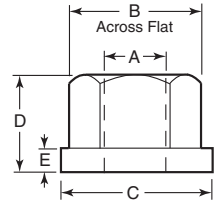
**Knurled Nuts**



Knurled nuts are made of hardened steel. Black oxide finish. Used extensively in the construction of jigs, fixtures and other special tooling.

Item No.	A	B	D	Pack Qty.
KN-1	3/8-16	1 1/8	7/32	1
KN-2	1/2-13	1 1/8	7/32	1
KN-3	3/8-11	1 1/8	1/4	1

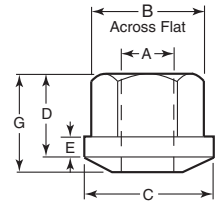
**Swivel Flange Nuts**



Holds firmly without marring the workpiece. Head rotates but washer remains stationary upon contact. Case hardened steel. Black oxide finish.

Item No.	A	B	C	D	E	Pack Qty.
SFN-1	1/4-20	1/2	3/8	3/8	1/8	1
SFN-2	3/16-18	9/16	3/4	7/16	9/64	1
SFN-3	3/8-16	1 1/16	7/8	17/32	9/32	1
SFN-4	1/2-13	7/8	1 1/8	23/32	7/32	1
SFN-5	3/8-11	1 1/16	1 3/8	29/32	1/4	1
SFN-6	3/4-10	1 1/4	1 3/8	1 1/64	9/32	1
SFN-7	7/8-9	1 7/16	1 3/4	1 1/8	7/16	1
SFN-8	1-8	1 5/8	2	1 15/64	15/32	1

**Spherical Collar Nuts**



Nut

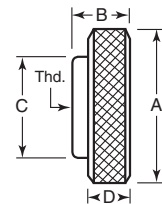
Washer

Made of cold finished steel and case hardened. Black oxide finish. The radius on spherical collar nuts fits the radius of the lower half of the corresponding size spherical washers.

See page 436 for spherical washers.

Nut Item No.	A	B	C	D	E	G	Pack Qty.	Washer Item No.
FNS-1	1/4-20	1/2	3/8	3/16	1/16	.354	1	SPW-1B
FNS-2	3/16-18	9/16	3/4	3/8	3/32	.434	1	SPW-2B
FNS-3	3/8-16	1 1/16	7/8	1/2	3/32	.574	1	SPW-3B
FNS-5	1/2-13	7/8	1 1/8	1 1/16	3/32	.688	1	SPW-4B
FNS-6	3/8-11	1 1/16	1 3/8	1 3/16	3/16	.923	1	SPW-5B
FNS-7	3/4-10	1 1/4	1 3/8	1	1/4	1.133	1	SPW-6B
FNS-8	7/8-9	1 7/16	1 3/4	1 1/8	1/4	1.263	1	SPW-7B
FNS-9	1-8	1 5/8	2	1 1/4	1/4	1.386	1	SPW-8B

**Check Nuts  
Steel and Stainless Steel**



Check nuts can be used in conjunction with many other components such as knurled head screws, torque thumb screws, hand knob assemblies, toggle shoe clamp assemblies and many other tooling applications. Steel are made of low carbon steel, soft, black oxide finish. Stainless are made of Type 303.

Steel Item No.	Stainless Item No.	A	B	C	D	Thread	Pack Qty.
V-0	—	3/4	7/32	1/2	5/32	10-24	1
V-1	VS-1	3/4	7/32	1/2	5/32	10-32	1
V-2	VS-2	3/4	7/32	1/2	5/32	1/4-20	1
V-3	VS-3	3/4	9/16	1/2	1/4	3/16-18	1
V-4	VS-4	3/4	9/16	1/2	1/4	3/8-16	1
V-5	VS-5	1	3/8	3/4	1/4	1/2-13	1
V-6	—	1	3/8	3/4	1/4	3/8-11	1



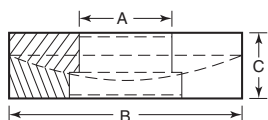


# SPHERICAL WASHERS

Buy One or Buy Bulk & SAVE



## Two-Piece Spherical Washers Steel and Stainless Steel



Precision machined and all sharp corners removed. Tops and bottoms are available separately. To order add a "T" or "B" part number. They are priced at one half the cost of a pair. Steel washers are made of cold finished steel and case hardened. Black oxide finish. Stainless are made from Type 303 stainless steel.

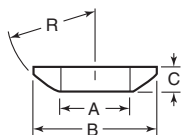
See page 435 for spherical collar nuts.

Steel Item No.	Stainless Item No.	Bolt Size	+/- .015 A	+/- .015 B	+/- .015 C	Pack Qty.
SPW-1	SSPW-1	1/4	9/32	5/8	3/16	1
SPW-2	SSPW-2	5/16	11/32	13/16	1/4	1
SPW-3	SSPW-3	3/8	13/32	15/16	1/4	1
SPW-4	SSPW-4	1/2	17/32	13/16	5/16	1
SPW-5	SSPW-5	5/8	21/32	13/8	5/16	1
SPW-6	SSPW-6	3/4	25/32	13/8	3/8	1
SPW-7	SSPW-7	7/8	15/16	17/8	3/8	1
SPW-8	SSPW-8	1	11/16	2	1/2	1
SPW-9	—	1 1/8	13/16	2 1/4	1/2	1
SPW-10	—	1 1/4	15/16	2 5/8	1/2	1
SPW-11	—	1 1/2	17/16	2 7/8	9/16	1
SPW-12	—	1 5/8	11/16	3 1/4	11/16	1
SPW-13	—	1 3/4	13/16	3 1/2	11/16	1
SPW-14	—	2	21/16	3 7/8	3/4	1

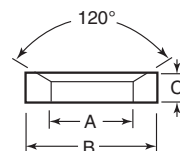
## Two-Piece Spherical Washers Steel Metric



Top



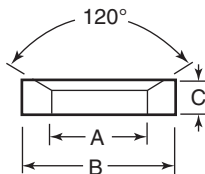
Bottom



Item No.	Bolt Size	A	B	C	R	Pack Qty.
<b>Top</b>						
AMF-186	M6	6.4	12	2.3	9	1
AMF-187	M8	8.4	17	3.2	12	1
AMF-188	M10	10.5	21	4.0	15	1
AMF-189	M12	13.0	24	4.6	17	1
AMF-190	M16	17.0	30	5.3	22	1
AMF-191	M20	21.0	36	6.3	27	1
AMF-192	M24	25.0	44	8.2	32	1

Item No.	Bolt Size	A	B	C	R	Pack Qty.
<b>Bottom</b>						
AMF-193	M6	7.1	12	2.8	—	1
AMF-194	M8	9.6	17	3.5	—	1
AMF-195	M10	12.0	21	4.2	—	1
AMF-196	M12	14.2	24	5.0	—	1
AMF-197	M16	19.0	30	6.2	—	1
AMF-198	M20	23.2	36	7.5	—	1
AMF-199	M24	28.0	44	9.5	—	1

## Heavy Duty Dished Washers Steel Metric



Punched, gauged and tempered. Similar to the washer bottoms shown above, but are designed for use on elongated holes. Dimensions are in millimeters.

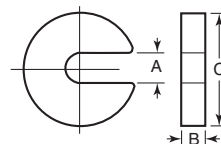
Item No.	Bolt Size	A	B	C	Pack Qty.
AMF-200	M6	7.1	17	4	1
AMF-201	M8	9.6	23	4	1
AMF-202	M10	12.0	30	5	1
AMF-203	M12	14.2	35	5	1
AMF-204	M16	19.0	45	6	1
AMF-205	M20	23.2	50	8	1
AMF-206	M24	28.0	60	10	1

## Heavy Duty C-Washers Steel and Stainless Steel



Steel C-washers are made of cold finished steel, case hardened with a black oxide finish. Stainless are Type 303 and have a knurl on the outside.

Item No.	A	B	C	Pack Qty.	Item No.	A	B	C	Pack Qty.
<b>Steel</b>					<b>Stainless</b>				
CW-3	9/32	1/4	1 1/4	1	CW-100	11/64	3/16	5/8	1
CW-7	11/32	5/16	1 1/4	1	CW-105	13/64	3/16	3/4	1
CW-12	13/32	3/8	1 1/2	1	CW-110	17/64	3/16	7/8	1
CW-18	17/32	3/8	2	1	CW-115	21/64	1/4	1	1
CW-21	21/32	3/8	2 1/8	1	CW-120	25/64	5/16	1 1/4	1
CW-24	25/32	7/16	2 1/2	1					
CW-27	27/32	1/2	2 5/8	1					

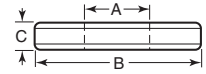




Heavy Duty Machined Flat Washers  
Steel and Stainless Steel

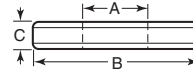


Steel		Stainless		Bolt Size	A	B	C	Pack Qty.
Item No.	Item No.							
FW-1	SFW-1	1/4	17/64	11/16	3/16	1		
FW-2	SFW-2	5/16	11/32	13/16	3/16	1		
FW-3	SFW-3	3/8	25/64	15/16	3/16	1		
FW-4	SFW-4	1/2	17/32	1 1/8	3/16	1		
FW-5	SFW-5	5/8	21/32	1 3/8	3/16	1		
FW-6	SFW-6	3/4	25/32	1 5/8	1/4	1		
FW-7	SFW-7	7/8	29/32	1 3/4	1/4	1		
FW-8	SFW-8	1	1 1/32	2	1/4	1		



Steel washers are made of cold finished steel and case hardened. Black oxide finish. All are machined flat and parallel. Stainless are made from Type 303 stainless steel.

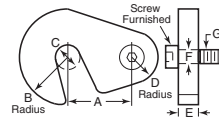
Heavy Duty Stamped Flat Washers  
Steel



Precision fine blanked washer. Heat treated, black oxide finish. Available in steel only. Tolerance: I.D. +/- .010", OD, thickness and flatness is .005" maximum on the inch only. Metric are tempered to 1200-1400N/mm2 tensile strength. Metric dimensions are in millimeters.

Item No.	Bolt Size	A	B	C	Pack Qty.	Item No.	Bolt Size	A	B	C	Pack Qty.
<b>Inch</b>						<b>Metric</b>					
EW-10	3/16	13/64	1/2	3/32	1	EW-210	M6	6.4	17	3	1
EW-20	1/4	9/32	5/8	1/8	1	EW-215	M8	8.4	23	4	1
EW-30	5/16	11/32	3/4	1/8	1	EW-220	M10	10.5	28	4	1
EW-40	3/8	13/32	7/8	1/8	1	EW-225	M12	13	35	5	1
EW-50	3/8	13/32	7/8	3/16	1	EW-230	M16	17	45	6	1
EW-60	7/16	15/32	1	1/8	1	EW-235	M20	21	50	6	1
EW-70	1/2	17/32	1 1/8	1/8	1	EW-240	M24	25	60	8	1
EW-80	1/2	17/32	1 1/8	3/16	1						
EW-90	5/8	21/32	1 3/8	1/8	1						
EW-100	5/8	21/32	1 3/8	3/16	1						
EW-110	3/4	25/32	1 5/8	5/32	1						
EW-120	3/4	25/32	1 5/8	1/4	1						
EW-130	7/8	29/32	1 3/4	5/32	1						
EW-140	1	1 1/32	2	3/16	1						

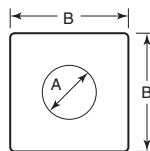
Swing C-Washers



Cold finished steel, hardened and ground. Black oxide finish.

Item No.	A	B	C	D	E	F	G	Pack Qty.
SCW-1	1	3/4	1 3/32	3/8	1/4	5/16	1/4-20	1
SCW-2	1 1/4	1	1 7/32	1/2	3/8	3/8	5/16-18	1
SCW-3	1 1/2	1 1/8	2 1/32	3/16	3/8	1/2	3/8-16	1
SCW-4	1 3/4	1 1/4	2 5/32	5/8	1/2	1/2	3/8-16	1

Heavy Duty Square Flat Washers  
Steel and Stainless Steel



Provides more surface area contact than round washers. Used for shimming machinery, construction applications and anywhere an extra large washer is needed. Steel washers are made from 1018 steel and case hardened with a black zinc finish. Stainless steel washers are made from Type 304 stainless steel.

Item No.	Bolt Size	A	B	Thickness	Pack Qty.
<b>Steel</b>					
JSW-32	1/2	1 7/32	1 3/8	1/4	1
JSW-33	1/2	1 7/32	2	1/4	1
JSW-34	5/8	2 1/32	2	1/4	1
JSW-35	3/4	1 3/16	2	1/4	1
JSW-36	3/4	1 3/16	2 1/2	1/4	1
JSW-37	1	1 1/16	2 1/2	1/4	1
<b>Stainless</b>					
ASFW-25	3/8	7/16	2	1/4	1
ASFW-30	1/2	3/16	2	1/4	1
ASFW-35	5/8	1 1/16	2	1/4	1



**Machinist Clamping Kit**



Contains 58 pieces in a strong plastic holder that can be mounted or can stand on a bench.

Kit includes:

- Six T-slot nuts
- Twenty-four studs - four each of 3", 4", 5", 6", 7" and 8" lengths
- Six flange nuts
- Four coupling nuts
- Twelve 1" step blocks
- Six step clamps
- One plastic stand

Item No.	Description	Pack Qty.
SUS-22200	58 Piece Machinist Clamping Kit	1

**Machinist Clamping Kit  
 1" Step Blocks**



Contains 57 pieces in a strong metal holder that can be mounted or can stand on a bench.

Kit includes:

- Six T-slot nuts
- Twenty-four studs - four each of 3", 4", 5", 6", 7" and 8" lengths
- Four flange nuts
- Four coupling nuts
- Twelve step blocks
- Six step clamps
- One T-slot cleaner
- One metal stand

See pages 378, 434 and 438 for exact dimensions of the individual studs, T-nuts, clamps and blocks.

Item No.	Stud Size	Table Slot	T-Nut Part No.	Step Clamp Part No.	Step Blocks Part No.	Pack Qty.
DCK-1	3/8-16	7/16	TN-2	CS-1, CS-2, CS-3	1-S, 2-S, 3-S	1
DCK-2	3/8-16	1/2	TN-3	CS-1, CS-2, CS-3	1-S, 2-S, 3-S	1
DCK-4	1/2-13	9/16	TN-4	CS-4, CS-5, CS-6	1-S, 2-S, 3-S	1
DCK-5	1/2-13	5/8	TN-5	CS-4, CS-5, CS-6	1-S, 2-S, 3-S	1
DCK-7	5/8-11	11/16	TN-6	CS-7, CS-8, CS-9	1-S, 2-S, 3-S	1
DCK-8	5/8-11	3/4	TN-7	CS-7, CS-8, CS-9	1-S, 2-S, 3-S	1

**Forged Rod Ends  
 Steel and Stainless Steel**



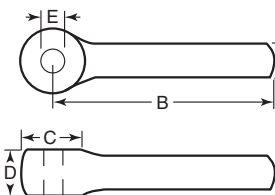
Blank



Milled and Drilled



Milled, Drilled and Threaded



The steel rod ends are a quality drop forged part with the average properties of C-1035 natural hot rolled steel. 75,000 to 85,000 lbs. psi tensile, 40,000 to 55,000 lbs. psi yield. They are supplied three ways: blank, milled and drilled or threaded. The stainless rod ends are made from forged Type 316 stainless steel.

See page 374 for steel cams.

Item No.	Item No.	Item No.	Thread	Thread Length	Hole ID				Pack Qty.		
					E	A	B	C			
<b>Steel</b>											
WB-1	WM-1	WMT-1	1/4-20	2	3/4	1/4	3	1/2	9/32	1	
WB-2	—	WMT-2	1/4-20	3	5/16	1/4	6	1/2	9/32	1	
WB-3	—	WMT-3	3/8-18	2	3/8	5/16	3	5/8	11/32	1	
WB-4	WM-4	WMT-4	3/8-18	3	3/8	5/16	6	5/8	11/32	1	
WB-5	WM-5	WMT-5	3/8-16	1 1/2	3/8	3/8	2 1/8	1 1/8	3/8	1	
WB-6	WM-6	WMT-6	3/8-16	1 3/4	3/8	3/8	2 1/2	3/4	3/8	1	
WB-7	WM-7	WMT-7	3/8-16	3	3/8	3/8	6	3/4	7/16	1	
WB-8	WM-8	WMT-8	7/16-14	3	7/16	7/16	6	7/8	1/2	1	
WB-9	WM-9	WMT-9	1/2-13	2	1/2	1/2	3 1/8	1 5/16	9/16	1	
WB-10	WM-10	WMT-10	1/2-13	2 1/2	1/2	1/2	3 1/2	1	9/16	1	
WB-11	WM-11	WMT-11	1/2-13	3	1/2	1/2	6	1	9/16	1	
WB-12	WM-12	WMT-12	5/8-11	2	5/8	5/8	3	1 1/4	11/16	1	
WB-13	WM-13	WMT-13	5/8-11	3 1/2	5/8	5/8	8	1 1/4	11/16	1	
WB-13A	WM-13A	WMT-13A	5/8-11	4	5/8	5/8	10	1 1/4	11/16	1	
WB-14	WM-14	WMT-14	3/4-10	3	3/4	3/4	6	1 1/2	13/16	1	
WB-14A	WM-14A	WMT-14A	3/4-10	4	3/4	3/4	10	1 1/2	13/16	1	
WB-15	—	WMT-15	7/8-9	3	7/8	7/8	6	1 3/4	15/16	1	
WB-15A	WM-15A	WMT-15A	7/8-9	4 1/2	7/8	7/8	12	1 3/4	15/16	1	
WB-16	WM-16	WMT-16	1-8	3	1	1	6	2	1 1/16	1	
WB-16A	WM-16A	WMT-16A	1-8	3 1/2	1	1	12	2	1 1/16	1	
<b>Stainless</b>											
WBS-38	—	—	—	—	—	—	3/8	6	3/4	7/16	1
WBS-50	—	—	—	—	—	—	1/2	6	1	9/16	1
WBS-75	—	—	—	—	—	—	3/4	6	1 1/2	1 1/16	1
WBS-88	—	—	—	—	—	—	7/8	6	1 3/4	1 1/16	1

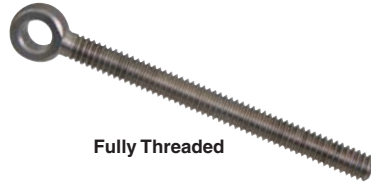
Note: Head Thickness (D dimension) is for blank only. Milled and drilled and threaded D dimension will be slightly undersized.



