

TOOLING COMPONENTS

Plungers	3.3
Screws	3.17
Leveling Pads	3.26
Spring Stops	3.28
Fixture Keys	3.30
Tooling Balls	3.32
Locating Bushings	3.33
Pins	3.34
Nuts	3.40
Bolts	3.49
Knobs, Handwheels	3.90
Handles	3.98
Rest Buttons	3.106
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Locating Pins	3.112
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Single Acting Kwik Lok Pins	3.167
Ball Lock Mounting Systems	3.173
E.Z. Lok Threaded Inserts	3.178
Threaded Inserts	3.192

AVAILABILITY! We pride ourselves in being able to ship your order the same day we receive it. At All American we keep a huge inventory of drill bushings and tooling components... Ready when you need them.

COST! You save money buying All American. That's one reason we're so popular! Your savings start with our prices and continue building up as long as you use **All American Bushings** and **Tooling Components**.

ORDERING INFORMATION

Order tooling components by the All American catalog number listed.

EXAMPLE:

Quantity	Catalog #
25	#107-50

All American personnel will be happy to help you convert other manufactures' numbers to the All American number where possible.

TERMS

TRADE TERMS: 1% ten days, net 30. (invoices not paid within 60 days are subject to a 1% service charge.)

SHIPMENT: All prices are quoted F.O.B. shipping point.

RETURNS: Standard products purchased from stock may be returned prepaid within one (1) month after shipment is made subject to inventory conditions and only with our written consent. A 15% restocking charge will be made. Special bushings, Tungsten Carbide, Airfeed and extended range bushings are not returnable.

PRICES: Subject to change without notice.

GUARANTEE

All American Drill Bushings and Tooling Accessories are guaranteed against defects in material and workmanship and are warranted to be accurate to ANSI and catalog standards. Our liability is limited to the replacement of any All American Drill Bushing part.

DISCLAIMER NOTICE: All American takes great care to ensure that the dimensions and specifications in our catalogs and flyers are correct but accepts no responsibility for printing and typing errors which unfortunately do sometimes occur. Our liability is limited to the replacement of any All American item. We at All American also reserve the right to change any dimension or specifications without notice.



SPRING PLUNGERS

SPRING PLUNGERS GIVE SURE AND POSITIVE CONTROLLED SPRING TENSION.

APPLICATIONS

Nylon Nose Spring Plungers are generally used with soft materials such as Aluminum, Brass, etc. They are also used for positioning parts in fixtures - Locating Pins - Detents - Ejecting parts - End product users.

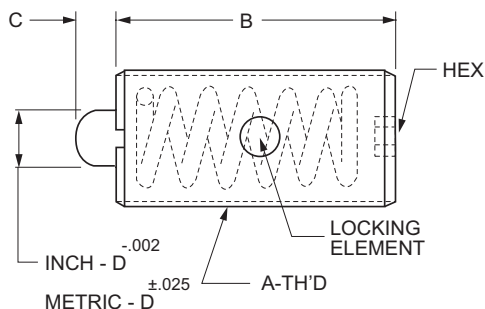
All American Spring Plungers are available in two spring pressures: **Black Nose** with standard pressure and **Silver Nose** with light pressure. The Nylon nose has high tensile strength excellent wear resistance and is reinforced for minimum deformation. Hardened steel plungers assure long life and a black oxide finish resists rust.

The optional self locking element provides a positive, vibration-proof lock. Compression of the nylon pellet creates a spring-like wedging action that locks the mated threads together. That locking element feature eliminates the need for set screws or more expensive methods of locking spring plungers.

NOTE: To provide full locking torque and to prevent damage to the insert when using a Locking Element type spring plungers, it is important that the tapped installation be countersunk 90° by 1/32 larger than the major thread diameter.

NOTE: Do Not use at temperatures above 600° for steels or 300° for Nylon.

SPECIAL SPRING OR BALL PLUNGERS can be made to your specifications. Prices are quoted upon request.



SPRING PLUNGERS

Steel Black Nose - Standard End Pressure
With or Without Thread Locking Element - Black Oxide Finish

P/N		DIMENSIONS				END PRESSURE (LBS.)	
PLAIN	WITH INSERT	A	B	C	D	1/2 COMP.	FULLY COMP.
100-05	101-05	6-32	3/8	1/16	.046	1.3	1.6
100-10	101-10	6-32	17/32	1/16	.046	3.0	4.5
100-15	101-15	8-32	5/8	3/32	.070	5.0	7.3
100-20	101-20	10-32	3/4	1/8	.093	7.0	11.1
100-25	101-25	1/4-20	3/4	1/8	.119	5.5	9.0
100-30	101-30	1/4-20	1	5/32	.119	8.0	13.0
100-35	101-35	1/4-28	1	5/32	.119	8.0	13.0
100-40	101-40	5/16-18	1	3/16	.135	9.0	15.0
100-45	101-45	3/8-16	1-1/8	3/16	.187	10.0	14.5
100-50	101-50	1/2-13	1-1/4	1/4	.249	12.0	17.4
100-55	101-55	5/8-11	1-1/2	5/16	.312	18.0	25.5
100-60	101-60	3/4-10	1-3/4	5/16	.374	22.0	37.3
100-65	101-65	1/8	2-13/32	1/2	.499	42.0	68.0

STAINLESS SPRING PLUNGERS

Stainless Steel Nose - Standard End Pressure
With or Without Thread Locking Element

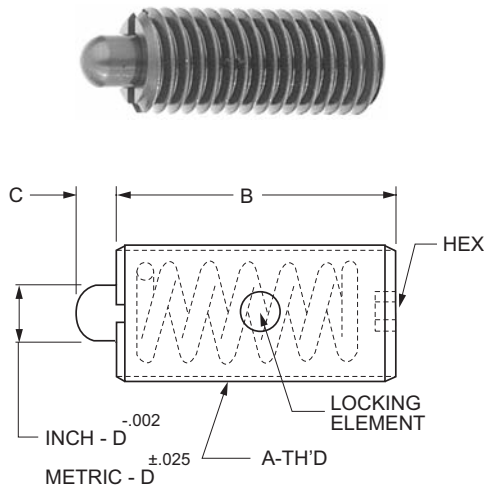
P/N		DIMENSIONS				END PRESSURE (LBS.)	
PLAIN	WITH INSERT	A	B	C	D	1/2 COMP.	FULLY COMP.
100-05S	101-05S	6-32	3/8	1/16	.046	1.3	1.6
100-10S	101-10S	6-32	17/32	1/16	.046	3.0	4.5
100-15S	101-15S	8-32	5/8	3/32	.070	5.0	7.3
100-20S	101-20S	10-32	3/4	1/8	.093	7.0	11.1
100-25S	101-25S	1/4-20	3/4	1/8	.119	5.5	9.0
100-30S	101-30S	1/4-20	1	3/16	.119	8.0	13.0
100-35S	101-35S	1/4-28	1	3/16	.119	8.0	13.0
100-40S	101-40S	5/16-18	1	3/16	.135	9.0	15.0
100-45S	101-45S	3/8-16	1-1/8	3/16	.186	10.0	14.5
100-50S	101-50S	1/2-13	1-1/4	1/4	.248	12.0	17.4

METRIC SPRING PLUNGERS

Steel Nose - Standard End Pressure
With Thread Locking Element

P/N	DIMENSIONS				END PRESSURE (KG)	
	A	B	C	D	1/2 COMP.	FULLY COMP.
101-71	M6 x 1.00	25.00	5.00	3.00	3.60	5.85
101-72	M8 x 1.25	25.00	5.00	3.40	4.05	6.75
101-73	M10 x 1.50	29.00	5.00	4.70	4.50	6.50
101-74	M12 x 1.75	32.00	6.00	6.30	5.40	7.85

SPRING PLUNGERS



METRIC SPRING PLUNGERS

Steel Nose - Light End Pressure
With Thread Locking Element

P/N	DIMENSIONS				END PRESSURE (KG)	
	A	B	C	D	1/2 COMP.	FULLY COMP.
103-74	M6 x 1.00	25.00	5.00	3.00	1.15	1.80
103-75	M8 x 1.25	25.00	5.00	3.40	1.35	2.00
103-76	M10 x 1.50	29.00	5.00	4.70	2.25	3.25
103-77	M12 x 1.75	32.00	6.00	6.30	2.70	4.20

NYLON SPRING PLUNGERS (DIE APPLICATION)

Brown Delrin Nose - Heavy End Pressure
With or Without Thread Locking Element - Black Oxide Finish

P/N		DIMENSIONS				END PRESSURE (LBS.)	
PLAIN	WITH INSERT	A	B	C	D	1/2 COMP.	FULLY COMP.
104-05	105-05	8-32	5/8	3/32	.070	5.0	7.3
104-10	105-10	10-32	3/4	1/8	.093	7.0	11.1
104-15	105-15	1/4-20	1	5/32	.119	8.0	13.0
104-20	105-20	5/16-18	1	3/16	.135	9.0	15.0
104-25	105-25	3/8-16	1-1/8	3/16	.187	10.0	14.5
104-30	105-30	1/2-13	1-1/4	1/4	.249	12.0	17.4
104-35	105-35	5/8-11	1-1/2	5/16	.312	18.0	25.2

STAINLESS SPRING PLUNGERS

Brown Delrin Nose - Heavy End Pressure
With or Without Thread Locking Element

P/N		DIMENSIONS				END PRESSURE (LBS.)	
PLAIN	WITH INSERT	A	B	C	D	1/2 COMP.	FULLY COMP.
104-05S	105-05S	8-32	5/8	3/32	.070	5.0	7.3
104-10S	105-10S	10-32	3/4	1/8	.093	7.0	11.1
104-15S	105-15S	1/4-20	1	3/16	.119	8.0	13.0
104-17S	105-17S	1/4-28	1	3/16	.119	8.0	13.0
104-20S	105-20S	5/16-18	1	3/16	.135	9.0	15.0
104-25S	105-25S	3/8-16	1-1/8	3/16	.186	10.0	14.5
104-30S	105-30S	1/2-13	1-1/4	1/4	.248	12.0	17.4

METRIC SPRING PLUNGERS

Brown Delrin Nose - Heavy End Pressure
With Thread Locking Element

P/N	DIMENSIONS				END PRESSURE (KG)	
	A	B	C	D	1/2 COMP.	FULLY COMP.
105-41	M6 x 1.00	25.00	5.00	3.00	3.60	5.85
105-42	M8 x 1.25	25.00	5.00	3.40	4.05	6.75
105-43	M10 x 1.50	29.00	5.00	4.70	4.50	6.50
105-44	M12 x 1.75	32.00	6.00	6.30	5.40	7.85

SPRING PLUNGERS

Steel SILVER Nose - Light End Pressure
With or Without Thread Locking Element - Black Oxide Finish

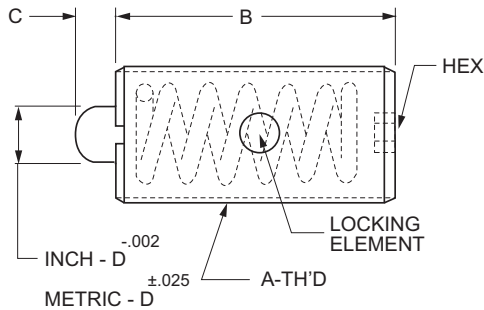
P/N		DIMENSIONS				END PRESSURE (LBS.)	
PLAIN	WITH INSERT	A	B	C	D	1/2 COMP.	FULLY COMP.
102-05	103-05	6-32	17/32	1/16	.046	1.0	1.5
102-10	103-10	8-32	5/8	3/32	.070	1.5	2.3
102-15	103-15	10-32	3/4	1/8	.093	2.0	2.7
102-20	103-20	1/4-20	3/4	1/8	.119	1.0	2.0
102-25	103-25	1/4-20	1	5/32	.119	2.5	4.0
102-30	103-30	1/4-28	1	5/32	.119	2.5	4.0
102-35	103-35	5/16-18	1	3/16	.135	3.0	4.5
102-40	103-40	3/8-16	1-1/8	3/16	.187	5.0	7.2
102-45	103-45	1/2-13	1-1/4	1/4	.249	6.0	9.3
102-50	103-50	5/8-11	1-1/2	5/16	.312	7.0	10.5
102-55	103-55	3/4-10	1-3/4	5/16	.374	11.0	16.0
102-60	103-60	1/8	2-13/32	1/2	.499	17.5	31.0

STAINLESS SPRING PLUNGERS

Stainless Steel Nose - Light End Pressure
With or Without Thread Locking Element

P/N		DIMENSIONS				END PRESSURE (LBS.)	
PLAIN	WITH INSERT	A	B	C	D	1/2 COMP.	FULLY COMP.
102-05S	103-05S	6-32	17/32	1/16	.046	1.0	1.5
102-10S	103-10S	8-32	5/8	3/32	.070	1.5	2.3
102-15S	103-15S	10-32	3/4	1/8	.093	2.0	2.7
102-25S	103-25S	1/4-20	1	3/16	.119	2.5	4.0
102-30S	103-30S	1/4-28	1	3/16	.119	2.5	4.0
102-35S	103-35S	5/16-18	1	3/16	.135	3.0	4.5
102-40S	103-40S	3/8-16	1-1/8	3/16	.186	5.0	7.2
102-45S	103-45S	1/2-13	1-1/4	1/4	.248	6.0	9.3

SPRING PLUNGERS



NYLON SPRING PLUNGERS (DIE APPLICATION)

White Delsin Nose - Light End Pressure
With or Without Thread Locking Element - Black Oxide Finish

P/N		DIMENSIONS				END PRESSURE (LBS.)	
PLAIN	WITH INSERT	A	B	C	D	1/2 COMP.	FULLY COMP.
106-05	107-05	8-32	5/8	3/32	.070	1.5	2.3
106-10	107-10	10-32	3/4	1/8	.093	2.0	2.7
106-15	107-15	1/4-20	1	5/32	.119	2.5	4.0
106-20	107-20	5/16-18	1	3/16	.135	3.0	4.5
106-25	107-25	3/8-16	1-1/8	3/16	.187	5.0	7.2
106-30	107-30	1/2-13	1-1/4	1/4	.249	6.0	9.3
106-35	107-35	5/8-11	1-1/2	5/16	.312	7.0	10.5

STAINLESS SPRING PLUNGERS

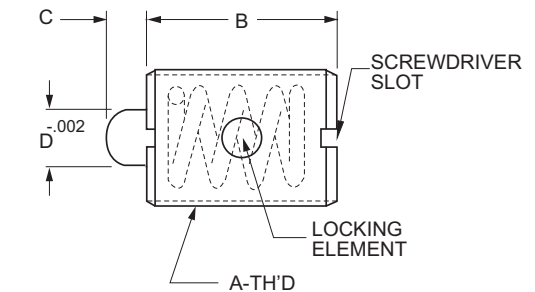
White Delrin Nose - Light End Pressure
With or Without Thread Locking Element

P/N		DIMENSIONS				END PRESSURE (LBS.)	
PLAIN	WITH INSERT	A	B	C	D	1/2 COMP.	FULLY COMP.
106-05S	107-05S	8-32	5/8	3/32	.070	1.5	2.3
106-10S	107-10S	10-32	3/4	1/8	.093	2.0	2.7
106-15S	107-15S	1/4-20	1	5/32	.119	2.5	4.0
106-17S	107-17S	1/4-28	1	3/16	.119	2.5	4.0
106-20S	107-20S	5/16-18	1	3/16	.135	3.0	4.5
106-25S	107-25S	3/8-16	1-1/8	3/16	.186	5.0	7.2
106-30S	107-30S	1/2-13	1-1/4	1/4	.248	6.0	9.3

METRIC SPRING PLUNGERS

White Delrin Nose - Light End Pressure
With Thread Locking Element - Black Oxide Finish

P/N	DIMENSIONS				END PRESSURE (KG)	
	A	B	C	D	1/2 COMP.	FULLY COMP.
107-41	M6 x 1.00	25.00	5.00	3.00	1.15	1.80
107-42	M8 x 1.25	25.00	5.00	3.40	1.35	2.00
107-43	M10 x 1.50	29.00	5.00	4.70	2.25	3.25
107-44	M12 x 1.75	32.00	6.00	6.30	2.70	4.20



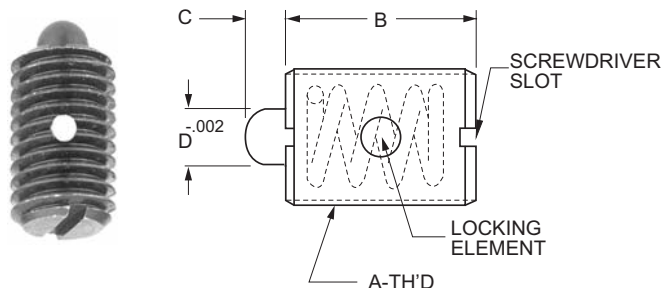
SHORT SPRING PLUNGERS

Steel Black Nose - Standard End Pressure
With Thread Locking Element - Black Oxide Finish

P/N	DIMENSIONS				END PRESSURE (LBS.)	
	A	B	C	D	1/2 COMP.	FULLY COMP.
107-49	8-32	7/16	.052	.070	3.10	4.75
107-50	8-36	7/16	.052	.070	3.10	4.75
107-51	10-32	15/32	.065	.093	4.00	6.25
107-52	1/4-20	17/32	.078	.119	6.75	10.50
107-53	5/16-18	9/16	.084	.135	9.60	15.50
107-54	3/8-16	5/8	.110	.186	11.50	18.50
107-55	1/2-13	3/4	.151	.248	16.50	28.00
107-56	5/8-11	1-1/16	.215	.310	28.50	50.00



SPRING PLUNGERS



STAINLESS STEEL SHORT SPRING PLUNGERS

Stainless Steel Nose - Standard End Pressure
With Thread Locking Element

P/N	DIMENSIONS				END PRESSURE (LBS.)	
	A	B	C	D	1/2 COMP.	FULLY COMP.
107-49S	8-32	7/16	.052	.070	3.10	4.75
107-50S	8-36	7/16	.052	.070	3.10	4.75
107-51S	10-32	15/32	.065	.093	4.00	6.25
107-52S	1/4-20	17/32	.078	.119	6.75	10.50
107-53S	5/16-18	9/16	.084	.135	9.60	15.50
107-54S	3/8-16	5/8	.110	.186	11.50	18.50
107-55S	1/2-13	3/4	.151	.248	16.50	28.00

SHORT SPRING PLUNGERS

Steel Silver Nose - Light End Pressure
With Thread Locking Element - Black Oxide Finish

P/N	DIMENSIONS				END PRESSURE (LBS.)	
	A	B	C	D	1/2 COMP.	FULLY COMP.
107-59	8-32	7/16	.052	.070	1.00	1.50
107-60	8-36	7/16	.052	.070	1.00	1.50
107-61	10-32	15/32	.065	.093	1.62	2.50
107-62	1/4-20	17/32	.078	.119	2.25	3.50
107-63	5/16-18	9/16	.084	.135	2.75	4.00
107-64	3/8-16	5/8	.110	.186	3.25	5.00
107-65	1/2-13	3/4	.151	.248	3.62	5.50
107-66	5/8-11	1-1/16	.215	.310	5.25	8.50

STAINLESS STEEL SHORT SPRING PLUNGERS

Stainless Steel Nose - Light End Pressure
With Thread Locking Element

P/N	DIMENSIONS				END PRESSURE (LBS.)	
	A	B	C	D	1/2 COMP.	FULLY COMP.
107-59S	8-32	7/16	.052	.070	1.00	1.50
107-60S	8-36	7/16	.052	.070	1.00	1.50
107-61S	10-32	15/32	.065	.093	1.62	2.50
107-62S	1/4-20	17/32	.078	.119	2.25	3.50
107-63S	5/16-18	9/16	.084	.135	2.75	4.00
107-64S	3/8-16	5/8	.110	.186	3.25	5.00
107-65S	1/2-13	3/4	.151	.248	3.62	5.50

SHORT SPRING PLUNGERS

Brown Delrin Nose - Standard End Pressure
With Thread Locking Element - Black Oxide Finish

P/N	DIMENSIONS				END PRESSURE (LBS.)	
	A	B	C	D	1/2 COMP.	FULLY COMP.
107-69	8-32	7/16	.052	.070	3.10	4.75
107-70	8-36	7/16	.052	.070	3.10	4.75
107-71	10-32	15/32	.065	.093	4.00	6.25
107-72	1/4-20	17/32	.078	.119	6.75	10.50
107-73	5/16-18	9/16	.084	.135	9.60	15.50
107-74	3/8-16	5/8	.110	.186	11.50	18.50
107-75	1/2-13	3/4	.151	.248	16.50	28.00
107-76	5/8-11	1-1/16	.215	.310	28.50	50.00

STAINLESS STEEL SHORT SPRING PLUNGERS

Brown Delrin Nose - Standard End Pressure
With Thread Locking Element

P/N	DIMENSIONS				END PRESSURE (LBS.)	
	A	B	C	D	1/2 COMP.	FULLY COMP.
107-69S	8-32	7/16	.052	.070	3.10	4.75
107-70S	8-36	7/16	.052	.070	3.10	4.75
107-71S	10-32	15/32	.065	.093	4.00	6.25
107-72S	1/4-20	17/32	.078	.119	6.75	10.50
107-73S	5/16-18	9/16	.084	.135	9.60	15.50
107-74S	3/8-16	5/8	.110	.186	11.50	18.50
107-75S	1/2-13	3/4	.151	.248	16.50	28.00

SHORT SPRING PLUNGERS

Nylon White Nose - Light End Pressure
With Thread Locking Element - Black Oxide Finish

P/N	DIMENSIONS				END PRESSURE (LBS.)	
	A	B	C	D	1/2 COMP.	FULLY COMP.
107-79	8-32	7/16	.052	.070	1.00	1.50
107-80	8-36	7/16	.052	.070	1.00	1.50
107-81	10-32	15/32	.065	.093	1.62	2.50
107-82	1/4-20	17/32	.078	.119	2.25	3.50
107-83	5/16-18	9/16	.084	.135	2.75	4.00
107-84	3/8-16	5/8	.110	.186	3.25	5.00
107-85	1/2-13	3/4	.151	.248	3.62	5.50
107-86	5/8-11	1-1/16	.215	.310	5.25	8.50

STAINLESS STEEL SHORT SPRING PLUNGERS

White Delrin Nose - Light End Pressure
With Thread Locking Element

P/N	DIMENSIONS				END PRESSURE (LBS.)	
	A	B	C	D	1/2 COMP.	FULLY COMP.
107-79S	8-32	7/16	.052	.070	1.00	1.50
107-80S	8-36	7/16	.052	.070	1.00	1.50
107-81S	10-32	15/32	.065	.093	1.62	2.50
107-82S	1/4-20	17/32	.078	.119	2.25	3.50
107-83S	5/16-18	9/16	.084	.135	2.75	4.00
107-84S	3/8-16	5/8	.110	.186	3.25	5.00
107-85S	1/2-13	3/4	.151	.248	3.62	5.50
107-86S	5/8-11	1-1/16	.215	.310	5.25	8.50

SPRING & BALL PLUNGERS

Plunger Wrenches makes it easy to install or remove spring or ball plungers. They also prevent possible spring damage that can result when a screwdriver is used on the plunger end.

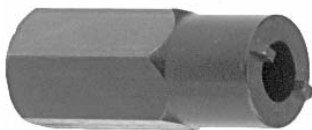
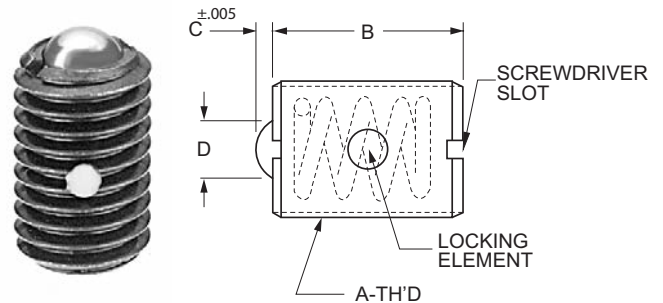


Ball Plungers are used for many locating applications in dies, jigs, fixtures and other tooling. They are also used in indexing automatic feed devices, for gear shifters, as locators in progressive dies, in torque-limiting clutches, for positioning levers, in gauges anywhere you need controlled end pressure. They are also used with detents where predetermined positioning is required. Ball plungers are furnished in three end pressures and are color-coded for easy identification. For Standard Measurements, **Black** is for standard end pressure, **Silver** is for light end pressure and **Gold** is for heavy end pressure. For Metric sizes, **White** is for light end pressure, **Green** is for medium end pressure and **Yellow** is for heavy end pressure.

Special Ball Plungers are made to your specifications will be priced upon request.

SPRING AND BALL PLUNGERS

P/N	PLUNGER SIZE
108-10	#8
108-15	#10
108-20	1/4
108-25	5/16
108-30	3/8
108-35	1/2
108-40	5/8
108-45	3/4
108-50	1



SPRING AND BALL PLUNGERS

P/N	PLUNGER SIZE
108-75	#6
108-76	#8 and M4
108-77	#10 and M5
108-78	1/4 and M6
108-79	5/16 and M8
108-80	3/8 and M10
108-81	1/2 and M12
108-82	5/8
108-83	3/4
108-84	1

SPRING PLUNGERS

Stainless Steel Ball Nose - With Thread Locking Element

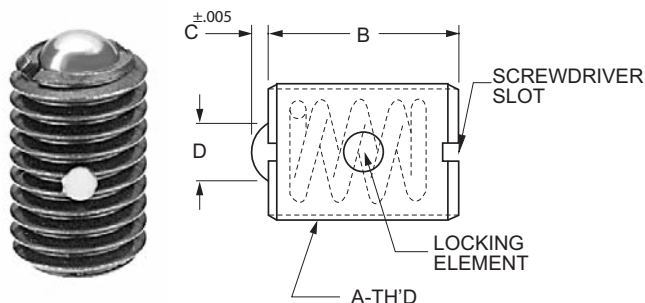
P/N	COLOR CODE	DIMENSIONS				END PRESSURE (LBS.)
		A	B	C	D	
109-02	Plain	4-48	.187	.020	.062	1/2
109-04	Plain	5-40	.250	.020	.062	3/4
109-06	Plain	6-40	.312	.023	.078	1
109-08	Plain	8-36	.344	.025	.093	1-1/4
109-09	Plain	8-32	.344	.025	.093	1-1/4
109-10	Black	10-32	.513	.025	.093	3
109-12	Silver	10-32	.513	.025	.093	1-1/2
109-14	Gold	10-32	.513	.025	.093	5
109-16	Black	1/4-20	.531	.035	.125	7
109-18	Silver	1/4-20	.531	.035	.125	4
109-20	Gold	1/4-20	.531	.035	.125	12
109-22	Black	5/16-18	.578	.040	.156	9
109-24	Silver	5/16-18	.578	.040	.156	4-1/2
109-26	Gold	5/16-18	.578	.040	.156	17
109-28	Black	3/8-16	.625	.048	.187	10
109-30	Silver	3/8-16	.625	.048	.187	5
109-32	Gold	3/8-16	.625	.048	.187	21
109-34	Black	1/2-13	.750	.072	.281	12
109-36	Silver	1/2-13	.750	.072	.281	6
109-38	Gold	1/2-13	.750	.072	.281	30
109-40	Black	5/8-11	.984	.096	.375	18
109-42	Silver	5/8-11	.984	.096	.375	9
109-44	Gold	5/8-11	.984	.096	.375	50

BALL PLUNGERS

Black is for standard end pressure,
Silver is for light end pressure
Gold is for heavy end pressure.

For Metric sizes,

White is for light end pressure,
Green is for medium end pressure
Yellow is for heavy end pressure.



BALL PLUNGERS

Delrin Ball Nose - With Thread Locking Element

P/N	COLOR CODE	DIMENSIONS				END PRESSURE (LBS.)
		A	B	C	D	
109-02D	Plain	4-48	.187	.020	.062	1/2
109-04D	Plain	5-40	.250	.020	.062	3/4
109-06D	Plain	6-40	.312	.023	.078	1
109-08D	Plain	8-36	.344	.025	.093	1-1/4
109-09D	Plain	8-32	.344	.025	.093	1-1/4
109-10D	Black	10-32	.513	.025	.093	3
109-12D	Silver	10-32	.513	.025	.093	1-1/2
109-14D	Gold	10-32	.513	.025	.093	5
109-16D	Black	1/4-20	.531	.035	.125	7
109-18D	Silver	1/4-20	.531	.035	.125	4
109-20D	Gold	1/4-20	.531	.035	.125	12
109-22D	Black	5/16-18	.578	.040	.156	9
109-24D	Silver	5/16-18	.578	.040	.156	4-1/2
109-26D	Gold	5/16-18	.578	.040	.156	17
109-28D	Black	3/8-16	.625	.048	.187	10
109-30D	Silver	3/8-16	.625	.048	.187	5
109-32D	Gold	3/8-16	.625	.048	.187	21
109-34D	Black	1/2-13	.750	.072	.281	12
109-36D	Silver	1/2-13	.750	.072	.281	6
109-38D	Gold	1/2-13	.750	.072	.281	30
109-40D	Black	5/8-11	.984	.096	.375	18
109-42D	Silver	5/8-11	.984	.096	.375	9
109-44D	Gold	5/8-11	.984	.096	.375	50

METRIC BALL PLUNGERS

Stainless Steel Ball Nose - With Thread Locking Element

P/N	COLOR CODE	DIMENSIONS				END PRESSURE (KG)
		A	B	C	D	
109-50	Green	M4 x 0.70	9.00	0.60	2.36	.50
109-51	White	M5 x 0.80	13.00	0.60	2.36	.70
109-52	Green	M5 x 0.80	13.00	0.60	2.36	1.35
109-53	Yellow	M5 x 0.80	13.00	0.60	2.36	2.25
109-54	White	M6 x 1.00	13.50	0.90	3.20	1.80
109-55	Green	M6 x 1.00	13.50	0.90	3.20	3.15
109-56	Yellow	M6 x 1.00	13.50	0.90	3.20	5.40
109-57	White	M8 x 1.25	15.00	1.00	3.96	2.00
109-58	Green	M8 x 1.25	15.00	1.00	3.96	4.00
109-59	Yellow	M8 x 1.25	15.00	1.00	3.96	7.65
109-60	White	M10 x 1.50	16.00	1.20	4.75	2.25
109-61	Green	M10 x 1.50	16.00	1.20	4.75	4.50
109-62	Yellow	M10 x 1.50	16.00	1.20	4.75	9.50
109-63	White	M12 x 1.75	19.00	2.00	7.14	2.70
109-64	Green	M12 x 1.75	19.00	2.00	7.14	5.40
109-65	Yellow	M12 x 1.75	19.00	2.00	7.14	13.50

METRIC BALL PLUNGERS

Delrin Ball Nose - With Thread Locking Element

P/N	COLOR CODE	DIMENSIONS				END PRESSURE (KG)
		A	B	C	D	
109-50D	Green	M4 x 0.70	9.00	0.60	2.36	.50
109-51D	White	M5 x 0.80	13.00	0.60	2.36	.70
109-52D	Green	M5 x 0.80	13.00	0.60	2.36	1.35
109-53D	Yellow	M5 x 0.80	13.00	0.60	2.36	2.25
109-54D	White	M6 x 1.00	13.50	0.90	3.20	1.80
109-55D	Green	M6 x 1.00	13.50	0.90	3.20	3.15
109-56D	Yellow	M6 x 1.00	13.50	0.90	3.20	5.40
109-57D	White	M8 x 1.25	15.00	1.00	3.96	2.00
109-58D	Green	M8 x 1.25	15.00	1.00	3.96	4.00
109-59D	Yellow	M8 x 1.25	15.00	1.00	3.96	7.65
109-60D	White	M10 x 1.50	16.00	1.20	4.75	2.25
109-61D	Green	M10 x 1.50	16.00	1.20	4.75	4.50
109-62D	Yellow	M10 x 1.50	16.00	1.20	4.75	9.50
109-63D	White	M12 x 1.75	19.00	2.00	7.14	2.70
109-64D	Green	M12 x 1.75	19.00	2.00	7.14	5.40
109-65D	Yellow	M12 x 1.75	19.00	2.00	7.14	13.50

BALL PLUNGERS

STAINLESS STEEL BALL PLUNGERS

Stainless Steel Ball Nose - With Thread Locking Element

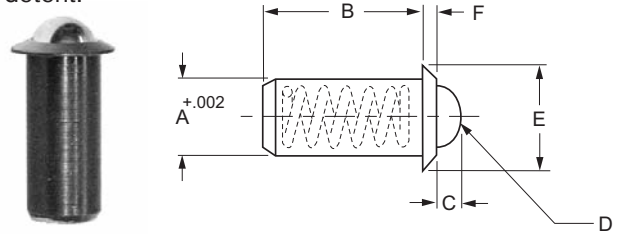
P/N	COLOR CODE	DIMENSIONS				END PRESSURE (LBS.)
		A	B	C	D	
110-05	Plain	4-48	.187	.020	.062	1/2
110-10	Plain	5-40	.250	.020	.062	3/4
110-15	Plain	6-40	.312	.023	.078	1
110-20	Plain	8-36	.344	.025	.093	1-1/4
110-22	Plain	8-32	.344	.025	.093	1-1/4
110-24	Black	10-32	.513	.025	.093	3
110-25	Silver	10-32	.513	.025	.093	1-1/2
110-26	Gold	10-32	.513	.025	.093	5
110-29	Black	1/4-20	.531	.035	.125	7
110-30	Silver	1/4-20	.531	.035	.125	4
110-31	Gold	1/4-20	.531	.035	.125	12
110-34	Black	5/16-18	.578	.040	.156	9
110-35	Silver	5/16-18	.578	.040	.156	4-1/2
110-36	Gold	5/16-18	.578	.040	.156	17
110-39	Black	3/8-16	.625	.048	.187	10
110-40	Silver	3/8-16	.625	.048	.187	5
110-41	Gold	3/8-16	.625	.048	.187	21
110-44	Black	1/2-13	.750	.072	.281	12
110-45	Silver	1/2-13	.750	.072	.281	6
110-46	Gold	1/2-13	.750	.072	.281	30
110-49	Black	5/8-11	.984	.096	.375	18
110-50	Silver	5/8-11	.984	.096	.375	9
110-51	Gold	5/8-11	.984	.096	.375	50

STAINLESS STEEL BALL PLUNGERS

Delrin Ball Nose - With Thread Locking Element

P/N	COLOR CODE	DIMENSIONS				END PRESSURE (LBS.)
		A	B	C	D	
110-05D	Plain	4-48	.187	.020	.062	1/2
110-10D	Plain	5-40	.250	.020	.062	3/4
110-15D	Plain	6-40	.312	.023	.078	1
110-20D	Plain	8-36	.344	.025	.093	1-1/4
110-22D	Plain	8-32	.344	.025	.093	1-1/4
110-24D	Black	10-32	.513	.025	.093	3
110-25D	Silver	10-32	.513	.025	.093	1-1/2
110-26D	Gold	10-32	.513	.025	.093	5
110-29D	Black	1/4-20	.531	.035	.125	7
110-30D	Silver	1/4-20	.531	.035	.125	4
110-31D	Gold	1/4-20	.531	.035	.125	12
110-34D	Black	5/16-18	.578	.040	.156	9
110-35D	Silver	5/16-18	.578	.040	.156	4-1/2
110-36D	Gold	5/16-18	.578	.040	.156	17
110-39D	Black	3/8-16	.625	.048	.187	10
110-40D	Silver	3/8-16	.625	.048	.187	5
110-41D	Gold	3/8-16	.625	.048	.187	21
110-44D	Black	1/2-13	.750	.072	.281	12
110-45D	Silver	1/2-13	.750	.072	.281	6
110-46D	Gold	1/2-13	.750	.072	.281	30
110-49D	Black	5/8-11	.984	.096	.375	18
110-50D	Silver	5/8-11	.984	.096	.375	9
110-51D	Gold	5/8-11	.984	.096	.375	50

This is an economical ball plunger ideal for easy installation for use in wood, soft plastic or aluminum. Press Fit Ball Plungers can be used when a threaded ball plunger is impractical or when threaded adjustments are not required for detent.



PRESS FIT BALL PLUNGERS

Stainless Steel Nose - Light End Pressure - White End Color - Black Oxide Finish

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
110-59A	.125	.252	.035	.093	.187	.032	0.5	1.0
110-60	.188	.405	.058	.156	.250	.035	1.0	2.5
110-61	.250	.481	.070	.187	.312	.044	1.5	3.5
110-61A	.312	.643	.090	.250	.375	.045	2.0	5.0
110-62	.375	.785	.110	.312	.500	.078	2.5	7.0
110-63	.500	1.130	.161	.437	.688	.088	4.0	9.0

STAINLESS STEEL PRESS FIT BALL PLUNGERS

Stainless Steel Nose - Light End Pressure - White End Color

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
110-59AS	.125	.252	.035	.093	.187	.032	0.5	1.0
110-60S	.188	.405	.058	.156	.250	.035	1.0	2.5
110-61S	.250	.481	.070	.187	.312	.044	1.5	3.5
110-61AS	.312	.643	.090	.250	.375	.045	2.0	5.0
110-62S	.375	.785	.110	.312	.500	.078	2.5	7.0
110-63S	.500	1.130	.161	.437	.688	.088	4.00	9.0

PRESS FIT BALL PLUNGERS

White Delrin Nose - Light End Pressure - White End Color - Black Oxide Finish

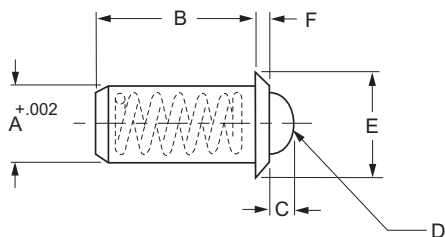
P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
110-74	.125	.252	.035	.093	.187	.032	0.5	1.0
110-76	.188	.405	.058	.156	.250	.035	1.0	2.5
110-76	.250	.481	.070	.187	.312	.044	1.5	3.5
110-76A	.312	.643	.090	.250	.375	.045	2.0	5.0
110-77	.375	.785	.110	.312	.500	.078	2.5	7.0
110-78	.500	1.130	.161	.437	.688	.088	4.0	9.0

STAINLESS STEEL PRESS FIT BALL PLUNGERS

White Delrin Nose - Light End Pressure - White End Color

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
110-74S	.125	.252	.035	.093	.187	.032	0.5	1.0
110-76S	.188	.405	.058	.156	.250	.035	1.0	2.5
110-76S	.250	.481	.070	.187	.312	.044	1.5	3.5
110-76AS	.312	.643	.090	.250	.375	.045	2.0	5.0
110-77S	.375	.785	.110	.312	.500	.078	2.5	7.0
110-78S	.500	1.130	.161	.437	.688	.088	4.0	9.0

BALL PLUNGERS



PRESS FIT BALL PLUNGERS

Stainless Steel Nose - Medium End Pressure
No End Color - Black Oxide Finish

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
110-63A	.125	.252	.035	.093	.187	.032	0.75	2.5
110-64	.188	.405	.058	.156	.250	.035	2.00	5.0
110-65	.250	.481	.070	.187	.312	.044	3.00	7.0
110-65A	.312	.643	.090	.250	.375	.045	4.00	1.00
110-66	.375	.785	.110	.312	.500	.078	5.00	14.0
110-67	.500	1.130	.161	.437	.688	.088	8.00	18.0

STAINLESS STEEL PRESS FIT BALL PLUNGERS

Stainless Steel Nose - Medium End Pressure
No End Color

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
110-63AS	.125	.252	.035	.093	.187	.032	0.75	2.5
110-64S	.188	.405	.058	.156	.250	.035	2.00	5.0
110-65S	.250	.481	.070	.187	.312	.044	3.00	7.0
110-65AS	.312	.643	.090	.250	.375	.045	4.00	1.00
110-66S	.375	.785	.110	.312	.500	.078	5.00	14.0
110-67S	.500	1.130	.161	.437	.688	.088	8.00	18.0

PRESS FIT BALL PLUNGERS

White Delrin Nose - Medium End Pressure
No End Color - Black Oxide Finish

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
110-69	.125	.252	.035	.093	.187	.032	0.75	2.5
110-70	.188	.405	.058	.156	.250	.035	2.00	5.0
110-71	.250	.481	.070	.187	.312	.044	3.00	7.0
110-71A	.312	.643	.090	.250	.375	.045	4.00	1.00
110-72	.375	.785	.110	.312	.500	.078	5.00	14.0
110-73	.500	1.130	.161	.437	.688	.088	8.00	18.0

STAINLESS STEEL PRESS FIT BALL PLUNGERS

White Delrin Nose - Medium End Pressure
No End Color

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
110-69S	.125	.252	.035	.093	.187	.032	0.75	2.5
110-70S	.188	.405	.058	.156	.250	.035	2.00	5.0
110-71S	.250	.481	.070	.187	.312	.044	3.00	7.0
110-71AS	.312	.643	.090	.250	.375	.045	4.00	10.0
110-72S	.375	.785	.110	.312	.500	.078	5.00	14.0
110-73S	.500	1.130	.161	.437	.688	.088	8.00	18.0

PRESS FIT BALL PLUNGERS

Stainless Steel Nose - Heavy End Pressure
Yellow End Color - Black Oxide Finish

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
110-54	.125	.252	.035	.093	.187	.032	2	5
110-55	.188	.405	.058	.156	.250	.035	4	10
110-56	.250	.481	.070	.187	.312	.044	6	13
110-56A	.312	.643	.090	.250	.375	.045	8	16
110-57	.375	.785	.110	.312	.500	.078	10	18
110-58	.500	1.130	.161	.437	.688	.088	12	23

STAINLESS STEEL PRESS FIT BALL PLUNGERS

Stainless Steel Nose - Heavy End Pressure - Yellow End Color

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
110-54S	.125	.252	.035	.093	.178	.032	2	5
110-55S	.188	.405	.058	.156	.250	.035	4	10
110-56S	.250	.481	.070	.187	.312	.044	6	13
110-56AS	.312	.643	.090	.250	.375	.045	8	16
110-57S	.375	.785	.110	.312	.500	.078	10	18
110-58S	.500	1.130	.161	.437	.688	.088	12	23

PRESS FIT BALL PLUNGERS

White Delrin Nose - Heavy End Pressure
Yellow End Color - Black Oxide Finish

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
110-84	.125	.252	.035	.093	.178	.032	2	5
110-85	.188	.405	.058	.156	.250	.035	4	10
110-86	.250	.481	.070	.187	.312	.044	6	13
110-86A	.312	.643	.090	.250	.375	.045	8	16
110-87	.375	.785	.110	.312	.500	.078	10	18
110-88	.500	1.130	.161	.437	.688	.088	12	23

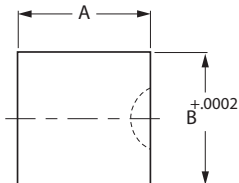
STAINLESS STEEL PRESS FIT BALL PLUNGERS

White Delrin Nose - Heavy End Pressure
Yellow End Color

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
110-84S	.125	.252	.035	.093	.187	.032	2	5
110-85S	.188	.405	.058	.156	.250	.035	4	10
110-86S	.250	.481	.070	.187	.312	.044	6	13
110-86AS	.312	.643	.090	.250	.375	.045	8	16
110-87S	.375	.785	.110	.312	.500	.078	10	18
110-88S	.500	1.130	.161	.437	.688	.088	12	23

SPRING PLUNGERS

The Ball Plunger Detent provides perfect mating with ball plunger or other similar applications. These Detents are hardened and ground for long wear.