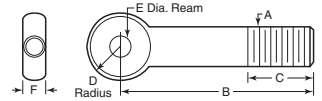
Swing Eye bolts  
Partially or Fully Threaded  
Steel or Stainless Steel



Partially Threaded



Fully Threaded



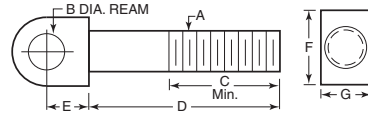
Made of heat-treated alloy (125,000 psi) steel with black oxide finish or Type 300 series stainless steel. Have many applications in the construction of machinery, jigs, fixtures and other tooling. Fully threaded eye bolts allow you to shorten the shank without sacrificing thread length. Metric dimensions are in millimeters.

Item No.	A	B	C	D	+0.01/+0.003 E	F	Pack Qty.	Item No.	A	B	C	D	+0.01/+0.003 E	F	Pack Qty.
<b>Steel - Partially Threaded - Inch</b>								<b>Steel - Partially Threaded - Metric</b>							
EB-1	1/4-20	2	3/4	1/4	3/16	1/4	1	MEB-65	M8 x 1.25	100	90	8	8	8	1
EB-11	1/4-20	3	1 1/4	1/4	3/16	1/4	1	MEB-70	M10 x 1.5	75	60	10	10	10	1
EB-285	1/4-20	4	3/4	1/4	3/16	1/4	1	MEB-75	M10 x 1.5	100	85	10	10	10	1
EB-5	5/16-18	3	1 1/2	5/16	1/4	5/16	1	MEB-80	M10 x 1.5	125	110	10	10	10	1
EB-52	5/16-18	3	1 1/2	5/16	5/16	5/16	1	MEB-85	M12 x 1.75	100	85	12	12	12	1
EB-51	5/16-18	4	2	5/16	1/4	5/16	1	MEB-90	M12 x 1.75	125	110	12	12	12	1
EB-53	5/16-18	4	2	5/16	5/16	5/16	1	MEB-95	M16 x 2.0	115	95	16	16	16	1
EB-22	3/8-16	3	1 1/2	3/8	5/16	3/8	1	MEB-100	M16 x 2.0	150	130	16	16	16	1
EB-24	3/8-16	3	1 1/2	3/8	3/8	3/8	1	MEB-105	M20 x 2.5	150	125	20	20	20	1
EB-2	3/8-16	3 3/4	1 1/2	3/8	3/8	1/2	1	<b>Stainless Steel - Partially Threaded - Inch</b>							
EB-25	3/8-16	3 3/4	2	3/8	3/8	3/8	1	EB-100	1/4-20	2 1/8	7/8	1/4	3/16	1/4	1
EB-290	3/8-16	4	1 1/2	3/8	3/8	3/8	1	EB-105	1/4-20	2 1/8	7/8	1/4	1/4	1/4	1
EB-23	3/8-16	5	2 1/2	3/8	5/16	3/8	1	EB-110	1/4-20	3	1 1/4	1/4	1/4	1/4	1
EB-26	3/8-16	5	2 1/2	3/8	3/8	3/8	1	EB-115	5/16-18	3 1/2	1 1/2	5/16	1/4	5/16	1
EB-21	3/8-16	5	2 1/2	1/2	3/8	1/2	1	EB-120	5/16-18	3 1/2	1 1/2	5/16	5/16	5/16	1
EB-3	1/2-13	3 3/4	1 1/2	1/2	3/8	1/2	1	EB-125	5/16-18	4	2	5/16	1/4	5/16	1
EB-31	1/2-13	5	2	1/2	3/8	1/2	1	EB-155	3/8-16	3	1 1/2	3/8	3/8	3/8	1
EB-295	1/2-13	6	1 1/2	1/2	3/8	1/2	1	EB-130	3/8-16	3 1/2	1 1/2	3/8	3/8	3/8	1
EB-4	5/8-11	4 1/2	2	5/8	5/8	5/8	1	EB-135	3/8-16	3 3/4	2	3/8	3/8	3/8	1
EB-41	5/8-11	6	2 1/2	5/8	5/8	5/8	1	EB-160	3/8-16	4	1 1/2	3/8	3/8	3/8	1
EB-300	5/8-11	7	1 3/4	5/8	5/8	5/8	1	EB-140	3/8-16	5	2 1/2	3/8	3/8	3/8	1
EB-305	5/8-11	8	1 3/4	5/8	5/8	5/8	1	EB-145	1/2-13	3 3/4	1 1/2	1/2	1/2	1/2	1
EB-6	3/4-10	4 1/2	2	3/4	3/4	3/4	1	EB-165	1/2-13	4	1 1/2	1/2	3/8	1/2	1
EB-61	3/4-10	6	2 1/2	3/4	3/4	3/4	1	EB-170	1/2-13	5	1 1/2	1/2	3/8	1/2	1
EB-310	3/4-10	7	1 3/4	3/4	5/8	3/4	1	EB-150	1/2-13	5	2	1/2	1/2	1/2	1
EB-315	3/4-10	8	1 3/4	3/4	5/8	3/4	1	EB-175	1/2-13	6	1 1/2	1/2	3/8	1/2	1
<b>Steel - Fully Threaded - Inch</b>								<b>Stainless Steel - Fully Threaded - Inch</b>							
EB-250*	1/4-20	3	2 3/4	1/4	3/16	1/4	1	EB-180	5/8-11	5	1 3/4	5/8	5/8	5/8	1
EB-255*	5/16-18	4	3 1/2	5/16	5/16	5/16	1	EB-185	5/8-11	6	1 3/4	5/8	5/8	5/8	1
EB-260*	3/8-16	5	4 1/2	3/8	3/8	3/8	1	EB-195	5/8-11	8	1 3/4	5/8	5/8	5/8	1
EB-265*	1/2-13	5	4 1/2	1/2	3/8	1/2	1	EB-200	3/4-10	5	1 3/4	3/4	3/4	3/4	1
EB-270*	5/8-11	6	5 1/4	5/8	5/8	5/8	1	EB-205	3/4-10	6	1 3/4	3/4	3/4	3/4	1
EB-275*	3/4-10	6	5 1/4	3/4	3/4	3/4	1	<b>Steel - Partially Threaded - Metric</b>							
EB-280*	1-8	10	1	5/8	5/8	1	1	MEB-50	M6 x 1.0	50	40	6	6	6	1
<b>Steel - Fully Threaded - Metric</b>								<b>Stainless Steel - Fully Threaded - Metric</b>							
MEB-55	M6 x 1.0	75	66	6	6	6	1	EB-220*	1/4-20	3	2 1/2	1/4	1/4	1/4	1
MEB-60	M8 x 1.25	75	65	8	8	8	1	EB-225*	5/16-18	4	3 1/2	5/16	5/16	5/16	1
								EB-230*	3/8-16	5	4 1/2	3/8	3/8	3/8	1
								EB-235*	1/2-13	5	4 1/4	1/2	1/2	1/2	1
								EB-240*	5/8-11	6	5 1/4	5/8	5/8	5/8	1
								EB-245*	3/4-10	6	5 1/8	3/4	3/4	3/4	1

\*Fully Threaded

Note: Diameter E metric tolerance is +.025mm/+0.075mm

Swing or Latch Bolts



Available in steel and stainless steel. Steel are made of cold finished steel and case hardened. Black oxide finish. Stainless are made from Type 18-8 stainless steel.

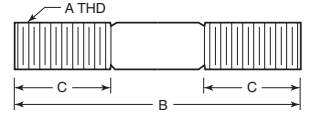
Steel Item No.	Stainless Item No.	A	B	C	D	E	F	G	Pack Qty.
SWB-4	SWB-4S	1/4-20	1/4	3/4	1 1/16	5/16	1/2	5/16	1
SWB-4L	SWB-4LS	1/4-20	1/4	1 1/4	2 3/16	5/16	1/2	5/16	1
SWB-5	SWB-5S	5/16-18	5/16	1	1 1/8	3/8	5/8	3/8	1
SWB-5L	SWB-5LS	5/16-18	5/16	1 1/8	2 5/8	3/8	5/8	3/8	1
SWB-1	SWB-1S	3/8-16	3/8	1 1/8	2	1/2	3/4	1/2	1
SWB-1L	SWB-1LS	3/8-16	3/8	2	3	1/2	3/4	1/2	1
SWB-2	SWB-2S	1/2-13	1/2	1 1/8	2 1/2	5/8	1	5/8	1
SWB-2L	SWB-2LS	1/2-13	1/2	2 1/4	3 1/2	5/8	1	5/8	1
SWB-3	SWB-3S	5/8-11	5/8	1 3/4	2 3/4	3/4	1 1/4	3/4	1
SWB-3L	SWB-3LS	5/8-11	5/8	2 1/2	4	3/4	1 1/4	3/4	1



# SETUP STUDS

Buy One or Buy Bulk & SAVE

## Standard Style Steel and Stainless Steel Inch



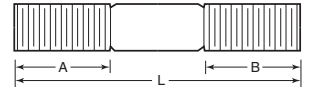
The steel inch studs are made of stress proof steel to ASTM A 311 class B. Yield strength is 100,000 psi, tensile strength is 125,000 psi. Stainless studs are made from Type 303. The metric studs are made of steel with rolled threads. Sizes M6-M12 are heat treated to strength Class 10.9. Sizes M16-M24 are heat treated to Class 8.8. All Steel studs are black oxide finish.

Steel Item No.	Stainless Item No.	Thread A	B	C	Pack Qty.
SUS-70	SUS-270	1/4-20	3	1	1
SUS-71	—	1/4-20	4	1	1
SUS-72	—	1/4-20	5	1 1/4	1
SUS-1	SUS-201	3/8-18	3	1 1/8	1
SUS-2	SUS-202	3/8-18	4	1 1/8	1
SUS-3	—	3/8-18	5	1 1/8	1
SUS-4	—	3/8-18	6	1 1/8	1
SUS-5	—	3/8-18	7	1 1/8	1
SUS-6	—	3/8-18	8	1 1/8	1
SUS-7	SUS-207	3/8-16	3	1 1/4	1
SUS-8	SUS-208	3/8-16	4	1 1/4	1
SUS-9	SUS-209	3/8-16	5	1 1/4	1
SUS-10	—	3/8-16	6	1 1/4	1
SUS-11	—	3/8-16	7	1 1/4	1
SUS-12	SUS-212	3/8-16	8	1 1/4	1
SUS-13	—	1/2-13	3	1 1/2	1
SUS-14	SUS-214	1/2-13	4	1 1/2	1
SUS-15	SUS-215	1/2-13	5	1 1/2	1
SUS-16	SUS-216	1/2-13	6	1 1/2	1
SUS-17	—	1/2-13	7	1 1/2	1
SUS-18	—	1/2-13	8	1 1/2	1
SUS-19	—	1/2-13	9	2	1
SUS-20	—	1/2-13	10	2	1
SUS-21	—	1/2-13	12	2	1
SUS-22	—	1/2-13	14	2	1
SUS-23*	—	5/8-11	3	1 3/4	1
SUS-24	SUS-224	5/8-11	4	1 3/4	1
SUS-25	SUS-225	5/8-11	5	1 3/4	1
SUS-26	SUS-226	5/8-11	6	1 3/4	1
SUS-27	—	5/8-11	7	1 3/4	1
SUS-28	—	5/8-11	8	1 3/4	1
SUS-29	—	5/8-11	9	2	1
SUS-30	—	5/8-11	10	2	1

Steel Item No.	Stainless Item No.	Thread A	B	C	Pack Qty.
SUS-31	—	3/8-11	12	2	1
SUS-32	—	3/8-11	14	2	1
SUS-34	—	3/4-10	3	2	1
SUS-35	—	3/4-10	4	2	1
SUS-36	—	3/4-10	5	2	1
SUS-37	—	3/4-10	6	2	1
SUS-38	—	3/4-10	7	2	1
SUS-39	—	3/4-10	8	2	1
SUS-40	—	3/4-10	9	2	1
SUS-41	—	3/4-10	10	2	1
SUS-42	—	3/4-10	12	2	1
SUS-43	—	3/4-10	14	2	1
SUS-44	—	3/4-10	16	2	1
SUS-46*	—	7/8-9	4	2 1/4	1
SUS-47	—	7/8-9	5	2 1/4	1
SUS-48	—	7/8-9	6	2 1/4	1
SUS-49	—	7/8-9	7	2 1/4	1
SUS-50	—	7/8-9	8	2 1/4	1
SUS-51	—	7/8-9	9	2 1/4	1
SUS-52	—	7/8-9	10	2 1/4	1
SUS-53	—	7/8-9	12	2 1/4	1
SUS-54	—	7/8-9	14	2 1/4	1
SUS-55	—	7/8-9	16	2 1/4	1
SUS-57	—	1-8	4	2 1/2	1
SUS-58	—	1-8	5	2 1/2	1
SUS-59	—	1-8	6	2 1/2	1
SUS-60	—	1-8	7	2 1/2	1
SUS-61	—	1-8	8	2 1/2	1
SUS-62	—	1-8	9	2 1/2	1
SUS-63	—	1-8	10	2 1/2	1
SUS-64	—	1-8	12	2 1/2	1
SUS-65	—	1-8	14	2 1/2	1

\*Studs too short for given thread lengths are threaded as close to center as possible.

## Standard Style Steel Metric

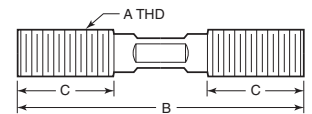


The steel inch studs are made of stress proof steel to ASTM A 311 class B. Yield strength is 100,000 psi, tensile strength is 125,000 psi. Stainless studs are made from Type 303. The metric studs are made of steel with rolled threads. Sizes M6-M12 are heat treated to strength Class 10.9. Sizes M16-M24 are heat treated to Class 8.8. All Steel studs are black oxide finish. Metric dimensions are in millimeters.

Item No.	Thread	L	A	B	Pack Qty.
SUS-300	M6 x 1.0	32	9	16	1
SUS-305	M6 x 1.0	40	9	20	1
SUS-310	M6 x 1.0	50	9	30	1
SUS-103	M6 x 1.0	63	9	40	1
SUS-104	M6 x 1.0	80	9	50	1
SUS-315	M8 x 1.25	40	11	20	1
SUS-106	M8 x 1.25	63	11	40	1
SUS-320	M8 x 1.25	80	11	50	1
SUS-108	M8 x 1.25	100	11	63	1
SUS-325	M8 x 1.25	125	11	75	1
SUS-109	M8 x 1.25	160	11	100	1
SUS-330	M10 x 1.5	50	13	25	1
SUS-111	M10 x 1.5	80	13	50	1
SUS-112	M10 x 1.5	100	13	75	1
SUS-114	M10 x 1.5	160	13	100	1
SUS-340	M12 x 1.75	50	15	25	1

Item No.	Thread	L	A	B	Pack Qty.
SUS-345	M12 x 1.75	63	15	32	1
SUS-118	M12 x 1.75	80	15	50	1
SUS-119	M12 x 1.75	100	15	63	1
SUS-120	M12 x 1.75	125	15	75	1
SUS-355	M16 x 2.0	63	19	32	1
SUS-121	M12 x 1.75	160	15	100	1
SUS-350	M12 x 1.75	200	15	125	1
SUS-365	M16 x 2.0	100	19	63	1
SUS-131	M16 x 2.0	125	19	75	1
SUS-132	M16 x 2.0	160	19	100	1
SUS-133	M16 x 2.0	200	19	125	1
SUS-370	M16 x 2.0	250	19	160	1
SUS-375	M16 x 2.0	315	19	180	1
SUS-380	M20 x 2.5	80	27	32	1
SUS-400	M20 x 2.5	500	27	315	1
SUS-410	M24 x 3.0	125	35	70	1

## Driver Style Steel Inch



Made of medium carbon steel with black oxide finish. Tensile strength is 125,000 psi minimum. All studs have wrench flats.

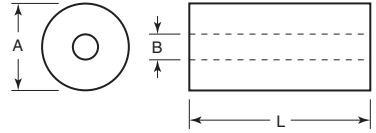
Item No.	Thread A	B	C	Pack Qty.	Item No.	Thread A	B	C	Pack Qty.
SUS-504	3/8-16	3	1	1	SUS-809	5/8-11	5 1/2	1 3/4	1
SUS-505	3/8-16	3 1/2	1 1/4	1	SUS-810	5/8-11	6	1 3/4	1
SUS-506	3/8-16	4	1 1/4	1	SUS-811	5/8-11	6 1/2	1 3/4	1
SUS-507	3/8-16	4 1/2	1 1/4	1	SUS-812	5/8-11	7	1 3/4	1
SUS-508	3/8-16	5	1 1/4	1	SUS-814	5/8-11	8	1 3/4	1
SUS-509	3/8-16	5 1/2	1 1/4	1	SUS-815	5/8-11	9	1 3/4	1
SUS-510	3/8-16	6	1 1/4	1	SUS-816	5/8-11	10	1 3/4	1
SUS-514	3/8-16	8	1 1/4	1	SUS-817	5/8-11	12	1 3/4	1
SUS-704	1/2-13	3	1	1	SUS-818	5/8-11	14	1 3/4	1
SUS-705	1/2-13	3 1/2	1 1/4	1	SUS-819	5/8-11	16	1 3/4	1
SUS-706	1/2-13	4	1 1/4	1	SUS-820	5/8-11	18	1 3/4	1
SUS-707	1/2-13	4 1/2	1 1/4	1	SUS-901	3/4-10	3	1	1
SUS-708	1/2-13	5	1 1/4	1	SUS-903	3/4-10	4	1 1/2	1

Item No.	Thread A	B	C	Pack Qty.	Item No.	Thread A	B	C	Pack Qty.
SUS-709	1/2-13	5 1/2	1 1/2	1	SUS-905	3/4-10	5	2	1
SUS-710	1/2-13	6	1 1/2	1	SUS-906	3/4-10	5 1/2	2	1
SUS-712	1/2-13	7	1 1/2	1	SUS-907	3/4-10	6	2	1
SUS-713	1/2-13	7 1/2	1 1/2	1	SUS-908	3/4-10	6 1/2	2	1
SUS-714	1/2-13	8	1 1/2	1	SUS-909	3/4-10	7	2	1
SUS-715	1/2-13	9	1 1/2	1	SUS-911	3/4-10	8	2	1
SUS-716	1/2-13	10	1 1/2	1	SUS-912	3/4-10	9	2	1
SUS-717	1/2-13	12	1 1/2	1	SUS-914	3/4-10	12	2	1
SUS-804	5/8-11	3	1	1	SUS-915	3/4-10	14	2	1
SUS-805	5/8-11	3 1/2	1 1/4	1	SUS-916	3/4-10	16	2	1
SUS-806	5/8-11	4	1 1/2	1	SUS-917	3/4-10	18	2	1
SUS-807	5/8-11	4 1/2	1 1/4	1	SUS-920	3/4-10	24	2	1
SUS-808	5/8-11	5	1 1/4	1					



Neoprene Elastomer Springs

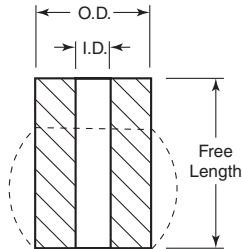
Item No.	A	B	L	R	D	T	Pack Qty.
BES-3500	.630	.25	1 <sup>5</sup> / <sub>32</sub>	436	.17	72	1
BES-3501	.630	.25	5 <sup>5</sup> / <sub>8</sub>	353	.22	77	1
BES-3502	.630	.25	2 <sup>5</sup> / <sub>32</sub>	292	.27	80	1
BES-3503	.630	.25	1	236	.34	83	1
BES-3510	.787	.33	5 <sup>5</sup> / <sub>8</sub>	610	.22	133	1
BES-3511	.787	.33	2 <sup>5</sup> / <sub>32</sub>	482	.28	132	1
BES-3512	.787	.33	1	381	.35	133	1
BES-3513	.787	.33	1 <sup>1</sup> / <sub>4</sub>	287	.44	126	1
BES-3520	1.000	.41	2 <sup>5</sup> / <sub>32</sub>	787	.28	215	1
BES-3521	1.000	.41	1	598	.35	209	1
BES-3522	1.000	.41	1 <sup>1</sup> / <sub>4</sub>	524	.44	229	1
BES-3523	1.000	.41	1 <sup>1</sup> / <sub>16</sub>	440	.55	241	1
BES-3530	1.250	.53	1 <sup>1</sup> / <sub>4</sub>	1,031	.44	451	1
BES-3531	1.250	.53	1 <sup>3</sup> / <sub>64</sub>	828	.55	471	1
BES-3532	1.250	.53	1 <sup>3</sup> / <sub>32</sub>	651	.69	456	1
BES-3533	1.250	.53	2 <sup>1</sup> / <sub>2</sub>	517	.87	452	1
BES-3540	1.560	.53	1 <sup>1</sup> / <sub>4</sub>	1,790	.44	783	1
BES-3541	1.560	.53	1 <sup>3</sup> / <sub>64</sub>	1,439	.55	816	1
BES-3542	1.560	.53	1 <sup>3</sup> / <sub>32</sub>	1,148	.69	804	1
BES-3543	1.560	.53	2 <sup>1</sup> / <sub>2</sub>	931	.87	815	1
BES-3544	1.560	.53	3 <sup>3</sup> / <sub>32</sub>	744	1.10	830	1
BES-3553	2.000	.66	2 <sup>1</sup> / <sub>2</sub>	1,482	.87	1,297	1
BES-3563	2.500	.66	2 <sup>1</sup> / <sub>2</sub>	2,286	.87	2,000	1
BES-3573	3.150	.83	2 <sup>1</sup> / <sub>2</sub>	4,572	.87	4,000	1
BES-3583	3.940	.83	2 <sup>1</sup> / <sub>2</sub>	6,435	.87	5,631	1



Neoprene elastomer springs have proven to be the safest, most efficient and reliable compression material for punching, stamping and drawing dies. Major advantages include higher loads, increased durability, better performance, no maintenance and very long life.

Note: R = Spring rate, lbs./inch deflection 20%  
 D = Max. recommended deflection - 35% L  
 T = Approximate total load at max. deflection ±20%

Urethane Springs



These urethane springs are designed for use in applications where corrosion, vibration and magnetism prevent the use of conventional steel springs. They replace steel coil springs in medium pressure applications involving space limitations, high blank holding pressure and adequate stripping. Durometer 95 shore A. Color black. Tensile strength 5,000 psi. Temperature range -40 to +180 degrees Fahrenheit.

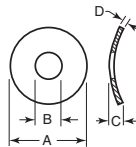
See pages 302-303 for bumpers in Material Handling.

Item No.	A	B	C	Load/Lbs. 1/8" Def.	Pack Qty.	Item No.	A	B	C	Load/Lbs. 1/8" Def.	Pack Qty.
US-10	7/8	1/4	1	425	1	US-80	1 1/4	5/8	1	700	1
US-15	7/8	1/4	1 1/4	325	1	US-90	1 1/4	5/8	2	325	1
US-30	7/8	1/4	12 1/2	—	1	US-95	1 1/4	5/8	12 1/2	—	1
US-35	1	3/8	1	525	1	US-100	1 1/2	3/4	1 1/4	875	1
US-40	1	3/8	1 1/4	425	1	US-105	1 1/2	3/4	1 1/2	725	1
US-45	1	3/8	1 1/2	325	1	US-110	1 1/2	3/4	2	525	1
US-50	1	3/8	2	250	1	US-115	1 1/2	3/4	12 1/2	—	1
US-55	1	3/8	12 1/2	—	1	US-120	2	1	1 1/4	1,550	1
US-60	1 1/8	1/2	1	600	1	US-125	2	1	2	850	1
US-65	1 1/8	1/2	1 1/4	475	1	US-130	2	1	2 3/4	625	1
US-70	1 1/8	1/2	2	275	1	US-135	2	1	12 1/2	—	1
US-75	1 1/8	1/2	12 1/2	—	1						

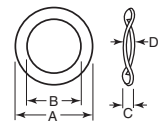
Spring Washers



Single Wave



Three Wave

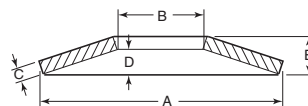


Spring washers are specifically designed to provide a compensating spring force and sustain a load or absorb a shock. Single wave washers are designed for applications involving low loads and requiring high deflection; often used in taking up the play for large tolerance variations or anti-rattle applications. Three wave washers provide somewhat greater load bearing capacity than single wave washers with some loss in deflection capability; commonly used as a take up spring for a wide range of load-bearing applications. Made from spring steel. Available plain, with phosphate oil, or zinc plated.

Item No.	Hole Size	Finish	At Yield Point			Thick. D	Max. Lbs.	Max. Deflection	Pack Qty.
			A Max./Min.	B Max./Min.	C Max./Min.				
<b>Single Wave</b>									
WW-125	#10	Plain	.448/.428	.208/.198	.080/.060	.010	7.2	.021	1
WW-130	#10	Plain	.510/.490	.208/.198	.090/.070	.015	17.8	.019	1
WW-135	#10	Zinc	.510/.490	.208/.198	.090/.070	.015	17.8	.019	1
WW-140	1/4	Plain	.495/.485	.270/.260	.100/.060	.015	13.8	.018	1
WW-155	1/4	Zinc	.510/.490	.257/.251	.107/.087	.010	6.6	.028	1
WW-160	5/16	Plain	.635/.615	.320/.314	.108/.088	.020	26.3	.022	1
WW-170	3/8	Plain	.760/.740	.395/.385	.150/.130	.010	6.4	.063	1
WW-175	3/8	Zinc	.760/.740	.395/.385	.150/.130	.010	6.4	.063	1
WW-185	1/2	Zinc	.750/.730	.510/.500	.140/.120	.015	9.5	.041	1
<b>Three Wave</b>									
WW-330	5/16	Plain	.510/.490	.332/.320	.065/.045	.015	36.2	.010	1
WW-345	3/8	Plain	.665/.645	.395/.385	.120/.100	.022	93.8	.012	1
WW-350	3/8	Plain	.885/.865	.659/.640	.135/.115	.015	25.4	.031	1



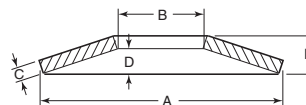
**Belleville Disc Springs  
Steel and Stainless Steel**



Conical in shape, these disc springs have special geometric relationships of OD, ID, thickness and height. They are used singly or in stacks to achieve desired load and travel in situations where coil springs are not practical. They are also used to maintain and absorb pressure in bolted assemblies. Carbon springs are made from 1075 steel for use up to 250 degree Fahrenheit. Stainless are made from 17/7 PH stainless steel for use up to 500 degree Fahrenheit. Deflection is shown at 75% of height.

Steel		Stainless							Steel		Stainless								
Item No.	Item No.	A	B	C	D	E	Deflection @ .75h Load Lbs.	Deflection @ F=.75h Deflection	Pack Qty.	Item No.	Item No.	A	B	C	D	E	Deflection @ .75h Load Lbs.	Deflection @ F=.75h Deflection	Pack Qty.
BDA-5	BDA-405	.315	.165	.0157	.0080	.0236	50	.0060	1	BDA-115	—	1.240	.642	.0787	.0300	.1083	1,497	.0225	1
BDA-10	BDA-410	.394	.205	.0197	.0099	.0295	78	.0074	1	BDA-130	—	1.400	.720	.0787	.0319	.1102	1,236	.0239	1
BDA-15	BDA-415	.492	.244	.0197	.0139	.0335	70	.0104	1	BDA-135	BDA-535	1.570	.642	.0591	.0515	.1102	658	.0386	1
BDA-20	BDA-420	.492	.244	.0276	.0119	.0394	159	.0090	1	BDA-140	BDA-540	1.570	.803	.0591	.0456	.1043	627	.0342	1
BDA-25	—	.551	.283	.0197	.0158	.0354	66	.0119	1	BDA-145	BDA-545	1.570	.803	.0886	.0358	.1240	1,570	.0269	1
BDA-30	BDA-430	.551	.283	.0315	.0119	.0433	191	.0090	1	BDA-150	—	1.570	.803	.0984	.0379	.1358	2,286	.0284	1
BDA-40	BDA-440	.630	.323	.0236	.0179	.0413	97	.0134	1	BDA-155	—	1.970	.803	.0787	.0595	.1378	1,111	.0446	1
BDA-45	—	.630	.323	.0315	.0159	.0472	197	.0119	1	BDA-160	BDA-560	1.970	1.000	.0787	.0557	.1339	1,129	.0418	1
BDA-50	BDA-450	.630	.323	.0354	.0140	.0492	242	.0105	1	BDA-165	BDA-565	1.970	1.000	.1181	.0438	.1614	2,871	.0329	1
BDA-55	BDA-455	.709	.323	.0315	.0199	.0512	187	.0149	1	BDA-175	—	2.360	1.201	.1181	.0678	.1850	3,184	.0508	1
BDA-60	—	.709	.362	.0394	.0159	.0551	300	.0119	1	BDA-180	—	2.480	1.220	.0984	.0695	.1673	1,705	.0521	1
BDA-70	BDA-470	.787	.402	.0394	.0219	.0610	343	.0164	1	BDA-195	—	2.760	1.398	.1181	.0836	.2008	2,924	.0627	1
BDA-75	BDA-475	.787	.402	.0433	.0179	.0610	364	.0134	1	BDA-200	—	2.760	1.595	.1575	.0641	.2205	5,619	.0480	1
BDA-80	—	.906	.323	.0315	.0297	.0610	170	.0223	1	BDA-215	—	3.150	1.420	.1575	.0875	.2441	5,125	.0656	1
BDA-85	BDA-485	.906	.402	.0394	.0278	.0669	314	.0208	1	BDA-220	—	3.150	1.610	.1181	.0915	.2087	2,491	.0686	1
BDA-90	BDA-490	.984	.480	.0591	.0218	.0807	702	.0164	1	BDA-225	—	3.150	1.610	.1968	.0678	.2638	8,062	.0509	1
BDA-95	BDA-495	1.100	.559	.0394	.0318	.0709	264	.0238	1	BDA-230	—	3.540	1.810	.1378	.0994	.2362	3,366	.0745	1
BDA-100	BDA-500	1.100	.559	.0591	.0258	.0846	683	.0193	1	BDA-240	—	3.940	2.010	.1575	.1194	.2756	4,918	.0895	1
BDA-105	BDA-505	1.240	.642	.0492	.0358	.0846	454	.0268	1	BDA-245	—	3.940	2.010	.2362	.0877	.3228	11,520	.0657	1
BDA-110	—	1.240	.642	.0690	.0278	.0965	930	.0209	1										

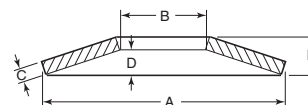
**Belleville Disc Springs  
For Flange Applications**



When placed under the nut or bolt head in bolted joints that are subject to thermal or mechanical shock, these discs deflect and move with the bolted joint. This helps compensate for any loosening that develops and prevents damage and leaks caused by thermal expansion, contraction and shock. Made from 17/7 PH stainless steel. Temperature range -220 to +300 degree Celsius. Load tolerance ±20% of load shown.

Item No.	Bolt Size	A	B	C	E	Load At Flat Lbs.	Pack Qty.
BDF-300	3/8	.714	.390	.080	.086	1,200	1
BDF-305	7/16	.820	.452	.080	.097	2,800	1
BDF-310	1/2	.900	.515	.089	.100	2,100	1
BDF-315	5/8	1.145	.656	.125	.143	6,000	1
BDF-320	3/4	1.365	.781	.131	.150	5,100	1
BDF-330	1	1.805	1.032	.168	.195	8,600	1

**Belleville Disc Springs  
For use with Ball Bearings**

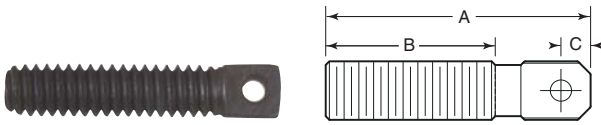


These Belleville disc springs are specially designed as preloading springs for use with ball bearings. They assure perfect positioning of the bearings with no side play. May be used to provide precise bearing preload and proper tension, extending the life of the bearings and eliminating excessive running noise. Made from C1075 steel. Load tolerances ±20% at 75% of height.

Item No.	Ball Bearing Size	A	B	C	D	E	Deflection @ .75h		Pack Qty.
							Load Lbs.	Deflection	
BDB-5	R-2	.366	.228	.0079	.0080	.0158	5.9	.0060	1
BDB-20	624 EL-4	.504	.283	.0098	.0099	.0197	6.7	.0075	1
BDB-30	625 634 EL-5	.622	.323	.0098	.0119	.0217	5.3	.0089	1
BDB-40	607 EL-7	.740	.402	.0138	.0138	.0276	11.8	.0104	1
BDB-50	R-6	.862	.539	.0138	.0158	.0295	11.8	.0118	1
BDB-55	609 EL-9	.933	.563	.0157	.0198	.0354	18.5	.0148	1
BDB-60	6000 629	1.012	.563	.0157	.0198	.0354	14.5	.0148	1
BDB-65	6001	1.091	.681	.0157	.0238	.0394	18.4	.0179	1
BDB-75	6200	1.169	.685	.0157	.0277	.0433	19	.0208	1
BDB-80	6002 6201	1.248	.803	.0157	.0277	.0433	18.6	.0208	1
BDB-85	R-10	1.358	1.000	.0197	.0277	.0472	34.8	.0208	1
BDB-95	6003 6202	1.362	.882	.0197	.0276	.0472	27.3	.0207	1
BDB-105	6203	1.559	1.004	.0197	.0316	.0512	25.3	.0237	1
BDB-110	6004 6302	1.638	1.004	.0197	.0355	.0551	26.1	.0266	1
BDB-120	6205 6304	2.028	1.398	.0236	.0357	.0591	31.1	.0267	1



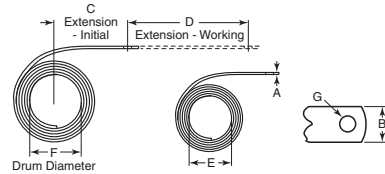
Spring Anchors



Spring anchors offer an economical way to secure the ends of extension springs, and provide easy adjustments. Available in C-12114 steel with a black oxide finish or 300 series stainless steel.

Steel	Stainless								
Item No.	Item No.	Thread	A	B	C	Hole Size	Load/Lbs.	Pack Qty.	
CSA-50	SSA-50	6-32	.625	.400	.070	.05	120	1	
CSA-60	SSA-60	8-32	.875	.625	.085	.07	170	1	
CSA-70	—	1/4-20	1.25	.875	.13	.10	500	1	
CSA-80	SSA-80	1/4-28	1.25	.875	.130	.10	500	1	
CSA-90	—	3/8-16	1.62	1.125	.180	.17	835	1	
—	SSA-70	1/4-20	1.25	.875	.130	.10	500	1	
—	SSA-90	3/8-16	1.62	1.125	.18	.17	835	1	

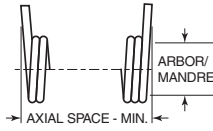
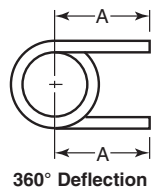
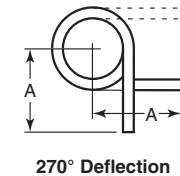
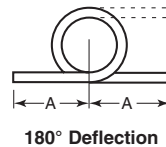
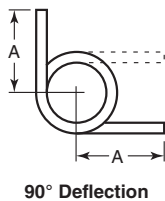
Constant-Force Springs  
Stainless Steel



Item No.	A	B	Lgth.	Min. C	D	E	F	G	+/- 10% Load Lbs.	Pack Qty.
<b>4,000 Cycle Fatigue Life</b>										
CFS-10	.004	.25	15	.61	12	.34	.40	.50	.131	1
CFS-20	.006	.37	22	.92	18	.51	.62	1.12	.131	1
CFS-25	.007	.50	26	1.06	21	.59	.75	1.62	.131	1
CFS-35	.010	.68	34	1.53	27	.85	1.00	3.50	.187	1
CFS-40	.012	.81	38	1.84	30	1.02	1.25	5.00	.187	1
CFS-45	.014	1.00	43	2.14	33	1.19	1.50	7.00	.187	1
<b>40,000 Cycle Fatigue Life</b>										
CFS-50	.006	.37	21	2.03	12	1.13	1.36	.25	.131	1
CFS-65	.010	.68	36	3.38	21	1.88	2.26	.75	.187	1
CFS-75	.014	1.00	48	4.74	27	2.63	3.16	1.62	.187	1

Well suited to long extensions with no load build up. The spring is usually mounted with the ID tightly wrapped on a drum and the free end attached to a loading force such as a counterbalance. Load capacity can be multiplied by using two or more strips in tandem, back to back or laminated. In use, be sure to leave at least 1 1/2" coiled on the drum at full extension. The spring ID will wrap tightly on the drum so that most applications require no fastening to the drum. Made from Type 301 stainless steel.

Torsion Springs  
Stainless Steel



Widely used to store and release energy of rotation or to maintain a pressure over a short distance. Normally used over a supporting mandrel or arbor. The suggested mandrel sizes below allow about 10% clearance at the deflection listed. Sufficient room (minimum axial space) must be provided in the assembly for the spring to function properly. These springs should be used in the direction that winds the coils. Torque values listed are recommended maximum torques. For inspection purposes, the load should be applied at 1/2 leg length (A). These values can be increased 20% for static conditions with only slight setting. Type 302 stainless, plain finish. (ASTM-A313 or AMS-5688).