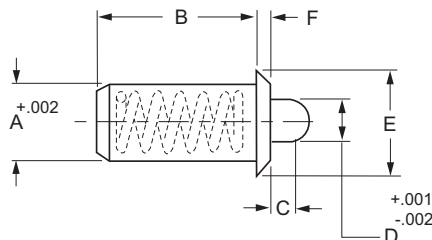


BALL PLUNGER DETENT

Case Hardened

P/N	USED WITH BALL PLUNGER	DIMENSIONS	
		A	B
111-05	109-02, 109-04	1/8	.1075
111-10	109-05	1/8	.1175
111-15	109-08 through 109-14	3/16	.1614
111-20	109-16, 109-18, 109-20	1/4	.2034
111-25	109-22, 109-24, 109-26	5/16	.2659
111-30	109-28, 109-30, 109-32	3/8	.3284
111-35	109-34, 109-36, 109-38	1/2	.4378

These are an economical Spring Plunger similar to the Press Fit Ball Plunger in body dimensions and material. The Press Fit Spring Plunger are intended to handle the long travel needs that might be needed.



PRESS FIT BALL PLUNGERS

Stainless Steel Nose - Heavy End Pressure - No End Color - Black Oxide Finish

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
111-50	.125	.252	.062	.070	.187	.032	1.0	2.0
111-51	.188	.405	.094	.121	.250	.035	1.5	4.5
111-52	.250	.481	.125	.168	.312	.044	2.5	6.0
111-53	.312	.643	.151	.186	.375	.045	4.0	10.0
111-54	.375	.785	.187	.234	.500	.078	5.0	14.0
111-55	.500	1.130	.250	.332	.688	.088	8.0	18.0

PRESS FIT BALL PLUNGERS

Stainless Steel Nose - Light End Pressure - White End Color - Black Oxide Finish

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
111-56	.125	.252	.062	.070	.187	.032	0.50	1.0
111-57	.188	.405	.094	.121	.250	.035	0.75	2.5
111-58	.250	.481	.125	.168	.312	.044	1.50	3.0
111-59	.312	.643	.151	.186	.375	.045	2.00	5.0
111-60	.375	.785	.187	.234	.500	.078	2.50	7.0
111-61	.500	1.130	.250	.332	.688	.088	4.00	9.0

STAINLESS STEEL PRESS FIT BALL PLUNGERS

Stainless Steel Nose - Heavy End Pressure - No End Color

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
111-62	.125	.252	.062	.070	.187	.032	1.0	2.0
111-63	.188	.405	.094	.121	.250	.035	1.5	4.5
111-64	.250	.481	.125	.168	.312	.044	2.5	6.0
111-65	.312	.643	.151	.186	.375	.045	4.0	10.0
111-66	.375	.785	.187	.234	.500	.078	5.0	14.0
111-67	.500	1.130	.250	.332	.688	.088	8.0	18.0

STAINLESS STEEL PRESS FIT BALL PLUNGERS

Stainless Steel Nose - Light End Pressure - White End Color

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
111-68	.125	.252	.062	.070	.187	.032	0.50	1.0
111-69	.188	.405	.094	.121	.250	.035	0.75	2.5
111-70	.250	.481	.125	.168	.312	.044	1.50	3.0
111-71	.312	.643	.151	.186	.375	.045	2.00	5.0
111-72	.375	.785	.187	.234	.500	.078	2.50	7.0
111-73	.500	1.130	.250	.332	.688	.088	4.00	9.0

PRESS FIT BALL PLUNGERS

Brown Delrin Nose - Heavy End Pressure - No End Color - Black Oxide Finish

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
111-74	.125	.252	.062	.070	.187	.032	1.0	2.0
111-75	.188	.405	.094	.121	.250	.035	1.5	4.5
111-76	.250	.481	.125	.168	.312	.044	2.5	6.0
111-77	.312	.643	.151	.186	.375	.045	4.0	10.0
111-78	.375	.785	.187	.234	.500	.078	5.0	14.0
111-79	.500	1.130	.250	.332	.688	.088	8.0	18.0

PRESS FIT BALL PLUNGERS

White Delrin Nose - Light End Pressure - No End Color - Black Oxide Finish

P/N	DIMENSIONS						NET LBS PER 100	END PRESSURE (LBS.)	
	A	B	C	D	E	F		STARTING COMP.	FULLY COMP.
111-80	.125	.252	.062	.070	.187	.032	1	0.50	1.0
111-81	.188	.405	.094	.121	.250	.035	1	0.75	2.5
111-82	.250	.481	.125	.168	.312	.044	1	1.50	3.0
111-83	.312	.643	.151	.186	.375	.045	1	2.00	5.0
111-84	.375	.785	.187	.234	.500	.078	2	2.50	7.0
111-85	.500	1.130	.250	.332	.688	.088	4	4.00	9.0

STAINLESS STEEL PRESS FIT BALL PLUNGERS

Brown Delrin Nose - Heavy End Pressure - No End Color

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
111-86	.125	.252	.062	.070	.187	.032	1.0	2.0
111-87	.188	.405	.094	.121	.250	.035	1.5	4.5
111-88	.250	.481	.125	.168	.312	.044	2.5	6.0
111-89	.312	.643	.151	.186	.375	.045	4.0	10.0
111-90	.375	.785	.187	.234	.500	.078	5.0	14.0
111-91	.500	1.130	.250	.332	.688	.088	8.0	18.0

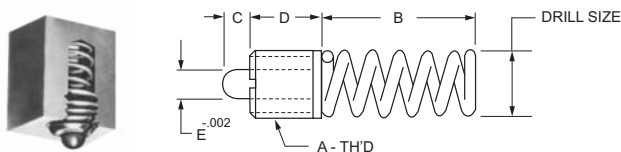
SPRING PLUNGERS & RETRACTABLE PLUNGERS

STAINLESS STEEL PRESS FIT BALL PLUNGERS

White Delrin Nose - Light End Pressure - No End Color

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
111-92	.125	.252	.062	.070	.187	.032	0.50	1.0
111-93	.188	.405	.094	.121	.250	.035	0.75	2.5
111-94	.250	.481	.125	.168	.312	.044	1.50	3.0
111-95	.312	.643	.151	.186	.375	.045	2.00	5.0
111-96	.375	.785	.187	.234	.500	.078	2.50	7.0
111-97	.500	1.130	.250	.332	.688	.088	4.00	9.0

Blind Hole Mounting is especially useful where space is limited. Also, excellent when used as strippers or locators.

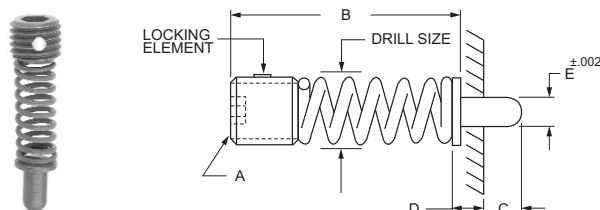


THREE PIECE SPRING PLUNGERS

Type A - Blind Hole Mounting - Hardened - Black Oxide

P/N	DIMENSIONS						DRILL SIZE
	A	B	C	D	E		
112-05	8/32	1/2	3/32	1/8	.070		#29
112-10	10-32	5/8	1/8	5/32	.093		#21
112-15	1/4-20	13/16	5/32	3/16	.119		#6
112-20	5/16-18	13/16	3/16	7/32	.135	F	
112-25	3/8-16	7/8	7/32	7/32	.187	5/16	
112-30	1/2-13	1	1/4	1/4	.249	27/64	
112-35	5/8-11	1-5/16	5/16	5/16	.312	17/32	
112-40	3/4-10	1-3/8	5/16	3/8	.374	21/32	

Through Hole Mounting inserts from the top of the die. Easily replaced. The thread locking element furnished with this type prevents vibrations from moving the screw after assembly

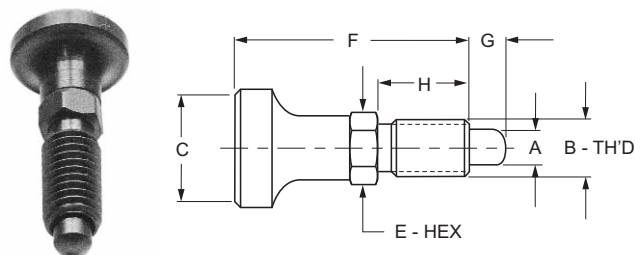


THREE PIECE SPRING PLUNGERS

Type B - Through Hole Mounting - Black Oxide - with Thread Locking Element

P/N	DIMENSIONS						DRILL SIZE
	A	B	C	D	E		
113-05	8/32 x 3/16	21/32	1/8	3/32	.070		#29
113-10	10-32 x 3/16	13/16	5/32	1/8	.093		#21
113-15	1/4-20 x 1/4	1-3/32	3/16	5/32	.119		#6
113-20	5/16-18 x 5/16	1-3/16	7/32	3/16	.135	F	
113-25	3/8-16 x 5/16	1-9/32	7/32	7/32	.187	5/16	
113-30	1/2-13 x 7/16	1-3/8	1/4	1/4	.249	27/64	
113-35	5/8-11 x 1/2	1-13/16	5/16	5/16	.312	17/32	
113-40	3/4-10 x 5/8	2-1/8	3/8	5/16	.374	21/32	

Delrin Button Head Retractable plungers are spring loaded to work in a variety of uses in both tooling and equipment. White Delrin Knob Stainless Steel body and springs are ideal for food and medical industry applications.



DELTRIN BUTTON HEAD RETRACTABLE PLUNGERS

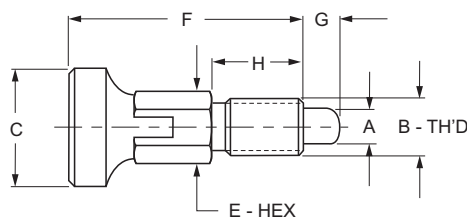
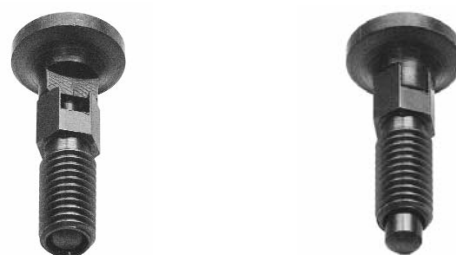
Non Locking Plunger - Radiused, Case Hardened - Black Oxide Finish

P/N	DIMENSIONS							END PRESSURE (LBS.)	
	A	B	C	E	F	G	H	STARTING COMP.	FULLY COMP.
113-42	.16	14-20	.50	1/4	0.97	.13	.50	.12	.36
113-43	.25	3/8-16	.75	3/8	1.40	.18	.75	.25	2.00
113-44	.31	1/2-13	1.00	1/2	1.90	.25	1.00	.50	1.75

STAINLESS STEEL DELTRIN BUTTON HEAD RETRACTABLE PLUNGERS

Non Locking Plunger

P/N	DIMENSIONS							END PRESSURE (LBS.)	
	A	B	C	E	F	G	H	STARTING COMP.	FULLY COMP.
113-42S	.16	14-20	.50	1/4	0.97	.13	.50	.12	.36
113-43S	.25	3/8-16	.75	3/8	1.40	.18	.75	.25	2.00
113-44S	.31	1/2-13	1.00	1/2	1.90	.25	1.00	.50	1.75



DELTRIN BUTTON HEAD RETRACTABLE PLUNGERS

Locking Plunger - Radiused, Case Hardened - Black Oxide Finish

P/N	DIMENSIONS							END PRESSURE (LBS.)	
	A	B	C	E	F	G	H	STARTING COMP.	FULLY COMP.
113-45	.16	14-20	.50	1/4	.97	.13	.50	.12	.36
113-46	.25	3/8-16	.75	3/8	1.40	.18	.75	.25	2.00
113-47	.31	1/2-13	1.00	1/2	1.90	.25	1.00	.50	1.75



RETRACTABLE PLUNGERS

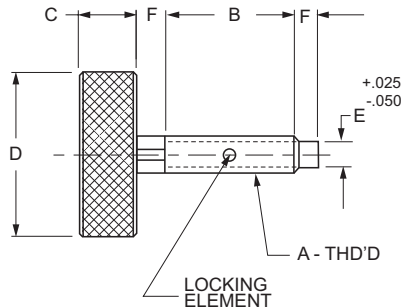
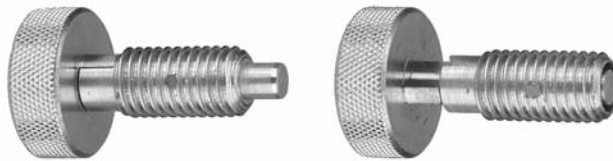
STAINLESS STEEL DELRIN BUTTON HEAD RETRACTABLE PLUNGERS

Locking Plunger - Radiused, Case Hardened

P/N	DIMENSIONS							END PRESSURE (LBS.)	
	A	B	C	E	F	G	H	STARTING COMP.	FULLY COMP.
113-45S	.16	14-20	.50	1/4	.97	.13	.50	.12	.36
113-46S	.25	3/8-16	.75	3/8	1.40	.18	.75	.25	2.00
113-47S	.31	1/2-13	1.00	1/2	1.90	.25	1.00	.50	1.75

The Hand Retractable Plungers are used in machining applications as positioner, loading pins and indexing devices. They are designed to function where space is limited.

The end pressure is measured in kilograms. Full pressure are the forces in kilograms needed to move the nose the distance shown in the "F" column.



METRIC HAND RETRACTABLE PLUNGERS

Zinc Plated Steel - Knurled Head - Locking Plunger
Heavy Pressure - With Thread Locking Element

P/N	DIMENSIONS						END PRESSURE (KGS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
113-50	M6 x 1.00	12.50	6.3	12.7	3	3.17	.45	2.27
113-55	M8 x 1.25	16.00	7.0	15.8	4	4.75	.68	2.72
113-60	M10 x 1.50	19.00	7.9	19.0	5	5.50	.68	3.63
113-65	M12 x 1.75	22.00	9.4	25.4	6	6.35	1.13	4.54

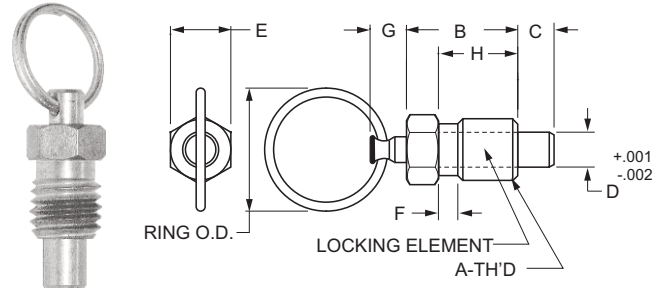
METRIC HAND RETRACTABLE PLUNGERS

Zinc Plated Steel - Knurled Head - Locking Plunger
Light Pressure - With Thread Locking Element

P/N	DIMENSIONS						END PRESSURE (KGS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
113-52	M6 x 1.00	12.50	6.3	12.7	3	3.17	.225	1.135
113-57	M8 x 1.25	16.00	7.0	15.8	4	4.75	.340	1.360
113-62	M10 x 1.50	19.00	7.9	19.0	5	5.50	.340	1.815
113-67	M12 x 1.75	22.00	9.4	25.4	6	6.35	.565	2.270

These plungers are used in machining applications as positioner, loading pins and indexing devices. They are designed to function where space is limited. The easy to grasp ring, allows you hold the plunger while changing the work piece.

The end pressure is measured in pounds. Full pressure are the forces in pounds needed to move the nose the distance shown in the "C" column.



STAINLESS STEEL HAND RETRACTABLE PLUNGER

Stainless Steel Nose - Pull Ring - Short Body
Non Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS								END PRESSURE (LBS.)	
	A	B	C	D	E	F	G	H	RING O.D.	STARTING COMP. FULLY COMP.
113-70	1/4-20	7/16	3/16	.156	1/4	1/32	5/32	9/32	3/4	.50 2.00
113-71	3/8-16	5/8	9/32	.250	3/8	1/8	3/16	7/16	3/4	.75 3.00
113-72	1/2-13	13/16	3/8	.312	1/2	5/32	1/4	9/16	1	1.00 4.00
113-73	5/8-11	1	7/16	.375	5/8	5/32	5/16	11/16	1	1.25 5.00

HAND RETRACTABLE PLUNGER

Zinc Plated Steel - Zinc Plated Steel Nose - Pull Ring - Short Body
Non Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS								END PRESSURE (LBS.)	
	A	B	C	D	E	F	G	H	RING O.D.	STARTING COMP. FULLY COMP.
113-75	1/4-20	7/16	3/16	.156	1/4	1/32	5/32	9/32	3/4	.50 2.00
113-80	3/8-16	5/8	9/32	.250	3/8	1/8	3/16	7/16	3/4	.75 3.00
113-85	1/2-13	13/16	3/8	.312	1/2	5/32	1/4	9/16	1	1.00 4.00
113-90	5/8-11	1	7/16	.375	5/8	5/32	5/16	11/16	1	1.25 5.00

STAINLESS STEEL HAND RETRACTABLE PLUNGER

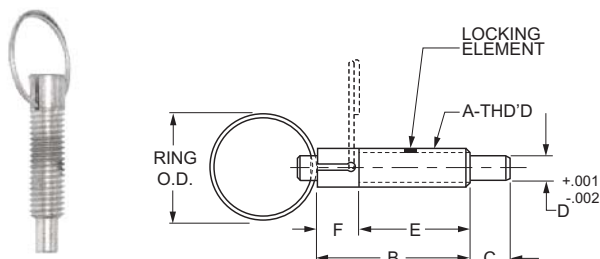
Phenolic Nose - Pull Ring - Short Body
Non Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS								END PRESSURE (LBS.)	
	A	B	C	D	E	F	G	H	RING O.D.	STARTING COMP. FULLY COMP.
113-76	1/4-20	7/16	3/16	.156	1/4	1/32	5/32	9/32	3/4	.50 2.00
113-81	3/8-16	5/8	9/32	.250	3/8	1/8	3/16	7/16	3/4	.75 3.00
113-86	1/2-13	13/16	3/8	.312	1/2	5/32	1/4	9/16	1	1.00 4.00
113-91	5/8-11	1	7/16	.375	5/8	5/32	5/16	11/16	1	1.25 5.00

HAND RETRACTABLE PLUNGERS

These plungers are used in machining applications as positioner, loading pins and indexing devices. They are designed to function where space is limited. The easy to grasp ring, allows you hold the plunger while changing the work piece.

The end pressure is measured in pounds. Full pressure are the forces in pounds needed to move the nose the distance shown in the "C" column.



STAINLESS STEEL HAND RETRACTABLE PLUNGER

Stainless Steel Nose - Pull Ring - Standard Length
Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS							END PRESSURE (LBS.)	
	A	B	C	D	E	F	RING O.D.	STARTING COMP.	FULLY COMP.
113-87S	1/4-20	1-1/8	1/4	.156	13/16	5/16	1	1.0	2.5
113-88S	3/8-16	1-11/16	3/8	.250	1-1/4	7/16	1-1/4	2.0	4.0
113-89S	1/2-13	2	1/2	.312	1-7/16	9/16	1-3/8	2.5	5.0

HAND RETRACTABLE PLUNGER

Zinc Plated Steel - Zinc Plated Steel Nose - Pull Ring - Standard Length
Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS							END PRESSURE (LBS.)	
	A	B	C	D	E	F	RING O.D.	STARTING COMP.	FULLY COMP.
113-92	1/4-20	1-1/8	1/4	.156	13/16	5/16	1	1.0	2.5
113-94	3/8-16	1-11/16	3/8	.250	1-1/4	7/16	1-1/4	2.0	4.0
113-96	1/2-13	2	1/2	.312	1-7/16	9/16	1-3/8	2.5	5.0

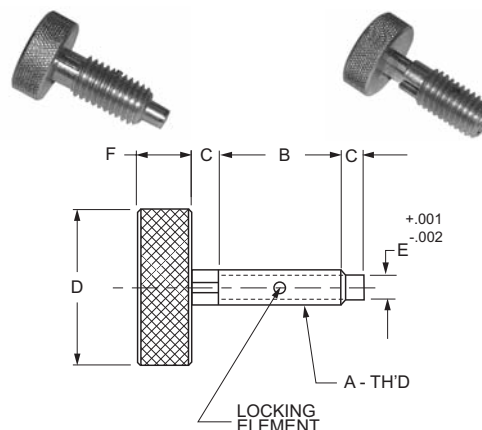
STAINLESS STEEL HAND RETRACTABLE PLUNGER

Phenolic Nose - Pull Ring - Standard Length
Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS							END PRESSURE (LBS.)	
	A	B	C	D	E	F	RING O.D.	STARTING COMP.	FULLY COMP.
113-93	1/4-20	1-1/8	1/4	.156	13/16	5/16	1	1.0	2.5
113-95	3/8-16	1-11/16	3/8	.250	1-1/4	7/16	1-1/4	2.0	4.0
113-97	1/2-13	2	1/2	.312	1-7/16	9/16	1-3/8	2.5	5.0

These plungers are used in machining, loading pins and indexing devices. Improved design allows the plunger pin to be locked in fully retracted position. To engage the plunger, simply turn the handle to line up with the slot in the body.

The end pressure is measured in pounds. Full pressure are the forces in pounds needed to move the nose the distance shown in the "C" column.



KNURLED HEAD PLUNGER

Zinc Plated Steel - Zinc Plated Steel Nose
Heavy Pressure - Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
113-99	10-32	13/32	3/32	3/8	.104	3/16	1.0	3.5
114-00	1/4-20	1/2	1/8	1/2	.124	1/4	1.0	5.0
114-05	5/16-18	5/8	3/16	5/8	.155	9/32	1.5	6.0
114-10	3/8-16	3/4	7/32	3/41	.186	5/16	1.5	8.0
114-20	1/2-13	7/8	1/4	1	.249	3/8	2.5	10.0

KNURLED HEAD PLUNGER

Zinc Plated Steel - Zinc Plated Steel Nose
Light Pressure - Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
114-01	10-32	13/32	3/32	3/8	.104	3/16	.50	2.0
114-02	1/4-20	1/2	1/8	1/2	.124	1/4	.50	2.5
114-07	5/16-18	5/8	3/16	5/8	.155	9/32	.75	3.0
114-12	3/8-16	3/4	7/32	3/41	.186	5/16	.75	4.0
114-17	1/2-13	7/8	1/4	1	.249	3/8	1.25	5.0

KNURLED HEAD PLUNGER

Zinc Plated Steel - Zinc Plated Steel Nose
Light Pressure - Non-Locking Plunger - Without Thread Locking Element

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
114-03	10-32	.400	3/32	3/8	.052	.19	.50	2.0
114-04	1/4-20	.500	1/8	1/2	.124	.19	.50	2.5
114-06	5/16-18	.625	3/16	5/8	.155	.25	.75	3.0
114-08	3/8-16	.750	7/32	3/41	.186	.31	.75	4.0
114-09	1/2-13	.875	1/4	1	.249	.38	1.25	5.0

HAND RETRACTABLE PLUNGERS

STAINLESS STEEL KNURLED HEAD PLUNGER

Stainless Steel Nose - Light Pressure - Non-Locking Plunger
Without Thread Locking Element

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
114-03S	10-32	.400	3/32	3/8	.052	.19	.50	2.0
114-04S	1/4-20	.500	1/8	1/2	.124	.19	.50	2.5
114-06S	5/16-18	.625	3/16	5/8	.155	.25	.75	3.0
114-08S	3/8-16	.750	7/32	3/4	.186	.31	.75	4.0
114-09S	1/2-13	.875	1/4	1	.249	.38	1.25	5.0

KNURLED HEAD PLUNGER

Zinc Plated Steel - Zinc Plated Steel Nose
Light Pressure - Non-Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
114-13	10-32	.400	3/32	3/8	.052	.19	.50	2.0
114-14	1/4-20	.500	1/8	1/2	.124	.19	.50	2.5
114-16	5/16-18	.625	3/16	5/8	.155	.25	.75	3.0
114-18	3/8-16	.750	7/32	3/4	.186	.31	.75	4.0
114-19	1/2-13	.875	1/4	1	.249	.38	1.25	5.0

STAINLESS STEEL KNURLED HEAD PLUNGER

Stainless Steel Nose - Light Pressure - Non-Locking Plunger
With Thread Locking Element

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
114-13S	10-32	.400	3/32	3/8	.052	.19	.50	2.0
114-14S	1/4-20	.500	1/8	1/2	.124	.19	.50	2.5
114-16S	5/16-18	.625	3/16	5/8	.155	.25	.75	3.0
114-18S	3/8-16	.750	7/32	3/4	.186	.31	.75	4.0
114-19S	1/2-13	.875	1/4	1	.249	.38	1.25	5.0

STAINLESS STEEL KNURLED HEAD PLUNGER

Stainless Steel Nose - Heavy Pressure - Locking Plunger
With Thread Locking Element

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
114-15	10-32	13/32	3/32	3/8	.104	3/16	1.0	3.5
114-30	1/4-20	1/2	1/8	1/2	.124	1/4	1.0	5.0
114-35	5/16-18	5/8	3/16	5/8	.155	9/32	1.5	6.0
114-40	3/8-16	3/4	7/32	3/4	.186	5/16	1.5	8.0
114-45	1/2-13	7/8	1/4	1	.249	3/8	2.5	10.0

STAINLESS STEEL KNURLED HEAD PLUNGER

Phenolic Nose - Heavy Pressure - Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
114-21	1/4-20	1/2	1/8	1/2	.124	1/4	1.0	5.0
114-23	5/16-18	5/8	3/16	5/8	.155	9/32	1.5	6.0
114-24	3/8-16	3/4	7/32	3/4	.186	5/16	1.5	8.0
114-28	1/2-13	7/8	1/4	1	.249	3/8	2.5	10.0

STAINLESS STEEL KNURLED HEAD PLUNGER

Phenolic Nose - Light Pressure - Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
114-26	1/4-20	1/2	1/8	1/2	.124	1/4	.50	2.5
114-27	5/16-18	5/8	3/16	5/8	.155	9/32	.75	3.0
114-28	3/8-16	3/4	7/32	3/4	.186	5/16	.75	4.0
114-29	1/2-13	7/8	1/4	1	.249	3/8	1.25	5.0

STAINLESS STEEL KNURLED HEAD PLUNGER

Stainless Steel Nose - Light Pressure - Locking Plunger
With Thread Locking Element

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
114-31	10-32	13/32	3/32	3/8	.104	3/16	.50	2.0
114-32	1/4-20	1/2	1/8	1/2	.124	1/4	.50	2.5
114-37	5/16-18	5/8	3/16	5/8	.155	9/32	.75	3.0
114-42	3/8-16	3/4	7/32	3/4	.186	5/16	.75	4.0
114-47	1/2-13	7/8	1/4	1	.249	3/8	1.25	5.0

KNURLED HEAD PLUNGER

Zinc Plated Steel - Zinc Plated Steel Nose
Light Pressure - Non-Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
114-33	10-32	13/32	3/32	3/8	.104	3/16	.50	2.0
114-34	1/4-20	1/2	1/8	1/2	.124	1/4	.50	2.5
114-36	5/16-18	5/8	3/16	5/8	.155	9/32	.75	3.0
114-38	3/8-16	3/4	7/32	3/4	.186	5/16	.75	4.0
114-39	1/2-13	7/8	1/4	1	.249	3/8	1.25	5.0

STAINLESS STEEL KNURLED HEAD PLUNGER

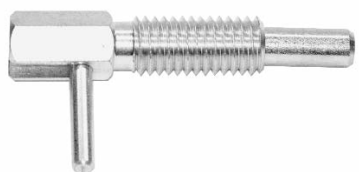
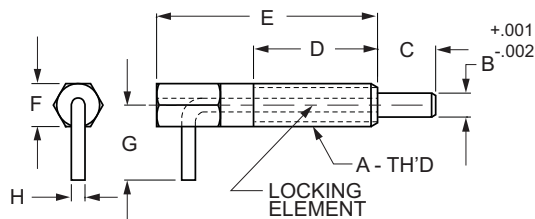
Stainless Steel Nose - Light Pressure - Non-Locking Plunger
With Thread Locking Element

P/N	DIMENSIONS						END PRESSURE (LBS.)	
	A	B	C	D	E	F	STARTING COMP.	FULLY COMP.
114-33S	10-32	13/32	3/32	3/8	.104	3/16	.50	2.0
114-34S	1/4-20	1/2	1/8	1/2	.124	1/4	.50	2.5
114-36S	5/16-18	5/8	3/16	5/8	.155	9/32	.75	3.0
114-38S	3/8-16	3/4	7/32	3/4	.186	5/16	.75	4.0
114-39S	1/2-13	7/8	1/4	1	.249	3/8	1.25	5.0

HAND RETRACTABLE PLUNGERS

These plungers are used in machining applications as positioner, loading pins and indexing devices. They are designed to function where space is limited. The easy to grasp L handle, allows you hold the plunger while changing the work piece.

The end pressure is measured in pounds. Full pressure are the forces in pounds needed to move the nose the distance shown in the "C" column.



HAND RETRACTABLE PLUNGER

L Handle - Zinc Plated Steel - Long Reach - Standard Length
Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS								END PRESSURE (LBS.)	
	A	B	C	D	E	F	G	H	STARTING COMP.	FULLY COMP.
114-50	1/4-20	.156	3/8	5/8	1-1/4	1/4	5/8	3/32	.50	2.50
114-55	3/8-16	.250	9/16	1-1/16	2	3/8	15/16	9/64	.75	3.75
114-60	1/2-13	.312	3/4	1-1/8	1-1/8	1/2	1-1/4	3/16	1.00	5.00
114-65	5/8-11	.375	1	1-3/4	3	5/8	1-5/16	3/16	1.00	5.00

STAINLESS STEEL HAND RETRACTABLE PLUNGER

L Handle - Long Reach - Standard Length
Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS								END PRESSURE (LBS.)	
	A	B	C	D	E	F	G	H	STARTING COMP.	FULLY COMP.
114-75	1/4-20	.156	3/8	5/8	1-1/4	1/4	5/8	3/32	.50	2.50
114-80	3/8-16	.250	9/16	1-1/16	2	3/8	15/16	9/64	.75	3.75
114-85	1/2-13	.312	3/4	1-1/8	1-1/8	1/2	1-1/4	3/16	1.00	5.00
114-90	5/8-11	.375	1	1-3/4	3	5/8	1-5/16	3/16	1.00	5.00

HAND RETRACTABLE PLUNGER

L Handle - Zinc Plated Steel - Long Reach - Short Plunger
Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS								END PRESSURE (LBS.)	
	A	B	C	D	E	F	G	H	STARTING COMP.	FULLY COMP.
114-92	1/4-20	.156	3/16	7/16	3/4	1/4	9/16	3/32	.125	.500
114-94	3/8-16	.250	5/16	5/8	1-1/8	3/8	3/4	9/64	.250	1.250
114-96	1/2-13	.312	13/32	7/8	1-1/2	1/2	1	3/16	.500	2.000
114-98	5/8-11	.375	1/2	1-1/8	1-7/8	5/8	1-3/16	3/16	.750	2.500

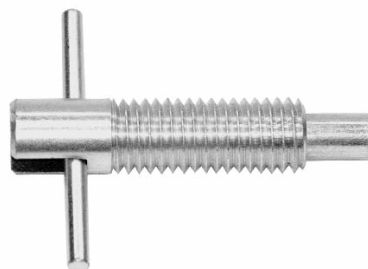
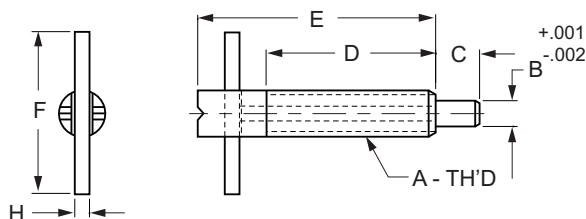
STAINLESS STEEL HAND RETRACTABLE PLUNGER

L Handle - Long Reach - Short Plunger
Locking Plunger - With Thread Locking Element

P/N	DIMENSIONS								END PRESSURE (LBS.)	
	A	B	C	D	E	F	G	H	STARTING COMP.	FULLY COMP.
114-93	1/4-20	.156	3/16	7/16	3/4	1/4	9/16	3/32	.125	.500
114-95	3/8-16	.250	5/16	5/8	1-1/8	3/8	3/4	9/64	.250	1.250
114-97	1/2-13	.312	13/32	7/8	1-1/2	1/2	1	3/16	.500	2.000
114-99	5/8-11	.375	1/2	1-1/8	1-7/8	5/8	1-3/16	3/16	.750	2.500

These plungers are used in machining applications as positioner, loading pins and indexing devices. They are designed to function where space is limited. The easy to grasp T handle, allows you hold the plunger while changing the work piece.

The end pressure is measured in pounds. Full pressure are the forces in pounds needed to move the nose the distance shown in the "C" column.



HAND RETRACTABLE PLUNGER

T Handle - Zinc Plated Steel - Locking Plunger

P/N	DIMENSIONS							END PRESSURE (LBS.)	
	A	B	C	D	E	F	H	STARTING COMP.	FULLY COMP.
114-70	1/4-20	.155	.250	0.8	1.14	1.13	.13	1.0	2.5
114-71	3/8-16	.233	.375	1.2	1.68	1.50	.13	2.0	4.0
114-72	1/2-13	.312	.500	1.4	2.00	2.00	.16	2.5	5.0
114-73	5/8-11	.375	.625	1.7	2.38	2.50	.19	2.5	5.0

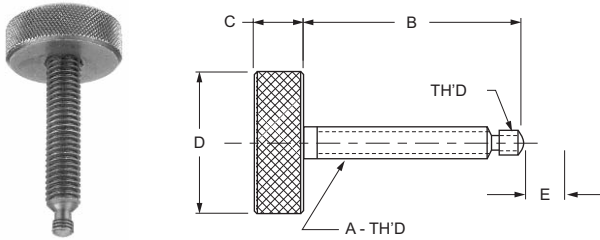
STAINLESS STEEL HAND RETRACTABLE PLUNGER

T Handle - Locking Plunger

P/N	DIMENSIONS							END PRESSURE (LBS.)	
	A	B	C	D	E	F	H	STARTING COMP.	FULLY COMP.
114-70S	1/4-20	.155	.250	0.8	1.14	1.13	.13	1.0	2.5
114-71S	3/8-16	.233	.375	1.2	1.68	1.50	.13	2.0	4.0
114-72S	1/2-13	.312	.500	1.4	2.00	2.00	.16	2.5	5.0
114-73S	5/8-11	.375	.625	1.7	2.38	2.50	.19	2.5	5.0

SWIVEL SCREWS

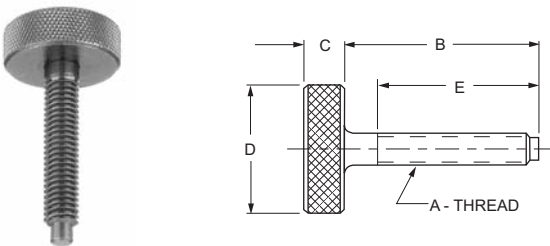
All the pads for this Swivel Screw are interchangeable and swivel 40°. Add pad dimension "E" for overall length
NOTE: For pads, see part #132-05 through 132-65.



BODIES FOR SWIVEL SCREW CLAMPS

Knurled Head - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
115-00	1/4-20	1-15/32	5/16	1
115-01	1/4-20	1-31/32	5/16	1
115-02	5/16-18	1-15/32	3/8	1-1/8
115-03	5/16-18	1-31/32	3/8	1-1/8
115-04	5/16-18	2-15/32	3/8	1-1/8
115-05	3/8-16	1-7/16	7/16	1-1/4
115-06	3/8-16	1-15/16	7/16	1-1/4
115-07	3/8-16	2-7/16	7/16	1-1/4
115-08	3/8-16	2-15/16	7/16	1-1/4
115-12	1/2-13	2-15/16	7/16	1-1/4



SCREWS DOG POINT

Knurled Head - Black Oxide Finish

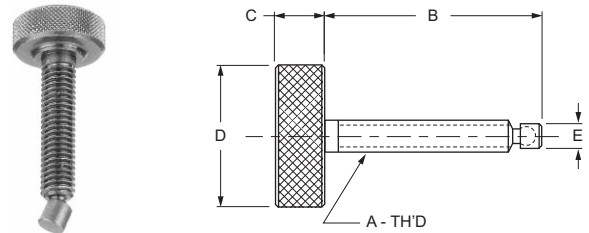
P/N	DIMENSIONS				
	A	B	C	D	E
116-00	10-24	1	1/4	3/4	3/4
116-01	10-24	1-1/2	1/4	3/4	1-1/4
116-02	10-24	2	1/4	3/4	1-3/4
116-03	10-32	1-1/2	1/4	3/4	1-1/4
116-04	1/4-20	1-1/2	5/16	1	1-1/4
116-05	1/4-20	2	5/16	1	1-3/4
116-06	1/4-20	2-1/2	5/16	1	2-1/4
116-07	5/16-18	1-1/2	3/8	1-1/8	1-1/4
116-08	5/16-18	2	3/8	1-1/8	1-3/4
116-09	5/16-18	2-1/2	3/8	1-1/8	2-1/4
116-10	3/8-16	2	7/16	1-1/4	1-3/4
116-11	3/8-16	2-1/2	7/16	1-1/4	2-1/4

SCREWS DOG POINT - CONTINUED

Knurled Head - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	E
116-12	3/8-16	3	7/16	1-1/4	2-3/4
116-13	1/2-13	3	1/2	1-1/4	2-3/4
116-14	1/2-13	3-1/2	1/2	1-1/4	3-1/4

These Swivel Screws are for use when finger-tight clamping is sufficient. The wide knurled head gives good gripping and assures fast screw in. The pad will swivel 7-1/2" in any direction.



SWIVEL SCREWS

Knurled Head - Black Oxide Finish

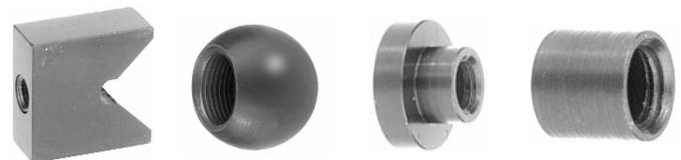
P/N		DIMENSIONS					
STEEL PAD	NYLON PAD	A	B	C	D	E	LOAD(LBS)
121-00	122-00	1/4-20	1-1/2	5/16	7/8	.185	900
121-05	122-02	1/4-20	2	5/16	7/8	.185	900
121-10	122-10	5/16-18	1-1/2	5/16	7/8	.240	2290
121-15	122-15	5/16-18	2	5/16	7/8	.240	2290
121-20	122-20	5/16-18	2-1/2	5/16	7/8	.240	2290
121-25	122-25	3/8-16	1-1/2	3/8	1	.293	3340
121-30	122-30	3/8-16	2	3/8	1	.293	3340
121-35	122-35	3/8-16	2-1/2	3/8	1	.293	3340
121-40	122-40	3/8-16	3	3/8	1	.293	3340
121-45	122-45	1/2-13	1-1/2	3/8	1	.400	7300
121-50	122-50	1/2-13	2	3/8	1	.400	7300
121-55	122-55	1/2-13	2-1/2	3/8	1	.400	7300
121-60	122-60	1/2-13	3	3/8	1	.400	7300

V
Steel Only
132-65*

BALL
Steel Only
132-40

LARGE
Steel Only
132-15

SMALL
Steel or Nylon
131-20



* Discontinued but available while supplies last.

SCREWS

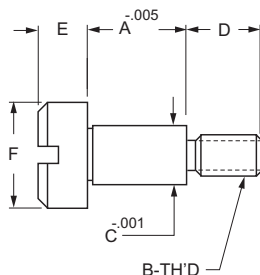
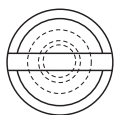
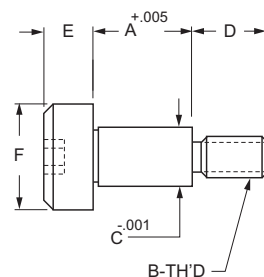
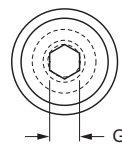
These are nylon pads used with knurled head swivel screws protect the finish on delicate work pieces.



NYLON PADS FOR KNURLED SWIVEL SCREWS

Nylon Pad Only

P/N	Fits the Following Parts
122.65	122-00 / 122-05
122.70	122-10 / 122-15 / 122-20
122.75	122-25 / 122-30 / 122-35 / 122-40
122.80	122-45 / 122-50 / 122-55 / 122-60



SLOTTED SHOULDER SCREWS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
123-00	.249	10-32	.072	1/4	1/8	1/2
123-01	.249	10-32	.135	1/4	1/8	1/2
123-02	.249	10-32	.197	1/4	1/8	1/2
123-03	.249	10-32	.260	1/4	1/8	1/2
123-04	.249	10-32	.322	1/4	1/8	1/2
123-10	.311	1/4-20	.252	3/8	3/16	3/4
123-20	.374	1/4-20	.135	3/8	5/32	3/4
123-21	.374	1/4-20	.197	3/8	3/16	5/8
123-22	.374	1/4-20	.252	3/8	5/32	3/4
123-23	.374	1/4-20	.260	3/8	5/32	5/8
123-24	.374	1/4-20	.314	3/8	3/16	3/4
123-25	.374	1/4-20	.322	3/8	5/32	5/8
123-26	.374	1/4-20	.385	3/8	5/32	3/4
123-30	.499	3/8-16	.377	5/8	1/4	3/4
123-31	.499	3/8-16	.502	5/8	1/4	3/4
123-32	.499	3/8-16	.510	1/2	3/16	7/8
123-33	.499	3/8-16	.627	5/8	1/4	3/4
123-34	.499	3/8-16	.635	1/2	3/16	7/8
123-35	.499	3/8-16	.752	5/8	1/4	3/4
123-36	.499	3/8-16	.760	1/2	3/16	7/8

SOCKET SHOULDER SCREWS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS						
	A	B	C	D	E	F	G
124-00	1/4	10-24	.250	3/8	3/16	3/8	1/8
124-01	5/16	10-24	.250	3/8	3/16	3/8	1/8
124-02	3/8	10-24	.250	3/8	3/16	3/8	1/8
124-03	1/2	10-24	.250	3/8	3/16	3/8	1/8
124-04	5/8	10-24	.250	3/8	3/16	3/8	1/8
124-05	3/4	10-24	.250	3/8	3/16	3/8	1/8
124-06	7/8	10-24	.250	3/8	3/16	3/8	1/8
124-07	1	10-24	.250	3/8	3/16	3/8	1/8
124-08	1/4	1/4-20	.3125	7/16	7/32	7/16	5/32
124-09	5/16	1/4-20	.3125	7/16	7/32	7/16	5/32
124-10	3/8	1/4-20	.3125	7/16	7/32	7/16	5/32
124-11	1/2	1/4-20	.3125	7/16	7/32	7/16	5/32
124-12	5/8	1/4-20	.3125	7/16	7/32	7/16	5/32
124-13	3/4	1/4-20	.3125	7/16	7/32	7/16	5/32
124-14	1	1/4-20	.3125	7/16	7/32	7/16	5/32
124-15	1/4	1/4-20	.375	3/8	3/16	5/8	5/32
124-16	1/4	5/16-18	.375	1/2	1/4	9/16	3/16
124-17	5/16	5/16-18	.375	1/2	1/4	9/16	3/16
124-18	3/8	5/16-18	.375	1/2	1/4	9/16	3/16
124-19	1/2	5/16-18	.375	1/2	1/4	9/16	3/16
124-20	5/8	5/16-18	.375	1/2	1/4	9/16	3/16
124-21	3/4	5/16-18	.375	1/2	1/4	9/16	3/16
124-22	7/8	5/16-18	.375	1/2	1/4	9/16	3/16
124-23	1	5/16-18	.375	1/2	1/4	9/16	3/16
124-24	3/8	3/8-16	.500	5/8	5/16	3/4	1/4
124-25	1/2	3/8-16	.500	5/8	5/16	3/4	1/4
124-26	5/8	3/8-16	.500	5/8	5/16	3/4	1/4
124-27	3/4	3/8-16	.500	5/8	5/16	3/4	1/4
124-28	7/8	3/8-16	.500	5/8	5/16	3/4	1/4
124-29	1	3/8-16	.500	5/8	5/16	3/4	1/4
124-30	1/2	1/2-13	.625	3/4	3/8	7/8	5/16
124-31	5/8	1/2-13	.625	3/4	3/8	7/8	5/16
124-32	3/4	1/2-13	.625	3/4	3/8	7/8	5/16
124-33	7/8	1/2-13	.625	3/4	3/8	7/8	5/16
124-34	1	1/2-13	.625	3/4	3/8	7/8	5/16

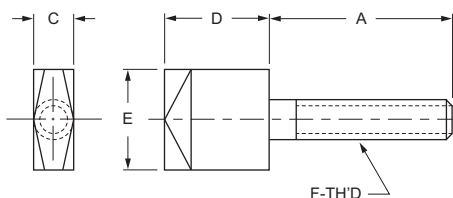
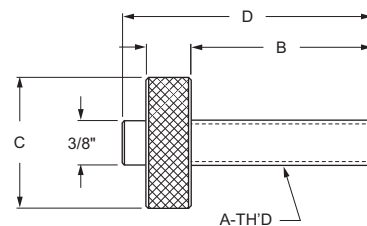
SCREWS

SOCKET SHOULDER SCREWS - CONTINUED

Hardened Steel - Black Oxide Finish

P/N	DIMENSIONS						
	A	B	C	D	E	F	G
124-35	1/2	5/8-11	.750	7/8	1/2	1	3/8
124-36	5/8	5/8-11	.750	7/8	1/2	1	3/8
124-37	3/4	5/8-11	.750	7/8	1/2	1	3/8
124-38	7/8	5/8-11	.750	7/8	1/2	1	3/8
124-39	1	5/8-11	.750	7/8	1/2	1	3/8
124-40	1-1/4	5/8-11	.750	7/8	1/2	1	3/8

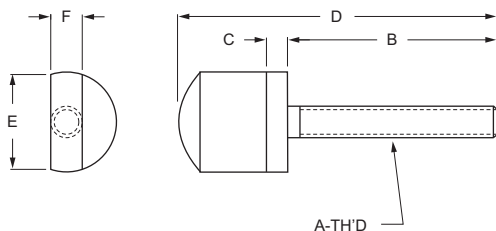
Jack Screws are used in fixtures to support irregularly shaped work pieces, such as castings, and to eliminate bowing or warping of thinner materials during machining.



QUARTER TURN SCREWS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	A	C	D	E	F
125-00	1	3/16	1/2	1/2	10-24
125-05	1	3/16	1/2	1/2	10-32
125-10	1-1/4	1/4	5/8	3/4	1/4-20
125-15	1-1/2	5/16	3/4	1	5/16-18
125-20	1-1/2	3/8	1	1	3/8-16



HALF TURN SCREWS

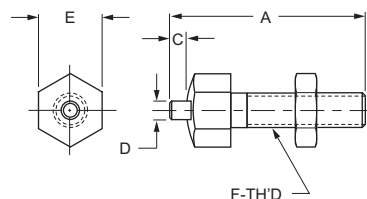
Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
126-00	10-24	1	3/16	1-11/16	3/4	3/16
126-05	1/4-20	1-1/4	3/16	2	3/4	1/4
126-10	5/16-18	1-1/4	3/16	2-1/16	1	5/16
126-15	3/8-16	1-3/4	1/4	2-11/16	1-1/16	3/8
126-20	1/2-13	1-3/4	1/4	23/4	1-1/4	1/2

JACK SCREW

Case Hardened - Knurled Head - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
127-00	3/8-16	1-1/4	1-1/8	1-7/8
127-05	3/8-16	1-5/8	1-1/8	2-1/2
127-10	3/8-16	2	1-1/8	2-5/8
127-15	1/2-13	1-1/4	1-1/8	1-7/8
127-20	1/2-13	1-5/8	1-1/8	2
127-25	1/2-13	2	1-1/8	2-5/8
127-30	1/2-13	2-1/2	1-1/8	3-1/8
127-35	5/8-11	1-5/8	1-3/8	2-1/4
127-40	5/8-11	2	1-3/8	2-5/8
127-45	5/8-11	2-1/2	1-3/8	3-1/2



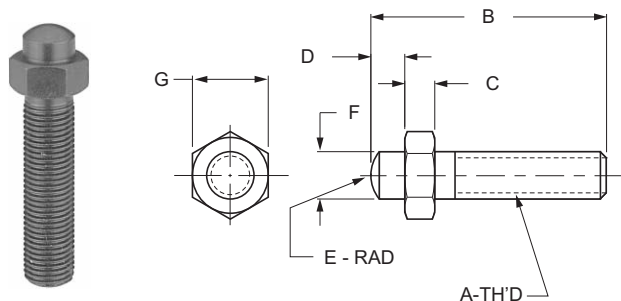
CLAMP RESTS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	A	C	D	E	F
128-00	1-1/4	1/8	5/32	7/16	1/4-20
128-02	1-7/8	3/16	7/32	1/2	5/16-18
128-05	2-1/4	7/32	11/32	9/16	3/8-16
128-10	2-3/8	1/4	11/32	11/16	1/2-13
128-15	3-7/8	1/4	11/32	11/16	1/2-13
128-18	2-7/8	1/4	15/32	7/8	5/8-11
128-20	3-7/8	1/4	15/32	7/8	5/8-11
128-25	2-3/4	1/4	15/32	1-1/16	3/4-10
128-30	3-7/8	1/4	15/32	1-1/16	3/4-10

SCREW CLAMPS

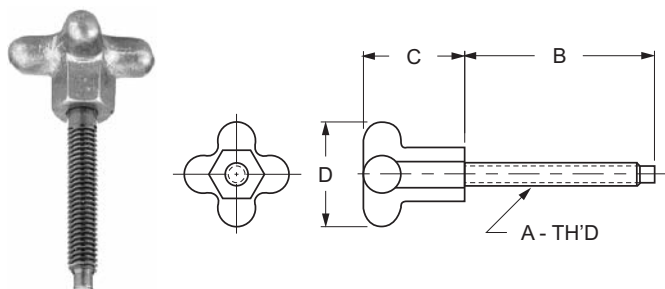
Adjustable locating screws are used together or in combination with fixed locating pins to accurately position work pieces in jig or fixture.



ADJUSTABLE LOCATING SCREWS

Case Hardened - Black Oxide Finish

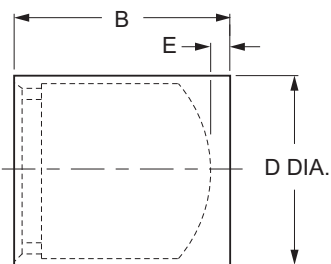
P/N	DIMENSIONS						
	A	B	C	D	E	F	G
129-00	10-32	1	1/8	1/8	1/8	316	1/4
129-05	1/4-28	1-1/2	3/16	3/16	3/16	1/4	3/8
129-10	3/8-24	2	1/4	1/4	1/4	3/8	1/2
129-15	1/2-20	2-1/2	5/16	5/16	5/16	1/2	5/8
129-20	5/8-18	3	3/8	3/8	3/8	5/8	3/4



ADJUSTABLE LOCATING SCREWS

Aluminum Hand Knob - Case Hardened Screws - Black Oxide Finish

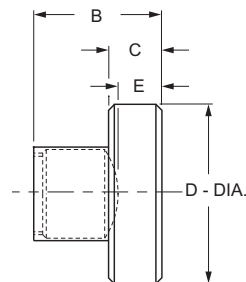
P/N	DIMENSIONS			
	A	B	C	D
130-00	1/4-20	1-1/2	3/4	1-1/8
130-05	1/4-20	2	3/4	1-1/8
130-10	1/4-20	2-1/2	3/4	1-1/8
130-20	5/16-18	2	7/8	1-1/2
130-25	5/16-18	2-1/2	7/8	1-1/2
130-30	3/8-16	2-1/16	1	2
130-35	3/8-16	2-9/16	1	2
130-40	3/8-16	3-1/16	1	2
130-45	1/2-13	2-9/16	1-1/2	2-1/2
130-50	1/2-13	3-1/16	1-1/2	2-1/2
130-55	1/2-13	3-9/16	1-1/2	2-1/2



SMALL PADS FOR SWIVEL SCREW CLAMPS

Black Oxide Finish

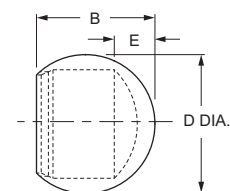
P/N	DIMENSIONS			
	FITS BODY THREAD SIZE	B	D	E
131-05	1/4-20	.193	3/16	1/16
131-10	5/16-18	19/64	1/4	3/64
131-15	3/8-16	21/64	19/64	1/16
131-20	1/2-13	25/64	13/32	1/16



LARGE PADS FOR SWIVEL SCREW CLAMPS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	FITS BODY THREAD SIZE	B	C	D	E
132-00	1/4-20	5/16	1/8	3/8	1/8
132-05	5/16-18	23/64	5/32	1/2	9/64
132-10	3/8-16	7/16	3/16	9/16	11/64
132-15	1/2-13	27/64	3/16	3/4	1/8



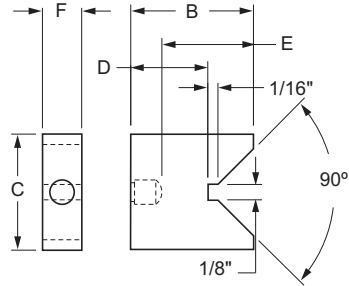
BALL PADS FOR SWIVEL SCREW CLAMPS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			
	FITS BODY THREAD SIZE	B	C	D
*132-25	1/4-20	7/32	1/4	5/64
*132-30	5/16-18	9/32	5/16	7/64
*132-40	1/2-13	7/16	1/2	11/64

* Discontinued but available while supplies last.

SWIVEL SCREWS

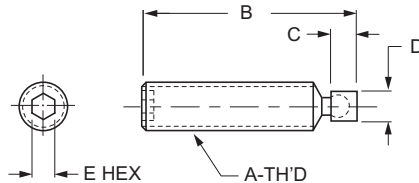


V - PADS FOR SWIVEL SCREW CLAMPS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	FITS BODY THREAD SIZE	B	C	D	E	F
*132-50	1/4-20	7/8	1	1/2	45/64	5/16
*132-55	5/16-18	15/16	1	9/16	47/64	3/8
*132-60	3/8-16	1	1	5/8	47/64	7/16
*132-65	1/2-13	1-1/2	2	11/16	1-13/64	1/2

These swivel screws are for use wherever maximum rigidity is necessary or where space is limited.



HEX SOCKET SWIVEL SCREWS

Case Hardened - Black Oxide Finish

P/N		DIMENSIONS					
STEEL PAD	NYLON PAD	A	B	C	D	E	LOAD(LBS)
135-00	135-50	10-32	1/2	1/8	.146	3/32	500
135-01	135-51	1/4-20	1/2	3/16	.185	1/8	900
135-02	135-52	1/4-20	3/4	3/16	.185	1/8	900
135-03	135-53	1/4-20	1	3/16	.185	1/8	900
135-04	135-54	1/4-20	1-1/2	3/16	.185	1/8	900
135-05	135-55	5/16-18	3/4	15/64	.240	1/8	2290
135-06	135-56	5/16-18	1	15/64	.240	1/8	2290
135-07	135-57	5/16-18	1-1/4	15/64	.240	1/8	2290
135-08	135-58	5/16-18	1-1/2	15/64	.240	1/8	2290
135-09	135-59	5/16-18	2	15/64	.240	1/8	2290
135-10	135-60	3/8-16	3/4	9/32	.293	3/16	3340
135-11	135-61	3/8-16	1	9/32	.293	3/16	3340
135-12	135-62	3/8-16	1-1/2	9/32	.293	3/16	3340
135-13	135-63	3/8-16	2	9/32	.293	3/16	3340
135-14	135-64	1/2-13	3/8	3/4	.400	3/16	7300
135-15	135-65	1/2-13	1	3/4	.400	3/16	7300
135-16	135-66	1/2-13	1-1/2	3/4	.400	3/16	7300
135-17	135-67	1/2-13	2	3/4	.400	3/16	7300

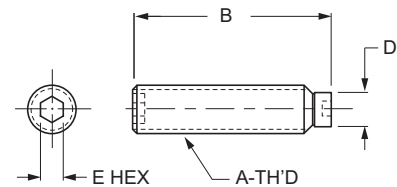
* Discontinued but available while supplies last.

HEX SOCKET SWIVEL SCREWS - CONTINUED

Case Hardened - Black Oxide Finish

P/N		DIMENSIONS					
STEEL PAD	NYLON PAD	A	B	C	D	E	LOAD(LBS)
135-18	135-68	1/2-13	2-1/2	3/4	.400	3/16	7300
135-19	135-69	1/2-13	3	3/4	.400	3/16	7300
135-20	135-70	5/8-11	2	7/16	.506	1/4	11700
135-21	135-71	5/8-11	2-1/2	7/16	.506	1/4	11700
135-22	135-72	5/8-11	3	7/16	.506	1/4	11700
135-23	135-73	3/4-10	2-1/2	13/32	.625	5/16	15000
135-24	135-74	3/4-10	3	13/32	.625	5/16	15000
135-25	135-75	3/4-10	3-1/2	13/32	.625	5/16	15000

The Headless Swivel screw features a hardened shoe that stop rotating upon contact with the part being clamped and prevents marring the work piece.



HEADLESS SWIVEL SCREW

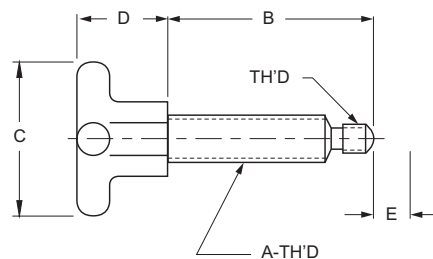
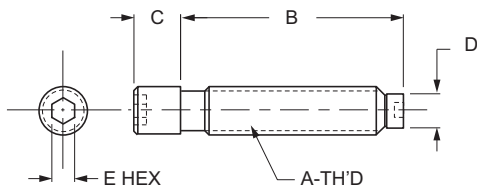
Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	D	E
136-00	1/4-20	3/4	3/16	1/8
136-05	1/4-20	1	3/16	1/8
136-10	5/16-18	3/4	15/64	1/8
136-15	5/16-18	1	15/64	1/8
136-20	3/8-16	1	9/32	3/16
136-25	3/8-16	1-1/4	9/32	3/16
136-30	1/2-13	1	25/64	3/16
136-35	1/2-13	1-1/4	25/64	3/16
136-40	5/8-11	1	1/2	1/4
136-45	5/8-11	1-1/2	1/2	1/4

SWIVEL SCREWS

The Head Swivel screw features a hardened shoe that stops rotating upon contact with the part being clamped and prevents marring. These are for use when a longer reach is required.

All pads for swivel clamps are interchangeable and swivel 40°. To get the overall length, add pad dimension "E." For pads, see page 3.30 parts 131-05 through 132-65.



HEADLESS SWIVEL SCREW

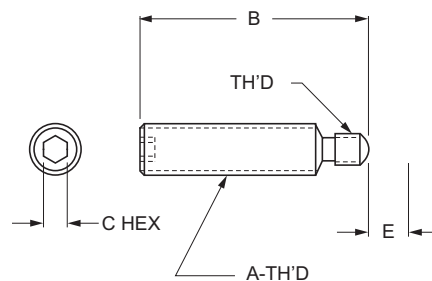
Black Oxide Finish - Case Hardened - Black Pentrate Finish

P/N	DIMENSIONS				
	A	B	C	D	E
137-00	1/4-20	5/8	1/4	3/16	1/8
137-05	1/4-20	1	1/4	3/16	1/8
137-10	1/4-20	1-1/4	1/4	3/16	1/8
137-15	5/16-18	3/4	5/16	15/64	5/32
137-20	5/16-18	1-1/4	5/16	15/64	5/32
137-25	5/16-18	1-1/2	5/16	15/64	5/32
137-30	3/8-16	1	3/8	9/32	3/16
137-35	3/8-16	1-1/4	3/8	9/32	3/16
137-40	3/8-16	1-1/2	3/8	9/32	3/16
137-45	3/8-16	2	3/8	9/32	3/16
137-50	1/2-13	1-1/2	1/2	25/64	1/4
137-55	1/2-13	2	1/2	25/64	1/4
137-60	1/2-13	2-1/2	1/2	25/64	1/4
137-65	5/8-11	2	5/8	1/2	5/16
137-70	5/8-11	2-1/2	5/8	1/2	5/16
137-75	5/8-11	3	5/8	1/2	5/16

BODIES FOR SWIVEL SCREW CLAMPS

Aluminum Hand Knob Head - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
*138-00	1/4-20	1-15/16	1-1/8	3/4
*138-05	1/4-20	1-31/32	1-1/8	3/4
*138-10	5/16-18	1-15/32	1-1/2	7/8
*138-20	5/16-18	2-15/32	1-1/2	7/8
*138-25	3/8-16	1-7/16	2	1
*138-30	3/8-16	1-15/16	2	1
*138-40	3/8-16	2-15/16	2	1
*138-45	1/2-13	1-7/16	2-1/2	1-1/2
*138-60	1/2-13	2-15/16	2-1/2	1-1/2
*138-65	1/2-13	3-15/16	2-1/2	1-1/2



BODIES FOR SWIVEL SCREW CLAMPS

Hex Socket Head - Black Oxide Finish

P/N	DIMENSIONS		
	A	B	C
140-00	1/4-20	15/32	1/8
140-05	1/4-20	23/32	1/8
140-10	1/4-20	31/32	1/8
140-15	1/4-20	1-15/32	1/8
140-20	5/16-18	23/32	5/32
140-25	5/16-18	31/32	5/32
140-30	5/16-18	1-15/32	5/32
140-35	5/16-18	1-31/32	5/32

* Discontinued but available while supplies last.

TORQUE SCREWS

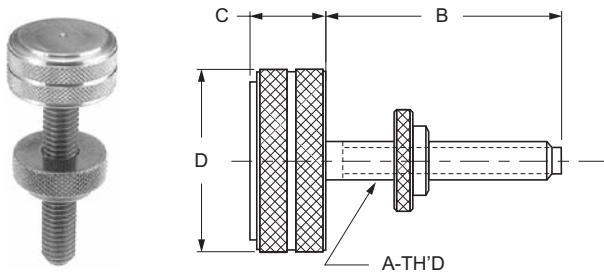
BODIES FOR SWIVEL SCREW CLAMPS - CONTINUED

Case Hardened - Hex Socket Head

P/N	DIMENSIONS		
	A	B	C
140-40	3/8-16	11/16	3/16
140-45	3/8-16	15/16	3/16
140-50	3/8-16	1-7/16	3/16
140-55	3/8-16	1-15/16	3/16
140-60	1/2-13	11/16	1/4
140-65	1/2-13	15/16	1/4
140-70	1/2-13	1-7/16	1/4
140-80	1/2-13	2-15/16	1/4

Back off action of these Torque screws is positive, assuring speedy unload of fixture or tool. Check Nuts are furnished with each torque screw at no additional cost. The Check Nut prevents backing off during operation due to chatter or vibration. The O.D. thread are Class 2-A, I.D. threads Class 2-B.

Torque 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 results being that spoilage due to deflection is eliminated. The head of the screw ratchets freely when the pre-set end pressure is reached. For use in all normal supporting operations.



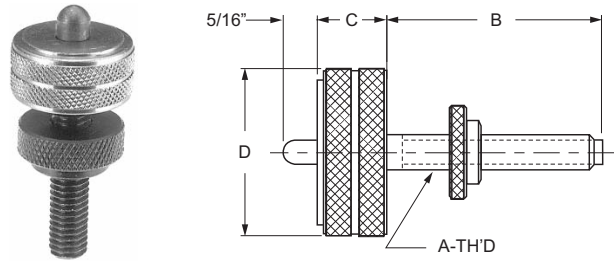
TORQUE SCREWS

Type A Standard, Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	END PRESSURE (LBS)
*141-10	1/4-20	2-1/2	1/2	7/8	12-14
*141-15	5/16-18	1-3/4	1/2	7/8	14-16
*141-25	5/16-18	3	1/2	7/8	14-16
*141-40	3/8-16	3	9/16	1-1/8	16-18
*141-45	1/2-13	1-3/4	9/16	1-1/8	18-20
*141-50	1/2-13	2-1/4	9/16	1-1/8	18-20
*141-60	1/2-13	3-1/2	9/16	1-1/8	18-20
*141-65	5/8-11	1-3/4	9/16	1-1/8	20-22
*141-70	5/8-11	3	9/16	1-1/8	20-22

* Discontinued but available while supplies last.

This Torque Screw is for use in all inverted positions.

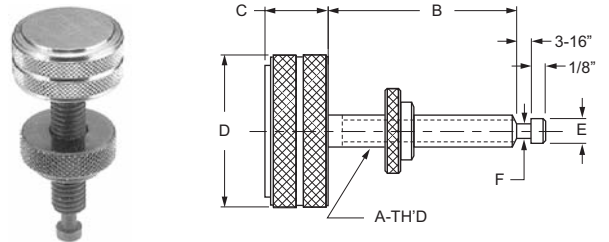


TORQUE SCREWS

Type B Inverted - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	END PRESSURE (LBS)
*142-05	3/8-16	1-3/4	9/16	1-1/8	16-18
*142-10	1/2-13	1-3/4	9/16	1-1/8	18-20

This torque Screw is for use in sliding V blocks. The tee end fits V-block forward and reverse motion.

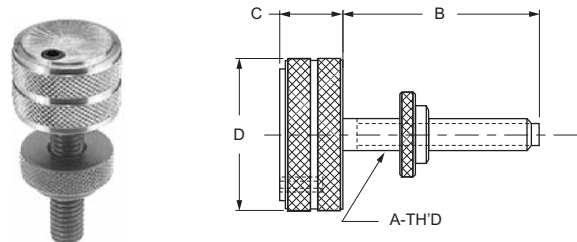


TORQUE SCREWS

Type C - Black Oxide Finish

P/N	DIMENSIONS						
	A	B	C	D	E	F	END PRESSURE (LBS)
*143-10	1/2-13	1-3/4	9/16	1-1/8	.396	.276	26-28

With this Torque Screw a simple wrench adjustment in the head permits holding pressure to be varied as needed. They are perfect for support with either fragile or heavy work pieces.



ADJUSTABLE TORQUE SCREWS

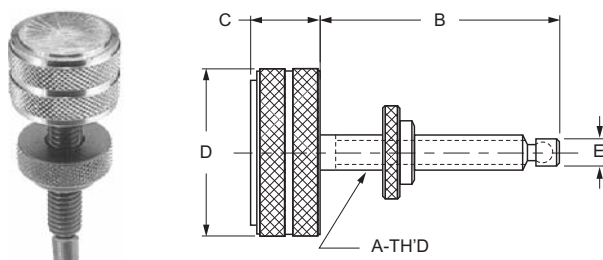
Type D - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	END PRESSURE (LBS)
*144-00	3/8-16	1-3/4	25/32	1-1/8	10-50
*144-05	3/8-16	3	25/32	1-1/8	10-50
*144-10	1/2-13	1-3/4	25/32	1-1/8	10-50

TORQUE SCREWS

Torque Head screws with swivel pads have a clamping angle of 7 1/2° minimum in each direction - a total of 15°. They hold firmly on irregular surface. Nylon pads are available on torque head screws with swivel pads. The nylon ads snap on over existing ball ends. They will not sag when used in horizontal applications, but allows 7-1/2° swivel when clamping angular surfaces.

The O.D. of the pad is smaller than the major pitch diameter, thus allowing the ad to pass though a threaded hole without disassembly. a simple wrench adjustment in the adjustable torque head screw permits holding pressures to be varied as needed.



STANDARD TORQUE HEAD SCREWS WITH SWIVEL PAD

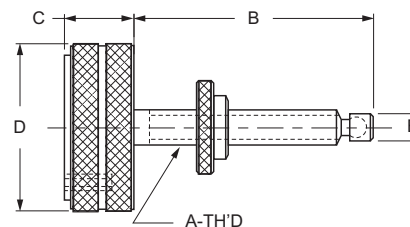
Steel Pads - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	END PRESSURE (LBS)
*145-00	1/4-20	2-1/4	1/2	7/8	.185	12 - 14
*145-10	3/8-16	2-1/4	9/16	1-1/8	.293	16 - 18

STANDARD TORQUE HEAD SCREWS WITH SWIVEL PAD

Nylon Pads - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	END PRESSURE (LBS)
*146-05	5/6-18	2-1/4	1/2	7/8	.240	14 - 16



ADJUSTABLE TORQUE HEAD SCREWS WITH SWIVEL PAD

Steel Pads - Black Oxide Finish

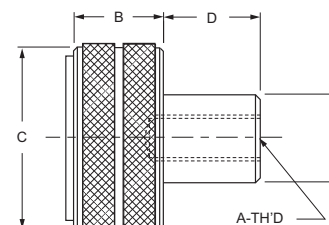
P/N	DIMENSIONS					
	A	B	C	D	E	END PRESSURE (LBS)
*147-10	1/2-13	1-3/4	25/32	1-1/8	.400	0 - 50

ADJUSTABLE TORQUE HEAD SCREWS WITH SWIVEL PAD

Nylon Pads - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	END PRESSURE (LBS)
*148-05	3/8-16	3	25/32	1-1/8	.293	0 - 50
*148-10	1/2-13	1-3/4	25/32	1-1/8	.400	0 - 50

This usefull torque-controlled device controls forward force in assemblies, machinery, etc., where ordinary torque screws would require considerable machining or customization. A simple wrench adjustment in the torque handle head permits holding pressure to be varied as needed. Controlled end pressure for all fixture applications.



TORQUE HANDLE

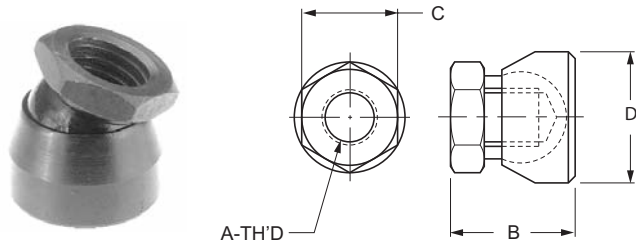
Threaded insert is Case Hardened

P/N	DIMENSIONS					
	A	B	C	D	E	END PRESSURE (LBS)
*149-05	3/8-16	7/8	1-1/4	7/16	5/8	15-115

* Discontinued but available while supplies last.

TOGGLE PADS

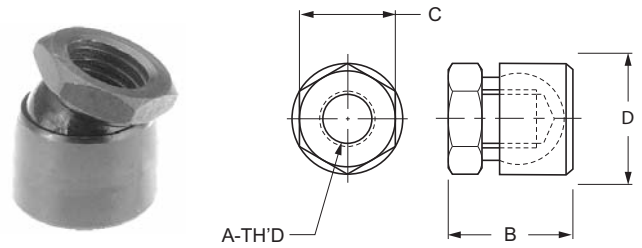
Toggle pads solidly clamp parts with uneven or off angle surfaces and they are self-aligning and self-leveling. They swivel 10° in any direction which allows the pad to automatically seat against the surface of the workpiece when a force is applied, thus eliminating clamp slippage. Clamp force is the same in any direction, regardless of angular position - there is no binding or distortion of the pad. The steel ball is hardened. The bottom of the steel pad is ground to eliminate marring of the workpiece. The aluminum pads are for softer materials and do not mar finishes. Steel pads are also available with relieved shoulders for easier access to the hex flats.



TOGGLE PAD

Steel pad - Relieved Head - Case Hardened - Black Oxide Finish

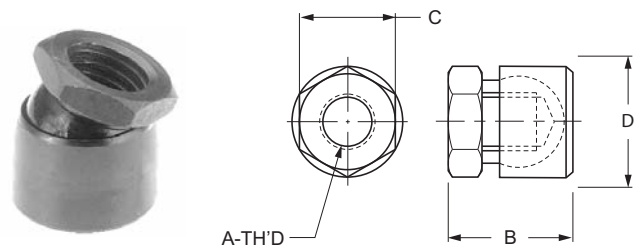
P/N	DIMENSIONS			
	A	B	C	D
150-00R	1/2-20	5/8	1/2	9/16
150-05R	5/16-18	11/16	9/16	11/16
150-10R	3/8-16	3/4	5/8	3/4
150-15R	1/2-13	15/16	3/4	7/8
150-20R	5/8-11	1	7/8	1
150-25R	3/4-10	1-1/4	1-1/16	1-1/4
150-30R	1/8	1-13/16	1-5/16	1-1/2



TOGGLE PAD

Steel pad - Standard Head - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
150-00	1/4-20	5/8	1/2	9/16
150-05	5/16-18	11/16	9/16	11/16
150-10	3/8-16	3/4	5/8	3/4
150-15	1/2-13	15/16	3/4	7/8
150-20	5/8-11	1	7/8	1
150-25	3/4-10	1-1/4	1-1/16	1-1/4
150-30	1/8	1-13/16	1-5/16	1-1/2



TOGGLE PAD

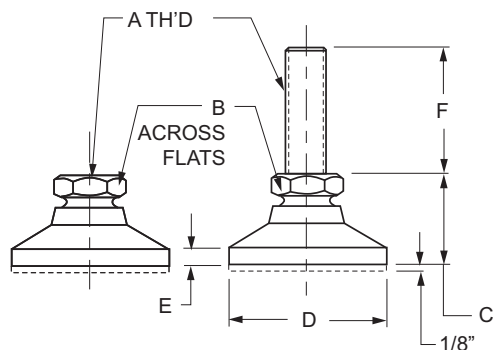
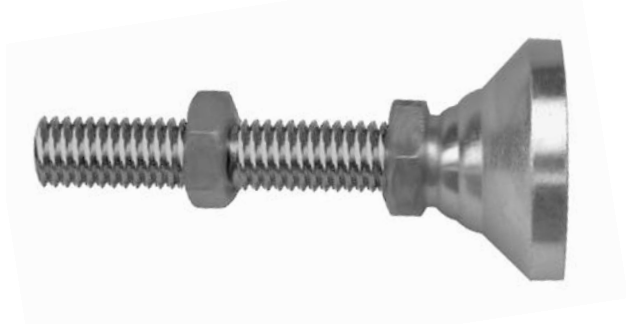
Aluminum pad - Standard Head - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
151-00	1/4-20	5/8	1/2	9/16
151-05	5/16-18	11/16	9/16	11/16
151-10	3/8-16	3/4	5/8	3/4
151-15	1/2-13	15/16	3/4	7/8
151-20	5/8-11	1	7/8	1
151-25	3/4-10	1-1/4	1-1/16	1-1/4
151-30	1/8	1-13/16	1-5/16	1-1/2

LEVELING PADS

These leveling pads swivel 15° to each side of the centerline for uneven surfaces. They are ideal for leveling machines, work benches and equipment. They come in socket and stud type with optional elastomer pads that add friction and prevent bench-top marring. Specify black oxide or gold iridite finish when ordering.

- Socket type or Stud type
- Optional elastomer pads
- Steel material
- Stainless Steel



LEVELING PADS						
Socket Type - With or Without Elastomer Pads - Black Oxide Finish						
P/N		DIMENSIONS				
WITHOUT PADS	WITH PADS	A	B	C	D	E
151-99	152-29	1/4-20	1/2	.70	1	5/32
152-00	152-30	3/8-16	5/8	7/8	1-1/4	3/16
152-05	152-35	1/2-13	3/4	1-1/8	1-7/8	1/4
152-10	152-40	5/8-11	7/8	1-1/4	2-1/2	5/16
152-15	152-45	3/4-10	1-1/16	1-1/2	3	1/2
152-17	152-47	1-8	1-1/2	1-7/8	4	13/32

STAINLESS STEEL LEVELING PADS

Socket Type - With or Without Elastomer Pads

P/N		DIMENSIONS					
WITHOUT PADS	WITH PADS	A	B	C	D	E	F
151-99S	152-29S	1/4-20	1/2	.70	1	5/32	1-1/4
152-00S	152-30S	3/8-16	5/8	7/8	1-1/4	3/16	2
152-05S	152-35S	1/2-13	3/4	1-1/8	1-7/8	1/4	2
152-10S	152-40S	5/8-11	7/8	1-1/4	2-1/2	5/16	2
152-15S	152-45S	3/4-10	1-1/16	1-1/2	3	1/2	2
152-17S	152-47S	1-8	1-1/2	1-7/8	4	13/32	4-1/4

LEVELING PADS

Socket Type - With or Without Elastomer Pads - Gold Iridite Finish

P/N		DIMENSIONS					
WITHOUT PADS	WITH PADS	A	B	C	D	E	F
151-99G	152-29G	1/4-20	1/2	.70	1	5/32	1-1/4
152-00G	152-30G	3/8-16	5/8	7/8	1-1/4	3/16	2
152-05G	152-35G	1/2-13	3/4	1-1/8	1-7/8	1/4	2
152-10G	152-40G	5/8-11	7/8	1-1/4	2-1/2	5/16	2
152-15G	152-45G	3/4-10	1-1/16	1-1/2	3	1/2	2
152-17G	152-47G	1-8	1-1/2	1-7/8	4	13/32	4-1/4

LEVELING PADS

Stud Type - With or Without Elastomer Pads - Black Oxide Finish

P/N		DIMENSIONS					
WITHOUT PADS	WITH PADS	A	B	C	D	E	F
152-49	152-79	1/4-20	1/2	.70	1	5/32	1-1/4
152-50	152-80	3/8-16	5/8	7/8	1-1/4	3/16	2
152-55	152-85	1/2-13	3/4	1-1/8	1-7/8	1/4	2
152-60	152-90	5/8-11	7/8	1-1/4	2-1/2	5/16	2
152-65	152-95	3/4-10	1-1/16	1-1/2	3	1/2	2
152-67	152-97	1-8	1-1/2	1-7/8	4	13/32	4-1/4

STAINLESS STEEL LEVELING PADS

Stud Type - With or Without Elastomer Pads

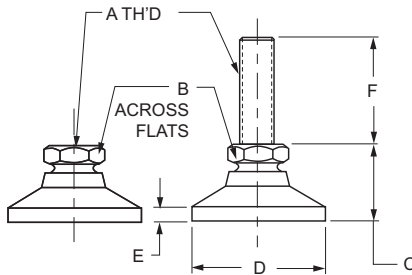
P/N		DIMENSIONS					
WITHOUT PADS	WITH PADS	A	B	C	D	E	F
152-49S	152-79S	1/4-20	1/2	.70	1	5/32	1-1/4
152-50S	152-80S	3/8-16	5/8	7/8	1-1/4	3/16	2
152-55S	152-85S	1/2-13	3/4	1-1/8	1-7/8	1/4	2
152-60S	152-90S	5/8-11	7/8	1-1/4	2-1/2	5/16	2
152-65S	152-95S	3/4-10	1-1/16	1-1/2	3	1/2	2
152-67S	152-97S	1-8	1-1/2	1-7/8	4	13/32	4-1/4

SURE LEVELING PADS

LEVELING PADS

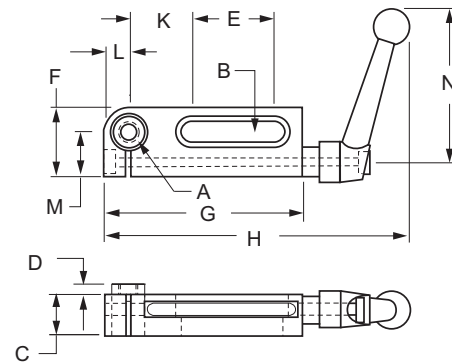
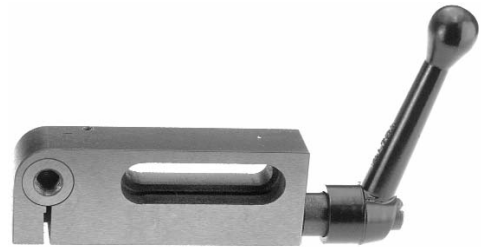
Stud Type - With or Without Elastomer Pads - Gold Iridite Finish

P/N		DIMENSIONS					
WITHOUT PADS	WITH PADS	A	B	C	D	E	F
152-49G	152-79G	1/4-20	1/2	.70	1	5/32	1-1/4
152-50G	152-80G	3/8-16	5/8	7/8	1-1/4	3/16	2
152-55G	152-85G	1/2-13	3/4	1-1/8	1-7/8	1/4	2
152-60G	152-90G	5/8-11	7/8	1-1/4	2-1/2	5/16	2
152-65G	152-95G	3/4-10	1-1/16	1-1/2	3	1/2	2
152-67G	152-97G	1-8	1-1/2	1-7/8	4	13/32	4-1/4



The Bedding Support is for use in Milling, Drilling, Planing and Grinding.

INSTALLATION: Press down the support pin and tighten the adjustable handle to keep the pin down while positioning it under the workpiece, then release the spring pin and re-tighten the handle to support the work piece. If more height is needed, a threaded stud can be screwed into the pin.



LEVELING PADS

Socket Type - Zinc Plated Steel - Delrin Pad

P/N	DIMENSIONS				
	A	B	C	D	E
153-00	1/4-20	1/2	.70	1	5/32
153-02	3/8-16	5/8	7/8	1-1/4	3/16
153-04	1/2-13	3/4	1-1/8	1-7/8	1/4
153-06	5/8-11	7/8	1-1/4	2-1/2	5/16
153-08	3/4-10	1-1/16	1-1/2	3	1/2
153-10	1-8	1-1/2	1-7/8	4	13/32

LEVELING PADS

Stud Type - Zinc Plated Steel - Delrin Pad

P/N	DIMENSIONS					
	A	B	C	D	E	F
153-01	1/4-20	1/2	.70	1	5/32	1-1/4
153-03	3/8-16	5/8	7/8	1-1/4	3/16	2
153-05	1/2-13	3/4	1-1/8	1-7/8	1/4	2
153-07	5/8-11	7/8	1-1/4	2-1/2	5/16	2
153-09	3/4-10	1-1/16	1-1/2	3	1/2	2
153-11	1-8	1-1/2	1-7/8	4	13/32	4-1/4

BEDDING SUPPORT

Black Oxide Finish

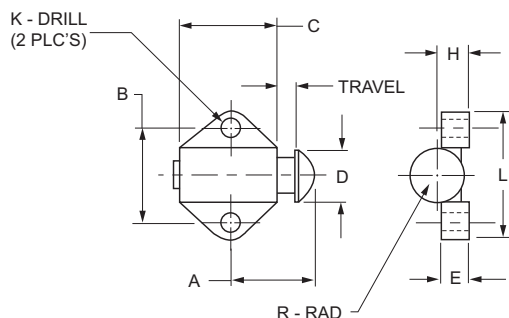
P/N	DIMENSIONS					
	A	B	C	D	E	F
158-76	5/16-18	.33	.71	.11	1-13/32	1-3/16
158-78	1/2-13	.53	.95	.23	3-9/16	2
158-80	5/8-11	.67	1.34	.43	4-1/16	2-3/8
P/N	G	H	K	L	M	N
158-76	3-3/8	5-3/16	1-1/16	13/32	25/32	2-9/16
158-78	6-1/2	8-13/16	1-17/32	19/32	1	3-1/8
158-80	7-1/2	10-5/8	1-3/4	13/16	1-9/16	4-5/16

SPRING STOPS

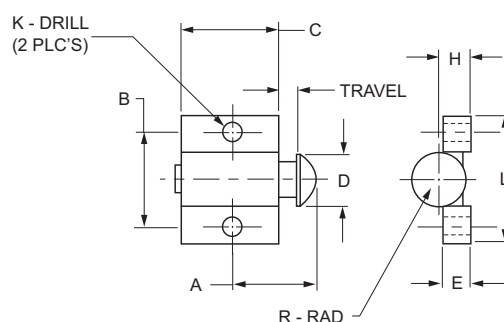
Spring Stops are used in the locating of parts in jigs and fixtures particularly where fixture walls are not available. Spring Stops insure accurate, controlled end pressure which makes for quick, convenient loading and unloading. The relieved base seats perfectly and eliminates wobble. The base has drilled, jigged holes for firm mounting, easy alignment and installation. The plunger is hardened and ground. It has a properly radiused nose for perfect fit with no wobble. The Spring Stop temporarily holds work tightly against locators. Different Spring Stops fill different needs. The round nose is for general tooling and the square nose is for thin parts. The nose is also available in Delrin. The medium and large Spring Stops are available either in a steel or aluminum body.



ALUMINUM BODY



STEEL BODY



SPRING STOPS

Round Nose - Case Hardened Steel Nose - Aluminum Body

P/N	SIZE	DIMENSIONS										*END PRESSURE (LBS)
		A	B	C	D	E	L	H	R	K	TRAVEL	
159-00	S	19/32	21/32	11/16	3/8	3/16	7/8	7/32	3/16	.13	1/8	10
161-00	M	7/8	1-1/8	1	9/16	7/32	1-1/2	5/16	5/16	.20	3/16	14
163-00	L	1-7/32	1-1/2	1-3/8	13/16	5/16	2	1/2	7/16	.27	1/4	32

SPRING STOPS

Round Nose - Delrin Nose - Aluminum Body

P/N	SIZE	DIMENSIONS										*END PRESSURE (LBS)
		A	B	C	D	E	L	H	R	K	TRAVEL	
159-00N	S	19/32	21/32	11/16	3/8	3/16	7/8	7/32	3/16	.13	1/8	10
161-00N	M	7/8	1-1/8	1	9/16	7/32	1-1/2	5/16	5/16	.20	3/16	14
163-00N	L	1-7/32	1-1/2	1-3/8	13/16	5/16	2	1/2	7/16	.27	1/4	32

SPRING STOPS

Round Nose - Case Hardened Steel Nose - Steel Body - Black Oxide Finish

P/N	SIZE	DIMENSIONS										*END PRESSURE (LBS)
		A	B	C	D	E	L	H	R	K	TRAVEL	
160-00	M	7/8	1-1/8	1	9/16	7/32	1-1/2	5/16	5/16	.20	3/16	14
162-00	L	1-7/32	1-1/2	1-3/8	13/16	5/16	2	1/2	7/16	.27	1/4	32

SPRING STOPS

Round Nose - Delrin Nose - Aluminum Body

P/N	SIZE	DIMENSIONS										*END PRESSURE (LBS)
		A	B	C	D	E	L	H	R	K	TRAVEL	
160-00N	M	7/8	1-1/8	1	9/16	7/32	1-1/2	5/16	5/16	.20	3/16	14
162-00N	L	1-7/32	1-1/2	1-3/8	13/16	5/16	2	1/2	7/16	.27	1/4	32

SPRING STOPS

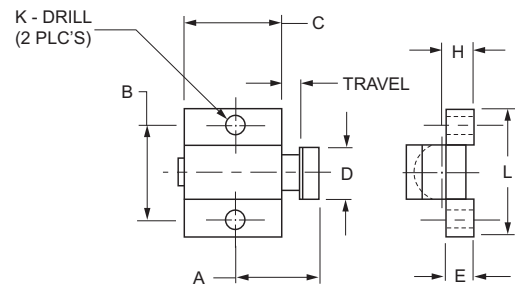
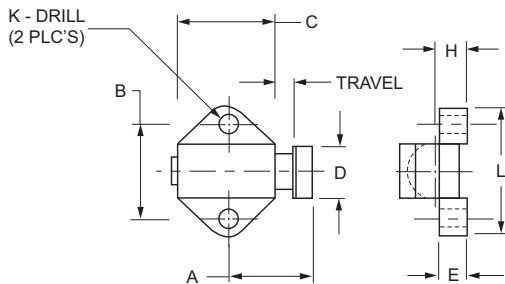
Square heads spring stops are ideal for holding thin gauge sheet metal in jig and fixtures during spot welding, piercing and notching, die operations, riveting and machining operations or where maximum holding area is required. The leading edge has long lead chamfer for easy insertion of stock. Square head spring stops are also used to preload and guide stock through dies as well as the preloading of tool slides and light duty bumper stops.