Left Hand Wound	Right Hand Wound	Wire Dia.	Outside Dia.	Degree of Deflection	Torque In-Lbs.	Mandrel Size	A	Min. Axial Space	Pack Qty.
TSP-10	—	.012	.109	180	.047	.067	.375	.086	1
TSP-30	—	.015	.130	180	.093	.078	.500	.107	1
TSP-60	TSP-560	.017	.259	270	.117	.156	.750	.123	1
TSP-90	TSP-590	.021	.271	360	.218	.187	1.000	.242	1
TSP-110	TSP-610	.025	.235	90	.375	.140	.750	.096	1
TSP-120	TSP-620	.025	.224	180	.375	.140	.750	.206	1
TSP-130	TSP-630	.028	.249	180	.515	.140	1.000	.238	1
—	TSP-640	.030	.281	90	.625	.172	1.000	.116	1
TSP-150	—	.032	.288	90	.820	.172	1.000	.152	1
TSP-170	TSP-670	.035	.450	180	1.000	.281	1.250	.212	1
TSP-160	TSP-660	.035	.315	90	1.000	.187	1.250	.135	1
TSP-180	—	.038	.353	270	1.190	.218	1.250	.465	1
TSP-190	TSP-690	.040	.309	90	1.375	.187	1.250	.198	1

Left Hand Wound	Right Hand Wound	Wire Dia.	Outside Dia.	Degree of Deflection	Torque In-Lbs.	Mandrel Size	A	Min. Axial Space	Pack Qty.
TSP-210	TSP-710	.045	.556	270	2.000	.359	2.000	.415	1
TSP-200	TSP-700	.045	.357	90	2.000	.203	1.250	.259	1
TSP-230	TSP-730	.048	.404	180	2.500	.250	1.250	.450	1
TSP-220	TSP-720	.048	.375	90	2.500	.218	1.250	.238	1
TSP-240	TSP-740	.051	.408	90	2.900	.234	2.000	.293	1
TSP-250	TSP-750	.054	.484	90	3.275	.296	2.000	.310	1
TSP-270	TSP-770	.059	.526	180	4.200	.328	2.000	.560	1
TSP-260	TSP-760	.059	.499	90	4.200	.296	2.000	.340	1
TSP-290	TSP-790	.063	.767	180	5.150	.500	2.000	.475	1
TSP-280	TSP-780	.063	.560	90	5.150	.343	2.000	.362	1
TSP-300	TSP-800	.070	.826	270	7.000	.531	2.000	.717	1
TSP-320	TSP-820	.078	.803	180	9.750	.500	2.000	.660	1
TSP-310	TSP-810	.078	.687	90	9.750	.406	2.000	.450	1

Springs  
Stainless Steel



Item No.	A	B	Wire Size	Pack Qty.	Item No.	A	B	Wire Size	Pack Qty.
RAF-1001	3/4	3/16	.010	1	RAF-1003	1 1/2	.310	.016	1





# COMPRESSION SPRINGS

Buy One or Buy Bulk & SAVE

## Individual Compression Springs



Music 302 Stainless						
Item No.	Item No.	OD	Wire Dia.	Coils Per Inch	Pack Qty.	
S-1	SSS-1	3/32	.010	28	1	
S-2	SSS-2	3/32	.014	28	1	
S-3	SSS-3	1/8	.012	23	1	
S-4	SSS-4	1/8	.016	25	1	
S-5	SSS-5	3/16	.014	13	1	
S-6	SSS-6	3/16	.018	14	1	
S-7	SSS-7	3/16	.025	16	1	
S-8	SSS-8	1/4	.018	9	1	
S-9	SSS-9	1/4	.026	10	1	
S-10	SSS-10	1/4	.031	11	1	
S-11	SSS-11	1/4	.035	13	1	
S-12	SSS-12	1/4	.042	10	1	
S-13	SSS-13	1/4	.047	11	1	
S-14	SSS-14	3/16	.022	10	1	
S-15	SSS-15	3/16	.031	10	1	
S-16	SSS-16	3/16	.038	11	1	
S-17	SSS-17	3/16	.042	9	1	
S-18	SSS-18	3/16	.047	10	1	
S-19	SSS-19	3/16	.055	9	1	
S-20	SSS-20	3/16	.043	7	1	
S-21	SSS-21	3/8	.055	7	1	
S-22	SSS-22	3/8	.063	8	1	
S-23	SSS-23	3/8	.073	8	1	
S-24	SSS-24	7/16	.063	6	1	
S-25		7/16	.076	6	1	
S-26	SSS-26	7/16	.086	6	1	
S-27	SSS-27	1/2	.063	5	1	
S-28	SSS-28	1/2	.075	5	1	
S-29	SSS-29	1/2	.093	6	1	
S-30	SSS-30	1/2	.114	6	1	

## Individual Compression Springs for Holes



Steel							
Item No.	OD	ID	Wire Dia.	Fits into Hole	Fits Over Rod	Coil Per Inch	Pack Qty.
S-31	.345	.281	.032	3/8	1/4	8	1
S-32	.405	.281	.062	7/16	1/4	8	1
S-33	.453	.329	.062	1/2	5/16	6	1
S-34	.500	.376	.062	3/8	5/16	5.3	1
S-35	.562	.438	.062	1/2	3/8	5.3	1
S-36	.625	.501	.062	11/16	7/16	5.3	1
S-37	.718	.594	.062	3/4	7/16	4	1
S-38	.781	.657	.062	13/16	5/8	4	1
S-39	.855	.729	.080	1/2	1/4	6	1
S-40	.580	.420	.080	5/8	3/8	5.3	1
S-41	.705	.545	.080	3/4	1/2	3.5	1
S-42	.830	.670	.080	7/8	5/8	3.2	1
S-43	.955	.795	.080	1	3/4	2.3	1
S-44	1.205	1.045	.080	1 1/4	1	2.3	1
S-45	.562	.376	.093	5/8	5/16	5.3	1
S-46	.687	.501	.093	3/4	7/16	4	1
S-47	.937	.751	.093	1	11/16	3.5	1
S-48	1.030	.844	.093	1 1/8	3/4	3.5	1
S-49	1.155	.969	.093	1 1/4	7/8	2.1	1
S-50	1.280	1.094	.093	1 3/8	1	1.9	1
S-51	.730	.520	.105	3/4	1/2	4.9	1
S-52	.917	.707	.105	1	5/8	4	1
S-53	1.042	.832	.105	1 1/8	3/4	2.4	1
S-54	1.052	.822	.115	1 1/8	3/4	3.5	1
S-55	1.177	.947	.115	1 1/4	7/8	2.1	1
S-56	1.459	1.229	.115	1 1/2	1 1/16	1.4	1

## Individual Compression Springs



Designed to fit freely over shoulder screws or on other similar applications.

Steel						
Item No.	OD	Wire Dia.	Min. ID	Fits Over Rod	Coils Per Inch	Pack Qty.
S-86	.328	.031	1/4	1/4	8	1
S-87	.340	.037	1/4	1/4	8	1
S-88	.350	.042	1/4	1/4	7	1
S-89	.360	.047	1/4	1/4	7	1
S-90	.368	.051	1/4	1/4	7	1
S-91	.412	.042	5/16	5/16	7	1
S-92	.422	.047	5/16	5/16	7	1
S-93	.438	.055	5/16	5/16	6	1
S-94	.452	.062	5/16	5/16	6	1
S-95	.462	.067	5/16	5/16	5	1
S-96	.485	.047	5/16	5/16	7	1
S-97	.501	.055	5/16	5/16	6	1
S-98	.515	.062	5/16	5/16	6	1
S-99	.535	.072	5/16	5/16	5	1
S-100	.543	.076	5/16	5/16	5	1
S-101	.640	.062	3/4	1/2	6	1
S-102	.660	.072	3/4	1/2	5	1
S-103	.676	.080	3/4	1/2	4	1
S-104	.688	.086	3/4	1/2	4	1
S-105	.702	.093	3/4	1/2	4	1
S-106	.785	.072	4/16	5/8	5	1
S-107	.813	.086	4/16	5/8	4	1
S-108	.827	.093	4/16	5/8	4	1
S-109	.851	.105	4/16	5/8	3.5	1
S-110	.871	.115	4/16	5/8	3	1
S-111	.926	.080	4/16	3/4	4	1
S-112	.952	.093	4/16	3/4	3.5	1
S-113	.976	.105	4/16	3/4	3	1
S-114	.996	.115	4/16	3/4	3	1
S-115	1.016	.125	4/16	3/4	2.5	1

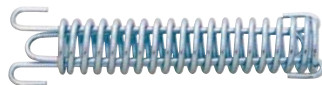
## Long Length Compression Springs 36 Inch Steel and 20 Inch Type 300 Series Stainless Steel



Long length compression springs can be cut to create a custom length spring. End coils may be bent back to touch the previous coil to create a squared end. Available in 20" long stainless steel or 36" long carbon steel. The constant divided by the number of coils equals the load rate per inch.

Item No.	OD	Wire Dia. Inches	Rate/Inch	Pack Qty.	Item No.	OD	Wire Dia. Inches	Rate/Inch	Pack Qty.	Item No.	OD	Wire Dia. Inches	Rate/Inch	Pack Qty.
<b>36" Steel</b>					<b>36" Steel</b>					<b>20" Stainless Steel</b>				
S-201	.094	.013	2.2	1	S-222	.750	.105	153.0	1	SSS-213	.250	.032	10.0	1
S-202	.125	.014	1.6	1	S-223	.875	.080	38.0	1	SSS-214	.312	.020	1.2	1
S-203	.125	.018	2.7	1	S-224	1.000	.092	47.0	1	SSS-215	.312	.026	2.9	1
S-204	.125	.023	14.0	1	S-225	1.000	.121	145.0	1	SSS-216	.312	.032	7.0	1
S-205	.187	.018	2.0	1	S-226	1.000	.135	232.0	1	SSS-217	.312	.041	15.0	1
S-206	.187	.028	14.0	1	S-227	1.125	.106	70.0	1	SSS-218	.375	.032	4.4	1
S-207	.250	.023	3.0	1	S-228	1.250	.121	88.0	1	SSS-219	.375	.041	11.0	1
S-208	.250	.035	16.0	1	S-229	1.250	.148	210.0	1	SSS-220	.375	.054	32.0	1
S-209	.312	.041	19.0	1	S-230	1.500	.162	208.0	1	SSS-221	.438	.041	7.6	1
S-210	.312	.048	36.0	1	S-231	1.750	.187	266.0	1	SSS-222	.438	.054	23.0	1
S-211	.375	.035	7.0	1	<b>20" Stainless Steel</b>					SSS-223	.500	.054	18.0	1
S-212	.438	.048	17.0	1	SSS-201	.125	.013	1.1	1	SSS-224	.500	.072	61.0	1
S-213	.500	.048	15.0	1	SSS-204	.125	.020	5.8	1	SSS-225	.562	.041	3.8	1
S-214	.500	.063	22.0	1	SSS-205	.187	.015	1.0	1	SSS-226	.562	.054	14.0	1
S-215	.500	.063	39.0	1	SSS-206	.187	.017	1.4	1	SSS-227	.562	.072	44.0	1
S-216	.562	.063	33.0	1	SSS-207	.187	.020	2.9	1	SSS-228	.562	.091	128.0	1
S-217	.562	.080	90.0	1	SSS-208	.187	.026	7.3	1	SSS-229	.625	.072	35.0	1
S-218	.625	.063	27.0	1	SSS-209	.250	.015	.6	1	SSS-230	.625	.091	99.0	1
S-219	.625	.072	45.0	1	SSS-210	.250	.017	1.0	1	SSS-231	.750	.091	66.0	1
S-220	.625	.092	129.0	1	SSS-211	.250	.020	1.6	1					
S-221	.750	.080	50.0	1	SSS-212	.250	.026	4.2	1					

## Drawbar Springs



Item No.	Rates Lbs./Inch	Max. Deflection	Max. Load Lbs.	Lgth.	Dia.	Pack Qty.
<b>Spring Steel</b>						
CDB-7001	25	2.0	50	6	1	1
CDB-7003	50	1.9	95	7	1 1/8	1
CDB-7005	75	2.1	160	7 1/2	1 3/8	1
CDB-7009	125	1.9	235	8 1/2	1 1/2	1
CDB-7010	155	1.8	300	7 1/4	1 3/16	1
CDB-7011	200	2.0	400	9 5/8	1 3/8	1
CDB-7013	250	2.4	600	13 3/4	2 1/4	1
CDB-7015	150	4.0	610	19 3/8	2 1/4	1
<b>Stainless Steel</b>						
CDBS-7052	50	1.3	70	4	1	1

Drawbar springs have long steel loops that pass through the center of the spring and hook around to opposite end, thus compressing the spring upon loading. This design produces physical extension stops to prevent unexpected overloading and fracturing while continuing to hold a static load. Available in zinc plated spring steel or stainless steel. The rate lbs./in. listed below indicates the pounds needed to pull out the first inch of the spring. For example, if the rate is 25 lbs. it will take 25 lbs. to pull out the first inch, 50 lbs. for the second inch, etc.





EXTENSION SPRINGS

Buy One or Buy Bulk & SAVE

Extension springs range in size from 1/8" to 1 1/4" OD. 1 1/2" through 8" in length.

Individual Extension Springs Short Length



Item No.	Material	Finish	OD	Wire Dia.	OAL	Lbs. Per Inch	Pack Qty.	Item No.	Material	Finish	OD	Wire Dia.	OAL	Lbs. Per Inch	Pack Qty.	Item No.	Material	Finish	OD	Wire Dia.	OAL	Lbs. Per Inch	Pack Qty.
ES-0102	Music	None	1/8	.015	6	.14	1	ES-1204	Spring Steel	Zinc	3/64	.042	8	1.09	1	ES-1907	Hard Drawn	Zinc	1/2	.080	1 1/2	66.23	1
ES-0103	Music	None	1/8	.015	8	.11	1	ES-1309	Spring Steel	Zinc	1/32	.048	1 1/16	15.64	1	ES-2301	Spring Steel	Zinc	3/64	.072	3 1/16	7.41	1
ES-0301	Music	Zinc	5/32	.020	1 1/2	1.45	1	ES-1402	Music	Zinc	3/8	.031	4 1/2	.26	1	ES-2303	Spring Steel	Zinc	3/64	.072	8	3.11	1
ES-0305	Music	None	5/32	.020	6	.32	1	ES-1403	Spring Steel	Zinc	3/8	.034	2 1/2	.81	1	ES-2401	Hard Drawn	Zinc	5/8	.080	6 1/2	5.27	1
ES-0404	Music	Zinc	3/16	.016	1 1/2	.23	1	ES-1404	Spring Steel	Zinc	3/8	.034	4	.47	1	ES-2503	Spring Steel	None	4/64	.080	7 3/4	3.90	1
ES-0407	Music	Zinc	3/16	.022	1	2.27	1	ES-1405	Spring Steel	Zinc	3/8	.041	3 3/4	1.44	1	ES-2603	Hard Drawn	Zinc	1 1/16	.091	4 3/4	10.96	1
ES-0409	Music	Tinned	3/16	.023	1 1/2	1.89	1	ES-1406	Spring Steel	Zinc	3/8	.041	6	.81	1	ES-2701	Spring Steel	Blk/Ox	4/64	.064	3 1/2	1.93	1
ES-0411	Music	Zinc	3/16	.023	6	.36	1	ES-1407	Hard Drawn	Zinc	3/8	.047	4 1/2	2.37	1	ES-2702	Hard Drawn	Zinc	4/64	.092	5 3/4	7.56	1
ES-0412	Music	Zinc	3/16	.025	1 1/2	2.65	1	ES-1408	Spring Steel	Zinc	3/8	.047	1 1/2	9.25	1	ES-2704	Hard Drawn	Zinc	4/64	.105	2 1/4	58.51	1
ES-0413	Music	Zinc	3/16	.025	1 1/8	2.03	1	ES-1409	Stainless	None	3/8	.049	1 3/4	8.08	1	ES-2706	Hard Drawn	Zinc	4/64	.105	2 3/4	43.88	1
ES-0414	Music	Zinc	3/16	.025	2 1/2	1.46	1	ES-1410	Spring Steel	Zinc	3/8	.048	1 1/16	8.24	1	ES-2707	Hard Drawn	Zinc	4/64	.105	2 1/2	39.61	1
ES-0611	Music	Zinc	7/32	.025	3/4	.66	1	ES-1411	Spring Steel	Zinc	3/8	.047	2 3/8	5.45	1	ES-2801	Hard Drawn	Zinc	3/4	.062	3 1/2	1.69	1
ES-0801	Music	Zinc	1/4	.015	1 1/2	.07	1	ES-1413	Spring Steel	Zinc	3/8	.047	2 1/16	4.09	1	ES-2802	Hard Drawn	Zinc	3/4	.062	4 1/2	1.19	1
ES-0807	Music	Zinc	1/4	.023	1 1/2	.70	1	ES-1414	Hard Drawn	Zinc	3/8	.047	3	3.63	1	ES-2803	Hard Drawn	Zinc	3/4	.080	6	3.04	1
ES-0808	Music	Zinc	1/4	.023	1 1/8	.51	1	ES-1416	Hard Drawn	Zinc	3/8	.047	5 1/8	1.76	1	ES-2804	Hard Drawn	Zinc	3/4	.091	6 1/2	5.94	1
ES-0811	Music	Zinc	1/4	.028	3	.90	1	ES-1417	Spring Steel	Zinc	3/8	.047	7 1/2	1.28	1	ES-2809	Hard Drawn	Zinc	3/4	.105	3 3/4	32.56	1
ES-0812	Music	Zinc	1/4	.028	4	.65	1	ES-1601	Music	Zinc	7/16	.028	4 1/2	.09	1	ES-2810	Hard Drawn	Zinc	3/4	.105	3 3/4	25.54	1
ES-0814	Music	Zinc	1/4	.029	1 3/16	3.04	1	ES-1604	Music	Zinc	7/16	.047	2 1/2	2.96	1	ES-2902	Hard Drawn	Zinc	1 3/16	.120	4	39.11	1
ES-0816	Hard Drawn	Zinc	1/4	.031	5	.84	1	ES-1606	Spring Steel	Zinc	7/16	.047	2 1/16	2.60	1	ES-3001	Spring Steel	Zinc	2 3/32	.105	3 1/16	17.56	1
ES-0818	Music	Zinc	1/4	.032	8	.62	1	ES-1608	Hard Drawn	Zinc	7/16	.047	3 1/2	1.97	1	ES-3101	Hard Drawn	Zinc	7/8	.091	3 1/2	7.72	1
ES-0904	Music	Zinc	9/32	.025	1 1/2	.74	1	ES-1609	Spring Steel	Zinc	7/16	.048	3 3/8	2.13	1	ES-3102	Hard Drawn	Zinc	7/8	.091	6	3.90	1
ES-1001	Spring Steel	Zinc	1 9/64	.041	4 1/4	2.57	1	ES-1610	Spring Steel	Zinc	7/16	.047	3 1/16	1.76	1	ES-3301	Spring Steel	Zinc	6 1/64	.121	3 3/4	23.74	1
ES-1110	Music	Zinc	3/16	.028	3	.41	1	ES-1613	Hard Drawn	Zinc	7/16	.062	6	4.68	1	ES-3302	Spring Steel	Zinc	3 3/32	.120	5 1/2	13.30	1
ES-1117	Spring Steel	Zinc	3/16	.035	1 3/4	2.52	1	ES-1901	Hard Drawn	Zinc	1/2	.062	4 1/2	4.14	1	ES-3303	Spring Steel	Zinc	3 3/32	.120	7 1/2	9.31	1
ES-1118	Spring Steel	Zinc	3/16	.036	1 1/16	3.02	1	ES-1903	Spring Steel	Zinc	1/2	.061	3 3/32	4.26	1	ES-3401	Hard Drawn	Zinc	1	.105	7 1/2	4.43	1
ES-1119	Spring Steel	Zinc	3/16	.036	2 3/8	2.52	1	ES-1904	Hard Drawn	Zinc	1/2	.062	6	3.03	1	ES-3402	Hard Drawn	Blk/Ox	1	.105	8	3.84	1
ES-1121	Music	Zinc	3/16	.035	5	.79	1	ES-1905	Spring Steel	Zinc	1/2	.064	7 1/2	2.60	1	ES-3501	Hard Drawn	Zinc	1 1/16	.105	7	3.66	1
ES-1203	Spring Steel	Zinc	2 3/64	.042	5 1/2	1.47	1	ES-1906	Hard Drawn	Zinc	1/2	.072	5	8.21	1	ES-3701	Spring Steel	None	1 1/4	.210	7 1/4	87.57	1

Long Length - Assortment



Long length extension springs can be custom cut to length. End coils can be bent into hooks or loops.

Item No.	Description	Includes	Pack Qty.
ESA-4	29 pc., 11" Spring Assortment, 1/8" to 1" OD	One (1) each of ES-57, ES-58, ES-59, ES-60, ES-61, ES-62, ES-63, ES-64, ES-65, ES-66, ES-67, ES-68, ES-69, ES-70, ES-71, ES-72, ES-73, ES-74, ES-75, ES-76, ES-77, ES-78, ES-79, ES-80, ES-81, ES-82, ES-83, ES-84 and ES-85	1

Note: See 11" long length individual springs listed below for additional details.

Long Length - Individual Springs



Long length extension springs can be custom cut to length. End coils can be bent into hooks or loops. Available in 11" music wire, 20" Type 302 stainless steel or 36" carbon steel.

Item No.	OD	Wire Dia.	Lbs. Per In.	Pack Qty.
<b>11" Music Wire</b>				
ES-57	1/8	.016	.11	1
ES-58	5/32	.016	.05	1
ES-59	5/32	.024	.46	1
ES-60	3/16	.016	.03	1
ES-61	3/16	.024	.25	1
ES-62	3/16	.031	1.00	1
ES-63	1/4	.023	.08	1
ES-64	1/4	.031	.37	1
ES-65	1/4	.042	2.00	1
ES-66	5/16	.024	.05	1
ES-67	5/16	.035	.34	1
ES-68	5/16	.047	1.70	1
ES-69	3/8	.031	.10	1
ES-70	3/8	.047	.92	1
ES-71	3/8	.062	4.20	1
ES-72	7/16	.047	.55	1
ES-73	7/16	.062	2.50	1
ES-74	1/2	.035	.08	1
ES-75	1/2	.047	.36	1
ES-76	1/2	.063	1.60	1
ES-77	5/8	.063	.82	1
ES-78	5/8	.071	1.50	1
ES-79	5/8	.080	3.00	1
ES-80	3/4	.063	.46	1
ES-81	3/4	.090	3.10	1
ES-82	7/8	.090	1.90	1
ES-83	7/8	.106	4.60	1
ES-84	1	.095	1.70	1
ES-85	1	.124	6.90	1

Item No.	OD	Wire Dia.	Lbs. Per In.	Pack Qty.
<b>20" Stainless Steel</b>				
ES-251	.125	.013	.33	1
ES-253	.125	.017	1.44	1
ES-254	.125	.020	3.50	1
ES-255	.187	.015	.18	1
ES-256	.187	.017	.40	1
ES-257	.187	.020	.88	1
ES-258	.187	.026	3.56	1
ES-261	.250	.020	.33	1
ES-262	.250	.026	1.19	1
ES-263	.250	.032	4.03	1
ES-264	.312	.020	.16	1
ES-266	.312	.032	1.87	1
ES-267	.312	.041	7.33	1
ES-268	.375	.032	1.02	1
ES-269	.375	.041	3.96	1
ES-270	.375	.054	17.35	1
ES-271	.438	.041	23.00	1
ES-272	.500	.054	6.50	1
ES-273	.438	.054	10.00	1
ES-274	.500	.072	29.00	1
ES-275	.562	.054	4.40	1
ES-276	.562	.072	19.00	1
ES-277	.562	.091	68.00	1
ES-279	.625	.091	51.00	1
ES-280	.750	.091	27.00	1

Item No.	OD	Wire Dia.	Lbs. Per In.	Pack Qty.
<b>36" Steel</b>				
ES-201	.125	.012	.25	1
ES-202	.125	.014	.56	1
ES-203	.125	.016	1.19	1
ES-204	.125	.023	8.71	1
ES-205	.187	.016	.32	1
ES-206	.187	.018	.57	1
ES-207	.187	.023	2.09	1
ES-208	.187	.028	6.11	1
ES-209	.250	.018	.22	1
ES-210	.250	.023	.79	1
ES-211	.250	.028	2.25	1
ES-212	.250	.035	7.23	1
ES-213	.312	.023	.38	1
ES-214	.312	.028	.60	1
ES-215	.312	.035	3.37	1
ES-216	.312	.047	18.81	1
ES-217	.375	.028	.58	1
ES-218	.375	.035	1.83	1
ES-219	.375	.047	9.90	1
ES-220	.375	.063	46.86	1
ES-237	.750	.080	15.08	1
ES-238	.750	.105	68.53	1
ES-239	.875	.080	9.42	1
ES-240	.875	.105	40.32	1
ES-241	.875	.135	158.78	1
ES-242	1.000	.092	13.14	1
ES-243	1.000	.120	52.47	1
ES-245	1.125	.135	67.86	1
ES-246	1.250	.120	24.97	1
ES-247	1.250	.148	79.23	1
ES-248	1.500	.162	68.83	1



**Music Wire**



**Steel** - Made of high carbon alloy. Many uses including springs, control linkages, wire forms, etc. **Stainless** - Made of full hard Type 302 stainless.

Steel		Stainless		Dia.	Gauge	Ft. per Lb.	Pack Qty.
Item No.	Lb. Size	Item No.	Lb. Size				
PBW-209	¼	—	—	.009	1/0	4,629	1
PBW-210	¼	PBW-9010	1	.010	1	3,749	1
PBW-212	¼	—	—	.012	3	2,604	1
PBW-216	¼	—	—	.016	6	1,465	1
PBW-220	¼	PBW-9020	1	.020	8	937	1
PBW-224	¼	PBW-9024	1	.024	10	650	1
PBW-026	1	—	—	.026	11	555	1
PBW-029	1	PBW-9029	1	.029	12	450	1
PBW-031	1	PBW-9031	1	.031	13	400	1
PBW-033	1	—	—	.033	14	346	1
PBW-035	1	—	—	.035	15	306	1
PBW-039	1	—	—	.039	17	250	1
PBW-041	1	PBW-9041	1	.041	18	223	1
PBW-043	1	—	—	.043	19	207	1
PBW-045	1	PBW-9045	1	.045	20	190	1
PBW-047	1	—	—	.047	21	172	1
PBW-059	1	PBW-9059	1	.059	25	110	1
PBW-063	1	PBW-9062*	1	.063	26	95	1
PBW-071	1	—	—	.071	28	78	1
PBW-080	1	PBW-9080	1	.080	30	58	1
PBW-090	1	PBW-9090	1	.090	32	45	1
PBW-125	1	PBW-9125	1	.125	—	24	1

\*Dia. is .0625

**Spring Looping Tool**

Hook-Kon spring looping tool forms a variety of perfect end loops and hooks on coil springs, 1/8" to 1/2" OD.



Item No.	Description	Pack Qty.
SW-104	Hook-Kon Spring Looping Tool	1

**Spring Winder**



The spring winder quickly winds extension, compression and torsion springs from 1/8" to 1/4" inside diameter in either right or left hand coils. Handles music wire from smallest to 3/16" diameter. A pitch gauge accurately regulates distance between coils and may be disengaged while winding extension springs or closed end coils on compression springs.

**SW-101 Spring Winder Kit:** Includes spring winder with cam lock tension release, two handles, one for large diameter and one for small diameter mandrels. Six mandrels, 1/8", 1/4", 3/8", 1/2", 5/8", and 3/4", wrench, four 1/4 lb. coils of .029", .047", .067" and .085" spring wire. Also includes Hook-Kon spring looping tool and nipper.

**SW-102 Spring Winder Kit:** Same as above but does not include Hook-Kon spring looping tool and nipper.

**SW-103 Utility Model:** Same as SW-102 but it does not have cam lock tension release or small handle. Four mandrels 1/8", 1/4", 3/8" and 1/2", with wrench. Spring wire not included.

Item No.	Description	Pack Qty.
SW-101	Spring Winder Kit	1
SW-102	Spring Winder Kit w/o Hook-Kon Tool & Nipper	1
SW-103	Utility Model	1



**DIE SPRINGS**

Buy One or Buy Bulk & SAVE



Medium Duty

Medium Heavy Duty

Heavy Duty

Extra Heavy Duty

Pressure	Color	Maximum Deflection as a Percent of Length	Efficient Operating Range as a Percent of Length
Medium Duty	Blue	50%	25% to 40%
Medium Heavy Duty	Red	37%	20% to 30%
Heavy Duty	Gold	30%	15% to 25%
Extra Heavy Duty	Green	25%	15% to 20%

Made from vapor degassed high tensile strength chromium alloy steels. Spring ends are ground square. Designed for long life cycle with constant high-speed deflections and shot peened to increase fatigue life. Load A is the load (in lbs.) at 1/10 inch deflection. Load B is the load (in lbs.) at maximum operating deflection which is 40% for medium duty, 30% for medium-heavy duty, 25% for heavy duty and 20% for extra heavy duty.

Medium Duty			Medium Heavy Duty			Heavy Duty			Extra Heavy Duty			Length	Pack Qty.
Item No.	Load B**	Load A*	Item No.	Load B**	Load A*	Item No.	Load B**	Load A*	Item No.	Load B**	Load A*		
<b>3/8" Hole Size - 3/16" Rod Size</b>													
JS-101	24.0	6.0	JS-401	27.0	9.0	JS-701	27.5	11.0	JS-901	44.0	22.0	1	1
JS-102	27.0	5.4	JS-402	27.4	7.3	—	—	—	—	—	—	1 1/4	1
JS-103	24.0	4.0	JS-403	30.2	6.7	JS-703	30.0	8.0	—	—	—	1 1/2	1
JS-104	23.8	3.4	—	—	—	—	—	—	—	—	—	1 3/4	1
JS-105	22.4	2.8	JS-405	30.0	5.0	JS-705	36.0	7.2	—	—	—	2	1
JS-106	24.0	2.4	—	—	—	JS-706	34.4	5.5	—	—	—	2 1/2	1
JS-107	25.2	2.1	—	—	—	JS-707	31.5	4.2	—	—	—	3	1
JS-108	28.8	0.6	—	—	—	—	—	—	—	—	—	12	1
<b>1/2" Hole Size - 3/32" Rod Size</b>													
JS-109	44.0	11.0	—	—	—	JS-709	59.0	23.6	JS-909	64.0	32.0	1	1
JS-111	41.0	8.2	JS-411	48.8	13.0	JS-711	58.1	18.6	—	—	—	1 1/4	1
JS-112	40.8	6.8	JS-412	42.8	9.5	JS-712	58.1	15.5	—	—	—	1 1/2	1
JS-113	42.0	6.0	JS-413	44.6	8.5	JS-713	60.4	13.8	—	—	—	1 3/4	1
JS-114	44.0	5.5	—	—	—	JS-714	55.0	11.0	—	—	—	2	1
JS-116	45.0	4.5	—	—	—	—	—	—	—	—	—	2 1/2	1
JS-117	42.0	3.5	—	—	—	—	—	—	—	—	—	3	1
JS-118	42.0	3.0	—	—	—	—	—	—	—	—	—	3 1/2	1
JS-122	33.6	0.7	—	—	—	—	—	—	—	—	—	12	1
<b>5/8" Hole Size - 1/2" Rod Size</b>													
JS-119	65.6	16.4	JS-419	90.0	30.0	JS-719	106.0	42.4	—	—	—	1	1
JS-121	64.0	12.8	JS-421	80.6	21.5	JS-721	92.5	29.6	—	—	—	1 1/4	1
JS-110	64.8	10.8	JS-410	85.5	19.0	JS-710	102.0	27.2	—	—	—	1 1/2	1
JS-115	67.2	9.6	JS-415	88.2	16.8	JS-715	105.0	24.0	—	—	—	1 3/4	1
JS-120	70.4	8.8	JS-420	88.8	14.8	JS-720	104.0	20.8	—	—	—	2	1
JS-125	60.0	6.0	—	—	—	JS-725	106.3	17.0	—	—	—	2 1/2	1
JS-130	67.2	5.6	JS-430	90.0	10.0	—	—	—	—	—	—	3	1
JS-140	70.4	4.4	—	—	—	—	—	—	—	—	—	4	1
JS-139	76.8	1.6	—	—	—	—	—	—	—	—	—	12	1
<b>3/4" Hole Size - 3/8" Rod Size</b>													
JS-141	124.8	31.2	JS-441	150.0	50.0	JS-741	270.0	108.0	JS-941	280.0	140.0	1	1
JS-142	128.0	25.6	JS-442	142.5	38.0	JS-742	275.0	88.0	JS-942	275.0	110.0	1 1/4	1
JS-145	120.0	20.0	JS-445	144.0	32.0	JS-745	246.0	65.6	—	—	—	1 1/2	1
JS-150	123.2	17.6	JS-450	151.2	28.8	JS-750	262.5	60.0	—	—	—	1 3/4	1
JS-155	115.2	14.4	JS-455	148.8	24.8	JS-755	248.0	49.6	JS-955	272.0	68.0	2	1
JS-160	120.0	12.0	JS-460	144.0	19.2	JS-760	250.0	40.0	JS-960	250.0	50.0	2 1/2	1
JS-165	115.2	9.6	JS-465	129.6	14.4	JS-765	255.0	34.0	—	—	—	3	1
JS-170	112.0	8.0	JS-470	134.4	12.8	—	—	—	—	—	—	3 1/2	1
JS-175	115.2	7.2	JS-475	144.0	12.0	—	—	—	—	—	—	4	1
JS-180	115.2	6.4	—	—	—	—	—	—	—	—	—	4 1/2	1
JS-185	120.0	6.0	—	—	—	—	—	—	—	—	—	5	1
JS-186	115.2	2.4	—	—	—	—	—	—	—	—	—	12	1
<b>1" Hole Size - 1/2" Rod Size</b>													
JS-187	220.0	55.0	JS-487	228.0	76.0	JS-787	520.0	208.0	—	—	—	1	1
JS-188	225.0	45.0	—	—	—	JS-788	535.0	171.2	—	—	—	1 1/4	1
JS-189	210.0	35.0	JS-489	223.2	49.6	JS-789	444.0	118.4	JS-989	480.0	160.0	1 1/2	1
JS-190	210.0	30.0	JS-490	231.0	44.0	JS-790	455.0	104.0	—	—	—	1 3/4	1
JS-200	208.0	26.0	JS-500	240.0	40.0	JS-800	450.0	90.0	JS-900	464.0	116.0	2	1
JS-205	200.0	20.0	JS-505	232.5	31.0	JS-805	425.0	68.0	—	—	—	2 1/2	1
JS-210	198.0	16.5	—	—	—	JS-810	408.0	54.4	—	—	—	3	1
JS-215	210.0	15.0	JS-515	226.8	21.6	JS-815	399.0	45.6	—	—	—	3 1/2	1
JS-220	192.0	12.0	JS-520	220.8	18.4	JS-820	400.0	40.0	—	—	—	4	1
JS-230	192.0	9.6	—	—	—	—	—	—	—	—	—	5	1
JS-240	192.0	8.0	—	—	—	—	—	—	—	—	—	6	1
JS-241	192.0	6.0	—	—	—	—	—	—	—	—	—	8	1
JS-242	192.0	4.0	—	—	—	—	—	—	—	—	—	12	1
<b>1 1/4" Hole Size - 5/8" Rod Size</b>													
JS-243	297.6	49.6	—	—	—	—	—	—	—	—	—	1 1/2	1
JS-245	281.6	35.2	JS-545	518.4	86.4	JS-845	748.0	149.6	—	—	—	2	1
JS-250	288.0	28.8	JS-550	468.0	62.4	JS-850	735.0	117.6	—	—	—	2 1/2	1
JS-255	288.0	24.0	JS-555	460.8	51.2	JS-855	714.0	95.2	—	—	—	3	1
JS-260	280.0	20.0	JS-560	462.0	44.0	JS-860	658.0	75.2	—	—	—	3 1/2	1
JS-275	272.0	13.6	JS-575	435.0	29.0	—	—	—	—	—	—	5	1
—	—	—	JS-565	441.6	36.8	—	—	—	—	—	—	4	1
<b>1 1/2" Hole Size - 3/4" Rod Size</b>													
JS-290	424.0	53.0	JS-590	648.0	108.0	JS-890	952.0	190.4	—	—	—	2	1
JS-295	450.0	45.0	—	—	—	JS-895	968.8	155.0	JS-950	1,472.0	294.4	2 1/2	1
JS-300	432.0	36.0	—	—	—	—	—	—	—	—	—	3	1
JS-305	420.0	30.0	—	—	—	—	—	—	—	—	—	3 1/2	1
JS-310	432.0	27.0	—	—	—	—	—	—	—	—	—	4	1
JS-320	420.0	21.0	—	—	—	—	—	—	—	—	—	5	1
JS-330	408.0	17.0	—	—	—	—	—	—	—	—	—	6	1
<b>2" Hole Size - 1" Rod Size</b>													
JS-335	1,000.0	100.0	—	—	—	—	—	—	—	—	—	2 1/2	1
JS-360	940.0	47.0	—	—	—	—	—	—	—	—	—	5	1

\* Load (in lbs.) @ 10% deflection

\*\* Load (in lbs.) @ maximum deflection (see table above for maximum deflection ratings)



Medium Duty



Medium Heavy Duty



Heavy Duty

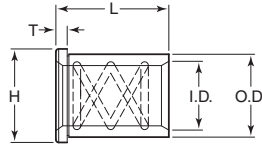
Pressure	Color Code	Maximum Deflection as a Percent of Lgth.	Efficient Operating Range as a Percent of Lgth.
Medium Duty	Blue	50%	25% to 35%
Medium Heavy Duty	Red	37%	20% to 25%
Heavy Duty	Gold	30%	15% to 20%

Chrome silicon die springs are longer lasting than high carbon steel. Shot peened to reduce working stress and to improve the surface. Available in medium, medium-heavy, and heavy pressure styles. Color coded for easy identification.