ALUMINUM BODY



STEEL BODY



SPRING STOPS

Square Nose - Case Hardened Steel Nose - Aluminum Body

P/N	SIZE	DIMENSIONS										*END PRESSURE (LBS)
		A	B	C	D	E	L	H	R	K	TRAVEL	
164-00	S	19/32	21/32	11/16	3/8	3/16	7/8	7/32	3/16	.13	1/8	10
166-00	M	7/8	1-1/8	1	19/16	7/32	1-1/2	5/16	5/16	.20	3/16	14
168-00	L	1-9/32	1-1/2	1-3/8	13/16	5/16	2	1/2	7/16	.27	1/4	32

SPRING STOPS

Square Nose - Delrin Nose- Aluminum Body

P/N	SIZE	DIMENSIONS										*END PRESSURE (LBS)
		A	B	C	D	E	L	H	R	K	TRAVEL	
164-00N	S	19/32	21/32	11/16	3/8	3/16	7/8	7/32	3/16	.13	1/8	10
166-00N	M	7/8	1-1/8	1	19/16	7/32	1-1/2	5/16	5/16	.20	3/16	14
168-00N	L	1-9/32	1-1/2	1-3/8	13/16	5/16	2	1/2	7/16	.27	1/4	32

SPRING STOPS

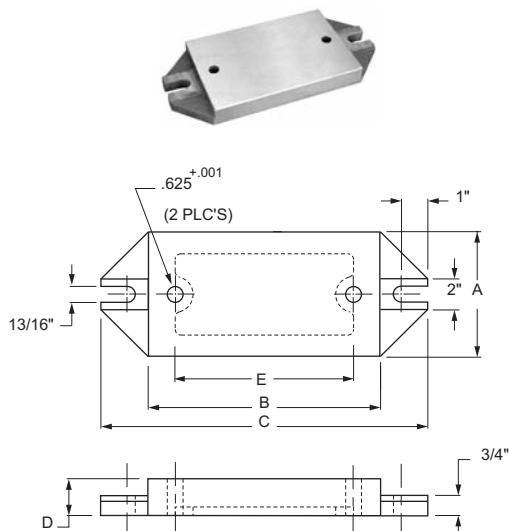
Square Nose - Case Hardened Steel Nose - Steel Body - Black Oxide Finish

P/N	SIZE	DIMENSIONS										*END PRESSURE (LBS)
		A	B	C	D	E	L	H	R	K	TRAVEL	
165-00	M	7/8	1-1/8	1	19/16	7/32	1-1/2	5/16	5/16	.20	3/16	14
167-00	L	1-9/32	1-1/2	1-3/8	13/16	5/16	2	1/2	7/16	.27	1/4	32

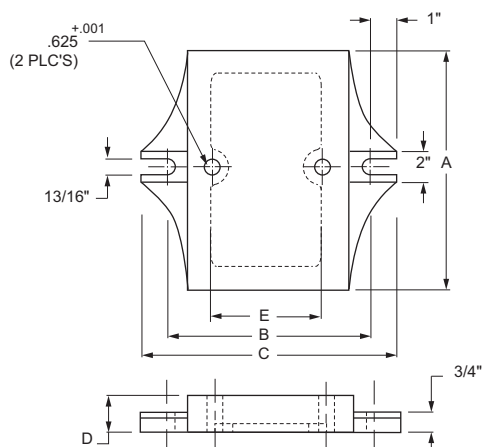
* The end pressure is measured at the mid-point of travel.

FIXTURE KEYS

All Mill Fixture Bases and Gang Fixture Bases are constructed of ASTM class #35 cast iron. The tops and bottoms are precision ground to within a .002" parallelism. The front edges are finished parallel to the two 0.0625 reamed holes and all mounting surfaces are milled finished.



MILL FIXTURE BASE

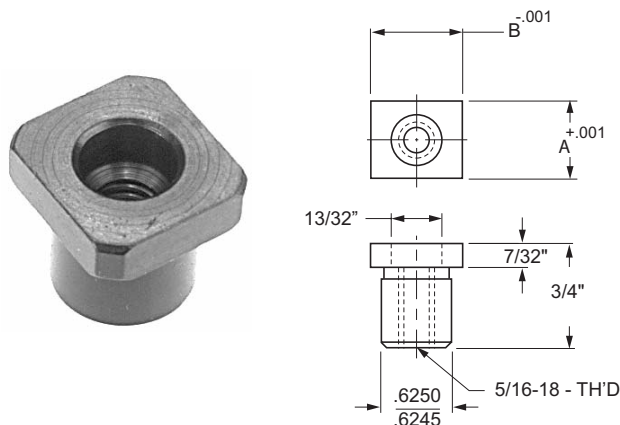


GANG FIXTURE BASE

MILL FIXTURE BASE					
P/N	DIMENSIONS				
	A	B	C	D	E
168-50	6	9	13	1-1/4	7
168-55	8	12	16	1-3/8	9.5
168-60	10	15	19	1-1/2	12

GANG FIXTURE PLATED					
P/N	DIMENSIONS				
	A	B	C	D	E
168-75	9	6	13	1-1/4	4
168-80	12	8	16	1-3/8	5.5

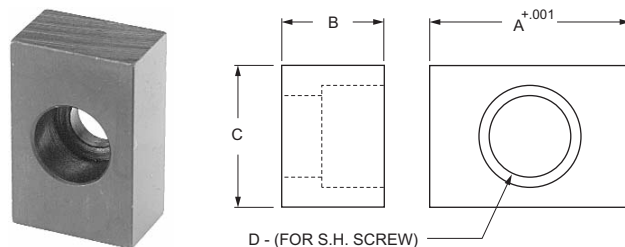
The Fixture Key Reamed Hole eliminates the necessity of milling long slots or pockets for other styles of keys. All sizes have a 5/8 inch diameter shank making them interchangeable. They can be fastened from the bottom with a 1/4-20 socket head cap screw or from the top with a 5/16-18 socket head cap screw. **The Body diameter is central to the flats "A" and "B" within .002 TIR.**



FIXTURE KEY REAMED HOLE

Case Hardened - Precision Ground - Black Oxide Finish

P/N	DIMENSIONS	
	A	B
169-00	.625	.6875
169-05	.625	.785
169-10	.625	.8125
169-15	.6875	.750
169-20	.6875	.8125
169-25	.750	.8125



D - (FOR S.H. SCREW)

FIXTURE KEY

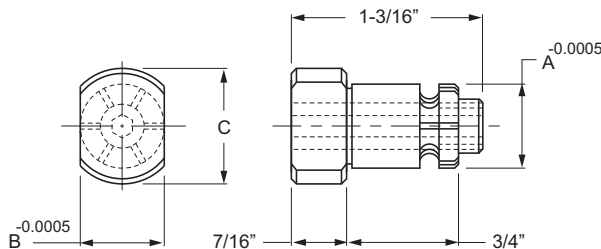
Case Hardened - Precision Ground - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
170-00	.500	1/2	3/4	1/4
170-05	.5625	1/2	3/4	1/4
170-10	.625	1/2	3/4	5/16
170-15	.6875	1/2	1	5/16
170-20	.750	1/2	1-1/4	5/16
170-25	.8125	1/2	1-1/4	5/16

FIXTURE KEYS

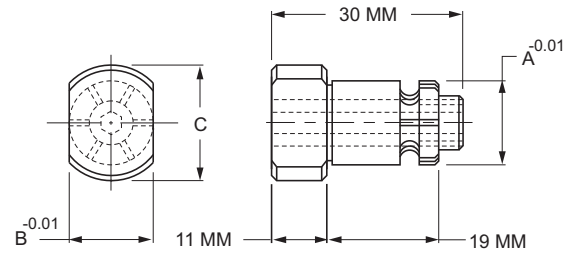
Now you can locate jig and fixtures on the machine tool tables and position the part to be machined in one operation. All American® Sine Fixture Keys eliminate the need to slot fixture bases, make step fixture keys, drill and tap keys. All you need to do is ream a 5/8 inch hole. Variations in table slot sizes are easily taken care of by the wide variety of Sine Fixture keys available. Table slot size are designated by the "B" column. Shank sizes are designated in the "A" column. the shanks have an expansion feature whereby the key can be locked in the fixture from either the top or the bottom of the fixture.

- Reduce fixture costs
- Cut extra set-up time
- Meet blueprint tolerances to the decimal point
- Completely interchangeable



SINE FIXTURE KEY

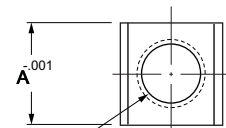
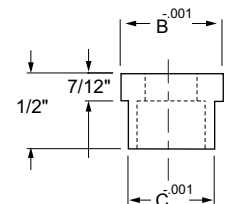
P/N	DIMENSIONS			
	A	B	C	LBS.
170-86	.625	.4995	1	.09
170-88	.625	.5620	1	.11
170-90	.625	.6245	1	.11
170-92	.625	.6870	1	.11
170-94	.625	.7495	1-1/8	.13
170-96	.625	.8120	1-1/8	.14
170-98	.625	.8745	1-1/8	.15



METRIC SINE FIXTURE KEY

P/N	DIMENSIONS			
	A	B	C	KG.
171-01	16	12	25	.04
171-02	16	14	25	.05
171-03	16	16	25	.05
171-04	16	18	29	.05
171-05	16	20	29	.06
171-06	16	22	29	.06
171-07	20	24	35	.07
171-08	20	28	35	.10
171-09	20	32	40	.10

The Step Fixture Keys are used for two different table slots by rotating the key 90°.



D (S.H. CAP SCREW)

STEP FIXTURE KEY

Black Oxide Finish

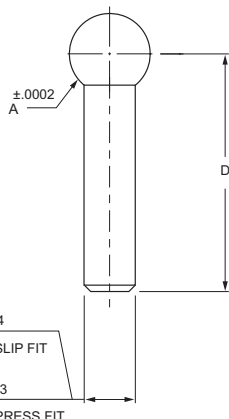
P/N	DIMENSIONS			
	A	B	C	D
*172-00	.5625	.5625	.4375	#10
*172-05	.6250	.6250	.5000	1/4
*172-10	.6875	.6875	.5625	1/4
*172-15	.6875	.6875	.6250	5/16
*172-20	.7500	.7500	.6250	5/16
*172-25	.8125	.8125	.6875	5/16

* Discontinued but available while supplies last.

TOOLING BALLS

Tooling balls may be used as reference points in the construction and checking of jigs and fixtures. They are hardened and ground. Standard and shoulder types are available with slip fit or light press fit shank diameters.

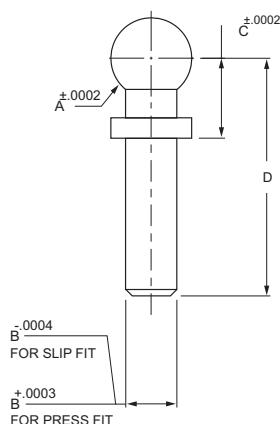
- Slip fit shank tolerance is $+0.0000 - .0004$
- Press Fit shank tolerance is $+0.0003 - .0000$
- The ball and shank are concentric within $.0002$ T.I.R.



STANDARD TOOLING BALL

Case Hardened and Ground

P/N		DIMENSIONS		
SLIP FIT	PRESS FIT	A	B	D
173-00	174-00	.2500	.1250	.563
173-05	174-05	.3750	.1875	.750
173-10	174-10	.5000	.2500	.940
173-15	174-15	.5000	.2500	1.500
173-20	174-20	.5000	.3750	1.500

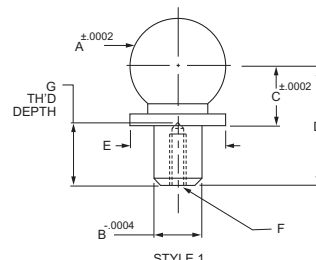


SHOULDER TOOLING BALL

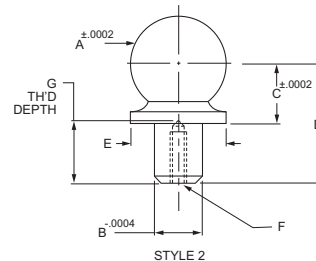
Case Hardened and Ground

P/N		DIMENSIONS			
SLIP FIT	PRESS FIT	A	B	C	D
175-00	176-00	.2500	.1250	.200	.563
175-05	176-05	.3750	.1875	.300	.750
175-10	176-10	.5000	.2500	.400	.940
175-15	176-15	.5000	.2500	.500	1.500
175-20	176-20	.5000	.3750	.500	1.500

With the construction ball, one size will fit the majority of the applications that might be needed. They are available with a tapped hole for screw mounting. The shoulder provides a precise $\pm .0002$ tolerance shoulder base to centerline dimension to facilitate locating the ball in three dimensions. The ball and shank are concentric within $.0002$ T.I.R.



STYLE 1



STYLE 2

TOOLMAKER'S CONSTRUCTION BALL

Style 1 - Case Hardened and Ground

P/N	DIMENSIONS						
	A	B	C	D	E	F	G
177-00	.5000	.2500	.3125	.625	.49	6-32	1/4
177-05	.5000	.2500	.3125	.625	.49	-	-
177-10	.2500	.1250	.2000	.560	.25	-	-
177-15	.3752	.1875	.3000	.750	.37	-	-
177-20	.5000	.2500	.4000	.940	.46	-	-
177-25	.7500	.3750	.5000	1.250	.75	-	-

TOOLMAKER'S CONSTRUCTION BALL

Style 2 - Case Hardened and Ground

P/N	DIMENSIONS						
	A	B	C	D	E	F	G
177-30	.5000	.2500	.3125	.63	.25	6-32	1/4
177-35	.5000	.2500	.5000	.94	.25	6-32	5/16
177-40	.5000	.2500	.5000	1.50	.25	-	-
177-45	.5000	.3125	.5000	.94	.46	6-32	5/16
177-50	.5000	.3125	.5000	1.50	.46	-	-
177-55	.5000	.3750	.5000	1.50	.56	-	-

METRIC TOOLMAKER'S CONSTRUCTION BALL

Style 1 - Case Hardened and Ground

P/N	DIMENSIONS						
	A	B	C	D	E	F	G
177-70	.2364	.1181	.2362	.47	.24	-	-
177-80	.4726	.2362	.4724	.87	.47	-	-
177-90	.4726	.2392	.4724	.98	.47	M3.5	.24

Slotted Locator Bushings for hard tooling. Use with "L" or "T" pins. Refer to the master round press fit bushing section of our main catalog for a complete selection, used with the locator bushings.

FEATURES & BENEFITS

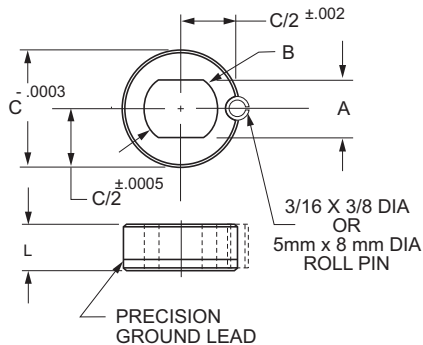
- Cuts tool fabrication costs.
- Reduces loading & unloading time.
- Limits binding, pin breakage and shearing of holes due to slight misalignment.
- Perfect for use on high production tooling.

INSTALLATION

- Drill and ream a 3/16 hole, 5mm for metric sizes, for the roll pin.
- Bore mounting hole to provide minimum diametral interference, 0.0003 to 0.0005 inch, .0076 to .0127 mm, is generally adequate.
- Press slotted locator bushing and roll pin together until flush with top of plate. The roll pin sets a precise alignment between slotted hole and layout axis.

MATERIAL

Slotted Locator Bushings are available in steel, stainless steel (303, 316, 420, 440, 17-4PH) and carbide. For ordering purposes, add "C" for carbide or 303SS, 316SS, 420SS, 440SS or 17-4PH for stainless steel on the end of the part number. Example - **178-25-303SS**.



PRESS FIT SLOTTED LOCATOR BUSHINGS

Case Hardened and Ground - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	L
178-00	.1876 / .1882	.312	.7504	.400
178-05	.2501 / .2507	.375	.7504	.400
178-10	.2501 / .2507	.375	1.0004	.400
178-15	.3126 / .3132	.437	1.0004	.400
178-20	.3751 / .3757	.500	1.0004	.400
178-25	.5001 / .5007	.625	1.0004	.400
178-30	.5001 / .5007	.625	1.0004	.900
178-35	.6251 / .6257	.750	1.2504	.900
178-40	.7501 / .7510	.812	1.5004	1.000
178-45	.8751 / .8760	1.000	1.5004	1.000
178-50	1.0001 / 1.0010	1.062	1.5004	1.000

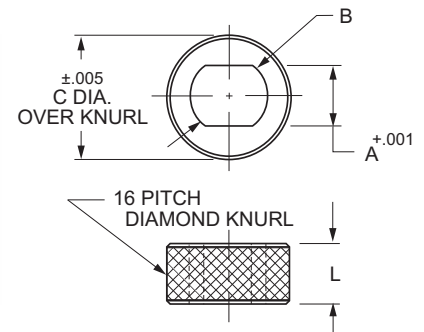
METRIC PRESS FIT SLOTTED LOCATOR BUSHINGS

P/N	DIMENSIONS			
	A	B	C	L
179-50	6.00/6.03mm .2363/.2373	9mm .354	20mm .7874	9mm .354
179-55	8.00/8.03mm .3151/.3161	11mm .433	24mm .9449	9mm .354
179-60	10.0/10.30mm .3938-.3948	13mm .512	24mm .9449	9mm .354
179-65	12.0/12.30mm .4725-.4735	15mm .591	24mm .9449	14mm .551
179-70	16.00/16.30mm .6300/.6310	18mm .709	30mm 1.1811	12mm .472
179-75	20.00/20.30mm .7875/.7885	22mm .866	36mm 1.4173	19mm .748
179-80	25.00/25.30mm .9844-.9854	27mm 1.063	40mm 1.5748	19mm .748

The Knurled Locator Bushing for use with many soft tooling.

MATERIAL

Knurled Locator Bushings are available in steel and stainless steel (303, 316, 420, 440, 17-4PH.) For ordering purposes add 303SS, 316SS, 420SS, 440SS or 17-4PH for stainless steel on the end of the part number. Example - **179-20-303SS**.



DIAMOND KNURLED LOCATOR BUSHINGS

Case Hardened and Ground - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	L
179-00	.1876	.375	.565	.500
179-05	.2501	.375	.640	.500
179-10	.3126	.437	.765	.500
179-15	.3751	.500	.890	.500
179-20	.5001	.625	1.015	.500
179-25	.5001	.625	1.015	1.000

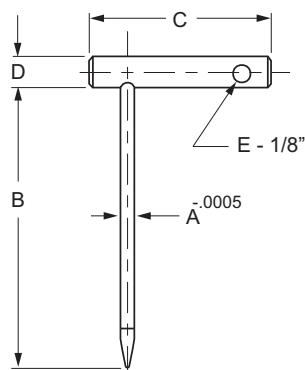
L-PINS

"L" PINS are quick removing locating devices for precision alignment of work pieces in jigs and fixtures. "L" handle is ideal where space is a consideration.

"L" PINS can be ordered with an optional nylon covered steel cable for attachment at Point "E" for connecting pins to jigs and fixtures.

(Specify part number and add A i.e.: **180-00A**)

- Add the price of 190-00 cable.
- Handle is drilled to receive pin, which allows pin to be used all the way to the handle



L - PINS

Case Hardened and Ground - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
180-00	.1250	2-1/2	1-1/2	1/4
180-25	.1562	3-1/2	2-1/2	5/16
180-01	.1875	3	2-1/2	5/16
180-26	.1875	4	2-1/2	5/16
180-02	.1875	6	2-1/2	5/16
180-03	.1910	3	2-1/2	5/16
180-27	.1910	4	2-1/2	5/16
180-04	.1910	6	2-1/2	5/16
180-05	.1960	3	2-1/2	5/16
180-28	.2500	2	2-1/2	3/8
180-06	.2500	3	2-1/2	3/8
180-07	.2500	4	2-1/2	3/8
180-08	.2500	6	2-1/2	3/8
180-09	.2570	3	2-1/2	3/8
180-29	.2570	4	2-1/2	3/8
180-30	.3125	2	2-1/2	7/16
180-10	.3125	3-1/2	3	7/16
180-31	.3125	4	3	7/16
180-11	.3125	6	3	7/16
180-32	.3750	3	2-1/2	1/2
180-12	.3750	4	3-1/2	1/2
180-33	.3750	5	3-1/2	1/2
180-13	.3750	6	3-1/2	1/2
180-34	.3750	7	3-1/2	1/2
180-14	.4375	4	3-1/2	9/16
180-35	.4375	5	3-1/2	9/16
180-15	.4375	6	3-1/2	9/16
180-16	.5000	4	3-1/2	5/8
180-36	.5000	5	3-1/2	5/8
180-17	.5000	6	3-1/2	5/8

L - PINS - CONTINUED

Case Hardened and Ground - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
180-37	.5000	7	3-1/2	5/8
180-38	.5000	9	3-1/2	5/8
180-18	.5625	4	3-1/2	5/8
180-19	.5625	6	3-1/2	5/8
180-20	.6250	6	3-1/2	7/8
180-39	.6250	8	3-1/2	7/8
180-21	.7500	6	3-1/2	7/8

METRIC L - PINS

Case Hardened and Ground - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
180-50	4	88	64	8
180-52	5	76	64	8
180-54	5	152	64	8
180-56	6	76	64	10
180-58	6	152	64	10
180-60	8	88	76	11
180-62	8	152	76	11
180-64	10	76	64	13
180-66	10	152	88	13
180-68	12	102	88	16
180-70	12	152	88	16
180-72	16	152	88	22
180-74	16	204	88	22
180-76	20	152	88	22
180-78	20	204	88	22

T-PINS

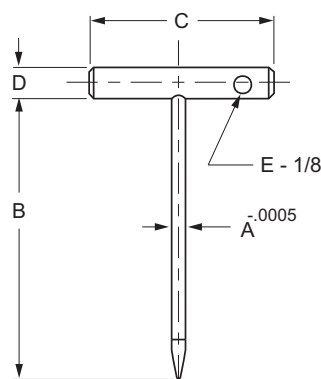
"T" PINS are quick removing locating devices for precision alignment of work pieces in jigs and fixtures.

"T" handle offers a better grip for easy removal.

"T" PINS can be ordered with an optional nylon covered steel cable for attachment at Point "E" for connecting pins to jigs and fixtures.

(Specify part number and add A i.e.: **181-00A**)

- Add the price of 190-00 cable.
- Handle is drilled to receive pin, which allows pin to be used all the way to the handle.



T - PINS

Case Hardened and Ground - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
181-00	.1250	2-1/2	1-1/2	1/4
181-25	.1562	3-1/2	2-1/2	5/16
181-01	.1875	3	2-1/2	5/16
181-26	.1875	4	2-1/2	5/16
181-02	.1875	6	2-1/2	5/16
181-03	.1910	3	2-1/2	5/16
181-27	.1910	4	2-1/2	5/16
181-04	.1910	6	2-1/2	5/16
181-05	.1960	3	2-1/2	5/16
181-28	.2500	2	2-1/2	3/8
181-06	.2500	3	2-1/2	3/8
181-07	.2500	4	2-1/2	3/8
181-08	.2500	6	2-1/2	3/8
181-09	.2570	3	2-1/2	3/8
181-29	.2570	4	2-1/2	3/8
181-30	.3125	2	2-1/2	7/16
181-10	.3125	3-1/2	3	7/16
181-31	.3125	4	3	7/16
181-11	.3125	6	3	7/16
181-32	.3750	3	2-1/2	1/2
181-12	.3750	4	3-1/2	1/2
181-33	.3750	5	3-1/2	1/2
181-13	.3750	6	3-1/2	1/2
181-34	.3750	7	3-1/2	1/2
181-14	.4375	4	3-1/2	9/16
181-35	.4375	5	3-1/2	9/16
181-15	.4375	6	3-1/2	9/16
181-16	.5000	4	3-1/2	5/8
181-36	.5000	5	3-1/2	5/8
181-17	.5000	6	3-1/2	5/8

T - PINS - CONTINUED

Case Hardened and Ground - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
181-37	.5000	7	3-1/2	5/8
181-38	.5000	9	3-1/2	5/8
181-18	.5625	4	3-1/2	5/8
181-19	.5625	6	3-1/2	5/8
181-20	.6250	6	3-1/2	7/8
181-39	.6250	8	3-1/2	7/8
181-21	.7500	6	3-1/2	7/8

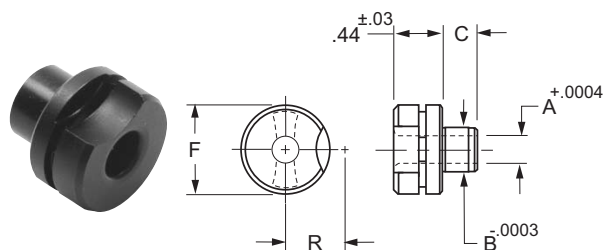
METRIC T - PINS

Case Hardened and Ground - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
181-50	4	88	64	8
181-52	5	76	64	8
181-54	5	152	64	8
181-56	6	76	64	10
181-58	6	152	64	10
181-60	8	88	76	11
181-62	8	152	76	11
181-64	10	76	64	13
181-66	10	152	88	13
181-68	12	102	88	16
181-70	12	152	88	16
181-72	16	152	88	22
181-74	16	204	88	22
181-76	20	152	88	22
181-78	20	204	88	22

LOCKING PINS AND BUSHINGS

Locking pin assemblies stay with the fixture until manually removed. The spring clip holds the pin in position and may be raised or lowered while completely in the bushing. Thus allowing work pieces to be moved freely between the plates in the jig. LS -1 Lock Screws are used to keep the bushing from unintentional removals from the fixture plate.



Spring Clips are included. LS -1 Lock Screws not included.

LOCKING PIN BUSHINGS

Case Hardened and Ground - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	F	R
182-20	.1868	.4078	5/16	13/16	5/8
182-23	.2493	.4078	5/16	13/16	5/8
182-24	.2493	.4078	1/2	13/16	5/8
182-26	.3118	.5017	5/16	13/16	5/8
182-27	.3118	.5017	3/8	13/16	5/8
182-28	.3118	.5017	1/2	13/16	5/8
182-29	.3743	.6267	5/16	13/16	5/8
182-30	.3743	.6267	1/2	13/16	5/8
182-32	.4993	.7518	1/2	1-1/16	3/4
182-34	.4993	.7518	3/4	1-1/16	3/4

LOCKING PINS

Case Hardened and Ground - Black Oxide Finish

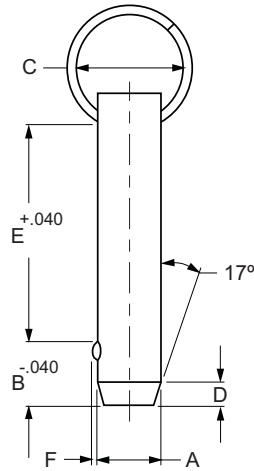
P/N		DIMENSIONS			
T - PINS	L - PINS	A	H	J	S
182-00	183-00	.1865	5/16	1-1/2	2-1/2
182-01	183-01	.1865	5/16	2	2-1/2
182-02	183-02	.1865	5/16	3	2-1/2
182-03	183-03	.2490	3/8	2	2-1/2
182-04	183-04	.2490	3/8	3	2-1/2
182-05	183-05	.2490	3/8	4	2-1/2
182-06	183-06	.3115	7/16	2	3
182-07	183-07	.3115	7/16	3-1/2	3
182-08	183-08	.3115	7/16	6	3
182-09	183-09	.3740	1/2	2	3-1/2
182-10	183-10	.3740	1/2	4	3-1/2
182-11	183-11	.3740	1/2	6	3-1/2
182-12	183-12	.4990	5/8	2	3-1/2
182-13	183-13	.4990	5/8	4	3-1/2
182-14	183-14	.4990	5/8	6	3-1/2

LOCKING PIN AND BUSHING ASSEMBLY

ASSEMBLIES T - PIN	ASSEMBLIES L - PIN	T-PIN PIN	L-PIN PIN	BUSHINGS	NOMINAL
182-40	183-40	182-00	183-00	182-20	3/16 x 1-1/2
182-41	183-41	182-01	183-01	182-20	3/16 x 2
182-42	183-42	182-02	183-02	182-20	3/16 x 3
182-43	183-43	182-03	183-03	182-23	1/4 x 2
182-44	183-44	182-04	183-04	182-24	1/4 x 3
182-45	183-45	182-05	183-05	182-24	1/4 x 4
182-46	183-46	182-06	183-06	182-26	5/16 x 2
182-47	183-47	182-07	183-07	182-27	5/16 x 3-1/2
182-48	183-48	182-08	183-08	182-28	5/16 x 6
182-49	183-49	182-09	183-09	182-29	3/8 x 2
182-50	183-50	182-10	183-10	182-30	3/8 x 4
182-51	183-51	182-11	183-11	182-30	3/8 x 6
182-52	183-52	182-12	183-12	182-32	1/2 x 2
182-53	183-53	182-13	183-13	182-34	1/2 x 4
182-54	183-54	182-14	183-14	182-34	1/2 x 6

DETENT PINS

The Ball Detent depresses and springs up for the “quick release” applications. They are used as a convenient way to adjust or remove accessories on equipment. This design is low cost and superior in its resistance to foreign material contamination which would shorten the ball life. Rigid quality control procedures ensure a consistent fastener you can count on.



DETENT RING PIN TOLERANCES

A	DIMENSIONS		
	DIAMETER TOLERANCES BEFORE PLATING COLD FINISHED ROUNDS ‡	BALL DIAMETER	BALL COMPRESSION LOAD, LBS *
3/16	.1855 - .1875	3/32	4-7
1/4	.2480 - .2500	1/8	7-11
5/16	.3105 - .3125	5/32	10-14
3/8	.3730 - .3750	3/16	14-18
7/16	.4355 - .4375	7/32	14-18
1/2	.4980 - .5000	1/4	16-20
5/8	.6230 - .6250	1/4	20-25
3/4	.7480 - .7500	3/8	20-25

* Ball Compression Load is the force required to compress the ball flush to the shank

‡ The plating will typically add .0002" - .0005" to the diameter

NOTE: Unless otherwise noted, All of the above dimensions are for reference only

DETENT RING PINS

Stainless Steel Ball - Carbon Steel - Zinc Plated

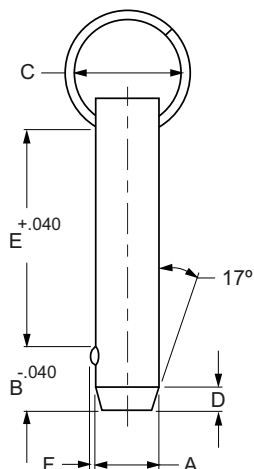
P/N	DIMENSIONS					
	A	B	C	D	E	F
184-00	3/16	.234	7/8	.078	13/16	.028
184-01	3/16	.234	7/8	.078	1	.028
184-02	3/16	.234	7/8	.078	1-5/16	.028
184-03	3/16	.234	7/8	.078	1-1/2	.028
184-04	3/16	.234	7/8	.078	1-13/16	.028
184-05	3/16	.234	7/8	.078	2	.028
184-06	1/4	.281	1	.094	3/4	.038
184-07	1/4	.281	1	.094	1	.038
184-08	1/4	.281	1	.094	1-1/4	.038
184-09	1/4	.281	1	.094	1-1/2	.038
184-10	1/4	.281	1	.094	1-3/4	.038
184-11	1/4	.281	1	.094	2	.038
184-12	1/4	.281	1	.094	1-1/4	.038
184-13	1/4	.281	1	.094	1-1/2	.038
184-14	1/4	.281	1	.094	1-3/4	.038
184-15	1/4	.281	1	.094	3	.038
184-16	5/16	.341	1	.125	5/8	.047
184-17	5/16	.341	1	.125	3/4	.047
184-18	5/16	.341	1	.125	1	.047
184-19	5/16	.341	1	.125	1-1/8	.047
184-20	5/16	.341	1	.125	1-1/2	.047
184-21	5/16	.341	1	.125	1-5/8	.047
184-22	5/16	.341	1	.125	2	.047
184-23	5/16	.341	1	.125	2-1/8	.047

DETENT RING PINS - CONTINUED

Stainless Steel Ball - Carbon Steel - Zinc Plated

P/N	DIMENSIONS					
	A	B	C	D	E	F
184-24	5/16	.341	1	.125	2-1/2	.047
184-25	5/16	.341	1	.125	3	.047
184-26	5/16	.391	1	.125	3-1/8	.047
184-27	3/8	.391	1	.141	5/8	.056
184-28	3/8	.391	1	.141	1	.056
184-29	3/8	.391	1	.141	1-1/8	.056
184-30	3/8	.391	1	.141	1-1/2	.056
184-31	3/8	.391	1	.141	1-5/8	.056
184-32	3/8	.391	1	.141	2	.056
184-33	3/8	.391	1	.141	2-1/8	.056
184-34	3/8	.391	1	.141	2-1/2	.056
184-35	3/8	.391	1	.141	2-5/8	.056
184-36	3/8	.391	1	.141	3	.056
184-37	3/8	.391	1	.141	3-1/8	.056
184-38	3/8	.391	1	.141	1	.056
184-39	7/16	.438	1	.156	2	.066
184-40	7/16	.438	1	.156	2-1/16	.066
184-41	7/16	.438	1	.156	2-1/2	.066
184-42	7/16	.438	1	.156	2-9/16	.066
184-43	7/16	.438	1	.156	3	.066
184-44	7/16	.438	1	.156	1/2	.066
184-45	7/16	.438	1	.156	1	.066
184-46	1/2	.484	1-1/4	.172	1-1/2	.075
184-47	1/2	.484	1-1/4	.172	1-1/2	.075

DETENT RING PINS



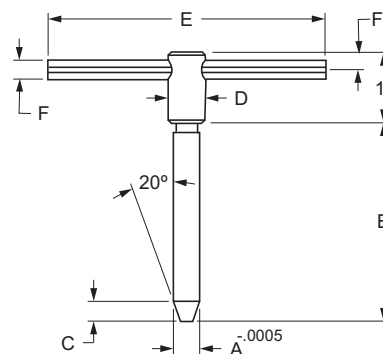
FERRULES FOR CABLES

P/N	DIMENSIONS	
	LENGTH	WIDTH
201-00	.32	1/16
201-05	.57	1/16
202-00	.43	3/32

DETENT RING PINS - CONTINUED

Stainless Steel Ball - Carbon Steel - Zinc Plated

P/N	DIMENSIONS					
	A	B	C	D	E	F
184-48	1/2	.484	1-1/4	.172	2	.075
184-49	1/2	.484	1-1/4	.172	2-1/2	.075
184-50	1/2	.500 or .562	1-1/4	.172	3	.075
184-51	5/8	.500 or .562	1-1/4	.188	1	.075
184-52	5/8	.500 or .562	1-1/4	.188	1-1/2	.075
184-53	5/8	.500 or .562	1-1/4	.188	2	.075
184-54	5/8	.500 or .562	1-1/4	.188	3	.075
184-55	5/8	.500 or .562	1-1/4	.188	4	.075
184-56	3/4	.563 or .625	1-1/2	.188	1	.100
184-57	3/4	.563 or .625	1-1/2	.188	2	.100
184-58	3/4	.563 or .625	1-1/2	.188	2-1/2	.100
184-59	3/4	.563 or .625	1-1/2	.188	3	.100
184-60	3/4	.563 or .625	1-1/2	.188	3-1/2	.100
184-61	3/4	.563 or .625	1-1/2	.188	4	.100



JIG PINS

Case Hardened and Ground - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
215-00	.1875	1-7/8	1/8	3/8	2	3/16
215-05	.2500	2	5/32	3/8	2	3/16
215-10	.3125	2-1/2	3/16	1/2	3	1/4
215-15	.3750	3-1/4	1/4	1/2	3	1/4
215-20	.5000	4	9/32	9/16	3	1/4

NOTE: The roll pin handle of the Jig Pin can be moved to make a "L" handle style.

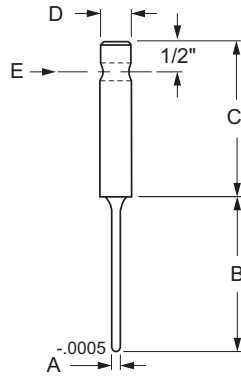


STEEL CABLE

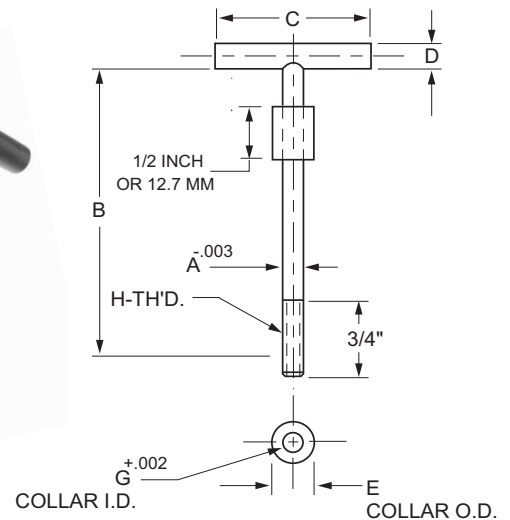
This ferrule is supplied uncrimped for installation.

P/N	DIMENSIONS	
	LENGTH	WIDTH
190-00	10" Nylon Covered Steel Cable	1/16" Dia.
191-00	10" Nylon Covered Steel Cable	3/32" Dia.
192-00	15" Nylon Covered Steel Cable	1/16" Dia.
193-00	15" Nylon Covered Steel Cable	3/32" Dia.
195-00	Uncut Nylon Covered Steel Cable	1/16" Dia.
196-00	Uncut Nylon Covered Steel Cable	3/32" Dia.

CLAMPING PINS



Used for clamping various thicknesses of material by adjusting the collar or bushing and brazing it in position. Will hold multiple layers of material.



JIG GAGE PINS

Steel Tips Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	E
216-00	.2500	2.5	2-5/8	1/2	1/4
216-05	.3125	2.5	2-5/8	9/16	1/4
216-10	.3750	4.0	2-5/8	5/8	1/4
216-15	.5000	3.0	2-5/8	3/4	5/16

CLAMPING PINS

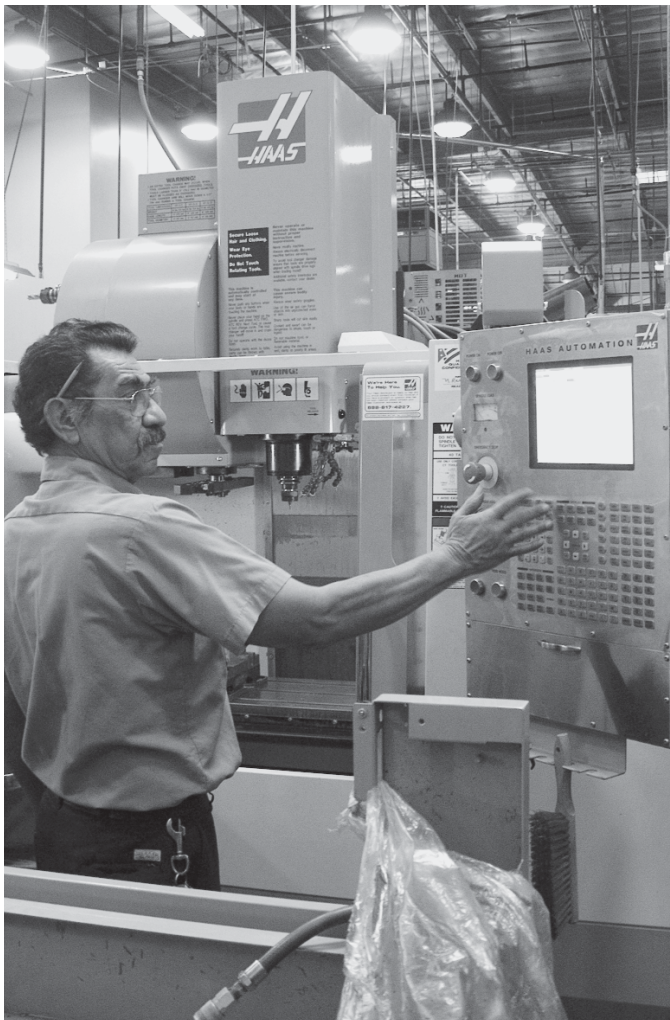
Black Oxide Finish

P/N	DIMENSIONS						
	A	B	C	D	E	G	H
250-00	.193	3	1-1/2	1/4	3/8	.203	10-24
250-05	.249	4	2-1/2	3/8	1/2	.252	1/4-20
250-10	.312	4	3	7/16	9/16	.315	5/16-18
250-15	.374	4-1/2	3-1/2	1/2	5/8	.378	3/8-16
250-20	.499	5	3-1/2	5/8	3/4	.503	1/2-13
250-25	.499	7	3-1/2	5/8	3/4	.503	1/2-13
250-30	.624	5-1/2	3-1/2	3/4	7/8	.628	5/8-11
250-35	.749	6	3-1/2	7/8	1	.753	3/4-10

METRIC CLAMPING PINS

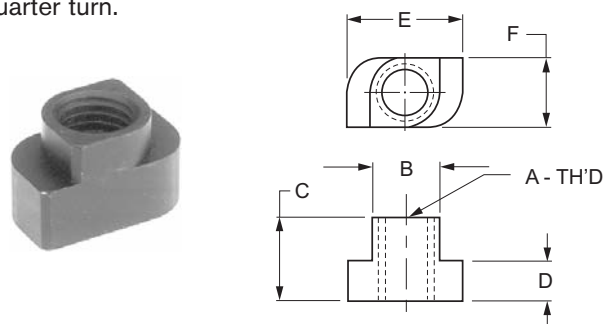
Black Oxide Finish

P/N	DIMENSIONS						
	A	B	C	D	E	G	H
250-50	6mm	102mm	64mm	6.4mm	12.7mm	6.40mm	M6
	.236	4	2-1/2	1/4	1/2	.252	
250-55	8mm	102mm	76mm	11.1mm	14.3mm	8.00mm	M8
	.315	4	3	7/16	9/16	.315	
250-60	10mm	114mm	89mm	12.7mm	15.9mm	9.60mm	M10
	.394	4-1/2	3-1/2	1/2	5/8	.378	
250-65	12mm	127mm	89mm	15.9mm	19.1mm	12.77mm	M12
	.472	5	3-1/2	5/8	3/4	.503	



T-SLOT NUTS

The Quarter Turn T-Slot Nut is easy to use. A stud or bolt can be installed directly into the slot and then given a quarter turn. The Quarter Turn T-slot Nut can also be inserted as shown. Simply place it in the slot and rotate a quarter turn.



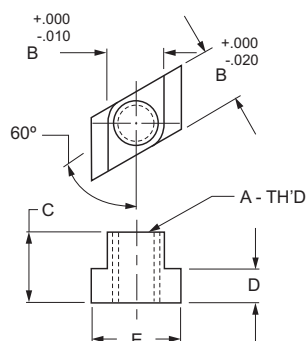
UNIQUE QUARTER TURN T-SLOT NUT

Hot Forged - Case Hardened - Black Oxide Finish

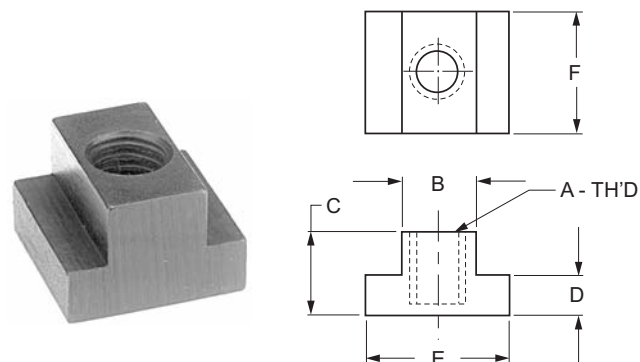
P/N	DIMENSIONS					
	A	B	C	D	E	F
255-15*	3/4-10	1	1	5/8	1-5/8	1

* Discontinued but available while supplies last.

- Add studs and clamp straps without tearing down previous set-ups.
- Supplements standard T-Slot Nuts.
- Seven sizes are available, covering 3/8", 1/2", 5/8" and 3/4" stud diameter slot width.
- Last thread is closed.