Medium Duty			Medium Heavy Duty			Heavy Duty			Lgth.	Pack Qty.
Item No.	Load A	Load B	Item No.	Load A	Load B	Item No.	Load A	Load B		
<b>5/8" Hole Size x 3/16" Rod Size</b>										
JS-101A	5.6	28.0	JS-401A	9.0	33.3	JS-701A	12.4	37.2	1	1
JS-102A	4.8	30.0	JS-402A	7.3	33.8	—	—	—	1 1/4	1
JS-103A	3.8	28.5	JS-403A	6.7	37.2	JS-703A	9.6	43.2	1 1/2	1
JS-105A	2.8	28.0	JS-405A	5.0	37.0	—	—	—	2	1
JS-106A	2.4	30.0	JS-406A	4.2	38.9	JS-706A	6.0	45.0	2 1/2	1
JS-107A	1.8	27.0	—	—	—	JS-707A	4.2	37.8	3	1
<b>1/2" Hole Size x 9/32" Rod Size</b>										
JS-109A	0.1	50.0	JS-409A	16.8	62.2	—	—	—	1	1
JS-111A	9.2	57.5	JS-411A	13.9	64.4	—	—	—	1 1/4	1
JS-112A	7.6	57.0	JS-412A	12.0	66.6	JS-712A	16.4	73.8	1 1/2	1
JS-113A	6.8	59.5	JS-413A	10.4	67.4	—	—	—	1 3/4	1
JS-114A	6.4	64.0	JS-414A	8.7	64.4	—	—	—	2	1
JS-116A	5.2	65.0	JS-416A	6.8	62.9	—	—	—	2 1/2	1
JS-117A	4.0	60.0	—	—	—	—	—	—	3	1
JS-118A	3.0	52.5	—	—	—	JS-718A	6.4	67.2	3 1/2	1
<b>5/8" Hole Size x 11/32" Rod Size</b>										
JS-119A	13.1	65.5	JS-419A	27.7	102.5	JS-719A	42.4	127.2	1	1
JS-121A	12.8	80.0	—	—	—	—	—	—	1 1/4	1
JS-110A	10.8	81.0	JS-410A	19.0	105.5	JS-710A	27.2	122.4	1 1/2	1
JS-115A	9.6	84.0	JS-415A	16.8	108.9	JS-715A	24.0	126.0	1 3/4	1
JS-120A	8.8	88.0	JS-420A	14.8	109.5	JS-720A	20.8	124.8	2	1
JS-125A	6.0	75.0	JS-425A	11.5	106.4	—	—	—	2 1/2	1
JS-130A	5.6	84.0	JS-430A	10.0	111.0	JS-730A	14.4	129.6	3	1
JS-135A	4.8	84.0	—	—	—	—	—	—	3 1/2	1
JS-140A	4.4	88.0	—	—	—	—	—	—	4	1
<b>3/4" Hole Size x 3/8" Rod Size</b>										
JS-145A	20.0	150.0	JS-445A	32.0	177.6	JS-745A	65.6	295.2	1 1/2	1
JS-150A	17.6	154.0	—	—	—	—	—	—	1 3/4	1
JS-155A	14.4	144.0	JS-455A	24.8	183.5	JS-755A	49.6	297.6	2	1
JS-160A	12.0	150.0	JS-460A	19.2	177.6	JS-760A	37.6	282.0	2 1/2	1
JS-165A	9.6	144.0	JS-465A	14.4	159.8	JS-765A	31.2	280.8	3	1
JS-170A	8.0	140.0	JS-470A	12.8	165.8	JS-770A	26.4	277.2	3 1/2	1
JS-180A	6.4	144.0	JS-480A	11.2	186.5	—	—	—	4 1/2	1
JS-195A	4.0	120.0	—	—	—	—	—	—	6	1
—	—	—	JS-475A	12.0	177.6	JS-775A	23.2	278.4	4	1
—	—	—	—	—	—	JS-790A	16.0	264.0	5 1/2	1
<b>1" Hole Size x 1/2" Rod Size</b>										
JS-200A	23.2	232.0	JS-500A	36.8	272.3	JS-800A	84.0	504.0	2	1
JS-205A	20.0	250.0	JS-505A	28.8	266.4	JS-805A	68.0	510.0	2 1/2	1
JS-210A	15.2	228.0	JS-510A	23.2	257.5	JS-810A	54.4	489.6	3	1
JS-215A	12.8	224.0	—	—	—	JS-815A	45.6	478.8	3 1/2	1
JS-220A	12.0	240.0	JS-520A	18.4	272.3	JS-820A	40.0	480.0	4	1
JS-225A	10.4	234.0	—	—	—	—	—	—	4 1/2	1
JS-230A	9.6	240.0	—	—	—	—	—	—	5	1
JS-240A	8.0	240.0	—	—	—	JS-840A	25.6	460.8	6	1
<b>1 1/4" Hole Size x 3/4" Rod Size</b>										
JS-245A	35.2	352.0	JS-545A	86.4	639.4	JS-845A	149.6	897.6	2	1
JS-250A	28.8	360.0	JS-550A	62.4	577.2	—	—	—	2 1/2	1
JS-255A	24.0	360.0	—	—	—	—	—	—	3	1
JS-265A	17.6	352.0	JS-565A	36.8	544.6	JS-865A	66.4	796.8	4	1
JS-275A	13.6	340.0	—	—	—	—	—	—	5	1
—	—	—	—	—	—	JS-870A	58.4	788.4	4 1/2	1
<b>1 1/2" Hole Size x 3/4" Rod Size</b>										
JS-290A	44.8	448.0	JS-590A	108.0	799.2	JS-890A	190.4	1,142.4	2	1
JS-295A	36.8	460.0	—	—	—	—	—	—	2 1/2	1
JS-300A	33.6	504.0	—	—	—	—	—	—	3	1
JS-310A	21.6	432.0	JS-610A	48.0	710.4	JS-910A	91.2	1,094.4	4	1
JS-315A	20.8	468.0	—	—	—	—	—	—	4 1/2	1
JS-320A	20.0	500.0	—	—	—	—	—	—	5	1
—	—	—	JS-605A	52.8	683.8	—	—	—	3 1/2	1
—	—	—	JS-630A	30.4	674.9	—	—	—	6	1
<b>2" Hole Size x 1" Rod Size</b>										
JS-335A	89.6	1,120.0	—	—	—	JS-935A	220.0	1,650.0	2 1/2	1
JS-345A	64.8	1,134.0	JS-645A	80.0	1,036.0	—	—	—	3 1/2	1
JS-360A	41.6	1,040.0	—	—	—	JS-960A	104.0	1,560.0	5	1



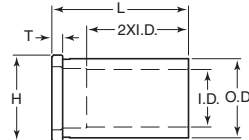
**Mold Components  
Shoulder Bushings Bronze Plated**



General Dimensions				
Nominal ID	ID		H	T
	+0.0005	-0.0005		
3/4	.7505	1.1255	1.302	3/16
7/8	.8755	1.2505	1.427	3/16
1	1.0005	1.3755	1.552	3/16
1 1/4	1.2505	1.6255	1.802	3/16
1 1/2	1.5005	2.0005	2.177	3/16
2	2.0005	2.5005	2.677	3/16
2 1/2	2.5005	3.2505	3.427	3/16

ID=3/4	ID=7/8	ID=1	ID=1 1/4	ID=1 1/2	ID=2	ID=2 1/2	L Length	Pack Qty.
Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.		
PCS-LBB-06-07	PCS-LBB-07-07	PCS-LBB-08-07	PCS-LBB-10-07	PCS-LBB-12-07	—	—	7/8	1
PCS-LBB-06-13	PCS-LBB-07-13	PCS-LBB-08-13	PCS-LBB-10-13	PCS-LBB-12-13	PCS-LBB-16-13	PCS-LBB-20-13	1 3/8	1
PCS-LBB-06-17	PCS-LBB-07-17	PCS-LBB-08-17	PCS-LBB-10-17	PCS-LBB-12-17	PCS-LBB-16-17	PCS-LBB-20-17	1 7/8	1
PCS-LBB-06-23	PCS-LBB-07-23	PCS-LBB-08-23	PCS-LBB-10-23	PCS-LBB-12-23	PCS-LBB-16-23	PCS-LBB-20-23	2 3/8	1
PCS-LBB-06-27	PCS-LBB-07-27	PCS-LBB-08-27	PCS-LBB-10-27	PCS-LBB-12-27	PCS-LBB-16-27	PCS-LBB-20-27	2 7/8	1
PCS-LBB-06-33	PCS-LBB-07-33	PCS-LBB-08-33	PCS-LBB-10-33	PCS-LBB-12-33	PCS-LBB-16-33	PCS-LBB-20-33	3 3/8	1
PCS-LBB-06-37	PCS-LBB-07-37	PCS-LBB-08-37	PCS-LBB-10-37	PCS-LBB-12-37	PCS-LBB-16-37	PCS-LBB-20-37	3 7/8	1
PCS-LBB-06-43	PCS-LBB-07-43	PCS-LBB-08-43	PCS-LBB-10-43	PCS-LBB-12-43	PCS-LBB-16-43	PCS-LBB-20-43	4 3/8	1
PCS-LBB-06-47	PCS-LBB-07-47	PCS-LBB-08-47	PCS-LBB-10-47	PCS-LBB-12-47	PCS-LBB-16-47	PCS-LBB-20-47	4 7/8	1
PCS-LBB-06-57	PCS-LBB-07-57	PCS-LBB-08-57	PCS-LBB-10-57	PCS-LBB-12-57	PCS-LBB-16-57	PCS-LBB-20-57	5 3/8	1

**Mold Components  
Shoulder Bushings**



General Dimensions				
Nominal ID	ID		H	T
	+0.0005	-0.0005		
3/4	.7505	1.1255	1.250	3/16
7/8	.8755	1.2505	1.375	3/16
1	1.0005	1.3755	1.500	3/16
1 1/4	1.2505	1.6256	1.750	3/16
1 1/2	1.5005	2.0005	2.125	3/16
2	2.0005	2.5005	2.625	3/16
2 1/2	2.5005	3.2505	3.375	3/16

ID=3/4	ID=7/8	ID=1	ID=1 1/4	ID=1 1/2	ID=2	ID=2 1/2	L Length	Pack Qty.
Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.		
PCS-BU-100	PCS-BU-200	PCS-BU-300	PCS-BU-400	PCS-BU-500	—	—	7/8	1
PCS-BU-101	PCS-BU-201	PCS-BU-301	PCS-BU-401	PCS-BU-501	PCS-BU-601	PCS-BU-701	1 3/8	1
PCS-BU-102	PCS-BU-202	PCS-BU-302	PCS-BU-402	PCS-BU-502	PCS-BU-602	PCS-BU-702	1 7/8	1
PCS-BU-103	PCS-BU-203	PCS-BU-303	PCS-BU-403	PCS-BU-503	PCS-BU-603	PCS-BU-703	2 3/8	1
PCS-BU-104	PCS-BU-204	PCS-BU-304	PCS-BU-404	PCS-BU-504	PCS-BU-604	PCS-BU-704	2 7/8	1
PCS-BU-105	PCS-BU-205	PCS-BU-305	PCS-BU-405	PCS-BU-505	PCS-BU-605	PCS-BU-705	3 3/8	1
PCS-BU-106	PCS-BU-206	PCS-BU-306	PCS-BU-406	PCS-BU-506	PCS-BU-606	PCS-BU-706	3 7/8	1
—	—	PCS-BU-307	PCS-BU-407	PCS-BU-507	PCS-BU-607	PCS-BU-707	4 3/8	1
—	PCS-BU-208	PCS-BU-308	PCS-BU-408	PCS-BU-508	PCS-BU-608	PCS-BU-708	4 7/8	1
—	PCS-BU-209	PCS-BU-309	PCS-BU-409	PCS-BU-509	PCS-BU-609	PCS-BU-709	5 3/8	1

**Mold Components  
Straight Leader Pins**



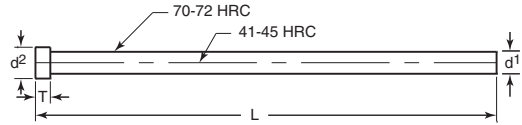
- Surface is hardened to 60-62 RC
- Core is hardened to 35-40 RC

General Dimensions				
Nominal Dia.	D		H	T
	+0.0000	-0.0005		
3/4	.749	.751	.990	3/16
7/8	.874	.876	1.115	1/4
1	.999	1.001	1.240	3/4
1 1/4	1.249	1.251	1.490	3/16
1 1/2	1.499	1.501	1.740	3/16
2	1.999	2.001	2.240	3/16
2 1/2	2.499	2.501	2.740	3/16

D=3/4		D=7/8		D=1		D=1 1/4		D=1 1/2		D=2		D=2 1/2		L Length	Pack Qty.
Item No.	PFL	Item No.	PFL	Item No.	PFL	Item No.	PFL	Item No.	PFL	Item No.	PFL	Item No.	PFL		
PCS-100-GL	7/8	PCS-200-GL	7/8	PCS-300-GL	7/8	—	—	—	—	—	—	—	—	1 3/4	1
PCS-101-GL	7/8	PCS-201-GL	7/8	PCS-301-GL	7/8	—	—	—	—	—	—	—	—	2 1/4	1
PCS-102-GL	7/8	PCS-202-GL	7/8	PCS-302-GL	7/8	PCS-402-GL	7/8	—	—	—	—	—	—	2 3/4	1
PCS-103-GL	7/8	PCS-203-GL	7/8	PCS-303-GL	7/8	PCS-403-GL	7/8	—	—	—	—	—	—	3 1/4	1
PCS-104-GL	7/8	PCS-204-GL	7/8	PCS-304-GL	7/8	PCS-404-GL	7/8	PCS-504-GL	1 3/8	—	—	—	—	3 3/4	1
PCS-105-GL	1 3/8	PCS-205-GL	1 3/8	PCS-305-GL	1 3/8	PCS-405-GL	1 3/8	PCS-505-GL	1 3/8	—	—	—	—	4 1/4	1
PCS-106-GL	1 3/8	PCS-206-GL	1 3/8	PCS-306-GL	1 3/8	PCS-406-GL	1 3/8	PCS-506-GL	1 3/8	—	—	—	—	4 3/4	1
PCS-107-GL	1 3/8	PCS-207-GL	1 3/8	PCS-307-GL	1 3/8	PCS-407-GL	1 3/8	PCS-507-GL	1 3/8	—	—	—	—	5 1/4	1
PCS-108-GL	1 3/8	PCS-208-GL	1 3/8	PCS-308-GL	1 3/8	PCS-408-GL	1 3/8	PCS-508-GL	1 3/8	PCS-608-GL	1 3/8	PCS-708-GL	2 3/8	5 3/4	1
PCS-109-GL	1 3/8	PCS-209-GL	1 3/8	PCS-309-GL	1 3/8	PCS-409-GL	1 3/8	PCS-509-GL	1 3/8	—	—	—	—	6 1/4	1
PCS-110-GL	1 3/8	PCS-210-GL	1 3/8	PCS-310-GL	1 3/8	PCS-410-GL	1 3/8	PCS-510-GL	1 3/8	PCS-610-GL	1 3/8	PCS-710-GL	2 3/8	6 3/4	1
PCS-111-GL	1 3/8	PCS-211-GL	1 3/8	PCS-311-GL	1 3/8	PCS-411-GL	1 3/8	—	—	—	—	—	—	7 1/4	1
PCS-112-GL	1 3/8	PCS-212-GL	1 3/8	PCS-312-GL	1 3/8	PCS-412-GL	1 3/8	PCS-512-GL	1 3/8	PCS-612-GL	1 3/8	PCS-712-GL	2 3/8	7 3/4	1
—	—	PCS-213-GL	1 3/8	PCS-313-GL	1 3/8	PCS-413-GL	1 3/8	—	—	—	—	—	—	8 1/4	1
—	—	PCS-214-GL	1 3/8	PCS-314-GL	1 3/8	PCS-414-GL	1 3/8	PCS-514-GL	1 3/8	PCS-614-GL	1 3/8	PCS-714-GL	2 3/8	8 3/4	1
PCS-115-GL	1 3/8	PCS-215-GL	1 3/8	PCS-315-GL	1 3/8	PCS-415-GL	1 3/8	—	—	—	—	—	—	9 1/4	1
—	—	—	—	PCS-316-GL	1 3/8	PCS-416-GL	1 3/8	PCS-516-GL	1 3/8	PCS-616-GL	1 3/8	PCS-716-GL	2 3/8	9 3/4	1
—	—	—	—	PCS-317-GL	1 3/8	PCS-417-GL	1 3/8	—	—	—	—	—	—	10 1/4	1
—	—	PCS-218-GL	1 3/8	PCS-318-GL	1 3/8	PCS-418-GL	1 3/8	PCS-518-GL	1 3/8	PCS-618-GL	1 3/8	PCS-718-GL	2 3/8	10 3/4	1
—	—	—	—	PCS-319-GL	1 3/8	PCS-419-GL	1 3/8	—	—	—	—	—	—	11 1/4	1
—	—	—	—	PCS-320-GL	1 3/8	PCS-420-GL	1 3/8	PCS-520-GL	1 3/8	PCS-620-GL	1 3/8	PCS-720-GL	2 3/8	11 3/4	1
—	—	PCS-221-GL	1 3/8	PCS-321-GL	1 3/8	PCS-421-GL	1 3/8	—	—	—	—	—	—	12 1/4	1
—	—	—	—	—	—	PCS-422-GL	1 3/8	PCS-522-GL	1 3/8	PCS-622-GL	1 3/8	PCS-722-GL	2 3/8	12 3/4	1
—	—	—	—	—	—	PCS-423-GL	1 3/8	PCS-523-GL	1 3/8	PCS-623-GL	1 3/8	PCS-723-GL	2 3/8	13 1/4	1
—	—	—	—	—	—	PCS-424-GL	1 3/8	PCS-524-GL	1 3/8	PCS-624-GL	1 3/8	PCS-724-GL	2 3/8	14 1/4	1
—	—	—	—	—	—	PCS-425-GL	1 3/8	PCS-525-GL	1 3/8	PCS-625-GL	1 3/8	PCS-725-GL	2 3/8	15 1/4	1
—	—	—	—	—	—	—	—	—	—	PCS-628-GL	2 3/8	PCS-728-GL	2 3/8	16 1/4	1
—	—	—	—	—	—	—	—	—	—	PCS-630-GL	2 3/8	PCS-730-GL	2 3/8	18 3/4	1



Mold Components  
JIS Standard Metric Ejector Pins

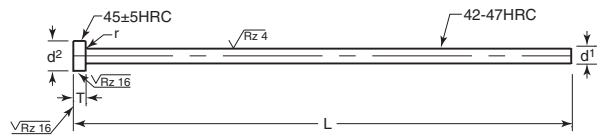
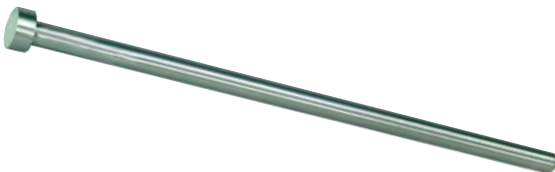


Type	JMP
Material	H-13
Nitrided	

Tolerances mm	
Pin Diameter (d1) > 12	-0.01
	-0.02
Pin Diameter (d1) > 14	-0.01
	-0.03
Head Diameter (d2)	0.0
	-0.2
Head Thickness (T)	0.0
	-0.05
Length (L)	+3.0
	+1.0

L = Length 150mm		L = Length 250mm		L = Length 350mm		L = Length 500mm		d1 Pin Dia.	d2 Head Dia.	T Head Thickness	Pack Qty.
Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.				
PCS-JMP01-150	—	—	—	—	—	—	—	1.0	6	4	1
PCS-JMP015-150	—	—	—	—	—	—	—	1.5	6	4	1
PCS-JMP02-150	PCS-JMP02-250	—	—	—	—	—	—	2.0	6	4	1
PCS-JMP025-150	PCS-JMP025-250	—	—	—	—	—	—	2.5	6	4	1
PCS-JMP03-150	PCS-JMP03-250	PCS-JMP03-350	—	—	—	—	—	3.0	6	4	1
PCS-JMP035-150	PCS-JMP035-250	PCS-JMP035-350	—	—	—	—	—	3.5	7	4	1
PCS-JMP04-150	PCS-JMP04-250	PCS-JMP04-350	—	—	—	—	—	4.0	8	6	1
PCS-JMP045-150	PCS-JMP045-250	PCS-JMP045-350	—	—	—	—	—	4.5	8	6	1
PCS-JMP05-150	PCS-JMP05-250	PCS-JMP05-350	PCS-JMP05-500	—	—	—	—	5.0	9	6	1
PCS-JMP06-150	PCS-JMP06-250	PCS-JMP06-350	PCS-JMP06-500	—	—	—	—	6.0	10	6	1
PCS-JMP07-150	PCS-JMP07-250	PCS-JMP07-350	PCS-JMP07-500	—	—	—	—	7.0	11	6	1
PCS-JMP08-150	PCS-JMP08-250	PCS-JMP08-350	PCS-JMP08-500	—	—	—	—	8.0	13	8	1
PCS-JMP10-150	PCS-JMP10-250	PCS-JMP10-350	PCS-JMP10-500	—	—	—	—	10.0	15	8	1
PCS-JMP12-150	PCS-JMP12-250	PCS-JMP12-350	PCS-JMP12-500	—	—	—	—	12.0	17	8	1
PCS-JMP14-150	PCS-JMP14-250	PCS-JMP14-350	PCS-JMP14-500	—	—	—	—	14.0	19	8	1
PCS-JMP16-150	PCS-JMP16-250	PCS-JMP16-350	PCS-JMP16-500	—	—	—	—	16.0	21	8	1
PCS-JMP18-150	PCS-JMP18-250	PCS-JMP18-350	PCS-JMP18-500	—	—	—	—	18.0	23	8	1
PCS-JMP20-150	PCS-JMP20-250	PCS-JMP20-350	PCS-JMP20-500	—	—	—	—	20.0	25	8	1

Mold Components  
Metric Core Pins

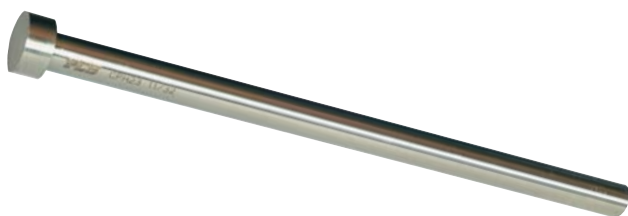


Type	A
DIN	1530
ISO	6751
Material	H-13

Tolerances mm	
Pin Diameter (d1)	g6
Head Diameter (d2)	-0.20
Head Thickness (T)	-0.05
Length (L)	-0.05
Radius (r)	+0.20

L = Length 100mm		L = Length 160mm		L = Length 200mm		L = Length 315mm		d1 Pin Dia.	d2 Head Dia.	T Head Thickness	r Radius	Pack Qty.
Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.					
PCS-MC15-100	PCS-MC15-160	PCS-MC15-200	—	—	—	—	—	1.5	3	1.5	0.2	1
PCS-MC20-100	PCS-MC20-160	PCS-MC20-200	—	—	—	—	—	2.0	4	2	0.2	1
PCS-MC25-100	PCS-MC25-160	PCS-MC25-200	—	—	—	—	—	2.5	5	2	0.3	1
PCS-MC30-100	PCS-MC30-160	PCS-MC30-200	—	—	—	—	—	3.0	6	3	0.3	1
PCS-MC35-100	PCS-MC35-160	PCS-MC35-200	—	—	—	—	—	3.5	7	3	0.3	1
PCS-MC40-100	PCS-MC40-160	PCS-MC40-200	PCS-MC40-315	—	—	—	—	4.0	8	3	0.3	1
PCS-MC45-100	PCS-MC45-160	PCS-MC45-200	PCS-MC45-315	—	—	—	—	4.5	8	3	0.3	1
PCS-MC50-100	PCS-MC50-160	PCS-MC50-200	PCS-MC50-315	—	—	—	—	5.0	10	3	0.3	1
PCS-MC60-100	PCS-MC60-160	PCS-MC60-200	PCS-MC60-315	—	—	—	—	6.0	12	5	0.5	1
PCS-MC70-100	PCS-MC70-160	PCS-MC70-200	PCS-MC70-315	—	—	—	—	7.0	12	5	0.5	1
PCS-MC80-100	PCS-MC80-160	PCS-MC80-200	PCS-MC80-315	—	—	—	—	8.0	14	5	0.5	1
PCS-MC100-100	PCS-MC100-160	PCS-MC100-200	PCS-MC100-315	—	—	—	—	10.0	16	5	0.5	1
PCS-MC120-100	PCS-MC120-160	PCS-MC120-200	PCS-MC120-315	—	—	—	—	12.0	18	7	0.8	1
PCS-MC122-100	PCS-MC122-160	PCS-MC122-200	PCS-MC122-315	—	—	—	—	12.2	18	7	0.8	1
PCS-MC125-100	PCS-MC125-160	PCS-MC125-200	PCS-MC125-315	—	—	—	—	12.5	18	7	0.8	1
PCS-MC140-100	PCS-MC140-160	PCS-MC140-200	PCS-MC140-315	—	—	—	—	14.0	18	7	0.8	1





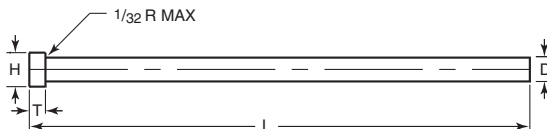
Tolerances	
Pin Diameter (D)	+0.001
	-0.0005
Head Diameter (H)	+0.000
	-0.01
Head Thickness (T)	0.000
	-0.002
Length (L)	+0.062
	-0.000

Feature:

- Air hardening premium hotwork steel
- .0005 diameter tolerance
- Etched for easy identification

Recommended heat treatment:

- Heat to 1800 degree -1850 degree Fahrenheit and air quench
- Temper between 900 degree -1100 degree Fahrenheit



**Core Pins**

**30-35 RC**

**Soft - Precision Ground**

L = Length 3"			L = Length 6"			L = Length 10"			
Item No.	Item No.	Item No.	D Pin Dia.	H Head Dia.	T Head Thickness				Pack Qty.
PCS-CPS7-3	PCS-CPS7-6	PCS-CPS7-10	3/32	1/4	1/8				1
PCS-CPS8-3	PCS-CPS8-6	PCS-CPS8-10	7/64	1/4	1/8				1
PCS-CPS9-3	PCS-CPS9-6	PCS-CPS9-10	1/8	1/4	1/8				1
PCS-CPS10-3	PCS-CPS10-6	PCS-CPS10-10	9/64	1/4	1/8				1
PCS-CPS11-3	PCS-CPS11-6	PCS-CPS11-10	5/32	9/32	5/32				1
PCS-CPS12-3	PCS-CPS12-6	PCS-CPS12-10	11/64	11/32	3/16				1
PCS-CPS13-3	PCS-CPS13-6	PCS-CPS13-10	3/16	3/8	3/16				1
PCS-CPS14-3	PCS-CPS14-6	PCS-CPS14-10	13/64	3/8	3/16				1
PCS-CPS15-3	PCS-CPS15-6	PCS-CPS15-10	7/32	13/32	3/16				1
PCS-CPS17-3	PCS-CPS17-6	PCS-CPS17-10	1/4	7/16	3/16				1
PCS-CPS19-3	PCS-CPS19-6	PCS-CPS19-10	9/32	7/16	1/4				1
PCS-CPS21-3	PCS-CPS21-6	PCS-CPS21-10	5/16	1/2	1/4				1
PCS-CPS23-3	PCS-CPS23-6	PCS-CPS23-10	11/32	9/16	1/4				1
PCS-CPS25-3	PCS-CPS25-6	PCS-CPS25-10	3/8	5/8	1/4				1
PCS-CPS27-3	PCS-CPS27-6	PCS-CPS27-10	13/32	11/16	1/4				1
PCS-CPS29-3	PCS-CPS29-6	PCS-CPS29-10	7/16	11/16	1/4				1
PCS-CPS31-3	PCS-CPS31-6	PCS-CPS31-10	15/32	3/4	1/4				1
PCS-CPS33-3	PCS-CPS33-6	PCS-CPS33-10	1/2	3/4	1/4				1
PCS-CPS35-3	PCS-CPS35-6	PCS-CPS35-10	9/16	13/16	1/4				1
PCS-CPS37-3	PCS-CPS37-6	PCS-CPS37-10	5/8	7/8	1/4				1
PCS-CPS41-3	PCS-CPS41-6	PCS-CPS41-10	3/4	1	1/4				1
—	PCS-CPS45-6	PCS-CPS45-10	7/8	1 1/8	1/4				1
—	PCS-CPS47-6	PCS-CPS47-10	1	1 1/4	1/4				1

**Core Pins**

**50-55 RC**

**Hard - Precision Ground**

L = Length 3"			L = Length 6"			L = Length 10"			
Item No.	Item No.	Item No.	D Pin Dia.	H Head Dia.	T Head Thickness				Pack Qty.
PCS-CPH7-3	PCS-CPH7-6	PCS-CPH7-10	3/32	1/4	1/8				1
PCS-CPH8-3	PCS-CPH8-6	PCS-CPH8-10	7/64	1/4	1/8				1
PCS-CPH9-3	PCS-CPH9-6	PCS-CPH9-10	1/8	1/4	1/8				1
PCS-CPH10-3	PCS-CPH10-6	PCS-CPH10-10	9/64	1/4	1/8				1
PCS-CPH11-3	PCS-CPH11-6	PCS-CPH11-10	5/32	9/32	5/32				1
PCS-CPH12-3	PCS-CPH12-6	PCS-CPH12-10	11/64	11/32	3/16				1
PCS-CPH13-3	PCS-CPH13-6	PCS-CPH13-10	3/16	3/8	3/16				1
PCS-CPH14-3	PCS-CPH14-6	PCS-CPH14-10	13/64	3/8	3/16				1
PCS-CPH15-3	PCS-CPH15-6	PCS-CPH15-10	7/32	13/32	3/16				1
PCS-CPH17-3	PCS-CPH17-6	PCS-CPH17-10	1/4	7/16	3/16				1
PCS-CPH19-3	PCS-CPH19-6	PCS-CPH19-10	9/32	7/16	1/4				1
PCS-CPH21-3	PCS-CPH21-6	PCS-CPH21-10	5/16	1/2	1/4				1
PCS-CPH23-3	PCS-CPH23-6	PCS-CPH23-10	11/32	9/16	1/4				1
PCS-CPH25-3	PCS-CPH25-6	PCS-CPH25-10	3/8	5/8	1/4				1
PCS-CPH27-3	PCS-CPH27-6	PCS-CPH27-10	13/32	11/16	1/4				1
PCS-CPH29-3	PCS-CPH29-6	PCS-CPH29-10	7/16	11/16	1/4				1
PCS-CPH31-3	PCS-CPH31-6	PCS-CPH31-10	15/32	3/4	1/4				1
PCS-CPH33-3	PCS-CPH33-6	PCS-CPH33-10	1/2	3/4	1/4				1
PCS-CPH35-3	PCS-CPH35-6	PCS-CPH35-10	9/16	13/16	1/4				1
PCS-CPH37-3	PCS-CPH37-6	PCS-CPH37-10	5/8	7/8	1/4				1
PCS-CPH41-3	PCS-CPH41-6	PCS-CPH41-10	3/4	1	1/4				1
—	PCS-CPH45-6	PCS-CPH45-10	7/8	1 1/8	1/4				1
—	PCS-CPH47-6	PCS-CPH47-10	1	1 1/4	1/4				1

Note: 3 inch heads are not annealed. 6 inch and 10 inch heads are annealed.

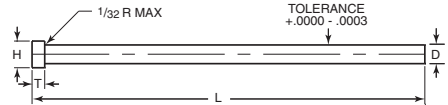


Mold Components  
Ejector Pins - Inch



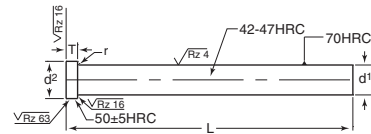
Features:

- Our Hardened Throughout pin can be used as an ejector or core pin, reducing inventory
- Surface is hardened to 65-70 RC
- Core is hardened to 50-52 RC
- Reduces "dishing" effect common to nitrided pins
- Precision ground to 4-10 micro-inch finish
- Manufactured from premium hotwork steel
- Etched for easy identification
- Annealed heads



L = Length 6" STD		L = Length 10" STD		L = Length 10" .005 OS		L = Length 12" STD		L = Length 14" STD		L = Length 14" .005 OS						
Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	D Pin Dia.	+ .0000/- .0003 Actual Size	H Head Dia.	T Head Thickness	Pack Qty.
PCS-P3-6	—	—	—	—	—	—	—	—	—	—	—	1/32	.0307	1/8	1/8	1
PCS-P4-6	—	—	—	—	—	—	—	—	—	—	—	3/64	.0464	5/32	1/8	1
PCS-P6-6	PCS-P6-10	PCS-P6-10-OS	—	—	—	—	—	—	—	—	—	5/64	.0776	13/64	1/8	1
PCS-P5-6	—	—	—	—	—	—	—	—	—	—	—	1/16	.0620	3/16	1/8	1
PCS-P7-6	PCS-P7-10	PCS-P7-10-OS	—	—	—	—	—	—	—	—	—	3/32	.0933	7/32	1/8	1
PCS-P8-6	PCS-P8-10	PCS-P8-10-OS	—	—	—	—	—	—	—	—	—	7/64	.1089	15/64	1/8	1
PCS-P9-6	PCS-P9-10	PCS-P9-10-OS	—	—	—	—	—	—	—	—	—	1/8	.1245	1/4	1/8	1
PCS-P11-6	PCS-P11-10	PCS-P11-10-OS	—	—	—	—	—	—	—	—	—	5/32	.1557	9/32	5/32	1
PCS-P13-6	PCS-P13-10	PCS-P13-10-OS	—	—	—	—	—	—	—	—	—	3/16	.1870	3/8	3/16	1
PCS-P15-6	PCS-P15-10	PCS-P15-10-OS	—	—	—	—	—	—	—	—	—	7/32	.2183	13/32	3/16	1
PCS-P17-6	PCS-P17-10	PCS-P17-10-OS	—	—	—	—	—	—	—	—	—	1/4	.2495	7/16	3/16	1
PCS-P19-6	PCS-P19-10	PCS-P19-10-OS	—	—	—	—	—	—	—	—	—	5/32	.2807	7/16	1/4	1
PCS-P21-6	PCS-P21-10	PCS-P21-10-OS	—	—	—	—	—	—	—	—	—	11/32	.3120	1/2	1/4	1
PCS-P23-6	PCS-P23-10	PCS-P23-10-OS	—	—	—	—	—	—	—	—	—	11/32	.3433	9/16	1/4	1
PCS-P25-6	PCS-P25-10	PCS-P25-10-OS	—	—	—	—	—	—	—	—	—	3/8	.3745	5/8	1/4	1
PCS-P29-6	PCS-P29-10	PCS-P29-10-OS	—	—	—	—	—	—	—	—	—	1/2	.4370	11/16	1/4	1
PCS-P31-6	PCS-P31-10	PCS-P31-10-OS	—	—	—	—	—	—	—	—	—	11/32	.4683	3/4	1/4	1
PCS-P33-6	PCS-P33-10	—	—	—	—	—	—	—	—	—	—	1/2	.4995	3/4	1/4	1
PCS-P34-6	PCS-P34-10	—	—	—	—	—	—	—	—	—	—	17/32	.5307	23/32	1/4	1
PCS-P35-6	PCS-P35-10	—	—	—	—	—	—	—	—	—	—	9/16	.5620	19/16	1/4	1
PCS-P37-6	PCS-P37-10	—	—	—	—	—	—	—	—	—	—	5/8	.6245	7/8	1/4	1
PCS-P39-6	PCS-P39-10	—	—	—	—	—	—	—	—	—	—	11/16	.6870	19/16	1/4	1
PCS-P41-6	PCS-P41-10	—	—	—	—	—	—	—	—	—	—	3/4	.7495	1	1/4	1
PCS-P45-6	PCS-P45-10	—	—	—	—	—	—	—	—	—	—	7/8	.8745	1 1/8	1/4	1
PCS-P47-6	PCS-P47-10	—	—	—	—	—	—	—	—	—	—	1	.9995	1 1/4	1/4	1
—	PCS-P33-10-OS	—	—	—	—	—	—	—	—	—	—	1/2	.4995	3/4	1/4	1