The last thread on the T-Solt is incomplete to prevent the stud from turning through to the bottom of the machining table. Run the stud to the bottom though for maximum hold. Tapped through T-Slot Nuts are also available. To order tapped through, add a "T" after the part number. Special sizes are quoted on request.



METRIC T-SLOT NUTS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS						
	A	B METRIC	*B INCH	C	D	E	F
259-00	M6 x 1.00	8	5/16	10	6	14	19
259-01	M6 x 1.00	10	7/16	11	6	16	22
259-02	M8 x 1.25	10	7/16	11	6	16	22
259-03	M10 x 1.50	12	1/2	13	7	19	22
259-04	M10 x 1.50	14	9/16	16	9	22	29
259-05	M12 x 1.75	14	9/16	16	9	22	29
259-06	M12 x 1.75	16	5/8	16	9	25	29
259-07	M12 x 1.75	17	11/16	19	11	29	32
259-08	M16 x 2.00	18	3/4	19	11	29	32
259-09	M16 x 2.00	20	13/16	25	14	32	38
259-10	M20 x 2.50	22	7/8	25	14	35	38

* Metric T-Slot Nut will fit the inch machine T-Slots.

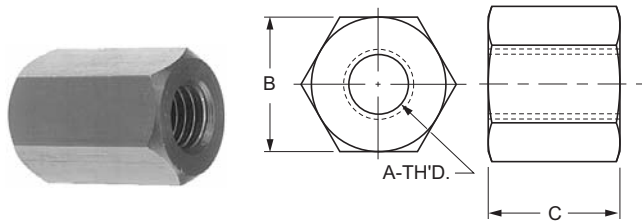
ROTARY T-SLOT NUT

Case Hardened - Heat Treated - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	Table Slot
255-20	3/8-16	.495	1/2	9/32	7/8	1/2
255-22	1/2-13	.557	5/8	11/32	7/8	9/16
255-24	1/2-13	.620	5/8	11/32	1	5/8
255-26	1/2-13	.682	3/4	7/16	1-1/8	11/16
255-28	5/8-11	.682	3/4	7/16	1-1/8	11/16
255-30	5/8-11	.745	3/4	15/32	1-1/8	3/4
255-32	3/4-10	.995	1	5/8	1-5/8	1

NUTS AND T-SLOT NUTS

Coupling Nuts can be used to join two or more studs to achieve the desired length.

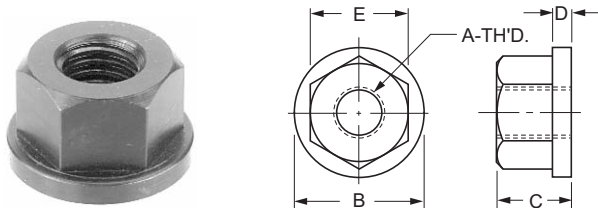


METRIC COUPLING EXTENSION NUT

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS		
	A	B	C
259-15	M6 x 1.00	13	16
259-16	M8 x 1.25	14	19
259-17	M10 x 1.50	16	24
259-18	M12 x 1.75	22	32
259-19	M16 x 2.00	27	40
259-20	M20 x 2.50	32	51

Flange Nuts will equalize thread loads when used with a spherical washers.

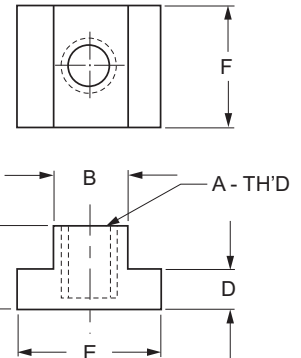


METRIC FLANGE NUT

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	E
259-25	M6 x 1.00	16	8	2.0	10
259-26	M8 x 1.25	19	10	2.5	13
259-27	M10 x 1.50	22	13	3.0	17
259-28	M12 x 1.75	27	17	4.0	19
259-29	M16 x 2.00	33	21	5.0	24
259-30	M20 x 2.50	40	25	6.0	30

The last thread on the T-Slot is incomplete to prevent the stud from turning through the bottom of the machining table. Run the stud to the bottom though for maximum hold. Tapped through T-Slot Nuts are also available. To order tapped through, add a "T" after the part number. Special Sizes are quoted on request.



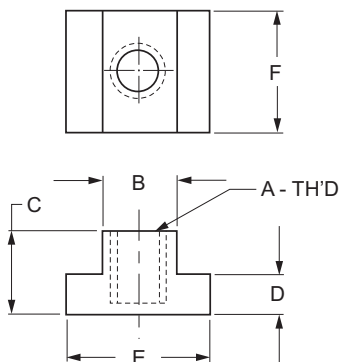
T-SLOT NUTS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS						
	A	B METRIC	*B INCH	C	D	E	F
259-97	5/16-18	12mm	7/16	1/2	9/32	7/8	7/8
259-98	5/16-18	10mm	3/8	1/2	3/16	5/8	7/8
259-99	5/16-18	13mm	1/2	1/2	9/32	7/8	7/8
260-00	1/4-20	8mm	5/16	1/4	3/16	9/16	9/16
260-01	1/4-20	10mm	3/8	3/8	15/16	9/16	9/16
260-02	5/16-18	10mm	3/8	3/8	1/4	5/8	7/8
260-03	3/8-16	12mm	7/16	1/2	7/32	11/16	7/8
260-04	3/8-16	12mm	1/2	1/2	9/32	7/8	7/8
260-05	3/8-16	15mm	9/16	5/8	11/32	7/8	1-1/8
260-06	7/16-14	13mm	1/2	1/2	9/32	7/8	7/8
260-07	7/16-14	13mm	1/2	3/8	7/32	3/4	7/8
260-08	1/2-13	15mm	9/16	5/8	11/32	7/8	1-1/8
260-09	1/2-13	16mm	5/8	5/8	11/32	1	1-1/8
260-10	1/2-13	16mm	5/8	3/4	3/8	1-1/8	1-1/8
260-11	1/2-13	18mm	11/16	3/4	7/16	1-1/8	1-1/4
260-12	1/2-13	20mm	3/4	3/4	15/32	1-1/4	1-1/4
260-13	5/8-11	18mm	11/16	3/4	7/16	1-1/8	1-1/4
260-14	5/8-11	20mm	3/4	3/4	15/32	1-1/4	1-1/4
260-15	3/4-10	21mm	13/16	1	9/16	1-1/4	1-1/2
260-16	3/4-10	21mm	13/16	1	9/16	1-1/4	1-1/2
260-17	3/4-10	23mm	7/8	1	9/16	1-1/2	1-1/2
260-18	3/4-10	26mm	1	1	5/8	1-5/8	1-3/4
260-19	3/4-10	26mm	1	1-1/2	3/4	1-3/4	1-3/4
260-20	3/4-10	27mm	1-1/16	1-1/8	11/16	1-5/8	2

* Inch T-Slot Nut will fit the metric machine T-Slots.

T-SLOT NUTS AND OTHER NUTS



T-SLOT NUTS - CONTINUED

Case Hardened - Black Oxide Finish

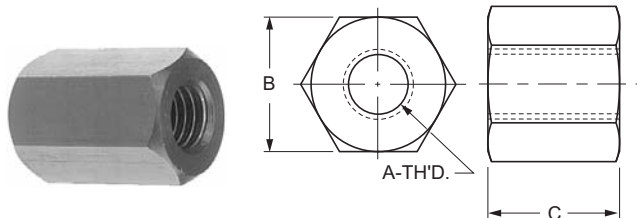
P/N	DIMENSIONS						
	A	B METRIC	*B INCH	C	D	E	F
260-21	7/8-9	26mm	1	1	5/8	1-5/8	1-3/4
260-22	7/8-9	27mm	1-1/16	1-1/8	11/16	1-5/8	2
260-23	7/8-9	28mm	1-1/8	1-1/2	3/4	1-3/4	2
260-24	1/8	27mm	1-1/16	1-1/8	11/16	1-5/8	2
260-25	1/8	32mm	1-1/8	1-1/2	3/4	1-3/4	2
260-26	1/8	32mm	1-1/4	1-1/4	7/8	2	2
260-27	7/8-9	34mm	1-5/16	1-1/4	15/16	2	2
260-28	1-8	34mm	1-5/16	1-1/4	15/16	2	2
260-30	1-1/4-7	36mm	1-3/8	1-3/4	1-1/8	2-1/2	2-1/2

STAINLESS STEEL T-SLOT NUTS

P/N	DIMENSIONS					
	A	*B INCH	C	D	E	F
260-50	1/4-20	5/16	1/4	3/16	1/2	9/16
260-51	5/16-18	3/8	3/8	1/4	5/8	7/8
260-52	3/8-16	7/16	3/8	13/64	5/8	7/8
260-53	3/8-16	1/2	1/2	9/32	7/8	7/8
260-54	1/2-13	9/16	1/2	11/32	7/8	1-1/8
260-55	1/2-13	5/8	5/8	11/32	1	1-1/8
260-56	1/2-13	11/16	3/4	7/16	1	1-1/4
260-57	5/8-11	11/16	3/4	7/16	1	1-1/4
260-58	5/8-11	3/4	3/4	15/32	1-1/4	1-1/4

* Inch T-Slot Nut will fit the metric machine T-Slots.

Coupling Nuts can be used to join two or more studs to achieve the desired length.

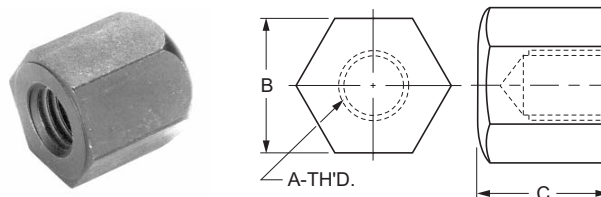


COUPLING EXTENSION NUT

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS		
	A	B	C
261-00	1/4-20	1/2	5/8
261-01	5/16-18	9/16	7/8
261-02	3/8-16	11/16	1
261-03	7/16-14	3/4	1-1/4
261-04	1/2-13	7/8	1-1/4
261-05	5/8-11	1-1/6	1-5/8
261-06	3/4-10	1-1/4	1-7/8
261-07	7/8-9	1-7/16	2-1/4
261-08	1-8	1-5/8	2-1/2
261-10	1-1/4-7	1-7/8	3

The closed end of the Acorn Nut protects the thread from damage and keeps out the grit and chips.

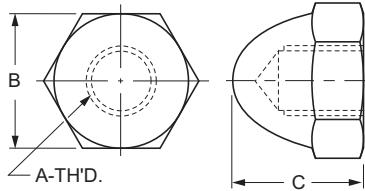


ACORN NUTS

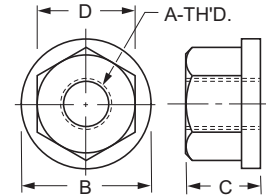
Case Hardened - Black Oxide Finish

P/N	DIMENSIONS		
	A	B	C
262-00	1/4-20	1/2	1/2
262-05	5/16-18	9/16	5/8
262-10	3/8-16	11/16	3/4
262-15	1/2-13	7/8	15/16
262-20	5/8-11	1-1/16	1-3/16
262-25	3/4-10	1-1/4	1-3/8
262-30	7/8-9	1-7/16	1-7/16

FLANGE NUTS AND WASHERS



Flange Nuts used when washers are not practical.



ACORN NUTS

Light - Low Crown - Case Hardened - Black Oxide Finish

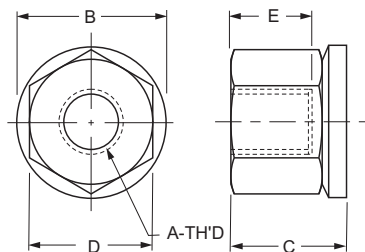
P/N	DIMENSIONS		
	A	B	C
262-50	10-24	3/8	13/32
262-52	1/4-20	7/16	15/32
262-54	5/16-18	1/2	17/32
262-56	3/8-16	9/16	5/8
262-58	7/16-14	5/8	11/16
262-60	1/2-13	3/4	13/16
262-62	9/16-12	7/8	15/16
262-64	5/8-11	15/16	1
262-66	3/4-10	1-1/16	1-5/32
262-68	7/8-9	1-1/4	1-23/64
262-70	1/8	1-7/16	1-35/64

FLANGE NUTS UNC

Course Thread - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
264-00	1/4-20	5/8	5/16	1/2
264-01	5/16-18	3/4	3/8	9/16
264-02	3/8-16	7/8	1/2	11/16
264-03	7/16-14	1	9/16	3/4
264-04	1/2-13	1-1/8	11/16	7/8
264-05	5/8-11	1-3/8	13/16	1-1/16
264-06	3/4-10	1-5/8	1	1-1/4
264-07	7/8-9	1-3/4	1-1/8	1-7/16
264-08	1-8	2	1-1/4	1-5/8
264-09	1-1/8-7	2-1/4	1-3/8	1-13/16
264-10	1-1/4-7	2-1/2	1-1/4	1-13/16

The Swivel Nut features a hardened pad that remains stationary upon contacting the part being clamped. This allows a rigid clamping without marring or moving of the part.



SWIVEL NUTS

Case Hardened - Black Oxide Finish

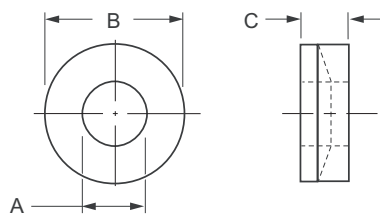
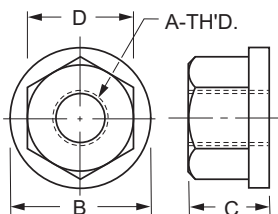
P/N	DIMENSIONS				
	A	B	C	D	E
263-00	10-24	5/16	5/16	1/4	13/64
263-05	1/4-20	3/8	13/32	5/16	3/16
263-10	5/16-18	7/16	15/32	3/8	1/4
263-15	3/8-16	1/2	17/32	7/16	17/64
263-20	1/2-13	11/16	21/32	5/8	3/8
263-25	5/8-11	7/8	27/32	3/4	7/16
263-30	3/4-10	1	1	7/8	1/2

FLANGE NUTS UNF

Fine Thread - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
265-00	1/4-28	5/8	5/16	1/2
265-01	5/16-24	3/4	3/8	9/16
265-02	3/8-24	7/8	1/2	11/16
265-03	7/16-20	1	9/16	3/4
265-04	1/2-20	1 1/8	11/16	7/8
265-05	5/8-18	1-3/8	13/16	1-1/16
265-06	3/4-16	1-5/8	1	1-1/4
265-07	7/8-14	1-3/4	1-1/8	1-7/16
265-08	1-14	2	1-1/4	1-5/8
265-09	1-1/8-12	2-1/4	1-3/8	1-13/16
265-10	1-1/4-12	2-1/2	1-1/4	1-13/16

FLANGE NUTS AND WASHERS



STAINLESS STEEL FLANGE NUTS

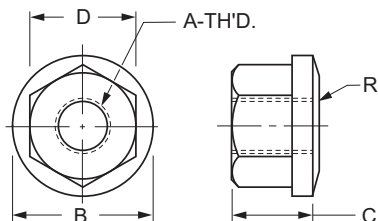
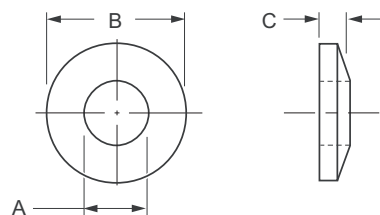
303 Stainless Steel

P/N	DIMENSIONS			
	A	B	C	D
266-00	1/4-20	5/8	5/16	1/2
266-01	5/16-18	3/4	3/8	9/16
266-02	3/8-16	7/8	1/2	11/16
266-03	7/16-14	1	9/16	3/4
266-04	1/2-13	1-1/8	11/16	7/8
266-05	5/8-11	1-3/8	13/16	1-1/16
266-06	3/4-10	1-5/8	1	1-1/4
266-07	7/8-9	1-3/4	1-1/8	1-7/16
266-08	1-8	2	1-1/4	1-5/8
266-09	1-1/4-7	2-1/2	1-1/4	1-13/16

STAINLESS STEEL SPHERICAL WASHER SETS

DIMENSIONS

P/N	A	B	C	STUD SIZE
268-85	9/32	5/8	3/16	3/16 & 1/4
268-86	13/32	7/8	1/4	3/8
268-87	17/32	1-1/8	5/16	7/16 & 1/2
268-88	21/32	1-3/8	5/16	5/8
268-89	25/32	1-5/8	3/8	3/4



STAINLESS STEEL SPHERICAL FLANGE NUTS

303 Stainless Steel

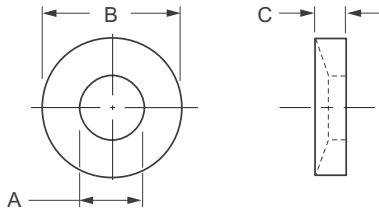
P/N	DIMENSIONS				
	A	B	C	D	R
268-70	1/4-20	5/8	5/16	1/2	3/4
268-72	5/16-18	3/4	3/8	9/16	1
268-74	3/8-16	7/8	1/2	11/16	1-1/4
268-76	1/2-13	1-1/8	11/16	7/8	1-1/2
268-78	5/8-11	1-3/8	13/16	1-1/16	1-3/4
268-80	3/4-10	1-5/8	1	1-1/4	2-1/4

STAINLESS STEEL SPHERICAL WASHER SETS TOP ONLY

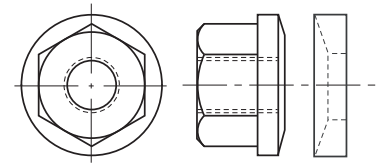
DIMENSIONS

P/N	A	B	C	STUD SIZE
268-90	9/32	5/8	1/8	3/16 & 1/4
268-91	13/32	7/8	9/64	3/8
268-92	17/32	1-1/8	13/64	7/16 & 1/2
268-93	21/32	1-3/8	13/64	5/8
268-94	25/32	1-5/8	1/4	3/4

FLANGE NUTS AND WASHERS



Assembly consists of 269-00 series and the bottom half of 276-00



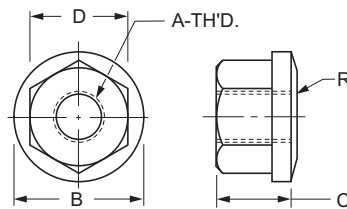
STAINLESS STEEL SPHERICAL WASHER SETS BOTTOM ONLY

P/N	DIMENSIONS			
	A	B	C	STUD SIZE
268-95	9/32	5/8	1/8	3/16 & 1/4
268-96	13/32	7/8	11/64	3/8
268-97	17/32	1-1/8	13/64	7/16 & 1/2
268-98	21/32	1-3/8	13/64	5/8
268-99	25/32	1-5/8	1/4	3/4

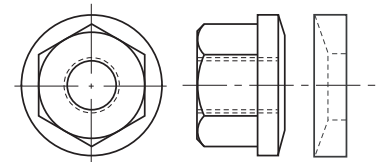
SPHERICAL FLANGE NUTS ASSEMBLIES

Case Hardened, Black Oxide Finish

P/N	DIMENSIONS		
	THREAD SIZE	P/N	THREAD SIZE
269-56	1/4-20	269-68	3/4-10
269-58	5/16-18	269-70	7/8-9
269-60	3/8-16	269-72	1-8
269-62	7/16-14	269-74	1-1/8-7
269-64	1/2-13	269-76	1-1/4-7
269-66	5/8-11		



Assembly consists of 268-70 series and the 268-95 series



SPHERICAL FLANGE NUTS

Case Hardened, Black Oxide Finish

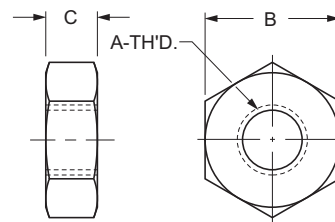
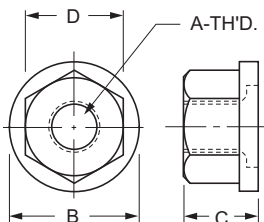
P/N	DIMENSIONS				
	A	B	C	D	R
269-00	1/4-20	5/8	5/16	1/2	3/4
269-05	5/16-18	3/4	3/8	9/16	1-1/4
269-10	3/8-16	7/8	1/2	11/16	1-1/4
269-15	7/16-14	1	9/16	3/4	1-1/2
269-20	1/2-13	1-1/8	11/16	7/8	1-1/2
269-25	5/8-11	1-3/8	13/16	1-1/16	1-3/4
269-30	3/4-10	1-5/8	1	1-1/4	2-1/4
269-35	7/8-9	1-3/4	1-1/8	1-7/16	2-1/2
269-40	1/8	2	1-1/4	1-5/8	2-3/4
269-45	1-1/8-7	2-1/4	1-1/4	1-13/16	3
269-50	1-1/4-7	2-1/2	1-1/4	1-13/16	3

STAINLESS STEEL SPHERICAL FLANGE NUTS ASSEMBLIES

416 Stainless Steel

P/N	DIMENSIONS	
	THREAD SIZE	TOTAL DEGREE OF ROTATION
269-80	1/4-20	5
269-81	5/16-18	5
269-82	3/8-16	3
269-83	1/2-13	4
269-84	5/8-11	2
269-85	3/4-10	2

FLANGE NUTS AND WASHERS



SWIVEL TYPE FLANGE NUTS

Case Hardened, Black Oxide Finish

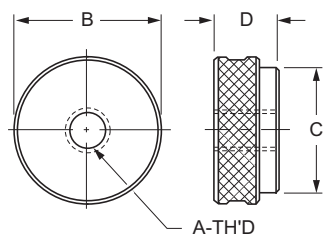
P/N	DIMENSIONS			
	A	B	C	D
270-00	1/4-20	5/8	3/8	1/2
270-05	5/16-18	3/4	7/16	9/16
270-10	3/8-16	7/8	17/32	11/16
270-15	1/2-13	1-1/8	23/32	7/8
270-20	5/8-11	1-3/8	29/32	1-1/16
270-25	3/4-10	1-5/8	1-1/64	1-1/4
270-30	7/8-9	1-3/4	1-1/8	1-7/16
270-35	1-8	2	1-15/64	1-5/8

HEAVY HEX NUTS

Case Hardened, Black Oxide Finish

P/N	DIMENSIONS		
	A	B	C
272-00	1/4-20	1/2	15/64
272-05	5/16-18	9/16	19/64
272-10	3/8-16	11/16	23/64
272-15	7/16-14	3/4	27/64
272-20	1/2-13	7/8	31/64
272-25	5/8-11	1-1/16	39/64
272-30	3/4-10	1-1/4	47/64
272-35	7/8-9	1-7/16	55/64
272-40	1-8	1-5/8	63/64
272-45	1-1/8-7	1-13/16	1-7/64
272-50	1-1/4-7	2	1-7/32

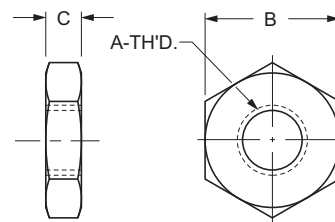
Check Nuts prevent backing off during operation due to chatter or vibration. Check Nuts can be used in conjunction with many other components such as Knurled Head Screws, Torque Head Screws, Hand Knob Assemblies, Toggle Shoe Assemblies and many other tooling applications. They are furnished with all Torque Head Screws and Swivel Pads.



CHECK NUTS

Case Hardened, Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
271-00	10-32	3/4	7/16	3/16
271-05	1/4-20	3/4	1/2	7/32
271-10	5/16-18	3/4	1/2	1/4
271-15	3/8-16	1	3/4	7/16
271-20	1/2-13	1	3/4	7/16
271-25	5/8-11	1-1/16	13/16	1/2



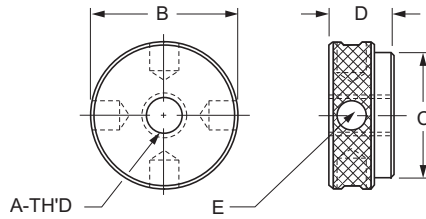
HEAVY HEX JAM NUTS

Case Hardened, Black Oxide Finish

P/N	DIMENSIONS		
	A	B	C
273-00	1/4-20	1/2	11/64
273-05	5/16-18	9/16	13/64
273-10	3/8-16	11/16	15/64
273-15	7/16-14	3/4	17/64
273-20	1/2-13	7/8	19/64
273-25	5/8-11	1-1/16	23/64
273-30	3/4-10	1-1/4	27/64
273-35	7/8-9	1-7/16	31/64
273-40	1-8	1-5/8	35/64
273-45	1-1/8-7	1-13/16	39/64
273-50	1-1/4-7	2	23/32

FLANGE NUTS AND WASHERS

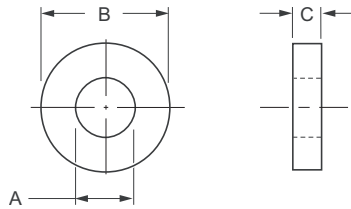
Many sizes functionally interchange or conform to TCMA standards.



KNURLED LOCK NUTS

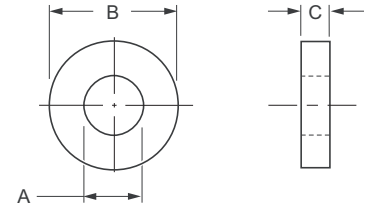
Case Hardened, Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	E
274-00	3/8-16	1-1/8	1"	1/2	"1/4" - DRILL
274-05	1/2-13	1-1/8	1"	1/2	"1/4" - DRILL
274-10	5/8-11	1-3/8	1"	1/2	"F" - DRILL



STAINLESS STEEL FLAT WASHERS

P/N	DIMENSIONS			
	A	B	C	STUD SIZE
274-50	13/64	1/2	3/32	3/16
274-51	9/32	5/8	1/8	1/4
274-52	11/32	3/4	1/8	5/16
274-53	13/32	7/8	1/8	3/8
274-54	15/32	1	1/8	7/16
274-55	17/32	1-1/8	1/8	1/2
274-56	21/32	1-3/8	1/8	5/8
274-57	25/32	1-5/8	5/32	3/4
274-58	29/32	1-3/4	5/32	7/8
274-59	1-1/32	2	3/16	1
274-60	1-5/32	2-1/4	7/32	1-1/8
274-71	1-9/32	2-1/2	9/32	1-1/4



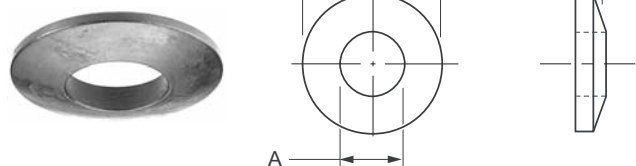
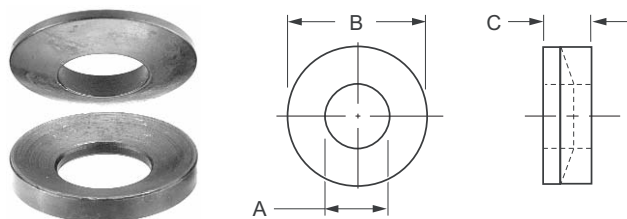
FLAT WASHERS

Case Hardened, Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	STUD SIZE
275-00	13/64	1/2	3/32	3/16
275-01	1/8	5/16	5/64	#4
275-02	5/32	3/8	5/64	#6
275-03	3/16	7/16	5/64	#8
275-05	9/32	5/8	1/8	1/4
275-10	11/32	3/4	1/8	5/16
275-12	11/32	3/4	3/16	5/16
275-15	13/32	7/8	1/8	3/8
275-16	13/32	7/8	3/16	3/8
275-20	15/32	1	1/8	7/16
275-25	17/32	1-1/8	1/8	1/2
275-27	17/32	1-1/8	3/16	1/2
275-30	21/32	1-3/8	1/8	5/8
275-32	21/32	1-3/8	3/16	5/8
275-35	25/32	1-5/8	5/32	3/4
275-37	25/32	1-5/8	1/4	3/4
275-40	29/32	1-3/4	5/32	7/8
275-42	29/32	1-3/4	1/4	7/8
275-45	1-1/32	2	3/16	1
275-47	1-1/32	2	9/32	1
275-50	1-5/32	2-1/4	7/32	1-1/8
275-55	1-9/32	2-1/2	9/32	1-1/4

WASHERS

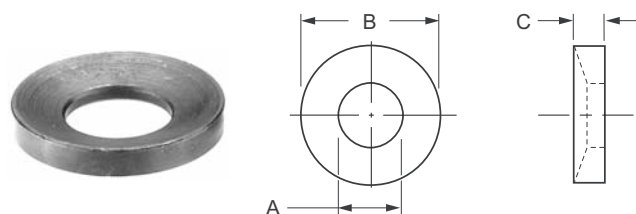
Spherical washers assist in more even fastening on parts not completely aligned.



SPHERICAL WASHER TOP ONLY

Case Hardened, Black Oxide Finish

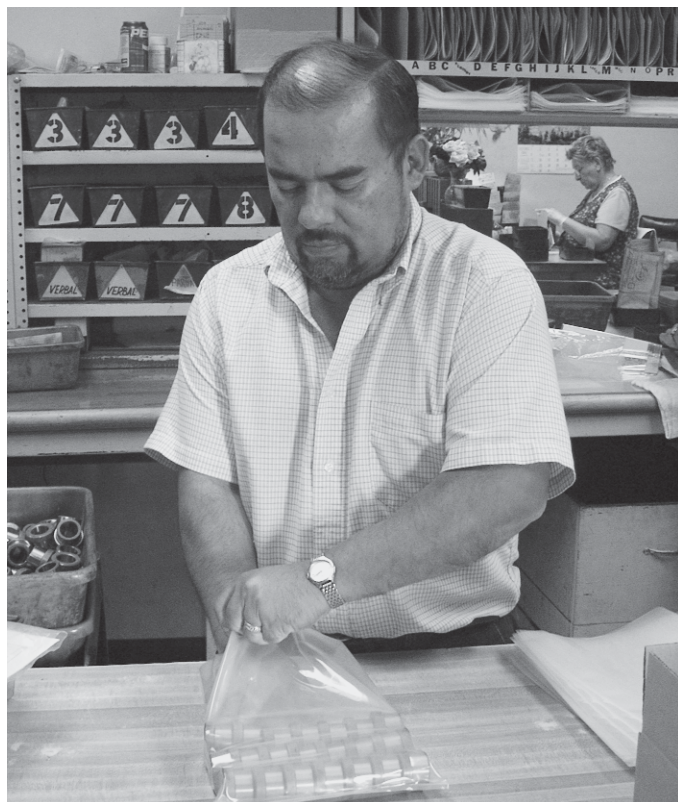
P/N	DIMENSIONS			
	A	B	C	STUD SIZE
276-20	9/32	5/8	1/8	3/16 & 1/4
276-30	11/32	3/4	5/32	5/16
276-21	13/32	7/8	9/64	3/8
276-22	17/32	1-1/8	3/16	7/16 & 1/2
276-23	21/32	1-3/8	3/16	5/8
276-24	25/32	1-5/8	7/32	3/4
276-25	15/16	1-3/4	1/4	7/8
276-26	1-1/16	2	11/32	1
276-27	1-3/16	2-1/4	19/64	1-1/8
276-28	1-5/16	2-5/8	11/32	1-1/4
276-29	1-9/16	2-7/8	23/64	1-1/2



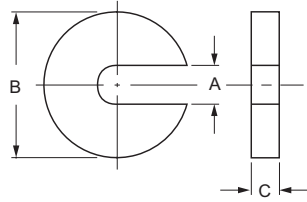
SPHERICAL WASHER BOTTOM ONLY

Case Hardened, Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	STUD SIZE
276-40	5/16	5/8	1/8	3/16 & 1/4
276-50	3/8	3/4	5/32	5/16
276-41	7/16	7/8	5/32	3/8
276-42	9/16	1-1/8	7/32	7/16 & 1/2
276-43	11/16	1-3/8	7/32	5/8
276-44	13/16	1-5/8	9/32	3/4
276-45	1	1-3/4	1/4	7/8
276-46	1-1/8	2	5/16	1
276-47	1-1/4	2-1/4	11/32	1-1/8
276-48	1-3/8	2-5/8	23/64	1-1/4
276-49	1-5/8	2-7/8	27/64	1-1/2



WASHERS & EYEBOLTS



Rod End Tooling Eye bolts are ideal for applications not requiring flat contact with the head. They are used as a stationary hinge point for cams or similar items and in applications where the bolt must be pivoted. These can be used with Spherical Flange Assemblies and Clamping Assemblies.

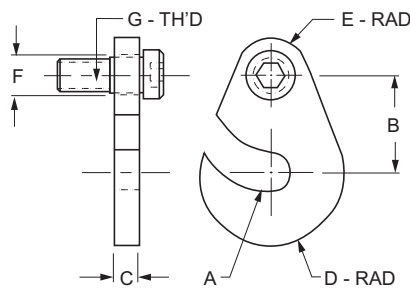
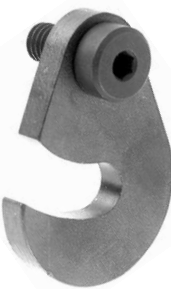
C-WASHERS

Case Hardened, Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	STUD SIZE
277-00	9/32	3/4	1/4	3/16-1/4
277-05	9/32	1	1/4	3/16-1/4
277-10	11/32	1-1/4	5/16	5/16
277-15	13/32	1-1/4	3/8	5/16-3/8
277-20	13/32	1-1/2	3/8	5/16-3/8
277-25	13/32	1-3/4	3/8	5/16-3/8
277-30	17/32	1-7/8	3/8	7/16-1/2
277-35	17/32	2-1/4	3/8	7/16-1/2
277-40	21/32	2-1/8	3/8	5/8
277-45	25/32	2-1/2	7/16	3/4

Swing C-Washers are intended for use in repetitive clamping applications requiring frequent insertions and removals of parts being clamped. The diameter of the screws acts on the Precision Shoulder as a pivot pin.

Swing C-Washers are available with a seat for Spherical Flange Nuts. Add "D" after the part number.



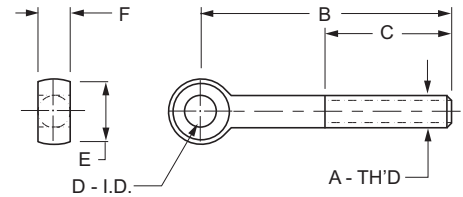
SWING C-WASHERS

Case Hardened, Black Oxide Finish

P/N	SCREW P/N	DIMENSIONS						
		A	B	C	D	E	F	G
278-00	124-16	13/32	1	1/4	3/4	3/8	3/8	5/16-18
278-05	124-17	17/32	1-1/4	5/16	1	1/2	3/8	5/16-18
278-10	124-24	21/32	1-1/2	3/8	1-1/8	9/16	1/2	3/8-16
278-15	124-25	25/32	1-3/4	1/2	1-1/4	5/8	1/2	3/8-16

FEATURES & BENEFITS

- Fully machined eye bolt provides tolerance for assembly.



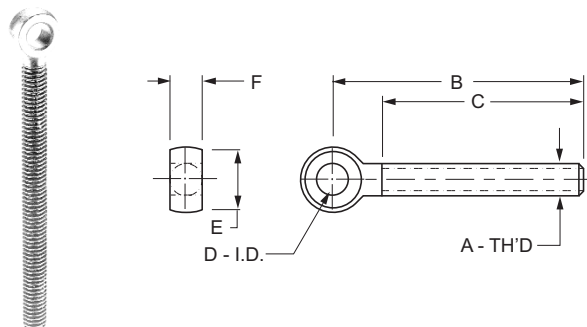
STAINLESS STEEL TOOLING EYE BOLT

Standard Thread Length - 304 Stainless Steel

P/N	DIMENSIONS					
	A	B	C	D	E	F
278-25	5/16-18	1.5	7/8	5/16	11/16	5/16
278-27	3/8-16	3.0	1-1/2	3/8	3/4	3/8
278-28	3/8-16	4.0	1-1/2	3/8	3/4	3/8
278-30	1/2-13	4.0	1-1/2	1/2	1	1/2
278-31	1/2-13	5.0	1-1/2	1/2	1	1/2
278-32	1/2-13	6.0	1-1/2	1/2	1	1/2
278-33	5/8-11	5.0	1-3/4	5/8	1-1/4	5/8
278-34	5/8-11	6.0	1-3/4	5/8	1-1/4	5/8
278-35	5/8-11	7.0	1-3/4	5/8	1-1/4	5/8
278-36	5/8-11	8.0	1-3/4	5/8	1-1/4	5/8
278-37	3/4-10	5.0	1-3/4	3/4	1-1/2	3/4
278-38	3/4-10	6.0	1-3/4	3/4	1-1/2	3/4
278-39	3/4-10	7.0	1-3/4	3/4	1-1/2	3/4
278-40	3/4-10	8.0	1-3/4	3/4	1-1/2	3/4

EYE BOLTS

The extended thread length Eye Bolts allows for shortening while maintaining enough to cover many applications.



STAINLESS STEEL FULL THREAD TOOLING EYE BOLT

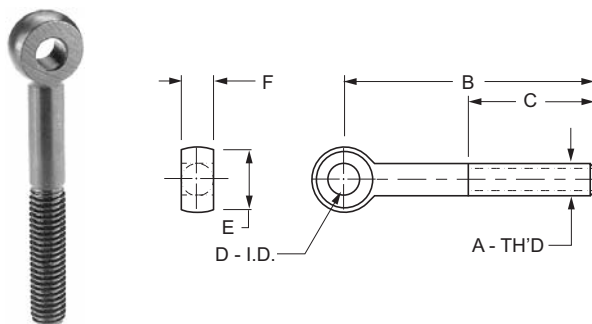
Extended Thread Length - 304 Stainless Steel

P/N	DIMENSIONS					
	A	B	C	D	E	F
278-44	1/4-20	3	2-1/4	1/4	1/2	1/4
278-45	5/16-18	4	3-1/4	5/16	5/8	5/16
278-46	3/8-16	5	4-1/4	3/8	3/4	3/8
278-47	1/2-13	5	4	1/2	1	1/2
278-48	5/8-11	6	5-1/4	5/8	1-1/4	5/8
278-49	3/4-10	6	5-1/8	3/4	1-1/2	3/4

Rod End Tooling Eye bolts are ideal for applications not requiring flat contact with the head. They are used as a stationary hinge point for cams or similar items and in applications where the bolt must be pivoted. These can be used with Spherical Flange Assemblies and Clamping Assemblies.

FEATURES & BENEFITS

- Fully machined eyebolt provides tolerance for assembly.



TOOLING EYE BOLT

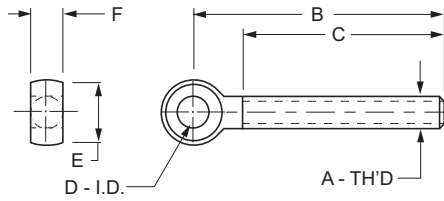
Standard Thread Length - Forged Chrom-moly Steel - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
279-00	1/4-20	2	3/4	3/16	1/2	1/4
279-01	1/4-20	3	1-1/4	3/16	1/2	1/4
279-02	5/16-18	3	1-1/2	1/4	5/8	5/16
279-03	5/16-18	4	2	1/4	5/8	5/16
279-04	5/16-18	3	1-1/2	5/16	5/8	5/16
279-05	5/16-18	4	2	5/16	5/8	5/16
279-06	3/8-16	3	1-1/2	5/16	3/4	3/8
279-07	3/8-16	3	1-1/2	3/8	3/4	3/8
279-08	3/8-16	3-3/4	2	3/8	3/4	3/8
279-09	3/8-16	5	2-1/2	3/8	3/4	3/8
279-10	1/2-13	3-3/4	1-1/2	3/8	1	1/2
279-11	1/2-13	5	2	3/8	1	1/2
279-12	5/8-11	4-1/2	2	5/8	1-1/4	5/8
279-13	5/8-11	6	2-1/2	5/8	1-1/4	5/8
279-14	3/4-10	4-1/2	2	3/4	1-1/2	3/4
279-15	3/4-10	6	2-1/2	3/4	1-1/2	3/4
279-16	1-8	10	FULL THREAD	5/8	2	1



EYE BOLTS

The extended thread length Eye Bolts allows for shortening while maintaining enough to cover many applications.



FULL THREAD TOOLING EYE BOLT

Extended Thread Length - Forged Chrom-moly Steel - Black Oxide Finish

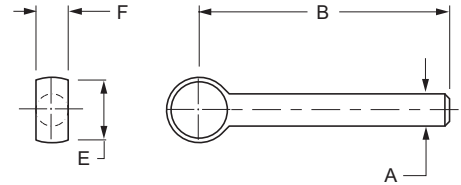
P/N	DIMENSIONS					
	A	B	C	D	E	F
279-25	1/4-20	3	2-1/4	3/16	1/2	1/4
279-28	5/16-18	4	3-1/2	5/16	5/8	5/16
279-31	3/8-16	5	4-1/2	3/8	3/4	3/8
279-34	1/2-13	5	4-1/2	3/8	1	1/2
279-37	5/8-11	6	5-1/2	5/8	1-1/4	5/8
279-40	3/4-10	6	5-1/2	3/4	1-1/2	3/4

METRIC TOOLING EYE BOLT

Extended Thread Length - Forged Chrom-moly Steel - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
279-50	M6	50	40	6	12	6
279-51	M6	75	66	6	12	6
279-52	M8	75	65	8	16	8
279-53	M8	100	90	8	16	8
279-54	M10	75	60	10	20	10
279-55	M10	100	85	10	20	10
279-56	M10	125	110	10	20	10
279-57	M12	100	85	12	24	12
279-58	M12	125	110	12	24	12
279-59	M16	115	95	16	32	16
279-60	M16	150	130	16	32	16
279-61	M20	150	125	20	40	20

The extended thread length Eye Bolts allows for shortening These Blanks are fully machined to close dimension but are not heat treated. The shank diameter is centerless ground.



BLANK ROD ENDS

5140 Alloy Carbon Steel - No Surface Finish

P/N	DIMENSIONS			
	A	B	E	F
279-70	1/4	3	1/2	1/4
279-71	1/4	5-1/4	1/2	1/4
279-72	5/16	3	5/8	5/16
279-73	5/16	6	5/8	5/16
279-74	3/8	2-1/2	3/4	3/8
279-75	3/8	4	3/4	3/8
279-76	1/2	2-1/2	1	1/2
279-77	1/2	6	1	1/2
279-78	5/8	3	1-1/4	5/8
279-79	5/8	6-1/2	1-1/4	5/8
279-80	3/4	4-1/2	1-1/2	3/4
279-81	3/4	5	1-1/2	3/4
279-82	1	4-1/2	2	1

STAINLESS STEEL BLANK ROD ENDS

304 Series Stainless Steel

P/N	DIMENSIONS			
	A	B	E	F
279-85	3/8	3	3/4	3/8
279-86	1/2	6	1	1/2
279-87	5/8	6	1-1/4	5/8
279-88	3/4	3-1/2	1-1/2	3/4
279-89	3/4	6	1-1/2	3/4
279-90	7/8	6	1-3/4	7/8
279-91	1	4-1/2	2	1

EYE BOLTS

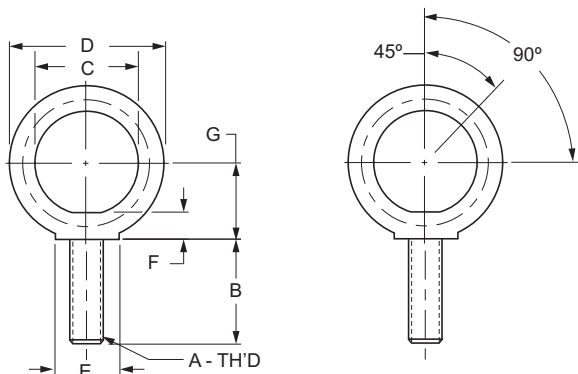
THE IMPROVED SHOULDER BOLT IS ENGINEERED FOR EXTRA STRENGTH AND SAFETY:

Our unique shoulder design counteracts the inadvertent side load giving greater strength on angled pulls. Designing the line of action (pull) closer to the work piece provide additional safety. For protection and easy identification: Inch sizes have a black oxide finish and Millimeter sizes have a gold anodized finish.