Ejector Pins - Metric



Features:

- Our Hardened Throughout TM pin can be used as an ejector or core pin, reducing inventory
- Surface is hardened to 65-70 RC
- Core is hardened to 50-52 RC
- Reduces "dishing" effect common to nitrided pins
- Precision ground to 4-10 micro-inch finish
- Manufactured from premium hotwork steel
- Etched for easy identification
- Annealed heads

Type	A
DIN	1530
ISO	6751
Material	H-13
Nitrided	

Tolerances mm	
Pin Diameter (d1)	g6
Head Diameter (d2)	-0.2
Head Thickness (T)	-0.05
Length (L)	+0.2
Radius (r)	+0.2

L = Length 125mm		L = Length 160mm		L = Length 200mm		L = Length 315mm						
Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	d1 Pin Dia.	d2 Head Dia.	T Head Thickness	r Radius	Pack Qty.
PCS-MP015-125	PCS-MP015-160	PCS-MP015-200	—	—	—	—	—	1.5	3.0	1.5	0.2	1
PCS-MP025-125	PCS-MP025-160	PCS-MP025-200	PCS-MP025-315	—	—	—	—	2.5	5.0	2.0	0.3	1
PCS-MP03-125	PCS-MP03-160	PCS-MP03-200	PCS-MP03-315	—	—	—	—	3.0	6.0	3.0	0.3	1
—	PCS-MP035-160	PCS-MP035-200	PCS-MP035-315	—	—	—	—	3.5	7.0	3.0	0.3	1
PCS-MP04-125	PCS-MP04-160	PCS-MP04-200	PCS-MP04-315	—	—	—	—	4.0	8.0	3.0	0.3	1
PCS-MP045-125	PCS-MP045-160	PCS-MP045-200	—	—	—	—	—	4.5	8.0	3.0	0.3	1
PCS-MP05-125	PCS-MP05-160	PCS-MP05-200	PCS-MP05-315	—	—	—	—	5.0	10.0	3.0	0.3	1
PCS-MP06-125	PCS-MP06-160	PCS-MP06-200	PCS-MP06-315	—	—	—	—	6.0	12.0	5.0	0.5	1
PCS-MP07-125	PCS-MP07-160	PCS-MP07-200	PCS-MP07-315	—	—	—	—	7.0	12.0	5.0	0.5	1
PCS-MP08-125	PCS-MP08-160	PCS-MP08-200	PCS-MP08-315	—	—	—	—	8.0	14.0	5.0	0.5	1
PCS-MP10-125	PCS-MP10-160	PCS-MP10-200	PCS-MP10-315	—	—	—	—	10.0	16.0	5.0	0.5	1
PCS-MP12-125	PCS-MP12-160	PCS-MP12-200	PCS-MP12-315	—	—	—	—	12.0	18.0	7.0	0.8	1
PCS-MP14-125	PCS-MP14-160	—	PCS-MP14-315	—	—	—	—	14.0	22.0	7.0	0.8	1
PCS-MP16-125	PCS-MP16-160	PCS-MP16-200	PCS-MP16-315	—	—	—	—	16.0	22.0	7.0	0.8	1
—	—	PCS-MP18-200	—	—	—	—	—	18.0	24.0	7.0	0.8	1
—	—	PCS-MP20-200	PCS-MP20-315	—	—	—	—	20.0	26.0	8.0	1.0	1
—	—	PCS-MP25-200	PCS-MP25-315	—	—	—	—	25.0	32.0	10.0	1.0	1



# MOLD COMPONENTS

Buy One or Buy Bulk & SAVE

## Mold Components MoldMax™ Pins



### Features:

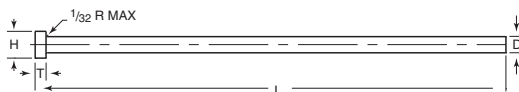
- Hardness 36-42 RC
- Resists corrosion, galling, and seizing
- Rapid and uniform heat removal reduces post cycle shrinkage and warpage
- Shorter cycle times with enhanced dimensional control
- High strength alloyed copper with superior thermal conductivity
- Special diameters available upon request

Tolerances	
Pin Diameter (D)	+0.000 -0.001
Head Diameter (H)	+0.000 -0.015
Head Thickness (T)	+0.000 -0.002

L = Length 4"	L = Length 8"	L = Length 12"	D Pin Dia.	H Head Dia.	T Head Thickness	Pack Qty.
PCS-CPM9-4	PCS-CPM9-8	PCS-CPM9-12	.1250	1/4	1/8	1
PCS-CPM11-4	PCS-CPM11-8	PCS-CPM11-12	.1563	5/32	5/32	1
PCS-CPM13-4	PCS-CPM13-8	PCS-CPM13-12	.1875	3/8	3/16	1
PCS-CPM15-4	PCS-CPM15-8	PCS-CPM15-12	.2188	13/32	3/16	1
PCS-CPM17-4	PCS-CPM17-8	PCS-CPM17-12	.2500	7/16	3/16	1
PCS-CPM19-4	PCS-CPM19-8	PCS-CPM19-12	.2812	7/16	1/4	1
PCS-CPM21-4	PCS-CPM21-8	PCS-CPM21-12	.3125	1/2	1/4	1
PCS-CPM25-4	PCS-CPM25-8	PCS-CPM25-12	.3750	5/8	1/4	1
PCS-CPM29-4	PCS-CPM29-8	PCS-CPM29-12	.4375	11/16	1/4	1
PCS-CPM33-4	PCS-CPM33-8	PCS-CPM33-12	.5000	3/4	1/4	1
PCS-CPM35-4	PCS-CPM35-8	PCS-CPM35-12	.5625	13/16	1/4	1
PCS-CPM37-4	PCS-CPM37-8	PCS-CPM37-12	.6250	7/8	1/4	1
PCS-CPM41-4	PCS-CPM41-8	PCS-CPM41-12	.7500	1	1/4	1

Note: MoldMAX is a part of Brush Wellman Corp.

## Ejector Pins - Nitrided



### Features:

- Precision ground hotwork steel
- Surface nitrided to 65-74 RC
- Core hardness of 35-40 RC
- 4-10 micro-inch finish minimizes wear and prolongs life
- All heads annealed
- Etched for easy identification

Tolerances	
Pin Diameter (D)	+0.000 -0.001
Head Diameter (H)	+0.000 -0.010

L = Length 6" STD	L = Length 10" STD	L = Length 10" .005 STD	L = Length 14" STD	L = Length 18" STD	L = Length 25" STD	D Pin Dia.	H Head Dia.	T Head Thickness	Pack Qty.
PCS-NP9-6	PCS-NP9-10	PCS-NP9-10-OS	PCS-NP9-14	PCS-NP9-18	PCS-NP9-25	1/8	1/4	1/8	1
PCS-NP10-6	PCS-NP10-10	PCS-NP10-10-OS	PCS-NP10-14	PCS-NP10-18	PCS-NP10-25	9/64	3/4	1/8	1
PCS-NP11-6	PCS-NP11-10	PCS-NP11-10-OS	PCS-NP11-14	PCS-NP11-18	PCS-NP11-25	5/32	5/32	5/32	1
PCS-NP12-6	PCS-NP12-10	PCS-NP12-10-OS	PCS-NP12-14	PCS-NP12-18	PCS-NP12-25	11/64	11/32	3/16	1
PCS-NP13-6	PCS-NP13-10	PCS-NP13-10-OS	PCS-NP13-14	PCS-NP13-18	PCS-NP13-25	3/16	3/8	3/16	1
PCS-NP14-6	PCS-NP14-10	PCS-NP14-10-OS	PCS-NP14-14	PCS-NP14-18	PCS-NP14-25	13/64	3/8	3/16	1
PCS-NP15-6	PCS-NP15-10	PCS-NP15-10-OS	PCS-NP15-14	PCS-NP15-18	PCS-NP15-25	7/32	11/32	3/16	1
PCS-NP16-6	PCS-NP16-10	PCS-NP16-10-OS	PCS-NP16-14	PCS-NP16-18	PCS-NP16-25	15/64	11/32	3/16	1
PCS-NP17-6	PCS-NP17-10	PCS-NP17-10-OS	PCS-NP17-14	PCS-NP17-18	PCS-NP17-25	1/4	7/16	3/16	1
PCS-NP18-6	PCS-NP18-10	PCS-NP18-10-OS	PCS-NP18-14	PCS-NP18-18	PCS-NP18-25	11/64	7/16	1/4	1
PCS-NP19-6	PCS-NP19-10	PCS-NP19-10-OS	PCS-NP19-14	PCS-NP19-18	PCS-NP19-25	5/32	7/16	1/4	1
PCS-NP20-6	PCS-NP20-10	PCS-NP20-10-OS	PCS-NP20-14	PCS-NP20-18	PCS-NP20-25	19/64	1/2	1/4	1
PCS-NP21-6	PCS-NP21-10	PCS-NP21-10-OS	PCS-NP21-14	PCS-NP21-18	PCS-NP21-25	3/16	1/2	1/4	1
PCS-NP22-6	PCS-NP22-10	PCS-NP22-10-OS	PCS-NP22-14	PCS-NP22-18	PCS-NP22-25	21/64	9/16	1/4	1
PCS-NP23-6	PCS-NP23-10	PCS-NP23-10-OS	PCS-NP23-14	PCS-NP23-18	PCS-NP23-25	11/32	9/16	1/4	1
PCS-NP24-6	PCS-NP24-10	PCS-NP24-10-OS	PCS-NP24-14	PCS-NP24-18	PCS-NP24-25	23/64	3/8	1/4	1
PCS-NP25-6	PCS-NP25-10	PCS-NP25-10-OS	PCS-NP25-14	PCS-NP25-18	PCS-NP25-25	3/8	3/8	1/4	1
PCS-NP26-6	PCS-NP26-10	PCS-NP26-10-OS	PCS-NP26-14	PCS-NP26-18	PCS-NP26-25	13/32	11/16	1/4	1
PCS-NP27-6	PCS-NP27-10	PCS-NP27-10-OS	PCS-NP27-14	PCS-NP27-18	PCS-NP27-25	7/16	11/16	1/4	1
PCS-NP28-6	PCS-NP28-10	PCS-NP28-10-OS	PCS-NP28-14	PCS-NP28-18	PCS-NP28-25	15/32	3/4	1/4	1
PCS-NP29-6	PCS-NP29-10	PCS-NP29-10-OS	PCS-NP29-14	PCS-NP29-18	PCS-NP29-25	1/2	3/4	1/4	1
PCS-NP30-6	PCS-NP30-10	PCS-NP30-10-OS	PCS-NP30-14	PCS-NP30-18	PCS-NP30-25	13/32	3/4	1/4	1
PCS-NP31-6	PCS-NP31-10	PCS-NP31-10-OS	PCS-NP31-14	PCS-NP31-18	PCS-NP31-25	1/2	3/4	1/4	1
PCS-NP32-6	PCS-NP32-10	PCS-NP32-10-OS	PCS-NP32-14	PCS-NP32-18	PCS-NP32-25	11/16	13/16	1/4	1
PCS-NP33-6	PCS-NP33-10	PCS-NP33-10-OS	PCS-NP33-14	PCS-NP33-18	PCS-NP33-25	3/4	13/16	1/4	1
PCS-NP34-6	PCS-NP34-10	PCS-NP34-10-OS	PCS-NP34-14	PCS-NP34-18	PCS-NP34-25	15/16	13/16	1/4	1
PCS-NP35-6	PCS-NP35-10	PCS-NP35-10-OS	PCS-NP35-14	PCS-NP35-18	PCS-NP35-25	15/16	13/16	1/4	1
PCS-NP36-6	PCS-NP36-10	PCS-NP36-10-OS	PCS-NP36-14	PCS-NP36-18	PCS-NP36-25	15/16	13/16	1/4	1
PCS-NP37-6	PCS-NP37-10	PCS-NP37-10-OS	PCS-NP37-14	PCS-NP37-18	PCS-NP37-25	15/16	13/16	1/4	1
PCS-NP38-6	PCS-NP38-10	PCS-NP38-10-OS	PCS-NP38-14	PCS-NP38-18	PCS-NP38-25	15/16	13/16	1/4	1
PCS-NP39-6	PCS-NP39-10	PCS-NP39-10-OS	PCS-NP39-14	PCS-NP39-18	PCS-NP39-25	15/16	13/16	1/4	1
PCS-NP40-6	PCS-NP40-10	PCS-NP40-10-OS	PCS-NP40-14	PCS-NP40-18	PCS-NP40-25	15/16	13/16	1/4	1
PCS-NP41-6	PCS-NP41-10	PCS-NP41-10-OS	PCS-NP41-14	PCS-NP41-18	PCS-NP41-25	3/4	1	1/4	1
PCS-NP42-6	PCS-NP42-10	PCS-NP42-10-OS	PCS-NP42-14	PCS-NP42-18	PCS-NP42-25	7/8	1 1/8	1/4	1
PCS-NP43-6	PCS-NP43-10	PCS-NP43-10-OS	PCS-NP43-14	PCS-NP43-18	PCS-NP43-25	1	1 1/4	1/4	1



Carbide Reamers



Tolerances		
Reamer Diameter		+ .0002 - .0000
Shank Diameter		+ .0000 - .0005

Item No.	Reamer Diameter		No. of Flutes	Flute Length	OAL	Shank Dia.	Pack Qty.
	Fractional Size	Decimal Size					
PCS-ROS-4	3/64 OS	.0517	4	1/2	4	.046	1
PCS-ROS-5	1/16 OS	.0673	4	1/2	4	.062	1
PCS-ROS-6	5/64 OS	.0829	4	1/2	4	.077	1
PCS-ROS-7	5/64 OS	.0986	4	3/4	4	.093	1
PCS-ROS-8	7/64 OS	.1142	4	7/8	4	.108	1
PCS-ROS-9	1/8 OS	.1298	4	7/8	4	.125	1
PCS-ROS-10	9/64 OS	.1454	6	1	4	.140	1
PCS-ROS-11	5/32 OS	.1610	6	1	4	.155	1
PCS-ROS-13	3/16 OS	.1923	6	1	4 1/2	.187	1
PCS-ROS-15	7/32 OS	.2236	6	1 1/8	5	.218	1
PCS-ROS-16	15/64 OS	.2392	6	1 1/8	5	.234	1
PCS-ROS-17	1/4 OS	.2548	6	1 1/8	5	.249	1
PCS-ROS-18	17/64 OS	.2704	6	1 3/8	5	.265	1
PCS-ROS-19	9/32 OS	.2860	6	1 3/8	5	.280	1
PCS-ROS-21	5/16 OS	.3173	6	1 3/8	5	.312	1
PCS-ROS-23	11/32 OS	.3486	6	1 1/2	5	.343	1
PCS-ROS-25	3/8 OS	.3798	6	1 1/2	5	.374	1
PCS-ROS-29	7/16 OS	.4423	6	1 3/8	5	.437	1
PCS-ROS-27	13/32 OS	.4110	6	1 3/8	5	.405	1
PCS-ROS-33	1/2 OS	.5048	6	1 3/4	6	.499	1

Features:

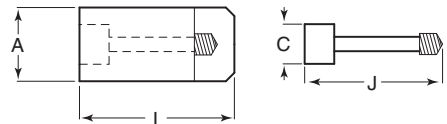
- Designed to work with PCS oversized ejector pins
- Straight flute
- Material: Micro-Grain Carbide
- Extra long shank for easy access to holes within a deep cavity
- Four or six flutes to check size precisely
- Extra long flute lengths for greater hole straightness
- Shank diameters smaller than reamer diameter to avoid seizing

Mold Components  
Cumsa Date Inserts



Easy Year Change:

- Simply insert screwdriver in arrow slot and turn counter clockwise until insert is removed
- Replace with new year arrow insert and turn clockwise approximately 8 times until unit clicks



Easy Month Change:

- Simply insert screwdriver into arrow slot and turn clockwise
- Insert remains flush with surface regardless of the number of clockwise turns
- Manufactured from 420 stainless
- Hardened to 45 - 50 RC

Month	Center Insert	Day	Shift	Year

Date Code	Tolerances Inches							
	4mm	5mm	6mm	8mm	10mm	12mm	16mm	20mm
A	0.0005	0.0005	0.0005	0.0006	0.0007	0.0007	0.0007	0.0008
Dia.	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003
L	+ .0000	+ .0000	+ .0000	+ .0000	+ .0000	+ .0000	+ .0000	+ .0000
Lgth.	- .0002	- .0002	- .0002	- .0002	- .0002	- .0002	- .0002	- .0002

Size	Engraving Depth Inches		
	Characters	Arrow Head	Arrow Body
3mm	.004 - .008	.016 - .020	.016 - .020
4-5mm	.004 - .006	.016 - .020	.016 - .022
6mm	.004 - .008	.016 - .020	.016 - .020
8mm	.006 - .010	.016 - .020	.016 - .020
10-16mm	.008 - .012	.020 - .024	.020 - .024
20mm	.008 - .012	.020 - .024	.020 - .024

Month w/ Arrow and Year		Center Insert Only w/ Year		Day Insert w/ Arrow		Shift Insert w/ Arrow		Year Insert w/ Arrow		Pack Qty.
Item No.	Item No.	Item No.	Item No.	Item No.	A	C	J	L		
PCS-DS0422	PCS-DP2275	—	PCS-DS04-03	PCS-DS04-Y	4	2.2	7.5	12	1	
PCS-DS0530	PCS-DP3075	PCS-DS05-31L	PCS-DS05-03	PCS-DS05-Y	5	3.0	7.5	12	1	
PCS-DS0632	PCS-DP3217	PCS-DS06-31L	PCS-DS06-03	PCS-DS06-Y	6	3.2	17.0	20	1	
PCS-DS0847	PCS-DP4717	PCS-DS08-31L	PCS-DS08-03	PCS-DS08-Y	8	4.7	17.0	20	1	
PCS-DS1057	PCS-DP5717	PCS-DS10-31L	PCS-DS10-03	PCS-DS10-Y	10	5.7	17.0	20	1	
PCS-DS1267	PCS-DP6717	PCS-DS12-31L	PCS-DS12-03	PCS-DS12-Y	12	6.7	17.0	20	1	
PCS-DS1687	PCS-DP8717	PCS-DS16-31L	PCS-DS16-03	PCS-DS16-Y	16	8.7	17.0	20	1	
PCS-DS20107	PCS-DP10717	PCS-DS20-31L	PCS-DS20-03	PCS-DS20-Y	20	10.7	17.0	20	1	

Note: Mold operating temperature should not exceed 150°C (300°F).

Note 2: When ordering, add year to the end of the part number (i.e. PCS-DS0632-03) or for assembly with arrow only (i.e. PCS-DS0632).