Shoulder eye bolts are designed for straight vertical pulls. General practice for other than vertical load per military standards are:

25% of the safe working load for a 45° load from vertical.
20% of the safe working load for a 90° load from vertical.

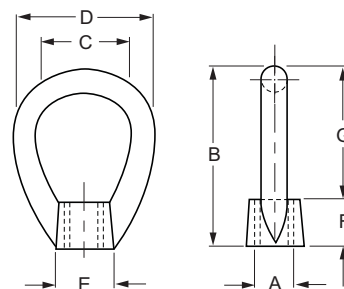
For consistent heavy side load (90°) and where shock load may be anticipated, hoist rings with swiveling and pivoting features are to be used.



METRIC IMPROVED SHOULDER EYE BOLT

Gold Anodized Finish

P/N	DIMENSIONS							SAFE LOAD (LBS)
	A	B	C	D	E	F	G	
280-05	8mmx1.25	9/16	7/8	1-1/4	9/16	5/16	11/16	725
280-15	10mmx1.50	3/4	15/16	1-5/8	13/16	3/8	7/8	1675
280-25	12mmx1.75	7/8	1-3/16	2	1	7/16	1-1/8	2800
280-35	16mmx2.00	1-1/16	1-3/8	2-3/8	1-1/8	9/16	1-1/4	5100
280-45	20mmx2.50	1-3/16	1-1/2	2-5/8	1-3/8	3/4	1-5/16	7000



HEAVY DUTY EYE BOLT

Forged - Case Hardened

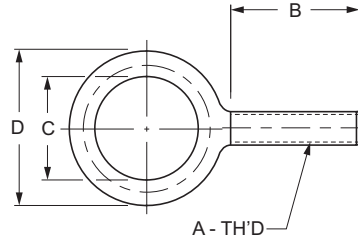
P/N	DIMENSIONS							SAFE LOAD (LBS)
	A	B	C	D	E	F	G	
280-54	3/8-16	2-1/2	1-1/4	2	7/8	5/8	1-1/2	2700
280-56	1/2-13	2-1/2	1-1/4	2	7/8	5/8	1-1/2	2700
280-58	5/8-11	3	1-1/2	2-1/2	1-3/8	3/4	1-3/4	5000
280-60	3/4-10	3	1-1/2	2-1/2	1-3/8	3/4	1-3/4	5000

IMPROVED SHOULDER EYE BOLT

Black Oxide Finish

P/N	DIMENSIONS							SAFE LOAD (LBS)
	A	B	C	D	E	F	G	
280-00	1/4-20	9/16	7/8	1-1/4	9/16	5/16	11/16	725
280-10	3/8-16	3/4	15/16	1-5/8	13/16	3/8	7/8	1675
280-20	1/2-13	7/8	1-3/16	2	1	7/16	1-1/8	2800
280-30	5/8-11	1-1/16	1-3/8	2-3/8	1-1/8	9/16	1-1/4	5100
280-40	3/4-10	1-3/16	1-1/2	2-5/8	1-3/8	3/4	1-5/16	7000

EYE BOLTS & SWING BOLTS



PLAIN EYE BOLT

Forged

P/N	DIMENSIONS			
	A	B	C	D
281-00	1/4-20	1	3/4	1-3/16
281-02	5/16-18	1-1/8	7/8	1-7/16
281-05	3/8-16	1-1/4	1	1-21/32
281-07	7/16-14	1-3/8	1-3/32	1-27/32
281-10	1/2-13	1-1/2	1-3/16	2-1/16
281-12	9/16-12	1-5/8	1-9/32	2-9/32
281-15	5/8-11	1-3/4	1-3/8	2-1/2
281-20	3/4-10	2	1-1/2	2-13/16
281-22	7/8-9	2-1/4	1-11/16	3-1/4
281-24	1-8	2-1/2	1-13/16	3-9/16

Stainless Steel Eye Bolts are available for use in corrosive or damp areas.

STAINLESS STEEL SHOULDER EYE BOLT

Forged

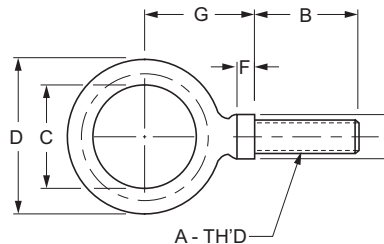
P/N	DIMENSIONS						
	A	B	C	D	E	F	G
282-05S	3/8-16	1-1/4	1	1-21/32	11/16	3/16	1-3/16
282-10S	1/2-13	1-1/2	1-3/16	2-1/16	7/8	1/4	1-13/32
282-15S	5/8-11	1-3/4	1-3/8	2-1/2	1-1/8	1/4	1-11/16
282-20S	3/4-10	2	1-1/2	2-13/16	1-1/4	5/16	1-13/16
282-24S	1-8	2-1/2	1-13/16	3-9/16	1-9/16	13/32	2-13/32

METRIC SHOULDER EYE BOLT

Forged

P/N	DIMENSIONS						
	A	B	C	D	E	F	G
282-30	M10 x 1.50	32	24	40	17	4.7	28
282-32	M12 x 1.75	38	28	50	22	5.5	34
282-34	M14 x 2.00	40	32	56	24	6.0	40
282-36	M16 x 2.00	44	35	62	26	6.0	44
282-38	M20 x 2.50	50	38	75	32	8.0	48

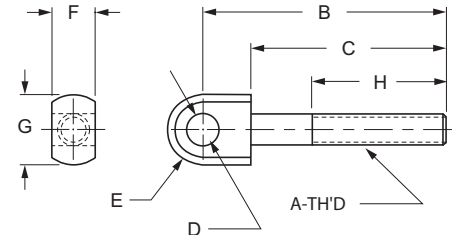
Forged Shoulder Eye Bolts are designed for straight vertical pulls. Safe with working loads drop off to 25% for 45° pulling angles.



SHOULDER EYE BOLT

Forged

P/N	DIMENSIONS						
	A	B	C	D	E	F	G
282-00	1/4-20	1	3/4	1-3/16	1/2	3/16	15/16
282-02	5/16-18	1-1/8	7/8	1-7/16	19/32	11/64	31/32
282-05	3/8-16	1-1/4	1	1-21/32	11/16	3/16	1-3/16
282-07	7/16-14	1-3/8	1-3/32	1-27/32	25/32	13/64	1-5/16
282-10	1/2-13	1-1/2	1-3/16	2-1/16	7/8	1/4	1-13/32
282-12	9/16-12	1-5/8	1-9/32	2-9/32	31/32	15/64	1-19/32
282-15	5/8-11	1-3/4	1-3/8	2-1/2	1-1/8	1/4	1-11/16
282-20	3/4-10	2	1-1/2	2-13/16	1-1/4	5/16	1-13/16
282-22	7/8-9	2-1/4	1-11/16	3-1/4	1-7/16	3/8	2-3/16
282-24	1-8	2-1/2	1-13/16	3-9/16	1-9/16	13/32	2-13/32



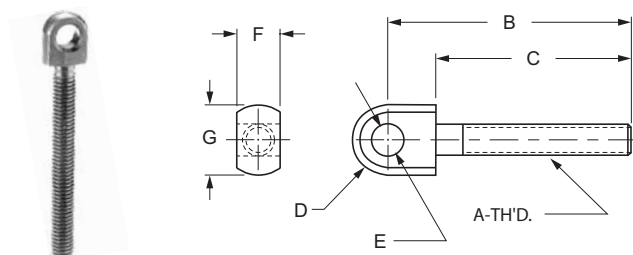
SWING BOLT

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS							
	A	B	C	D	E	F	G	H
284-00	1/4-20	1-1/2	1-3/16	1/4	1/4	5/16	1/2	3/4
284-05	1/4-20	2-1/2	2-3/16	1/4	1/4	5/16	1/2	1-1/4
284-10	5/16-18	2	1-5/8	5/16	5/16	3/8	5/8	1
284-15	5/16-18	3	2-5/8	5/16	5/16	3/8	5/8	1-3/8
284-20	3/8-16	2-1/2	2	3/8	3/8	1/2	3/4	1-3/8
284-25	3/8-16	3-1/2	3	3/8	3/8	1/2	3/4	2
284-30	1/2-13	3-1/8	2-1/2	1/2	1/2	5/8	1	1-3/4
284-35	1/2-13	4-1/8	3-1/2	1/2	1/2	5/8	1	2-1/4
284-40	5/8-11	3-1/2	2-3/4	5/8	5/8	3/4	1-1/4	1-3/4
284-45	5/8-11	4-3/4	4	5/8	5/8	3/4	1-1/4	2-1/2
284-47	3/4-10	4-1/2	3-5/8	3/4	3/4	7/8	1-1/2	2
284-49	3/4-10	6	5-1/8	3/4	3/4	7/8	1-1/2	3

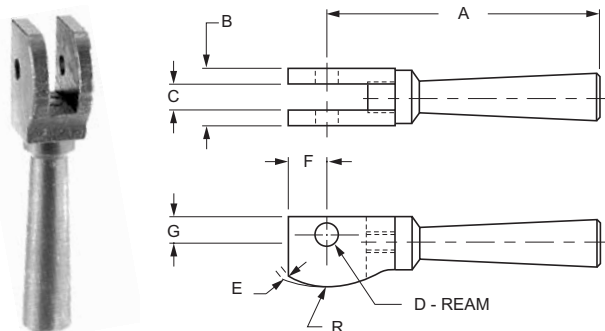
BOLTS AND CAMS

Jig Latch Bolts are similar to Swing Bolts. They have a thinner head, longer shank and are threaded much closer to the head.



JIG LATCH BOLT Case Hardened - Black Oxide Finish							
P/N	DIMENSIONS						
	A	B	C	D	E	F	G
284-50	1/4-20	2-5/8	2-5/16	1/4	.257	1/4	1/2
284-55	5/16-18	3-3/16	2-13/16	5/16	.323	5/16	5/8
284-60	3/8-16	3-3/4	3-5/16	3/8	.386	3/8	3/4
284-65	1/2-13	4-7/8	4-5/16	1/2	.515	1/2	1

Double Cams are designed for the rapid action locking of work that requires great holding pressure. The slot is milled and can be used with our eye bolts.

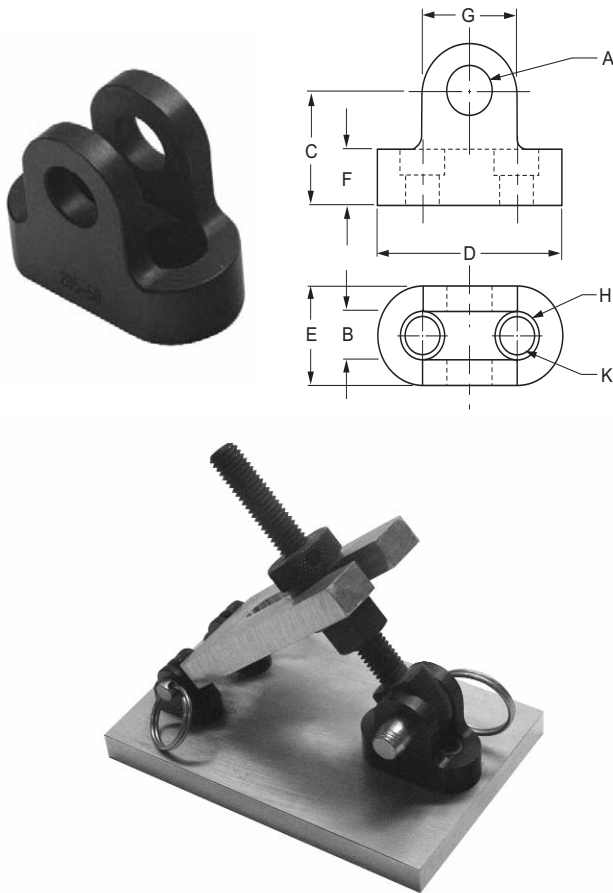


DOUBLE CAM Case Hardened - Black Oxide Finish								
P/N	DIMENSIONS							
	A	B	C	D	E	F	G	R
284-80	2-1/2	9/16	1/4	3/16	1/16	3/8	3/16	9/16
284-85	3-1/2	5/8	5/16	1/4	1/16	1/2	9/32	11/16
284-90	5	1-1/8	1/2	3/8	7/64	5/8	13/32	15/16
284-95	5-3/8	1-1/4	5/8	5/8	9/64	7/8	9/16	1-3/16



CLEVIS AND CLAMP SETS

The **Heavy Duty Clevis** is a versatile tooling item which is designed for use with our Jig Latch Bolts (not Included) or a customers own threaded rods. Each Clevis comes with a ball retained pin and mounting screws.



HEAVY DUTY CLEVIS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
285-25	1/4	.225/.252	9/16	1	1/2	1/4
285-31	5/16	.318/.315	11/16	1-1/4	5/8	5/16
285-37	3/8	.381/.378	7/8	1-1/2	3/4	7/16
285-50	1/2	.505/.502	1-1/8	2	1	9/16
P/N	G	H	K	Mounting Screws	Jig Latch Bolt	Detent Retaining Pin
285-25	1/2	17/64	.116	8/32 x 3/8	284-50	184-09
285-31	5/8	5/16	.196	10-24 x 3/4	284-55	184-16
285-37	3/4	3/8	.527	1/4-20 x 3/4	284-60	184-28
285-50	1	1/2	.316	5/16-18 x 3/4	284-60	184-46

NOTE: Nuts and Bolts not included in this item.

Each Super Clamp set contains 50 pieces:

- 24 - studs with flats 4 each 3", 4", 5", 6", 7", 8" long
- 4 - Coupling nuts
- 4 - Flange nuts
- 4 - T-Slot nuts
- 6 - Serrated end clamps
- 6 - Step blocks
- 1 - T-Slot cleaner



SUPER CLAMP SETS WITH STEEL BLOCKS

Case Hardened - Black Oxide Finish*

P/N	DIMENSIONS				
	STEP BLOCK SIZE	TABLE T-SLOT SIZE	STUD SIZE	STUD SET NO.	STEP BLOCK & CLAMP SET NO.
286-00	1	3/8	5/16-18	291-00	302-00
286-01	1	7/16	3/8-16	291-01	302-00
286-02	1	1/2	3/8-16	291-02	302-00
286-03	1	9/16	3/8-16	291-03	302-00
286-04	1	9/16	1/2-13	291-04	302-05
286-05	1	5/8	1/2-13	291-05	302-05
286-06	1	11/16	1/2-13	291-06	302-05
286-07	1	11/16	5/8-11	291-07	302-10
286-08	1	3/4	5/8-11	291-08	302-10
286-09	1	13/16	5/8-11	291-09	302-10
286-10	1-1/2	9/16	1/2-13	291-04	302-15
286-11	1-1/2	5/8	1/2-13	291-05	302-15
286-12	1-1/2	11/16	1/2-13	291-06	302-15
286-13	1-1/2	11/16	5/8-11	291-07	302-20
286-14	1-1/2	3/4	5/8-11	291-08	302-20
286-15	1-1/2	13/16	5/8-11	291-09	302-20
286-16	1-1/2	13/16	3/4-10	291-10	302-25
286-17	1-1/2	7/8	3/4-10	291-11	302-25
286-18	1-1/2	1	3/4-10	291-12	302-25
286-19	2	1	7/8-9	291-13	302-30
286-20	2	1-1/16	1-8	291-16	302-30

* Studs are not Case Hardened. T-Slot cleaners are not Case Hardened or Black Oxide Finished.

NOTE: For part specs, see individual information

CLAMP SETS

Each Machinist Clamping set contains 54 pieces:

24 - studs with flats 4 each 3", 4", 5", 6", 7", 8" long

4 - Coupling nuts

6 - Flange nuts

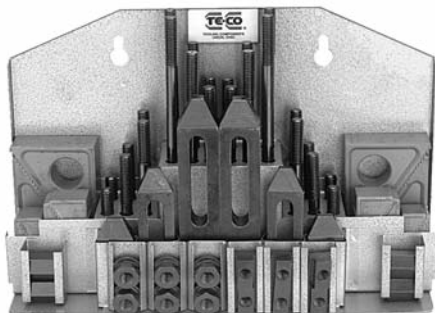
6 - T-Slot nuts

6 - Serrated end clamps

6 - Step blocks

1 - T-Slot cleaner

1 - Holder



MACHINIST CLAMP SETS

Case Hardened - Black Oxide Finish*

P/N	DIMENSIONS			
	TABLE T-SLOT SIZE	STUD SIZE	"T" NUT NO.	STEP BLOCK & CLAMP SET NO.
288-00	7/16	3/16-16	260-03	302-00
288-05	1/2	3/16-16	260-04	302-00
288-10	9/16	3/16-16	260-05	302-00
288-15	9/16	1/2-13	260-08	302-05
288-20	5/8	1/2-13	260-09	302-05
288-25	11/16	1/2-13	260-11	302-05
288-30	11/16	5/8-11	260-13	302-10
288-35	3/4	5/8-11	260-14	302-10
288-40	13/16	5/8-11	260-15	302-10

* Studs are not Case Hardened. T-Slot cleaners are not Case Hardened or Black Oxide Finished.

NOTE: For part specs, see individual part information

The Plastic Clamp Kit is designed exclusively for the CMM inspection, laboratory inspection and gaging applications.

- Kits are used to properly hold down work piece during workpiece inspection
- Eliminates marring of workpiece surface
- Lightweight construction minimizes part distortion
- Reduces risk of damage to surface plate or CMM table
- Hand knobs allow optimum force without damage to granite plate insertions.

24 - studs with flats 4 each 3", 4", 5", 6", 7", 8" long

12 - plastic clamps 4 each 2-1/2", 4", 6" long Nylon 101

4 - steel coupling nuts

8 - steel washers

4 - plastic rest feet

4 - plastic hand knobs

1 - Holder



PLASTIC CLAMP KITS

Steel Parts are Case Hardened - Black Oxide Finish* - Plastic parts are Nylon 101

P/N	DIMENSIONS
**288-50	Plastic CMM Clamp Kit 1/4-20
288-52	Plastic CMM Clamp Kit 5/16-18
288-54	Plastic CMM Clamp Kit 3/8-16

METRIC PLASTIC CLAMP KITS

Steel Parts are Case Hardened - Black Oxide Finish* - Plastic parts are Nylon 101

P/N	DIMENSIONS
288-60	Plastic CMM Clamp Kit 8mm
288-62	Plastic CMM Clamp Kit 10mm
288-64	Plastic CMM Clamp Kit 12mm

* Studs are not Case Hardened. T-Slot cleaners are not Case Hardened or Black Oxide Finished.

** 8" Stud not included in this kit.

NOTE: Plastic Clamps are NOT recommended for machining purposes

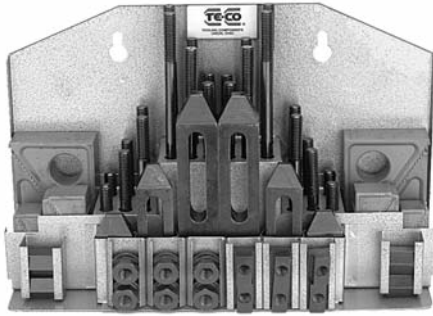
CLAMP SETS

Each Metric Machinist Clamping set contains 54 pieces:

- 24 - studs with flats 4 each**
- 4 - Coupling nuts
- 6 - Flange nuts
- 6 - T-Slot nuts
- 6 - Serrated end clamps
- 6 - Step blocks
- 1 - T-Slot cleaner
- 1 - Holder

Expanding capability when used with step block and clamp set. Each T-nut and Stud set contains 38 pieces:

- 24 - studs with flats 4 each 3", 4", 5", 6", 7", 8" long
- 4 - Coupling nuts
- 4 - Flange nuts
- 4 - T-Slot nuts
- 1 - T-Slot cleaner
- 1 - Holder



METRIC MACHINIST CLAMP SETS

With 25mm Thick Step BLocks - Case Hardened - Black Oxide Finish*

P/N	DIMENSIONS				
	STUD LENGTH	TABLE T-SLOT SIZES	STUD SIZE	"T" NUT NO.	STEP BLOCK & CLAMP SET NO.
288-70	80mm, 110mm, 125mm 150mm, 175mm, 200mm	12MM	M10 x 1.50	259-03	302-00M
288-72	80mm, 110mm, 125mm 150mm, 175mm, 200mm	14MM	M10 x 1.50	259-04	302-00M
288-74	80mm, 110mm, 125mm 150mm, 175mm, 200mm	14MM	M12 x 1.75	259-05	302-00M
288-76	80mm, 110mm, 125mm 150mm, 175mm, 200mm	16MM	M12 x 1.75	259-06	302-05M
288-78	80mm, 110mm, 140mm 150mm, 175mm, 200mm	17MM	M12 x 1.75	259-07	302-05M
288-80	80mm, 110mm, 140mm 150mm, 175mm, 200mm	18MM	M16 x 2.00	259-08	302-10M
288-82	80mm, 110mm, 150mm 175mm, 200mm, 250mm	20MM	M16 x 2.00	259-09	302-10M

* Studs are not Case Hardened. T-Slot cleaners are not Case Hardened or Black Oxide Finished.

NOTE: For part specs, see individual part information

T-NUT AND STUD SETS

Case Hardened - Black Oxide Finish*

P/N	DIMENSIONS		
	TABLE T-SLOT SIZE	STUD SIZE	T-NUT NUMBER
291-00	3/8	5/16-18	260-02
291-01	7/16	3/8-16	260-03
291-02	1/2	3/8-16	260-04
291-03	9/16	3/8-16	260-05
291-04	9/16	1/2-13	260-08
291-05	5/8	1/2-13	260-09
291-06	11/16	1/2-13	260-11
291-07	11/16	5/8-11	260-13
291-08	3/4	5/8-11	260-14
291-09	13/16	5/8-11	260-15
291-10	13/16	3/4-10	260-16
291-11	7/8	3/4-10	260-17
291-12	1	3/4-10	260-18
291-13	1	7/8-9	260-21
291-14	1-1/16	7/8-9	260-22
291-15	1-1/8	7/8-9	260-23
291-16	1-1/16	1-8	260-24

* Studs are not Case Hardened. T-Slot cleaners are not Case Hardened or Black Oxide Finished.

NOTE: For part specs, see individual part information

CLAMP SETS & STEP BLOCK SETS

Expanding capability when used with step block and clamp set. Each Metric T-nut and Stud set contains 50 pieces:

- 24 - studs with flats 4 each
- 4 - Coupling nuts
- 4 - Flange nuts
- 4 - T-Slot nuts
- 1 - T-Slot cleaner
- 1 - Holder



METRIC T-NUT AND STUD SETS

Case Hardened - Black Oxide Finish*

P/N	DIMENSIONS				
	STUD LENGTH	STUD THREAD SIZE	INCH TABLE T-SLOT SIZE	METRIC TABLE T-SLOT SIZE	T-SLOT NUT NUMBER
291-20M	80mm, 110mm, 140mm 150mm, 175mm, 200mm	M10 x 1.50	1/2	M12	259-03
291-21M	80mm, 110mm, 140mm 150mm, 175mm, 200mm	M10 x 1.50	9/16	M14	259-04
291-22M	80mm, 110mm, 140mm 150mm, 175mm, 200mm	M12 x 1.75	9/16	M14	259-05
291-23M	80mm, 110mm, 140mm 150mm, 175mm, 200mm	M12 x 1.75	5/8	M16	259-06
291-24M	80mm, 110mm, 140mm 150mm, 175mm, 200mm	M12 x 1.75	11/16	M17	259-07
291-25M	80mm, 110mm, 150mm 175mm, 200mm, 250mm	M16 x 2.00	3/4	M18	259-08
291-26M	80mm, 110mm, 150mm 175mm, 200mm, 250mm	M16 x 2.00	13/16	M20	259-09
291-27M	80mm, 110mm, 150mm 175mm, 200mm, 250mm	M20 x 2.50	7/8	M22	259-10

* Studs are not Case Hardened. T-Slot cleaners are not Case Hardened or Black Oxide Finished.

NOTE: For part specs, see individual part information

This kit has improved flexibility when used with T-Nut and stud kit, (Part 291-00 to 291-16) or with Metric T-Nut and Stud sets (291-20M to 291-27M.) Two halves put together to make one block. Blocks work with Metric or Inch Serrated End Clamps.



METRIC SURE GRIP STEP BLOCK KITS

Case Hardened - Black Oxide Finish

P/N	4 EACH	4 EACH	2 EACH
293-00M	296-00M	296-05M	296-10M
293-05M	296-15M	296-20M	296-25M
293-10M	296-30M	296-35M	296-40M

SURE GRIP STEP BLOCK KITS

10 Piece set - Case Hardened - Black Oxide Finish

P/N	4 EACH	4 EACH	2 EACH
293-00	296-00	296-05	296-10
293-05	296-15	296-20	296-25
293-10	296-30	296-35	296-40

ALUMINUM SURE GRIP STEP BLOCK KITS

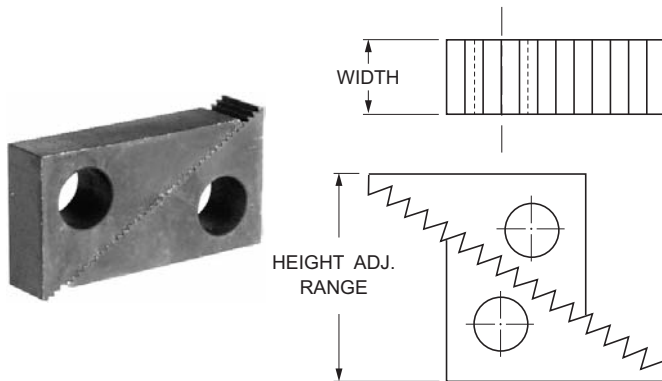
10 Piece set

P/N	4 EACH	4 EACH	2 EACH
293-15	297-00	297-05	297-10
293-20	297-15	297-20	297-25

* Discontinued but available while supplies last.

STEP BLOCK SETS

The Larger sizes on the Sure Grip Step Blocks have chamfered holes for ease of use. One step block consists of two pieces. Please order by block number.



SURE GRIP STEP BLOCKS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS	
	WIDTH	HEIGHT ADJ. RANGE
296-00	1	3/4 to 1-5/8
296-05	1	1-1/8 to 2-1/2
296-10	1	2-1/2 to 6
296-15	1-1/2	1-3/4 to 4
296-20	1-1/2	2-1/2 to 6
296-25	1-1/2	3-1/2 to 9
296-30	2	1-3/4 to 4
296-35	2	2-1/2 to 6
296-40	2	3-1/2 to 9
296-45	2	4-7/8 to 10-1/2

SURE GRIP STEP BLOCKS

Aluminum

P/N	DIMENSIONS	
	WIDTH	HEIGHT ADJ. RANGE
297-00	1	3/4 to 1-5/8
297-05	1	1-1/8 to 2-1/2
297-10	1	2-1/2 to 6
297-15	1-1/2	1-3/4 to 4
297-20	1-1/2	2-1/2 to 6
*297-25	1-1/2	3-1/2 to 9

METRIC SURE GRIP STEP BLOCKS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS	
	WIDTH	HEIGHT ADJ. RANGE
296-00M	25mm	19 to 41
296-05M	25mm	29 to 64
296-10M	25mm	64 to 152
296-15M	38mm	45 to 102
296-20M	38mm	64 to 164
296-25M	38mm	89 to 229
296-30M	51mm	45 to 102
296-35M	51mm	64 to 152
296-40M	51mm	89 to 229



BASIC CLAMP SETS

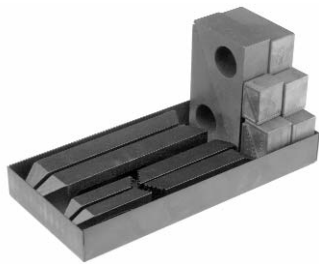
Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			
	SERRATED END CLAMP 2 EACH	PLAIN CLAMP 2 EACH	STEP CLAMP 2 EACH	STUD SIZE
300-00	320-00 320-05 320-10	319-00 319-05 319-10	322-00	3/8-16
300-05	320-15 320-20 320-25	319-15 319-20 319-25	322-05	1/2-13
300-10	320-30 300-35 320-40	319-30 319-35 319-40	322-10	5/8-11

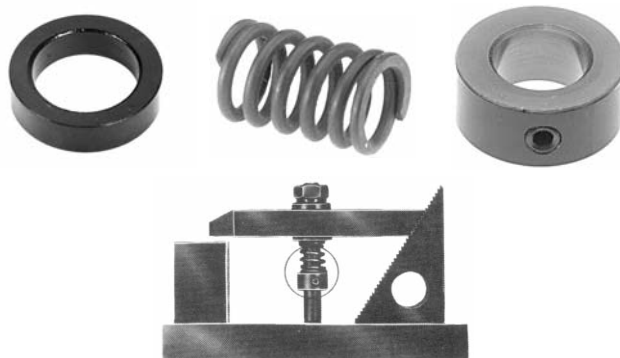
STEP BLOCK AND CLAMP SETS

Each Step Block and Clamp set contains 13 pieces:

- 6 - Serrated Clamps
- 6 - Step Blocks
- 1 - Holder



Each set consists of a washer, a spring and a collar.



STEP BLOCK AND CLAMP SETS				
Case Hardened - Black Oxide Finish				
P/N	STEP BLOCK SIZE	STUD SIZE	STEP BLOCKS 4 EACH	SERRATED END CLAMPS 4 EACH
302- 00	1	5/16 & 3/8	296-00 296-05 296-10	320-00 320-05 320-10
302- 05	1	1/2	296-00 296-05 296-10	320-15 320-20 320-25
302- 10	1	5/8	296-00 296-05 296-10	320-30 320-35 320-40
302- 15	1-1/2	1/2	296-15 296-20 296-25	320-15 320-20 320-25
302- 20	1-1/2	5/8	296-15 296-20 296-25	320-30 320-35 320-40
302- 25	1-1/2	3/4	296-15 296-20 296-25	320-45 320-50 320-55
302- 30	2	7/8 & 1	296-30 296-35 296-40	320-60 320-65 320-70

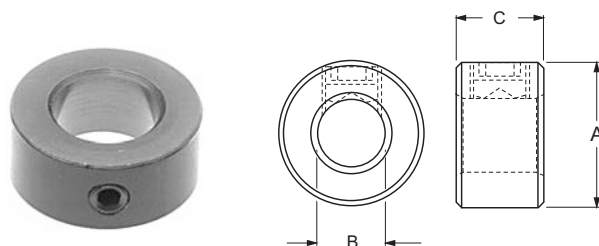
NOTE: Set 302-30 will be furnished with a flat board holder

METRIC STEP BLOCK AND CLAMP SETS				
Case Hardened - Black Oxide Finish				
P/N	STEP BLOCK SIZE	STUD SIZE	STEP BLOCKS 4 EACH	SERRATED END CLAMPS 4 EACH
302- 00M	25mm	M10 x 1.50	296-00M 296-05M 296-10M	320-00M 320-05M 320-10M
302- 05M	25mm	M12 x 1.75	296-00M 296-05M 296-10M	320-15M 320-20M 320-25M
302- 10M	25mm	M16 x 2.00	296-00M 296-05M 296-10M	320-30M 320-35M 320-40M
302- 15M	38mm	M12 x 1.75	296-15M 296-20M 296-25M	320-15M 320-20M 320-25M
302- 20M	38mm	M16 x 2.00	296-15M 296-20M 296-25M	320-30M 320-35M 320-40M
302- 25M	38mm	M20 x 2.50	296-15M 296-20M 296-25M	320-45M 320-50M 320-55M

CLAMP SUPPORTS

Black Oxide Finish

P/N	DIMENSIONS				
	STUD SIZE	P/N	STUD SIZE	P/N	STUD SIZE
306-00	1/4	306-15	1/2	306-30	1
306-05	5/16	306-20	5/8		
306-10	3/8	306-25	3/4		



SHAFT COLLAR

Black Oxide Finish

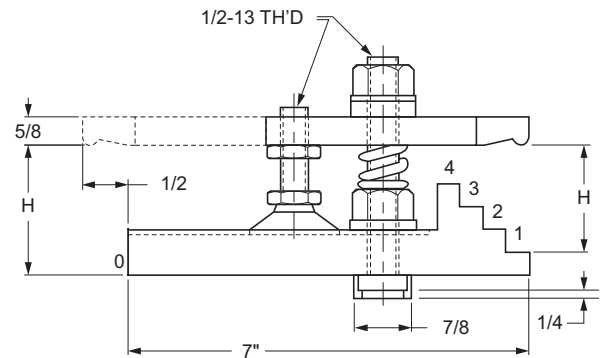
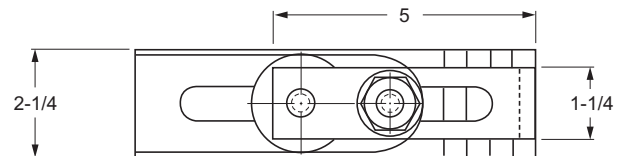
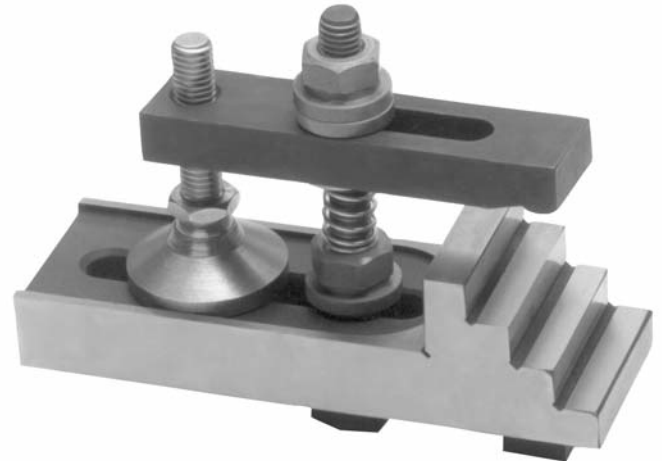
P/N	DIMENSIONS		
	A	B	C
306-50	5/8	1/4	3/8
306-55	11/16	5/16	3/8
306-60	3/4	3/8	7/16
306-65	7/8	1/2	1/2
306-70	1-1/8	5/8	1/2
306-75	1-1/4	3/4	1/2
306-80	1-1/2	1	9/16

LEVELING CLAMPS

Throw away the parallel bars. The Leveling Clamp comes complete as shown to the right, including a grade 8 T-Slot Bolt. Nothing else is required.

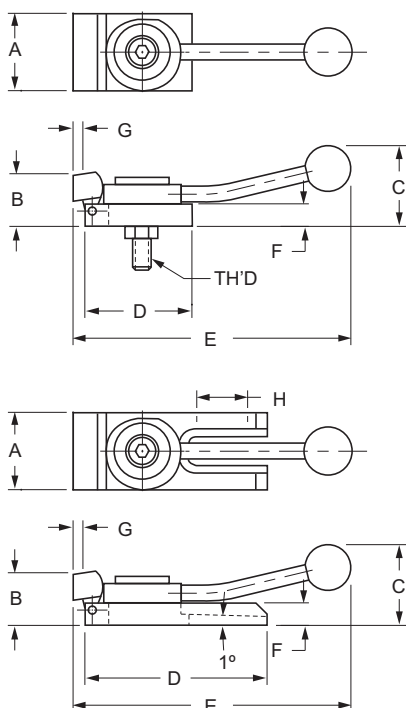
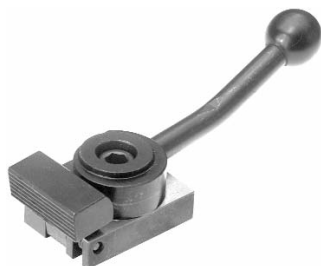
- **Multi Function** - level, Locate, stop and clamp the work piece all in one stroke.
- **Fast Set-up** - All clamp parts stay together, so the parts don't get lost.
- **Convenient Clamping** - Tighten either the flange nut or the rear support.
- **Versatile** - Fully adjustable round tipped front strap and self-aligned rear support allow for clamping of slightly uneven work pieces.
- **Precise** - The hardened steps are ground to ± 0.0005 accuracy.
- **Strong** - T-Slot Bolt is grade 8 strong. Clamp strap is made of medium carbon steel heat treated to RC36. Strong enough for most applications yet soft enough not to damage the cutter.

The Clamp can be used on work pieces at five different levels: 0, 1/2, 1, 1-1/2 and 2. The T-Bolt and leveling studs are 1/2 - 13 thread.



LEVELING CLAMP				
P/N	DIMENSIONS			
	THICKNESS/ LEVEL	HIEGHT ± 0.0005	MIN. H	MAX H
307-00	0	0	2	3
	1	0.500	1-9/16	2-1/2
	2	1.000	1-1/16	2
	3	1.500	9/16	1-1/2
	4	2.000	0	1

This low profile, quick action Cam Action Clamp has a jaw that pivots forward and downward simultaneously when the handle is turned. It locks positively in any position within 180° turn enabling it to hold parts that vary slightly dimensionally. The extended base Cam Action Clamp allows position adjustment on the machine table.



CAM ACTION CLAMP

Standard Base - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS								
	STUD	A	B	C	D	E	F	G	H
307-44	5/16-18	1-1/4	1	1-5/8	1-3/4	5	7/16	1/8	-
307-50	1/2-13	1-7/8	1-1/2	2-1/2	2-3/4	7-1/2	5/8	5/32	-

CAM ACTION CLAMP

Extended Base - Case Hardened - Black Oxide Finish

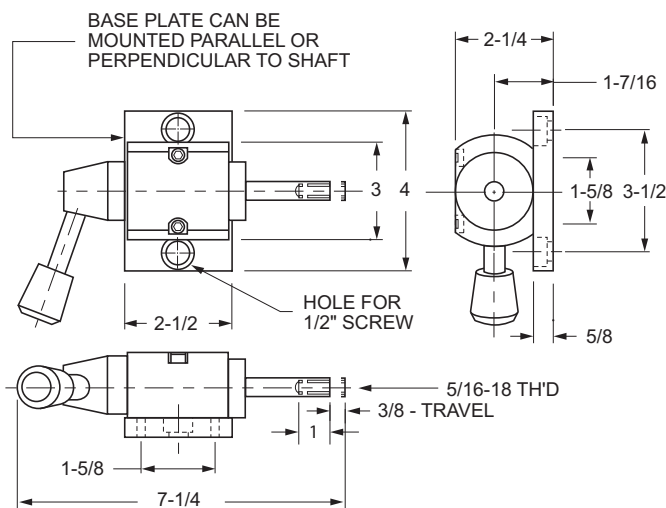
P/N	DIMENSIONS								
	STUD	A	B	C	D	E	F	G	H
307-45	5/16-18	1-1/4	1	1-5/8	3-1/8	5	7/16	1/8	1
307-55	1/2-13	1-7/8	1-1/2	2-1/2	4-3/4	7-1/2	5/8	5/32	1-1/2

STRAIGHT LINE SCREW CLAMP SERIES 307-75*

Screw Clamps offer screw action clamping with variable yet positive clamping force. Unlike toggle action clamps, Screw Clamps will tolerate irregularities in work size. The more you turn the handle, the tighter the clamp force. A lever turn of 180 degree will advance the spindle 3/8". Screw Clamps combine positive screw action clamping with the swiftness of a toggle clamp. Turning action is converted through a hardened triple acting screw thread set into strong clamping pressure.

An Average operator weighing 140 Lbs. can easily produce 1000 Lbs. of clamping pressure using wrist action alone.

The front end of the shaft is tapped so a screw extension, or special adapter, can be added. The clamp can be mounted parallel, or perpendicular to the tee-slots. The Screw Clamp can also be mounted directly onto the fixture base.

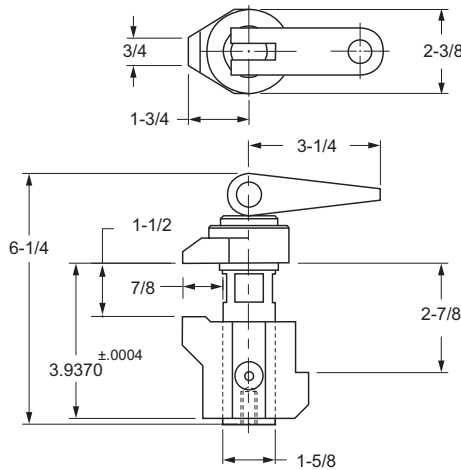


* Discontinued but available while supplies last.

VERTICAL LIFT CLAMP SERIES 307-80*

The Vertical Lift Clamp is the choice for perfect parallel alignment of the machine side of the part to your table. All American's Vertical Lift Clamp does the job with absolute accuracy and less setup time.

The lower jaw moves up on the threaded spindle to two different heights 180° opposite, tightening the part. Both jaws rotate 360°. Work the clamp action by lowering the quick acting cam, turn the cam clockwise. The inner screw will draw the lower jaw upward.



* Discontinued but available while supplies last.

HEAVY DUTY MULTI-VISE SERIES 307-90*

A fantastic, flexible clamping system for holding irregular work pieces!

- Safely holds odd shapes by at least three point for heavy machining processes.
- Top jaws lock securely to give positive nestling to parts.
- Built in parallels of different heights having three sets of movable end jaws in each vice.
- Can be used as a regular precision milling vice.
- Heavy Duty - All components are machined from high strength chrome alloy steel. Case hardened to with stand tough clamping force and wear
- All clamping surfaces, parallels, guides and fitted parts are precision finished ground.
- Fast set-up for odd shapes and low volume jobs.

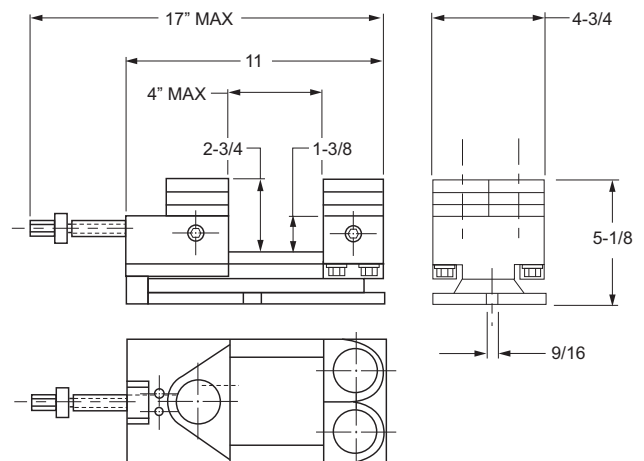
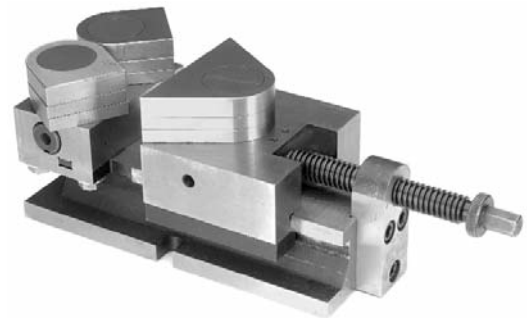
JAW CAPACITY: 4"

JAW WIDTH: 4-3/4"

HEAT TREAT: Screw RC 45-50 (4140)

Jaws RC 50-56 (4140)

Body RC 52-58 (4140)



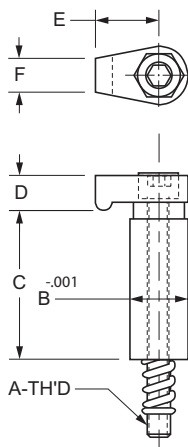
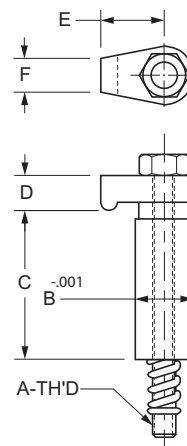
* Discontinued but available while supplies last.

CLAMPS

This hook clamp assembly has excellent holding power and is ideal for jig and fixture quick build systems. The hook clamp assembly is available in two styles. They come in either a socket head cap screw or a hex nut for locking. The hook rotates through 360 degrees, allowing easy removal and loading of work pieces.

Some of the many benefits of this space saving modular clamping unit are:

- Economy
- Excellent holding power
- Fast, easy set-ups
- Versatility



HOOK CLAMP ASSEMBLY

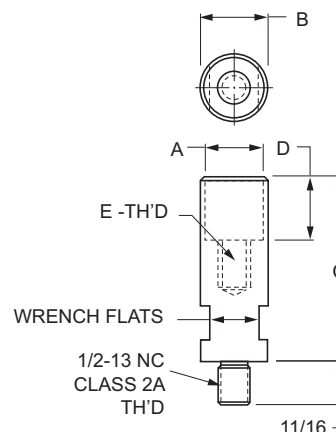
Stud and Nut Style - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
308-14	5/16-18 x 2-1/2	.624	7/8	1/2	11/16	7/16
308-17	1/2-13 x 4	.874	1-21/32	19/32	1	9/16
308-19	1/2-13 x 4-1/2	.999	1-3/4	13/16	1-3/16	3/4
308-21	5/8-11 x 5	1.124	1-11/16	7/8	1-7/16	7/8
308-23	5/8-11 x 5	1.124	2	7/8	1-7/16	7/8

HOOK CLAMP ASSEMBLY

Socket Head Cap Screw Style - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
308-00	5/16-18 x 1-3/4	.624	7/8	1/2	11/16	7/16
308-02	3/8-16 x 3	.874	1-21/32	19/32	1	9/16
308-04	1/2-13 x 3-1/2	.999	1-3/4	13/16	1-3/16	3/4
308-06	1/2-13 x 3-1/2	1.124	1-11/16	7/8	1-7/16	7/8
308-08	1/2-13 x 3-1/2	1.124	2	7/8	1-7/16	7/8

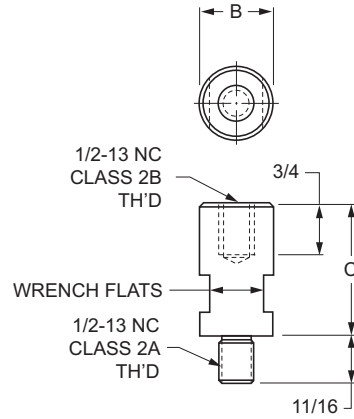


HOOK CLAMP MOUNTING STAND

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	USED WITH CLAMP #	A	B	C	D	E
308-30	308-00 - 308-14	5/8	3/4	1-3/4	7/8	5/16-18
308-32	308-00 - 308-14	5/8	3/4	2-1/4	7/8	5/16-18
308-34	308-00 - 308-14	5/8	3/4	2-3/4	7/8	5/16-18
308-36	308-02	7/8	1-1/8	3	1-9/16	3/8-16
308-37	308-17	7/8	1-1/8	3	1-9/16	1/2-13
308-38	308-02	7/8	1-1/8	4	1-9/16	3/8-16
308-39	308-17	7/8	1-1/8	4	1-9/16	1/2-13
308-40	308-04	1	1-1/4	3-1/2	1-3/4	1/2-13
308-42	308-19	1	1-1/4	4-1/2	1-3/4	1/2-13

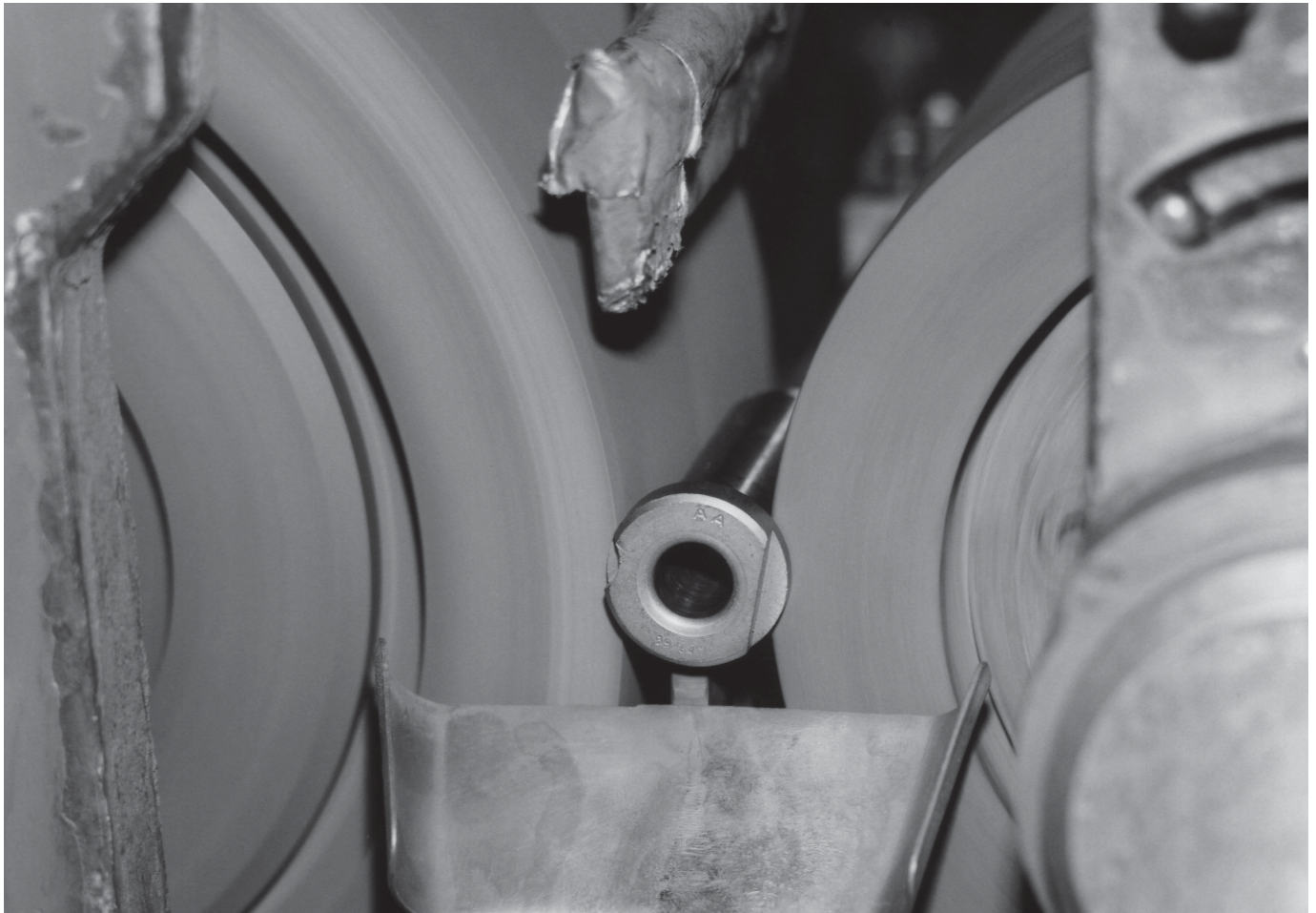
CLAMPS



HOOK CLAMP RISER BLOCKS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			
	USED WITH CLAMP #	A	B	C
308-49	308-30 - 308-32 - 308-34	1/2-13	3/4	1
308-51	308-30 - 308-32 - 308-34	1/2-13	3/4	2
308-53	308-36 - 308-38	1/2-13	1-1/8	2
308-57	308-40 - 308-42	1/2-13	1-1/4	1-7/16
308-59	308-40 - 308-42	1/2-13	1-1/4	2



All American[®] Pivot Clamp offers these important advantages:

- Super hold and easy setup.
- Applications: milling, die work, drilling, boring, tapping and welding.
- Instant height adjustment - special spring maintains height adjustment to facilitate repeated clamping and un-clamping.
- Spherical washers ensures even clamping.
- A brass shim protects your machine table and work piece.
- The Design permits the use on irregular shapes and varying sizes without blocks and shims.

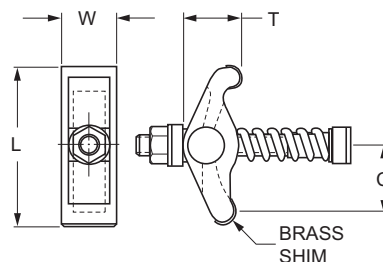
All American's[®] Pivot Clamp offers safe sure- holding power with up to 90% time savings over conventional set up methods. Not only are they fast and easy to set up, but they offer exceptional clamping force. No more fumbling with complicated clamping kits trying to find the proper size pieces.

Each Pivot Clamp set contains 2 of each:

- Clamps
- T-slot nuts
- Studs
- Springs
- Spherical Flange Nuts
- Spherical Washers
- Flat Washers

Isn't it time you changed to our Top Brass Pivot Clamp?

We have them in stock for IMMEDIATE DELIVERY!



TOP BRASS PIVOT CLAMP							
Complete Set - Case Hardened - Shims are Brass - Black Oxide Finish							
P/N	DIMENSIONS						
	STUD SIZE	T-SLOT NUT SIZE	CLAMPING CAPACITY	L	W	T	C
310-00	1/2-13 X 5	5/8	2-7/8	4	1-5/8	1-3/8	2-3/8
310-05	5/8-11 X 6	3/4	3-3/4	5-1/2	2-1/8	1-7/8	3
310-10	3/4-10 X 7	1	4-1/2	6-1/4	2-5/8	2-1/8	3-5/8

PIVOT CLAMP SPECIAL SPRING AND WASHER SET	
P/N	DIMENSIONS
	USED WITH STUD SIZE
310-80	1/2
310-85	5/8
310-90	3/4

FRONT AND REAR SHIM KITS	
With Screws	
P/N	
310-97	
310-98	
310-99	

TOP BRASS PIVOT CLAMP					
Pivot Clamp Body Only - Case Hardened - Shims are Brass - Black Oxide Finish					
P/N	DIMENSIONS				
	STUD SIZE	L	W	T	C
310-92	1/2	4	1-5/8	1-3/8	2-3/8
310-94	5/8	5-1/2	2-1/8	1-7/8	3
310-95	3/4	6-1/4	2-5/8	2-1/8	3-5/8

FULL CONTACT™ CLAMPS

The Full Contact™ clamp is an accurate, strong and quick acting clamp. Each clamp consists of three parts that are easily installed on tooling plates, sub-plates and other fixtures. Once installed, the tooling plates can be locked into place with a quarter turn. The Full Contact™ clamp sleeve when expanded, contacts 100% with the tooling plate or the optional bushing. This eliminates any chatter from clearance tolerances that can occur on other quick release clamps.

FEATURES:

- Repeatability $\pm .0005$ inches.
- Easy Installation.
- Full Contact when expanded.
- Quick release
- Inexpensive
- Made of 4130 Steel and an alloy steel fastener.

All parts are coated with a multistep process that provides

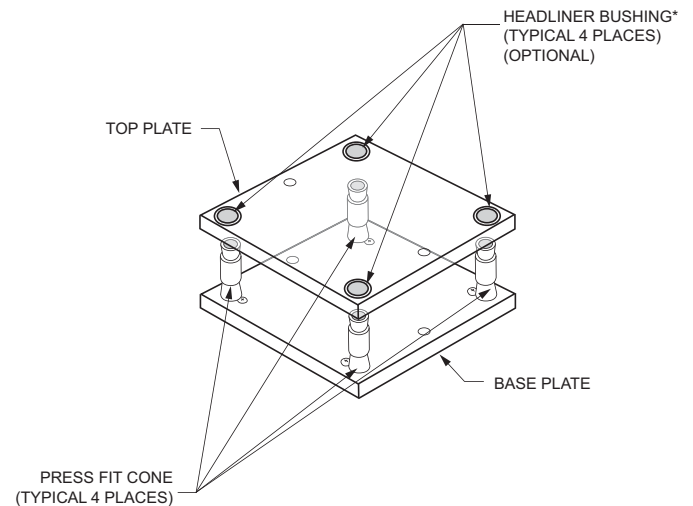
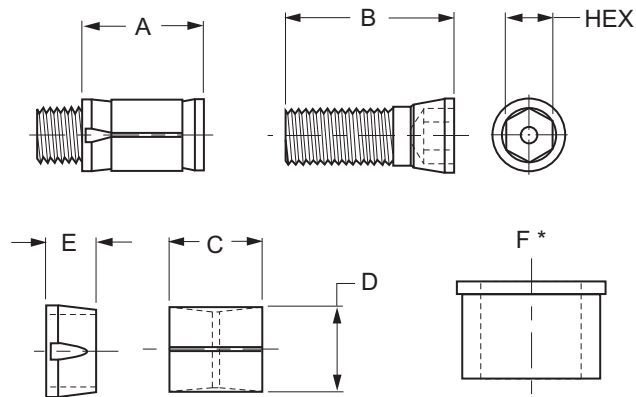
- Increased hardness (Rockwell C60-C70)
- Permanent lubricity.
- Corrosion resistance.
- Low co-efficient of friction.
- Abrasion resistance.
- Electrical Conductivity.

CUSTOM SOCKET
HEAD BOLT

SLEEVE

PRESS FIT CONE

OPTIONAL
HEADLINES
BUSHING*



FULL CONTACT™ CLAMPS

DIMENSIONS

P/N	SIZE	ASSEMBLY	CUSTOM SOCKET HEAD UNIT		SLEEVE		PRESS FIT CONES	RETAINER SCREW	HEADLINER BUSHINGS
		A	B	HEX	C	D	E		F*
311-50	1/2	.950	3/8-16 x 1-3/8	5/16	.550	.490	.480	N/A	#HL8-48-12 (1/2 I.D. x 3/4 O.D.)
311-55	3/4	1.250	1/2-13 x 1-31/32	3/8	.775	.740	.570	8/32 x 1/2 P-TRUSS	#HL8-64-16 (3/4 I.D. x 1 O.D.)
311-60	1	1.375	3/4-10 x 2-7/32	5/8	.990	.990	.950	8/32 x 1/2 P-TRUSS	#HL8-88-16 (1 I.D. x 1-3/8 O.D.)

NOTE: Installation on next page.

INSTALLATION INSTRUCTIONS:

BASE PLATED:

1. Position holes, drill and tap per chart "F" measurement.
2. Drill and ream hole for Press Fit Cone per chart "G" and "H" measurement (figure 2.)
3. Press cone into the reamed hole using standard hex bolt and nut. Hold bolt stationary and turn hex nut to press cone into position.

NOTES:

- It is recommended that a 8-32 x 1/2 " P-Truss retainer screw be used with a 3/4" and larger Full Contact™ clamp (refer to figure-2 and chart item "M".)
- An adhesive or and Epoxy may be used in place or the retaining screw.

FIXTURE PLATE:

1. Position the hole to match base plate location. Drill and ream to dimensions as required in chart item "N" measurements.
2. If optional liner bushing is used, drill and ream per bushing manufacturer recommendations.

INSTALLATION STATISTICS			
	1/2"	3/4"	1"
(G) REAMED HOLE DIAMETER	.490	.740	.950
(H) REAMED HOLE DEPTH	.150	.160	.160
(I) TAPPED HOLE	3/8-16	1/2-13	3/4-10
(J) RETAINER CENTER LINE	-	.522	.630
(K) RETAINER SCREW COUNTER BORE	-	.110	.110
(L) RETAINER SCREW HEAD DIAMETER	-	.380	.380
(M) RETAINER SCREW	-	8-32 x 1/2 P-TRUSS	8-32 x 1/2 P-TRUSS
(N) FIXTURE PLATE HOLE DIA.	.495 - .515	.745 - .765	.995 - 1.015
OPTIONAL HEADLINER BUSHING	HL 48-12	HL 64-16	HL - 88-16
MAX. LOAD	4200 LBS.	7500 LBS.	11000 LBS.

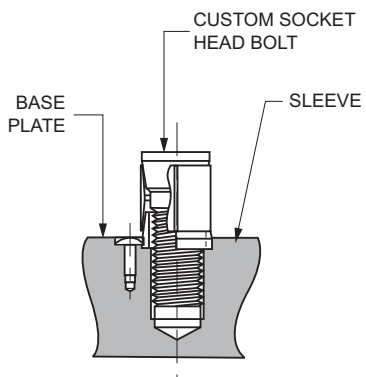


Figure 1

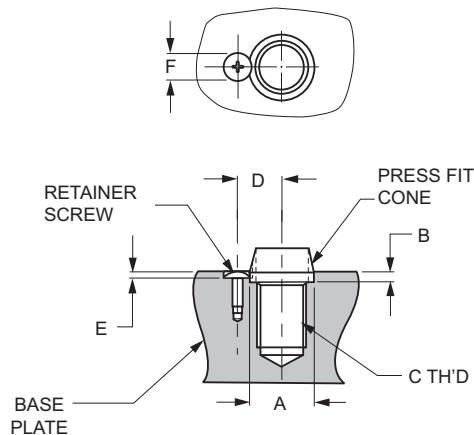


Figure 2

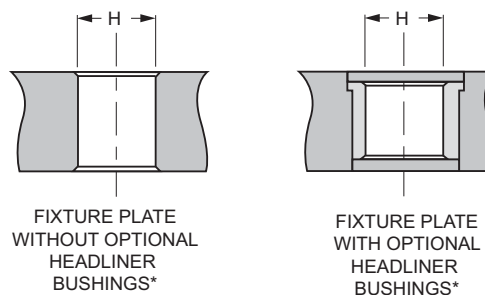


Figure 3

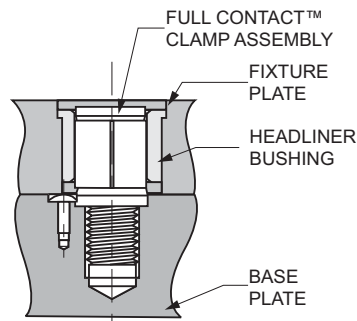


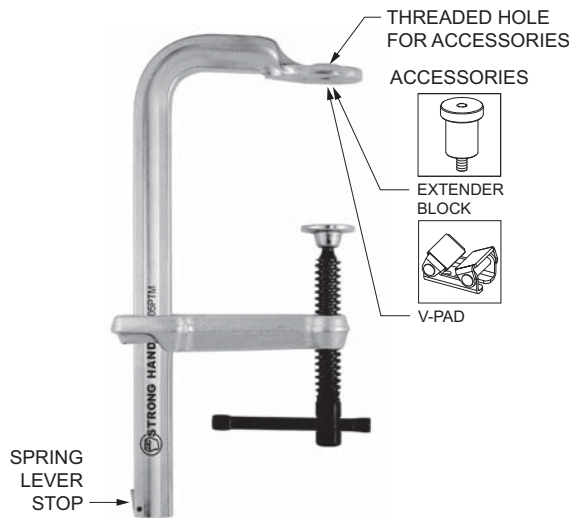
Figure 4

CLAMPS

Utility Clamps are available in 6 models. They are rated for loads of 300 lbs. to 2400 lbs.

FEATURES:

- Ease of use, instant clamping at any opening. Simply slide the arm into position and tighten!
- The Pads swivel and tilt up to 35° for secure clamping.
- The Utility clamp provides rapid clamping with adjustments, without the tedious screwing of the spindle.
- They are 90% faster than C-Clamps.
- The slide arm reduces exposure of the spindle screw, which insures maximum usage.



STRONG HAND® UTILITY CLAMP 300 lbs Clamping Pressure - Standard Pad - Standard Head Case Hardened - Nickel / Chrome Finish				
P/N	DIMENSIONS			
	RAIL SIZE	CAPACITY	THROAT DEPTH	THREADED HOLE
311-62	1/2 x 1/4	4-1/2	2-1/2	1/4-20
311-63	1/2 x 1/4	6-1/2	2-1/2	1/4-20
311-64	1/2 x 1/4	8-1/2	2-1/2	1/4-20
311-66	1/2 x 1/4	12-1/2	2-1/2	1/4-20
311-67	1/2 x 1/4	16-1/2	2-1/2	1/4-20
311-68	1/2 x 1/4	20-1/2	2-1/2	1/4-20

STRONG HAND® UTILITY CLAMP 500 lbs Clamping Pressure - Standard Pad - Standard Head Case Hardened - Nickel / Chrome Finish				
P/N	DIMENSIONS			
	RAIL SIZE	CAPACITY	THROAT DEPTH	THREADED HOLE
311-71	5/8 x 5/16	4-1/2	3-1/4	5/16-18
311-73	5/8 x 5/16	6-1/2	3-1/4	5/16-18
311-74	5/8 x 5/16	8-1/2	3-1/4	5/16-18

STRONG HAND® UTILITY CLAMP 1,000 lbs Clamping Pressure - Standard Pad - Standard Head Case Hardened - Nickel / Chrome Finish				
P/N	DIMENSIONS			
	RAIL SIZE	CAPACITY	THROAT DEPTH	THREADED HOLE
311-75	7/8 x 7/16	6-1/2	4-3/4	3/8-16
311-76	7/8 x 7/16	10	4-3/4	3/8-16

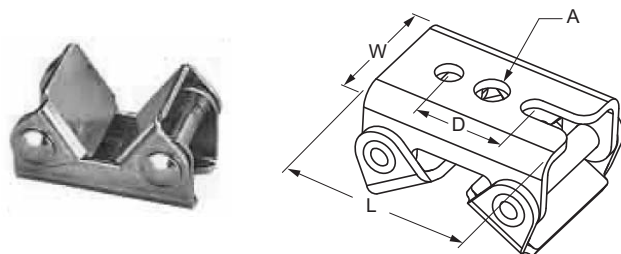
STRONG HAND® UTILITY CLAMP 1,200 lbs Clamping Pressure - Standard Pad - Standard Head Case Hardened - Nickel / Chrome Finish				
P/N	DIMENSIONS			
	RAIL SIZE	CAPACITY	THROAT DEPTH	THREADED HOLE
311-78	1 x 15/32	8-1/2	4-3/4	3/8-16
311-80	1 x 15/32	12-1/2	4-3/4	3/8-16

STRONG HAND® UTILITY CLAMP 2,400 lbs Clamping Pressure - Standard Pad - Standard Head Case Hardened - Nickel / Chrome Finish				
P/N	DIMENSIONS			
	RAIL SIZE	CAPACITY	THROAT DEPTH	THREADED HOLE
311-83	1-3/16 x 9/16	8-1/2	5-1/2	3/8-16
311-85	1-3/16 x 9/16	10-1/2	5-1/2	3/8-16
311-87	1-3/16 x 9/16	12-1/2	5-1/2	3/8-16

STRONG HAND® UTILITY CLAMP 2,400 lbs Clamping Pressure - Heavy Duty Pad - Standard Head Case Hardened - Nickel / Chrome Finish				
P/N	DIMENSIONS			
	RAIL SIZE	CAPACITY	THROAT DEPTH	THREADED HOLE
311-81	1-3/16 x 9/16	6-1/2	5-1/2	3/8-16
311-82	1-3/16 x 9/16	8-1/2	5-1/2	3/8-16
311-84	1-3/16 x 9/16	10-1/2	5-1/2	3/8-16
311-86	1-3/16 x 9/16	12-1/2	5-1/2	3/8-16
311-89	1-3/16 x 9/16	16-1/2	5-1/2	3/8-16
311-90	1-3/16 x 9/16	20-1/2	5-1/2	3/8-16

STRONG HAND® UTILITY CLAMP J-Clamp Head - Case Hardened - Nickel / Chrome Finish							
P/N	DIMENSIONS						
	RAIL SIZE	CAPACITY	THROAT DEPTH	THREADED HOLE	CLAMPING PREASURE	J - LENGTH	*PAD
311-72	5/8 X 5/16	4-1/2	3-1/4	5/16-18	500	2	STD
311-77	7/8 X 7/16	10	4-3/4	3/8-16	1,000	3	STD
311-79	1 X 15/32	10-1/2	4-3/4	3/8-16	1,200	4	STD
311-88	1-3/16 x 9/16	12-1/2	5-1/2	3/8-16	2,400	4	HD

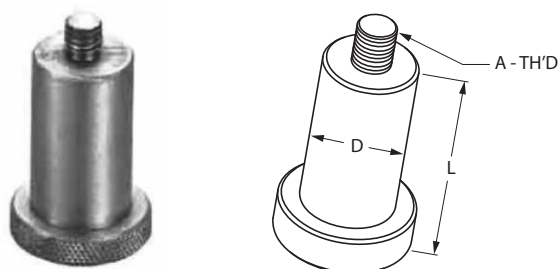
CLAMPS



STRONG HAND[®] UTILITY PAD ACCESSORIES

V-Pad - V-Pad is attached to the Clamp Pad

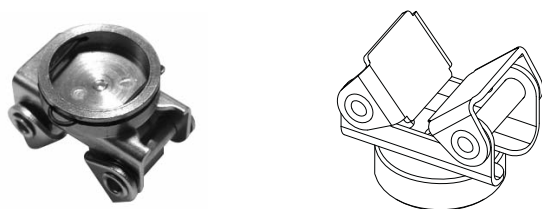
P/N	DIMENSIONS				
	MODELS	A	D	L	W
311-91	311-71 to 311-74	5/16	15/16	2	3/4
311-69	311-75 to 311-80	3/8	1-1/8	2-1/8	1-1/8
311-912	311-81 to 311-90	3/8	1-1/8	2-3/8	1-1/2



STRONG HAND[®] UTILITY PAD ACCESSORIES

Extender Block

P/N	DIMENSIONS			
	MODELS	A	D	L
311-92	311-71 to 311-74	5/16-18	1	3/4
311-921	311-75 to 311-80	3/8-16	2	9/16
311-952	311-81 to 311-90	3/8-16	2	1-3/16

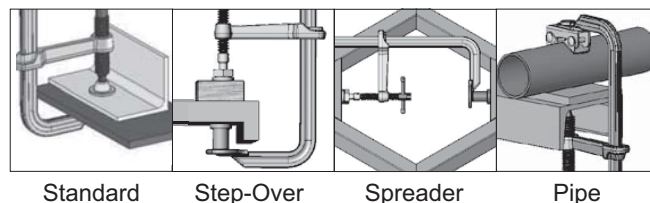
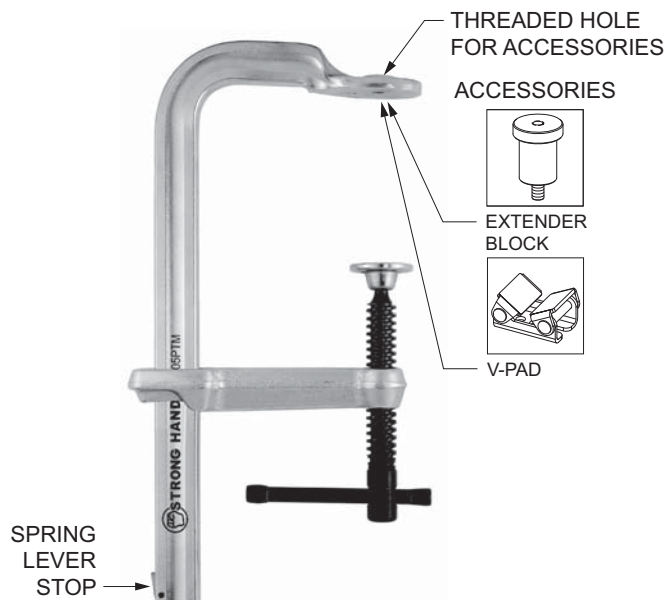


STRONG HAND[®] UTILITY PAD ACCESSORIES

Top V-Pad - The V-Pad clips on to the Spindle Pad.

P/N	DIMENSIONS	
	MODELS	PADS
311-91	311-71 to 311-74	STD. PAD
311-69	311-75 to 311-80	STD. PAD
311-912	311-81 to 311-90	HEAVY DUTY PAD

NOTE: Standard pads clip on and Heavy Duty Pads screw on.



STRONG HAND[®] 4 IN 1 CLAMP KIT

Case Hardened - Nickel / Chrome Finish

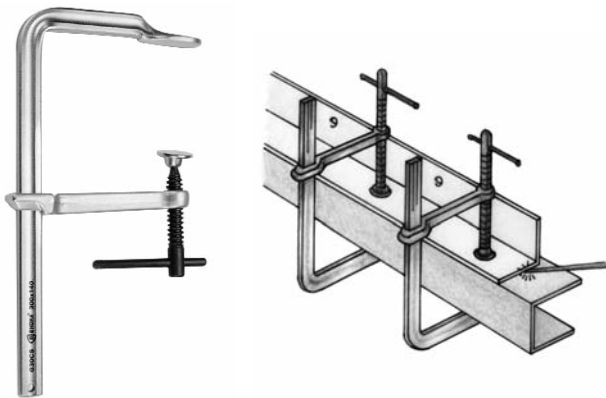
P/N	DIMENSIONS					
	INCLUDED IN KIT	RAIL SIZE	CAPACITY	THROAT DEPTH	THREADED HOLE	CLAMPING PREASURE
311-97	311-71, 311-91 311-92	5/8 X 5/16	4-1/2	3-1/4	5/16-18	500
311-98	311-75, 311-69 311-921	7/8 X 7/16	6-1/2	4-3/4	3/8-16	1,000
311-99	311-78, 311-69 311-921	1 x 15/32	8-1/2	4-3/4	3/8-16	1,200
311-100	311-85, 311-912 311-952	1-3/16 x 9/16	10-1/2	5-1/2	3/8-16	2,400

CLAMPS

Made of heat treated steel and nickel / chrome plated for strength and durability.

FEATURES:

- 6 Models to choose from
- Rated loads: 800 lbs. to 4800 lbs.
- Capacity: 6" to 60"
- Easy to use, instant clamping at any opening. Simply slide arm into position and tighten!
- Pads swivel and tilt 35° for secure clamping.
- Rapid clamping with instant adjustments, without the tedious screwing of the spindle.
- 90% faster than C-Clamps.
- Sliding Arm reduces exposure of spindle screw, which insures maximum usage.



SWING ARM CLAMP - ECONO MODEL

Case Hardened - Nickel / Chrome Finish

P/N	DIMENSIONS					
	RAIL SIZE	CAPACITY	THROAT DEPTH	PRESSURE (LBS.)	CROSS REF WILTON	CROSS REF BESSEY
312-00	5/8 x 5/16	6"	3	550	6306PST	G16ZK
312-02	3/4 x 3/8	8"	4	792	6308PST	G20ZK
312-04	7/8 x 7/16	10"	4-1/2	1056	6310PST	-
312-06	1 x 15/32	12"	5-1/2	1210	6312PST	G30ZK
312-10	1-1/16 x 1/2	16"	6-7/8	1540	-	-
312-12	1 x 15/32	20"	4-3/4	1320	6320PST	G50ZK
312-14	1 x 15/32	24"	4-3/4	1320	6324PST	G60ZK
312-16	1-1/16 x 1/2	40"	4-3/4	1650	6330PST	G100ZK

SWING ARM CLAMP - REGULAR DUTY

Case Hardened - Nickel / Chrome Finish

P/N	DIMENSIONS				
	RAIL SIZE	CAPACITY	THROAT DEPTH	PRESSURE (LBS.)	CROSS REF BESSEY
312-20	1-1/16 x 1-1/2	8"	4-3/4	1870	SGL20
312-22	1-1/16 x 1-1/2	10"	4-3/4	1870	SGL25
312-24	1-1/16 x 1-1/2	12"	4-3/4	1870	SGL30
312-26	1-1/16 x 1-1/2	16"	4-3/4	1870	SGL40
312-28	1-1/16 x 1-1/2	20"	4-3/4	1870	SGL50
312-30	1-1/16 x 1-1/2	24"	4-3/4	1870	SGL60

SWING ARM CLAMP - PROFESSIONAL DUTY

Case Hardened - Nickel / Chrome Finish

P/N	DIMENSIONS				
	RAIL SIZE	CAPACITY	THROAT DEPTH	PRESSURE (LBS.)	CROSS REF BESSEY
312-40	7/8 x 7/16	6"	4-3/4	1330	SQ-4
312-44	1-3/16 x 9/16	10"	4-3/4	2660	SQ-10
312-46	1-3/16 x 9/16	12"	4-3/4	2660	SQ-12
312-48	1-3/16 x 9/16	20"	4-3/4	2660	SQ-20

SWING ARM CLAMP - MEDIUM MODEL

Case Hardened - Nickel / Chrome Finish

P/N	DIMENSIONS					
	RAIL SIZE	CAPACITY	THROAT DEPTH	PRESSURE (LBS.)	CROSS REF WILTON	CROSS REF BESSEY
312-50	1-3/16 x 9/16	10"	4-3/4	2640	6410PST	2400S-10
312-54	1-3/16 x 9/16	16"	4-3/4	2640	6416PST	-
312-56	1-3/16 x 9/16	20"	5-1/2	2640	6420PST	2400S-20
312-60	1-3/16 x 9/16	32"	5-1/2	2640	6432PST	-
312-62	1-3/16 x 9/16	40"	4-3/4	2640	6440PST	2400S-40

SWING ARM CLAMP - HEAVY DUTY

Case Hardened - Nickel / Chrome Finish

P/N	DIMENSIONS					
	RAIL SIZE	CAPACITY	THROAT DEPTH	PRESSURE (LBS.)	CROSS REF WILTON	CROSS REF BESSEY
312-70	1-9/16 x 3/4	12	7	4840	6512P	4800S-12
312-72	1-9/16 x 3/4	16	7	4840	6516P	-
312-74	1-9/16 x 3/4	20	7	4840	6520P	4800S-20
312-76	1-9/16 x 3/4	24	7	4840	6524P	-
312-78	1-9/16 x 3/4	32	7	4840	6532P	-
312-80	1-9/16 x 3/4	40	7	4840	6540P	4800S-40
312-82	1-9/16 x 3/4	60	7	4840	6560P	4800S-60

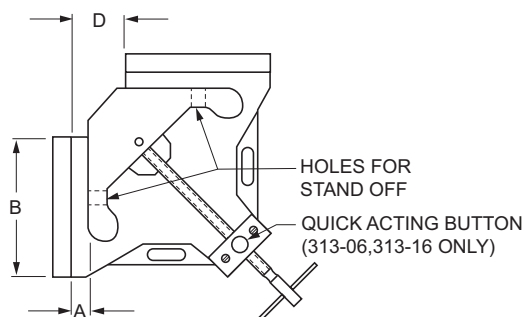
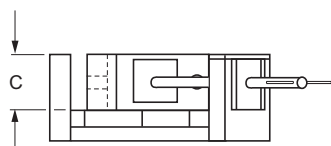
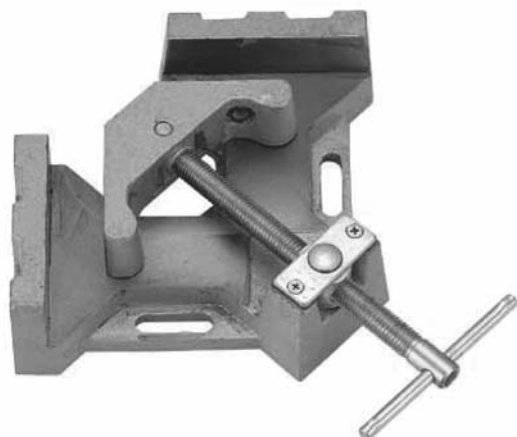
SWING ARM CLAMP - ACCESSORIES

P/N	DESCRIPTION
313-72	PLAIN PAD FOR PARTS 312-70 THROUGH 312-82
313-81	JOINT AND NUT FOR 312-70 THROUGH 312-82
313-84	NUT FOR 312-70 THROUGH 312-82
313-86	SPINDLE AND T-HANDLE FOR 312-50 THROUGH 312-62
313-87	SPINDLE AND T-HANDLE FOR 312-70 THROUGH 312-82

ANGLE CLAMPS

The 2 Axis Welders Angle Clamps are made with machined cast iron. All models EXCEPT for the econo version 313-04 feature the following improvements:

- Machined outside faces - usable for upright joints.
- Stand-off increases access.
- Quick acting screws on deluxe models (313-06 & 313.16)



STRONG HAND® 2 AXIS WELDERS ANGLE CLAMPS

Cast Iron - Machined on 2 sides

P/N	DIMENSIONS				
	FEATURES	MITER JOINTS "A"	JAW LENGTH "B"	JAW HEIGHT "C"	T CLEARANCE "D"
313-00	STANDARD SCREW	2.21	3.54	1.28	1.85
313-02	ECON. MODEL STANDARD SCREW	3.75	4.80	1.38	2.45
313-06	QUICK ACTING SCREW, STAND OFFS	4.75	5.32	2.50	3.92
313-16	QUICK ACTING SCREW, STAND OFFS	3.75	4.80	1.38	2.45

The 3 Axis Welders Angle Clamps holds a 3-axis workpiece in position before welding. The new 313-14 features quick acting screws, "swing away" arm. With the push of the buttons, the threaded screws easily slide in and out. When the job is finished, simply "swing away" the 3rd axis arm for quick and easy part removal. Holds parts in position during cool down to minimize distortion due to contraction.



STRONG HAND® 3 AXIS WELDERS ANGLE CLAMPS

Cast Iron - Machined on 2 sides

P/N	DIMENSIONS				
	FEATURES	MITER JOINTS "A"	JAW LENGTH "B"	JAW HEIGHT "C"	T CLEARANCE "D"
313-14	QUICK ACTING SCREW, SWING AWAY ARM, STAND OFFS	3.75	4.80	1.38	2.45

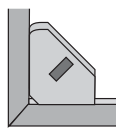
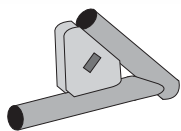
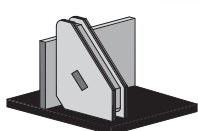
Stand Offs are used for increased space between the jaw and work piece. They are applicable to clamp models 313-06, 313-14 and 313-16.

STRONG HAND® STAND OFFS

P/N	DIMENSIONS	
	SIZE	
313-10	1/4-20 x 1-1/4"	

MAGNETS

Turn the switch off to release the magnet from the work piece.



STRONG HAND® ADJUST-O-MATIC SQUARE

45° - 90° ANGLES

P/N	DIMENSIONS	
	SPECIFICATIONS	MAGNET FORCE
313-15	4-3/8 x 3-3/4 x 1	50
*313-17	4-3/8 x 3-3/4 x 1-1/8	80
313-20	6 x 5-1/8 x 1-1/4	75
*313-23	6 x 5-1/8 x 1-7/6	140

* Heavy Duty Item.



STRONG HAND® STANDARD MAGNET SQUARE

P/N	DIMENSIONS		
	DESCRIPTION	SPECIFICATIONS	MAGNET FORCE
313-25	45° x 90°	4-3/8 x 3-3/4 x 3/4	45
313-30	30°/60° x 90°	4-3/8 x 3-3/4 x 3/4	45

The Meg-Level is a handy level/magnet combination for use anywhere! Use in 0°, 45°, or 90° positions with round, square or angle steel stock. Ideal for fast alignment on large construction beams or any awkward place where a traditional leveler just won't do the job! Turn the switch off to release the magnet from the work piece.



STRONG HAND® MAG-LEVEL

DIMENSIONS

P/N	DESCRIPTION	SPECIFICATIONS	MAGNET FORCE
313-35	0°, 45° & 90°	4 x 16 x 1	50



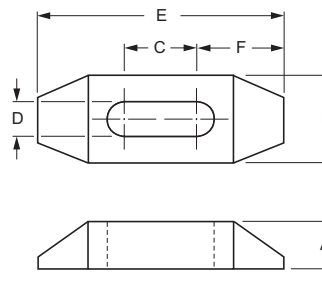
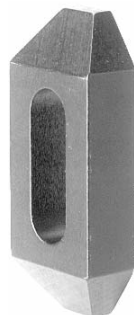
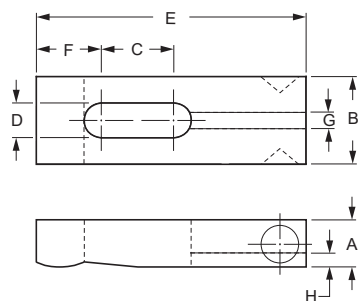
STRONG HAND® MAGNET DISPLAY KITS

Includes Card board Display, Signage, Metal test strip and Literature
12 x 12 x 20 high

P/N	DIMENSIONS	
	MAGNET STRENGTH	SPECIFICATIONS
313-50	STANDARD	12 ea. - 313-15 6 ea. - 313-20
313-55	STANDARD AND HEAVY DUTY	6 ea. - 313-15, 6 ea. - 313-17 3 ea. - 313-20, 3 ea. - 313-23

CLAMPS

The Center Clamp has finger grips on both sides.



CENTER CLAMPS

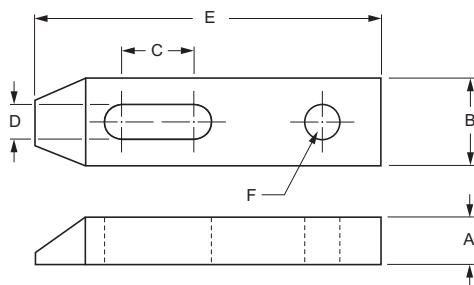
Case Hardened - Black Oxide Finish

P/N	DIMENSIONS							
	A	B	C	D	E	F	G	H
316-05	3/8	5/8	3/4	1/4	2-1/2	7/16	3/16	1/8
316-10	5/8	1-1/4	1-1/4	1/2	4	3/4	3/8	9/32
316-11	5/8	1-1/4	3/4	3/8	3	9/16	3/8	9/32
316-12	5/8	1-1/4	1	3/8	4	13/16	3/8	9/32
316-13	5/8	1-1/4	1-1/2	3/8	5	13/16	3/8	9/32
316-20	5/8	1-1/4	1-1/2	1/2	5	1-1/4	3/8	9/32
316-25	5/8	1-1/4	2	1/2	5-1/2	1-3/4	3/8	9/32
316-30	5/8	1-1/4	2-1/4	1/2	6	3/4	3/8	9/32
316-35	3/4	1-1/2	1-3/4	5/8	4-1/2	7/8	1/2	9/32
316-40	3/4	1-1/2	1-5/8	5/8	5	7/8	1/2	9/32
316-45	1	1-3/4	2	3/4	6	1	1/2	9/32

PLAIN CLAMPS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
319-00	1/2	1	13/16	5/16 & 3/8	2-1/2	27/32
319-05	5/8	1	1-7/16	5/16 & 3/8	4	1-1/32
319-10	3/4	1-1/8	2-3/16	5/16 & 3/8	6	1-5/32
319-15	1/2	1-1/8	11/16	1/2	2-1/2	29/32
319-20	3/4	1-1/4	1-5/16	1/2	4	1-5/32
319-25	7/8	1-1/4	2-1/16	1/2	6	1-9/32
319-30	5/8	1-1/2	9/16	5/8	2-1/2	31/32
319-35	3/4	1-1/2	1-3/16	5/8	4	1-9/32
319-40	7/8	1-1/2	1-15/16	5/8	6	1-3/32
319-45	3/4	1-1/2	1-1/16	3/4	4	1-11/32
319-50	1	1-1/2	1-15/16	3/4	6	1-15/32
319-55	1-1/8	1-3/4	2-3/16	3/4	8	1-29/32
319-60	1-1/4	2	1-11/16	7/8 & 1	6	1-27/32
319-65	1-3/8	2	1-15/16	7/8 & 1	8	2-1/32
319-70	1-1/2	2	2-15/16	7/8 & 1	10	2-1/32



HI-RISE CLAMPS

Case Hardened - Black Oxide Finish

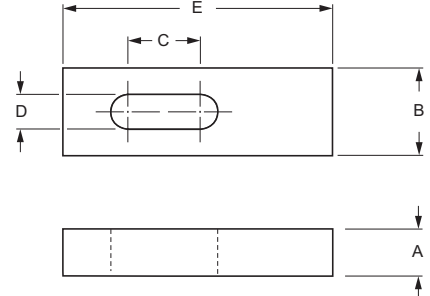
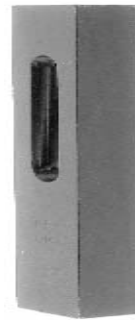
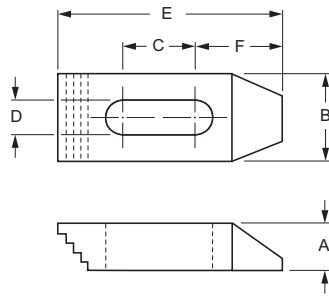
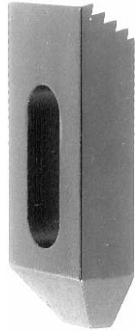
P/N	DIMENSIONS					
	A	B	C	D	E	F
318-00	3/4	1-1/2	1-1/2	1/2	6	25/32
318-05	7/8	1-3/4	1-1/2	5/8	6	25/32
318-10	1-1/8	1-3/4	1-1/2	3/4	6	25/32
318-15	1-3/8	2	1-1/2	1	6	1-1/32

METRIC PLAIN CLAMPS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
319-00M	13	25	21	M6-M8-M10	64	21
319-05M	16	25	37	M6-M8-M10	102	26
319-10M	19	29	56	M6-M8-M10	152	29
319-15M	13	29	18	M12	64	23
319-20M	16	32	33	M12	102	29
319-25M	19	32	52	M12	152	29
319-30M	16	32	14	M16	64	25
319-35M	19	38	30	M16	102	31
319-40M	22	38	49	M16	152	34
319-45M	19	38	27	M20	102	33
319-50M	25	38	49	M20	152	37

CLAMPS



SERRATED END CLAMPS

Teeth Match All Step Blocks - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
320-00	1/2	1	13/16	5/16 & 3/8	2-1/2	27/32
320-05	5/8	1	1-7/16	5/16 & 3/8	4	1-1/32
320-10	3/4	1-1/8	2-3/16	5/16 & 3/8	6	1-5/32
320-15	1/2	1-1/8	11/16	1/2	2-1/2	29/32
320-20	3/4	1-1/4	1-5/16	1/2	4	1-5/32
320-25	7/8	1-1/4	2-1/16	1/2	6	1-9/32
320-30	5/8	1-1/4	9/16	5/8	2-1/2	31/32
320-35	3/4	1-1/2	1-3/16	5/8	4	1-9/32
320-40	7/8	1-1/2	1-15/16	5/8	6	1-13/32
320-45	3/4	1-1/2	1-1/16	3/4	4	1-11/32
320-50	1	1-1/2	1-15/16	3/4	6	1-15/32
320-55	1-1/8	1-3/4	2-3/16	3/4	8	1-29/32
320-60	1-1/4	2	1-11/16	7/8 & 1	6	1-23/32
320-65	1-3/8	2	1-15/16	7/8 & 1	8	2-1/32
320-70	1-1/2	2	2-15/16	7/8 & 1	10	2-1/32

METRIC SERRATED END CLAMPS

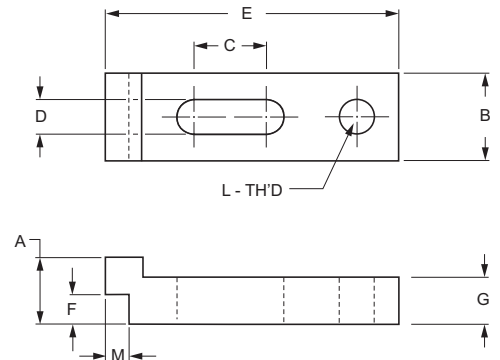
Teeth Match All Step Blocks - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
320-00M	13	25	21	M6-M8-M10	64	21
320-05M	16	25	37	M6-M8-M10	102	26
320-10M	19	29	56	M6-M8-M10	152	29
320-15M	13	29	18	M12	64	23
320-20M	16	32	33	M12	102	29
320-25M	19	32	52	M12	152	29
320-30M	16	32	14	M16	64	25
320-35M	19	38	30	M16	102	31
320-40M	22	38	49	M16	152	34
320-45M	19	38	27	M20	102	33
320-50M	25	38	49	M20	152	37
320-55M	29	45	56	M20	203	48

SOFT CLAMPS

Mild Steel Clamp for Easy Modification - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	E
321-00	3/4	1-1/8	2	5/16 & 3/8	6
321-05	3/4	1-1/2	2	1/2	6
321-10	7/8	1-1/2	2	5/8	6
321-15	1	1-1/2	2	3/4	6

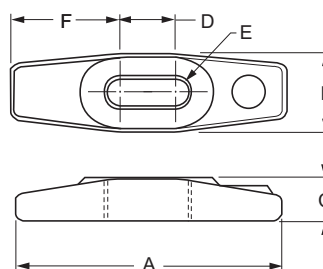
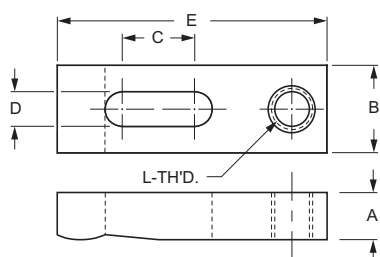


STEP CLAMPS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	E
322-00	1-1/8	1	7/8	3/8	3-1/4
322-05	1-1/8	1-1/8	7/8	1/2	3-5/8
322-10	1-3/8	1-1/4	7/8	5/8	3-3/4
322-15	1-3/8	1-1/2	3/4	3/4	4-1/4
P/N	F	G	L	M	
322-00	1/2	5/8	3/8-16	1/2	
322-05	1/2	5/8	3/8-16	1/2	
322-10	3/4	3/4	3/8-16	3/8	
322-15	3/4	3/4	1/2-13	3/8	

CLAMPS



TAPPED END CLAMPS

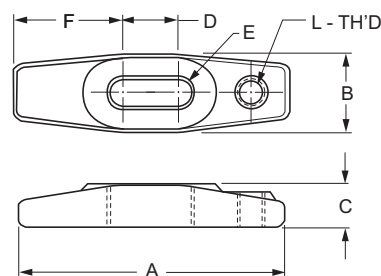
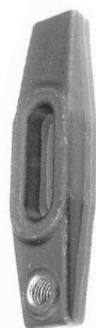
Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	L
323-00	3/8	5/8	1/2	1/4	2	1/4-20
323-05	3/8	5/8	1/2	1/4	2-1/2	1/4-20
323-15	1/2	1	13/16	5/16	3-1/4	5/16-18
323-20	5/8	1-1/4	3/4	3/8	3	3/8-16
323-25	5/8	1-1/4	1	3/8	4	3/8-16
323-30	5/8	1-1/4	1-1/2	3/8	5	3/8-16
323-35	5/8	1-1/4	1	1/2	4	1/2-13
323-40	5/8	1-1/4	1-1/2	1/2	4-1/2	1/2-13
323-45	5/8	1-1/4	1-1/2	1/2	5	1/2-13
323-50	5/8	1-1/4	1-1/2	1/2	6	1/2-13
323-55	3/4	1-1/2	1	5/8	4-1/2	5/8-11
323-60	3/4	1-1/2	1-1/2	5/8	5	5/8-11
323-70	3/4	1-1/2	1-1/2	5/8	6	5/8-11
323-75	7/8	1-1/2	1	5/8	4-1/2	5/8-11
323-80	7/8	1-1/2	1-1/2	5/8	5	5/8-11
323-85	7/8	1-1/2	1-1/2	5/8	6	5/8-11

FORGED PLAIN CLAMPS

Forged High Tensile Carbon Steel - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
324-00	4	1-5/8	3/4	11/16	5/8 or 1/2	1-21/32
324-02	6	1-3/4	7/8	1-3/8	5/8 or 1/2	2-5/16
324-04	8	2-1/8	1-1/8	2	3/4	2-31/32
324-06	10	2-1/2	1-3/8	2-3/4	7/8	3-5/8

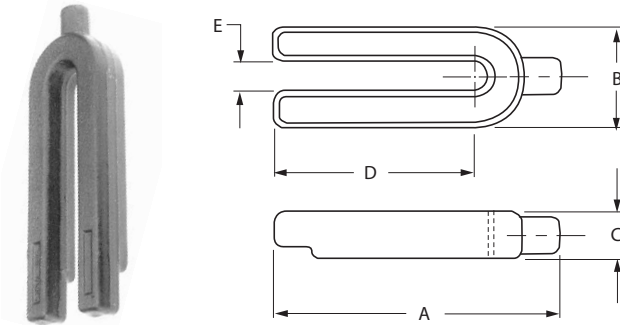


FORGED TAPPED PLAIN CLAMPS

Forged High Tensile Carbon Steel - Black Oxide Finish

P/N	DIMENSIONS						
	A	B	C	D	E	F	L
324-10	4	1-5/8	3/4	11/16	5/8 or 1/2	1-21/32	1/2-13
324-12	6	1-3/4	7/8	1-3/8	5/8 or 1/2	2-5/16	5/8-11
324-14	8	2-1/8	1-1/8	2	3/4	2-31/32	3/4-10
324-16	10	2-1/2	1-3/8	2-3/4	7/8	3-5/8	7/8-9

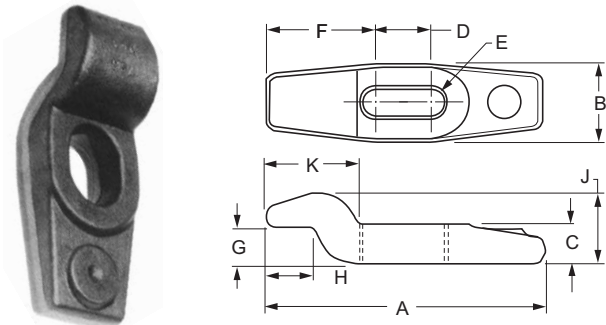
CLAMPS



FORGED "U" CLAMPS

Forged High Tensile Carbon Steel - Black Oxide Finish

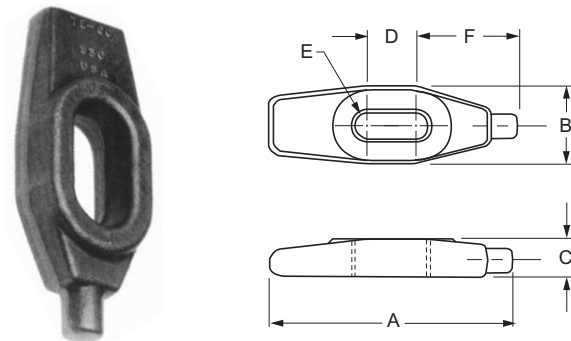
P/N	DIMENSIONS				
	A	B	C	D	E
324-20	4	1-3/4	3/4	2-9/16	5/8 or 1/2
324-22	6	2	7/8	4-5/16	5/8 or 1/2
324-24	8	2-3/8	1-1/8	6	3/4
324-26	10	2-3/4	1-1/4	7-11/16	7/8
324-28	12	3-1/4	1-3/8	9-5/16	1



FORGED GOOSENECK CLAMPS

Forged High Tensile Carbon Steel - Black Oxide Finish

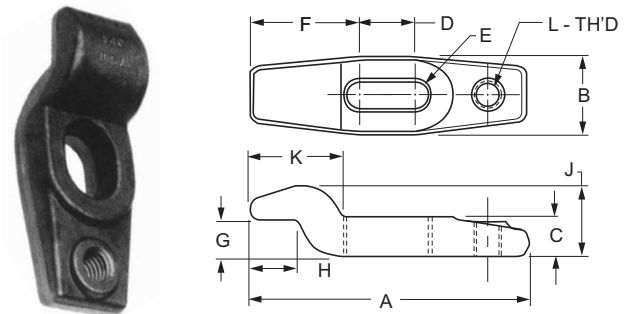
P/N	DIMENSIONS				
	A	B	C	D	E
324-38	4	1-5/8	3/4	1/4	5/8 or 1/2
324-40	6	1-3/4	7/8	1	5/8 or 1/2
324-42	8	2-1/8	1-1/8	1-5/8	3/4
P/N	F	G	H	J	K
324-38	1-7/8	13/16	3/4	1-7/16	1-3/8
324-40	2-1/2	15/16	1	1-9/16	1-3/4
324-42	3-3/16	1-1/8	1-1/4	2-1/16	2-1/2



FORGED FINGER-TIP CLAMPS

Forged High Tensile Carbon Steel - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
324-30	4	1-5/8	3/4	11/16	5/8 or 1/2	1-21/32
324-32	6	1-3/4	7/8	1-1/4	5/8 or 1/2	2-3/8
324-34	8	2-1/8	1-1/8	1-3/4	3/4	3-1/8



FORGED TAPPED GOOSENECK CLAMPS

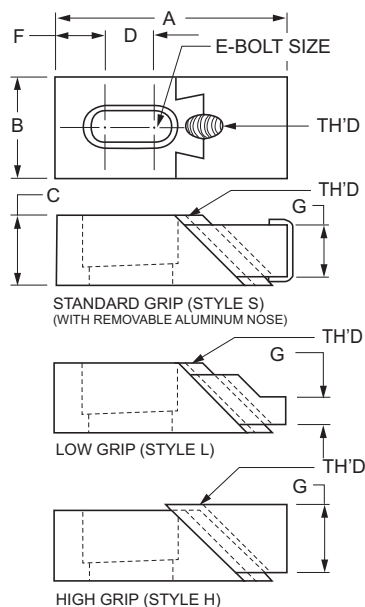
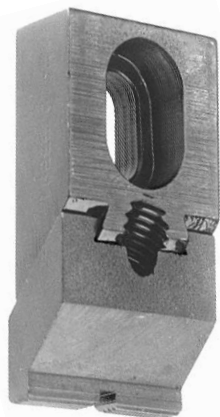
Forged High Tensile Carbon Steel - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
324-44	4	1-5/8	3/4	1/4	5/8 or 1/2	1-7/8
324-46	6	1-3/4	7/8	1	5/8 or 1/2	2-1/2
324-48	8	2-1/8	1-1/8	1-5/8	3/4	3-3/16
P/N	G	H	J	K	L	
324-44	13/16	3/4	1-7/16	1-3/8	1/2-13	
324-46	15/16	1	1-9/16	1-3/4	5/8-11	
324-48	1-1/8	1-1/4	2-1/16	2-1/2	5/8-11	

CLAMPS

HEAVY DUTY NUZZLER FEATURES:

- Double acting adjustable jaws exert clamping forces both in and down.
- The Heavy Duty Nuzzlers low profile provides great machining clearance.
- The "V" groove in the nose allows a positive grip on round parts and workpiece.
- Removeable aluminum nose cap prevents damage to the workpiece.
- Edge clamps feature a double action, adjustable nose which exerts clamping pressures both downward and inward through a 45° angle.
- The nose of the Heavy duty Nuzzler[®] has serrations or better gripping of non-finished or semi-finished workpieces.
- Tapered slots prevents the clamp from sliding off the workpiece during tightening.
- Length "A" is calculated with the nose raised 1/8".



HEAVY DUTY NUZZLER[®] DOUBLE ACTION EDGE CLAMPS

Nose Style "L" - 1018 Steel - Black Oxide Finish

P/N	DIMENSIONS							WRENCH SIZE
	A	B	C	D	E	F	G	
325-00	2-5/16	1-1/4	5/8	3/8	3/8	7/16	1/4	3/16
325-02	4-1/8	1-1/4	5/8	2	3/8	11/16	1/4	3/16
325-04	3-5/16	1-1/2	3/4	3/4	1/2	11/16	3/8	1/4
325-06	5-3/16	1-1/2	3/4	2-1/2	1/2	5/8	3/8	1/4
325-08	5-13/16	1-1/2	1-1/4	2-1/4	1/2	1-1/16	3/8	1/4
325-11	7-1/8	1-1/2	1-1/4	3-5/16	1/2	1-3/16	3/8	1/4
325-16	1-7/8	1	5/8	1/4	5/16	13/32	1/8	5/32
325-17	2-3/8	1	5/8	3/4	5/16	5/16	1/8	5/32
325-18	2-7/8	1	5/8	1-1/4	5/16	5/16	1/8	5/32
325-19	2-3/4	1-1/4	5/8	13/16	3/8	1/2	1/4	3/16
325-20	4-11/16	1-1/4	5/8	2-3/16	3/8	15/16	1/4	3/16
325-21	3-7/8	1-1/2	7/8	1-1/4	1/2	1/2	1/4	1/4
325-22	5-5/16	1-1/2	7/8	2	1/2	7/8	1/4	1/4
325-23	7-1/4	1-1/2	7/8	3	1/2	1-3/8	1/4	1/4
325-24	5-1/4	2	1-1/4	1-3/8	3/4	27/32	3/8	5/16

HEAVY DUTY NUZZLER[®] DOUBLE ACTION EDGE CLAMPS

Nose Style "S" - 1018 Steel - Black Oxide Finish

P/N	DIMENSIONS							WRENCH SIZE
	A	B	C	D	E	F	G	
325-01	2-5/16	1-1/4	5/8	3/8	3/8	7/16	5/8	3/16
325-03	4-1/8	1-1/4	5/8	2	3/8	11/16	5/8	3/16
325-05	3-5/16	1-1/2	3/4	3/4	1/2	11/16	3/4	1/4
325-07	5-3/16	1-1/2	3/4	2-1/2	1/2	5/8	3/4	1/4
325-09	5-13/16	1-1/2	1-1/4	2-1/4	1/2	1-1/16	3/4	1/4
325-12	7-1/8	1-1/2	1-1/4	3-5/16	1/2	1-3/16	3/4	1/4
325-25	1-7/8	1	5/8	1/4	5/16	13/32	5/8	5/32
325-26	2-3/8	1	5/8	3/4	5/16	5/16	5/8	5/32
325-27	2-7/8	1	5/8	1-1/4	5/16	5/16	5/8	5/32
325-28	2-3/4	1-1/4	5/8	13/16	3/8	1/2	5/8	3/16
325-29	4-11/16	1-1/4	5/8	2-3/16	3/8	15/16	5/8	3/16
325-30	3-7/8	1-1/2	7/8	1-1/4	1/2	1/2	7/8	1/4
325-31	5-5/16	1-1/2	7/8	2	1/2	7/8	7/8	1/4
325-32	7-1/4	1-1/2	7/8	3	1/2	1-3/8	7/8	1/4

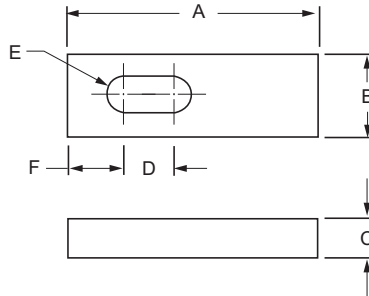
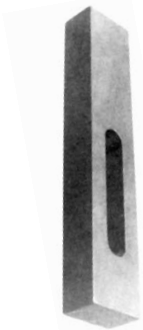
HEAVY DUTY NUZZLER[®] DOUBLE ACTION EDGE CLAMPS

Nose Style "H" - 1018 Steel - Black Oxide Finish

P/N	DIMENSIONS							WRENCH SIZE
	A	B	C	D	E	F	G	
325-10	6-1/8	1-1/2	1-1/4	2-1/4	1/2	1-1/16	1	1/4
325-13	7-3/8	1-1/2	1-1/4	3-5/16	1/2	1-3/16	1	1/4
325-14	5-1/4	2	1-1/4	1-3/8	3/4	27/32	1-1/4	5/16
325-15	6-7/16	2-1/2	1-1/2	2	7/8	15/16	1-1/2	1/2

CLAMPS

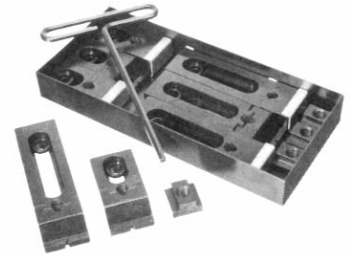
- The Nuzzler® Edge Clamp Spacer is used to increase the height of the Edge Clamp and in turn lower the nose profile.
- The Edge Clamp Spacer is adjustable to allow for breakthrough clearance.



The Nuzzler® Edge Clamp Kit Contains:

- 4 Low Grip clamps
- 4 Standard Grip Clamps
- 4 T-Slot Nuts
- 8 Washers
- 1 T-Handle Wrench
- 1 Holder

For Material Information see individual components.



NUZZLER® EDGE CLAMP SPACERS

Low and Standard Grip - Black Oxide Finish

NUZZLER® EDGE CLAMP SPACERS						
Black Oxide Finish						
P/N	DIMENSIONS					
	A	B	C	D	E	F
325-43	6.00	1.5	0.500	2.50	.531	.688
325-44	4.62	1.5	1.000	2.06	.531	.688
325-45	5.62	1.5	1.000	2.43	.531	.688
325-46	4.00	1.5	1.000	1.46	.531	.688
325-47	5.75	2.0	1.500	2.41	.812	.840
325-48	3.25	1.0	0.313	1.50	.340	.310
325-49	3.25	1.0	0.625	1.05	.340	.310

P/N	DIMENSIONS			
	EDGE CLAMPS 2 EACH	T SLOT NUT #	TABLE SLOT SIZE	SOCKET CAP SCREW SIZE
325-50	325-16, 325-17 325-18, 325-27	260-02T	3/8	5/16
325-52	325-16, 325-17 325-18, 325-27	259-96T	7/16	5/16
325-54	325-16, 325-17 325-18, 325-27	259-98T	1/2	5/16
325-56	325-00, 325-01 325-02, 325-03	259-98T	7/16	3/8
325-58	325-00, 325-01 325-02, 325-03	260-04T	1/2	3/8
325-60	325-00, 325-01 325-02, 325-03	260-05T	9/16	3/8
325-62	325-04, 325-05 325-06, 325-07	260-08T	9/16	1/2
325-64	325-04, 325-05 325-06, 325-07	260-09T	5/8	1/2
325-66	325-04, 325-05 325-06, 325-07	260-11T	11/16	1/2



The Nuzzler® Edge Clamp Kit

Contains:

6 Low Grip clamps

6 T-Slot Nuts

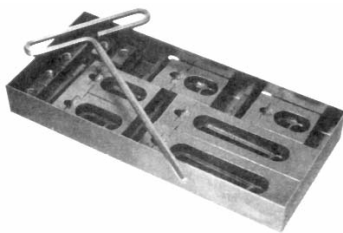
6 Washers

1 T-Handle Wrench

1 Holder

For Material Information

see individual components.



NUZZLER® T-HANDLE WRENCH

Black Oxide Finish

P/N	DIMENSIONS		
	FITS CLAMP NUMBER	WRENCH HEX SIZE	ADJUSTMENT SCREW SIZE
326-00	325-00, 325-01 325-02, 325-03 325-19, 325-20 325-28, 325-29	3/16	3/16-18
326-01	325-04, 325-05 325-06, 325-07 325-08, 325-09 325-10, 325-11 325-12, 325-13 325-21, 325-22 325-23, 325-30 325-31, 325-32	1/4	1/2-13
326-02	325-14, 325-24	5/16	5/8-11
326-03	325-15	1/2	7/8-9
326-04	325-16, 325-17 325-18, 325-25 325-26, 325-27	5/32	5/16-18

- Prevents damage to the workpiece.



NUZZLER® ALUMINUM END CAP

For Standard Grip Clamps Only

P/N	DIMENSIONS		
	FITS CLAMP NUMBER	WRENCH HEX SIZE	ADJUSTMENT SCREW SIZE
326-49	325-25, 325-26 325-27	5/8	1
326-50	325-01, 325-03 325-28, 325-29	5/8	1-1/4
326-51	325-05, 325-07 325-28, 325-29	3/4	1-1/2
326-52	325-30, 325-31 325-32	7/8	1-1/2

NUZZLER® EDGE CLAMP SPACERS

Low Grip - Black Oxide Finish

P/N	DIMENSIONS			
	EDGE CLAMPS 2 EACH	T SLOT NUT #	TABLE SLOT SIZE	SOCKET CAP SCREW SIZE
325-70	325-16, 325-17 325-18	260-02T	3/8	5/16
325-72	325-16, 325-17 325-18	259-96T	7/16	5/16
325-74	325-16, 325-17 325-18	259-98T	1/2	5/16
325-76	325-00, 325-19 325-20	259-98T	7/16	3/8
325-78	325-00, 325-19 325-20	260-04T	1/2	3/8
325-80	325-00, 325-19 325-20	260-05T	9/16	3/8
325-82	325-21, 325-22 325-23	260-08T	9/16	1/2
325-84	325-21, 325-22 325-23	260-09T	5/8	1/2
325-86	325-21, 325-22 325-23	260-11T	11/16	1/2

CLAMPS AND T-SLOT BOLTS



NUZZLER® ADJUSTMENT SCREWS Black Oxide Finish			
P/N	DIMENSIONS		
	FITS CLAMP NUMBER	THREAD	WRENCH HEX SIZE
327-00	325-00, 325-01	3/8-16	3/16
	325-02, 325-03		
	325-19, 325-20		
	325-28, 325-29		
327-05	325-04, 325-05	1/2-13	1/4
	325-06, 325-07		
	325-08, 325-09		
	325-11, 325-12		
327-10	325-14, 325-24	5/8-11	5/16
327-15	325-15	7/8-9	1/2
327-20	325-10, 325-13	1/2-13	1/4
	325-21, 325-22		
	325-23, 325-30		
	325-31, 325-32		
327-25	325-16, 325-17	5/16-18	5/32
	325-18, 325-25		
	325-26, 325-27		

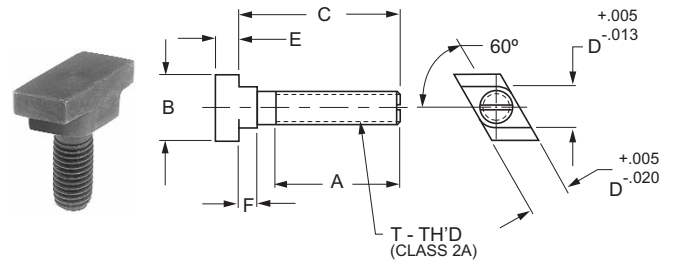


NUZZLER® CLAMP SPRINGS Black Oxide Finish		
P/N	DIMENSIONS	
	FITS STUD SIZE	OVERALL FREE LENGTH
330-00	1/4	3/4
330-05	5/16	1
330-10	3/8	1-1/4
330-15	1/2	1-1/4
330-20	5/8	1-1/4
330-25	3/4	1-3/8
330-30	1	1-3/8

- Combines the convenience of the Rotary T-Slot Nut with the strength and simplicity of the Forged T-Slot bolts.
- Slot on the top of the bolts makes it easy to rotate the head in the T-Slot.
- Fully threaded, extra long shank for versatility.

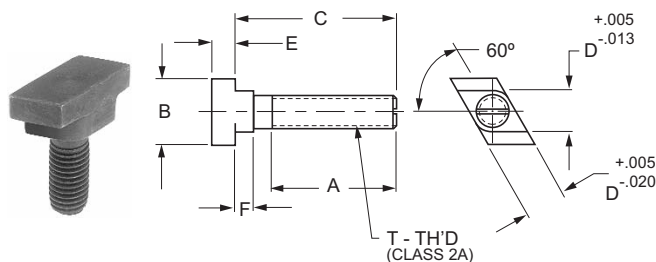


NUZZLER® T-HANDLE WRENCH Case Hardened - Black Oxide Finish		
P/N	DIMENSIONS	
	FITS CLAMP NUMBER	SOCKET CAP SCREWER SIZE
328-50	325-00, 325-01	3/8
	325-02, 325-03	
	325-19, 325-20	
	325-28, 325-29	
328-55	325-04, 325-05	1/2
	325-06, 325-07	
	325-08, 325-09	
	325-10, 325-11	
	325-12, 325-13	
	325-21, 325-22	
	325-23, 325-30	
	325-31, 325-32	
328-60	325-14, 325-24	3/4
326-65	325-15	7/8
326-70	325-16, 325-17	5/16
	325-18, 325-25	
	325-26, 325-27	



ROTARY T-SLOT BOLT Case Hardened to Grade 5 - Black Oxide Finish							
P/N	DIMENSIONS						
	A	B	C	D	E	F	T
333-50	1.0	1-1/8	1.5	.625	11/32	11/32	1/2-13
333-52	1.5	1-1/8	2.0	.625	11/32	11/32	1/2-13
333-54	2.0	1-1/8	2.5	.625	11/32	11/32	1/2-13
333-56	2.5	1-1/8	3.0	.625	11/32	11/32	1/2-13
333-58	2.5	1-1/8	3.5	.625	11/32	11/32	1/2-13
333-60	2.5	1-1/8	4.0	.625	11/32	11/32	1/2-13
333-62	2.5	1-1/8	4.5	.625	11/32	11/32	1/2-13
333-64	2.5	1-1/8	5.0	.625	11/32	11/32	1/2-13
333-66	2.5	1-1/8	6.0	.625	11/32	11/32	1/2-13

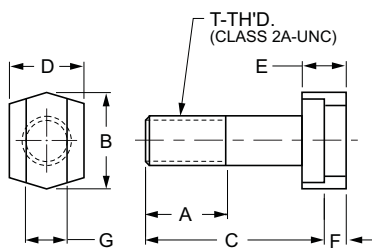
T-SLOT BOLTS



ROTARY T-SLOT BOLT CONTINUED

Case Hardened to Grade 5 - Black Oxide Finish

P/N	DIMENSIONS						
	A	B	C	D	E	F	T
333-68	1.0	1-1/4	1.5	.75	13/32	13/32	5/8-11
333-70	1.5	1-1/4	2.0	.75	13/32	13/32	5/8-11
333-72	2.0	1-1/4	2.5	.75	13/32	13/32	5/8-11
333-74	2.5	1-1/4	3.0	.75	13/32	13/32	5/8-11
333-76	2.5	1-1/4	3.5	.75	13/32	13/32	5/8-11
333-78	2.5	1-1/4	4.0	.75	13/32	13/32	5/8-11
333-80	2.5	1-1/4	5.0	.75	13/32	13/32	5/8-11
333-82	4.5	1-1/4	6.0	.75	13/32	13/32	5/8-11



T-SLOT BOLT

5140 Medium Carbon Alloy - Case Hardened to Grade 5 (125,000 PSI)
Black Oxide Finish

P/N	DIMENSIONS							
	A	B	C	D	E	F	G	T
*334-02	1	13/16	1-1/2	11/16	3/8	3/16	3/8	3/8-16
*334-04	1-1/2	13/16	2	11/16	3/8	3/16	3/8	3/8-16
*334-06	2	13/16	2-1/2	11/16	3/8	3/16	3/8	3/8-16
*334-08	2	13/16	3	11/16	3/8	3/16	3/8	3/8-16
*334-10	2	13/16	3-1/2	11/16	3/8	3/16	3/8	3/8-16
*334-12	2-1/2	13/16	4	11/16	3/8	3/16	3/8	3/8-16
*334-16	2-1/2	13/16	5	11/16	3/8	3/16	3/8	3/8-16
*334-22	1	1-3/16	1-1/2	7/8	9/16	1/4	1/2	1-12-13
*334-24	1-1/2	1-3/16	2	7/8	9/16	1/4	1/2	1-12-13
*334-26	2	1-3/16	2-1/2	7/8	9/16	1/4	1/2	1-12-13

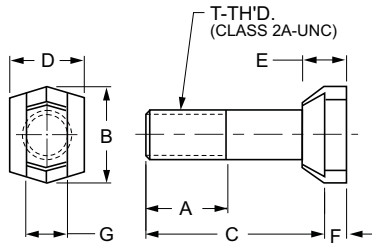
T-SLOT BOLT - CONTINUED

5140 Medium Carbon Alloy - Case Hardened to Grade 5 (125,000 PSI)
Black Oxide Finish

P/N	DIMENSIONS							
	A	B	C	D	E	F	G	T
*334-28	2	1-3/16	3	7/8	9/16	1/4	1/2	1-12-13
*334-30	2	1-3/16	3-1/2	7/8	9/16	1/4	1/2	1-12-13
*334-32	2-1/2	1-3/16	4	7/8	9/16	1/4	1/2	1-12-13
*334-34	2-1/2	1-3/16	4-1/2	7/8	9/16	1/4	1/2	1-12-13
*334-36	2-1/2	1-3/16	5	7/8	9/16	1/4	1/2	1-12-13
*334-38	2-1/2	1-3/16	6	7/8	9/16	1/4	1/2	1-12-13
*334-39	2-1/2	1-1/4	6	1	9/16	1/4	1/2	1-12-13
*334-42	1-1/2	1-5/16	2	1-1/8	3/4	3/8	3/4	5/8-11
*334-44	2	1-5/16	2-1/2	1-1/8	3/4	3/8	3/4	5/8-11
*334-46	2	1-5/16	3	1-1/8	3/4	3/8	3/4	5/8-11
*334-48	2	1-5/16	3-1/2	1-1/8	3/4	3/8	3/4	5/8-11
*334-50	2-1/2	1-5/16	4	1-1/8	3/4	3/8	3/4	5/8-11
*334-52	2-1/2	1-5/16	5	1-1/8	3/4	3/8	3/4	5/8-11
*334-54	2-1/2	1-5/16	6	1-1/8	3/4	3/8	3/4	5/8-11
*334-56	3	1-5/16	7	1-1/8	3/4	3/8	3/4	5/8-11
*334-58	3-1/2	1-5/16	8	1-1/8	3/4	3/8	3/4	5/8-11
*334-60	1-1/2	1-1/2	2	1-1/4	7/8	7/16	3/4	3/4-10
*334-62	2	1-1/2	2-1/2	1-1/4	7/8	7/16	3/4	3/4-10
*334-64	2	1-1/2	3	1-1/4	7/8	7/16	3/4	3/4-10
*334-66	2	1-1/2	3-1/2	1-1/4	7/8	7/16	3/4	3/4-10
*334-68	2-1/2	1-1/2	4	1-1/4	7/8	7/16	3/4	3/4-10
*334-70	2-1/2	1-1/2	5	1-1/4	7/8	7/16	3/4	3/4-10
*334-72	2-1/2	1-1/2	6	1-1/4	7/8	7/16	3/4	3/4-10
*334-74	3	1-1/2	7	1-1/4	7/8	7/16	3/4	3/4-10
*334-76	3-1/2	1-1/2	8	1-1/4	7/8	7/16	3/4	3/4-10
*334-78	4	1-1/2	9	1-1/4	7/8	7/16	3/4	3/4-10
*334-79	2	2-1/16	3	2-3/4	1-1/8	11/16	1	1-8
*334-80	2-1/2	2-1/16	4	1-3/4	1-1/8	11/16	1	1-8
*334-82	2-1/2	2-1/16	5	1-3/4	1-1/8	11/16	1	1-8
*334-84	2-1/2	2-1/16	6	1-3/4	1-1/8	11/16	1	1-8
*334-86	3	2-1/4	7	1-3/4	1-1/8	11/16	1	1-8
*334-88	3-1/2	2-1/4	8	1-3/4	1-1/8	11/16	1	1-8
*334-90	4	2-1/4	10	1-3/4	1-1/8	11/16	1	1-8
*334-92	4	2-1/4	12	1-3/4	1-1/8	11/16	1	1-8
*334-94	6	2-1/4	14	1-3/4	1-1/8	11/16	1	1-8
*334-96	8	2-1/4	16	1-3/4	1-1/8	11/16	1	1-8
*334-98	8	2-1/4	18	1-3/4	1-1/8	11/16	1	1-8

* Discontinued but available while supplies last.

T-SLOT BOLTS



T-SLOT BOLT

C1050 Medium Carbon Steel - Case Hardened to Grade 5 (125,000 PSI)
Black Oxide Finish

P/N	DIMENSIONS							
	A	B	C	D	E	F	G	T
335-02	1	13/16	1-1/2	11/16	3/8	3/16	3/8	3/8-16
335-04	1-1/2	13/16	2	11/16	3/8	3/16	3/8	3/8-16
335-06	2	13/16	2-1/2	11/16	3/8	3/16	3/8	3/8-16
335-08	2	13/16	3	11/16	3/8	3/16	3/8	3/8-16
335-09	2	13/16	3-1/2	11/16	3/8	3/16	3/8	3/8-16
335-10	2	13/16	4	11/16	3/8	3/16	3/8	3/8-16
335-11	2	13/16	4-1/2	11/16	3/8	3/16	3/8	3/8-16
335-12	2	13/16	5	11/16	3/8	3/16	3/8	1/2-13
335-13	2	13/16	5-1/2	11/16	3/8	3/16	3/8	1/2-13
335-14	2	13/16	6	11/16	3/8	3/16	3/8	1/2-13
335-15	2	13/16	7	11/16	3/8	3/16	3/8	1/2-13
335-16	2	13/16	8	11/16	3/8	3/16	3/8	1/2-13
335-18	1	1-3/16	1-1/2	7/8	9/16	1/4	1/2	1/2-13
335-20	1-1/2	1-3/16	2	7/8	9/16	1/4	1/2	1/2-13
335-22	2	1-3/16	2-1/2	7/8	9/16	1/4	1/2	1/2-13
335-24	2	1-3/16	3	7/8	9/16	1/4	1/2	1/2-13
335-25	2	1-3/16	3-1/2	7/8	9/16	1/4	1/2	1/2-13
335-26	2	1-3/16	4	7/8	9/16	1/4	1/2	1/2-13
335-27	2	1-3/16	4-1/2	7/8	9/16	1/4	1/2	1/2-13
335-28	2	1-3/16	5	7/8	9/16	1/4	1/2	1/2-13
335-29	2	1-3/16	5-1/2	7/8	9/16	1/4	1/2	5/8-11
335-30	2	1-3/16	6	7/8	9/16	1/4	1/2	5/8-11
335-31	2	1-3/16	7	7/8	9/16	1/4	1/2	5/8-11
335-32	2	1-3/16	8	7/8	9/16	1/4	1/2	5/8-11
335-33	2	1-3/16	9	7/8	9/16	1/4	1/2	5/8-11
335-34	2	1-3/16	10	7/8	9/16	1/4	1/2	5/8-11
335-35	2	1-3/16	12	7/8	9/16	1/4	1/2	5/8-11
335-36	1	1-5/16	1-1/2	1-1/8	11/16	11/32	5/8	5/8-11
335-37	1-1/2	1-5/16	2	1-1/8	11/16	11/32	5/8	5/8-11
335-39	2	1-5/16	2-1/2	1-1/8	11/16	11/32	5/8	5/8-11

T-SLOT BOLT - CONTINUED

C1050 Medium Carbon Steel - Case Hardened to Grade 5 (125,000 PSI)
Black Oxide Finish

P/N	DIMENSIONS							
	A	B	C	D	E	F	G	T
335-41	2	1-5/16	3	1-1/8	11/16	11/32	5/8	5/8-11
335-42	2	1-5/16	3-1/2	1-1/8	11/16	11/32	5/8	5/8-11
335-43	2	1-5/16	4	1-1/8	11/16	11/32	5/8	5/8-11
335-44	2	1-5/16	4-1/2	1-1/8	11/16	11/32	5/8	5/8-11
335-45	2	1-5/16	5	1-1/8	11/16	11/32	5/8	5/8-11
335-46	2	1-5/16	5-1/2	1-1/8	11/16	11/32	5/8	5/8-11
335-47	2	1-5/16	6	1-1/8	11/16	11/32	5/8	5/8-11
335-48	2	1-5/16	7	1-1/8	11/16	11/32	5/8	5/8-11
335-49	2	1-5/16	8	1-1/8	11/16	11/32	5/8	5/8-11
335-50	2	1-5/16	9	1-1/8	11/16	11/32	5/8	5/8-11
335-51	2	1-5/16	10	1-1/8	11/16	11/32	5/8	5/8-11
335-52	2	1-5/16	12	1-1/8	11/16	11/32	5/8	5/8-11
335-53	1-1/2	1-9/16	2	1-1/4	7/8	15/32	3/4	3/4-10
335-54	2	1-9/16	2-1/2	1-1/4	7/8	15/32	3/4	3/4-10
335-55	2	1-9/16	3	1-1/4	7/8	15/32	3/4	3/4-10
335-56	2	1-9/16	3-1/2	1-1/4	7/8	15/32	3/4	3/4-10
335-57	2	1-9/16	4	1-1/4	7/8	15/32	3/4	3/4-10
335-58	2	1-9/16	4-1/2	1-1/4	7/8	15/32	3/4	3/4-10
335-59	2	1-9/16	5	1-1/4	7/8	15/32	3/4	3/4-10
335-60	2	1-9/16	5-1/2	1-1/4	7/8	15/32	3/4	3/4-10
335-61	2	1-9/16	6	1-1/4	7/8	15/32	3/4	3/4-10
335-62	2	1-9/16	7	1-1/4	7/8	15/32	3/4	3/4-10
335-63	2	1-9/16	8	1-1/4	7/8	15/32	3/4	3/4-10
335-64	2	1-9/16	9	1-1/4	7/8	15/32	3/4	3/4-10
335-65	2	1-9/16	10	1-1/4	7/8	15/32	3/4	3/4-10
335-66	2	1-9/16	12	1-1/4	7/8	15/32	3/4	3/4-10
335-67	2	1-3/4	3	1-1/2	1	9/16	7/8	7/8-9
335-68	2	1-3/4	4	1-1/2	1	9/16	7/8	7/8-9
335-69	2	1-3/4	5	1-1/2	1	9/16	7/8	7/8-9
335-70	2	1-3/4	6	1-1/2	1	9/16	7/8	7/8-9
335-71	2	1-3/4	7	1-1/2	1	9/16	7/8	7/8-9
335-72	2	1-3/4	8	1-1/2	1	9/16	7/8	7/8-9
335-73	2	1-3/4	9	1-1/2	1	9/16	7/8	7/8-9
335-74	2	1-3/4	10	1-1/2	1	9/16	7/8	7/8-9
335-75	2	1-3/4	12	1-1/2	1	9/16	7/8	7/8-9
335-76	2	1-3/4	14	1-1/2	1	9/16	7/8	7/8-9
335-77	2	1-3/4	16	1-1/2	1	9/16	7/8	7/8-9
335-78	2	1-3/4	18	1-1/2	1	9/16	7/8	7/8-9

T-SLOT BOLTS AND T BOLTS

T-SLOT BOLT - CONTINUED

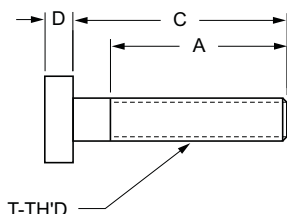
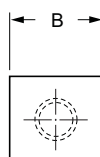
C1050 Medium Carbon Steel - Case Hardened to Grade 5 (125,000 PSI)
Black Oxide Finish

P/N	DIMENSIONS							
	A	B	C	D	E	F	G	T
335-79	2	2-1/16	3	1-3/4	1-1/8	11/16	1	1-8
335-80	2	2-1/16	4	1-3/4	1-1/8	11/16	1	1-8
335-81	2	2-1/16	5	1-3/4	1-1/8	11/16	1	1-8
335-82	2	2-1/16	6	1-3/4	1-1/8	11/16	1	1-8
335-83	2	2-1/16	7	1-3/4	1-1/8	11/16	1	1-8
335-84	2	2-1/16	8	1-3/4	1-1/8	11/16	1	1-8
335-85	2	2-1/16	9	1-3/4	1-1/8	11/16	1	1-8
335-86	2	2-1/16	10	1-3/4	1-1/8	11/16	1	1-8
335-87	2	2-1/16	12	1-3/4	1-1/8	11/16	1	1-8
335-88	2	2-1/16	14	1-3/4	1-1/8	11/16	1	1-8
335-89	2	2-1/16	16	1-3/4	1-1/8	11/16	1	1-8
335-90	2	2-1/16	18	1-3/4	1-1/8	11/16	1	1-8

T - BOLT - CONTINUED

Medium Carbon Alloy Steel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	T
336-10	1	7/8	1-1/2	5/16	1/2-13
336-11	1-1/2	7/8	2	5/16	1/2-13
336-12	2	7/8	2-1/2	5/16	1/2-13
336-13	2	7/8	3	5/16	1/2-13
336-14	2	7/8	3-1/2	5/16	1/2-13
336-15	2	7/8	4	5/16	1/2-13
336-16	2	7/8	5	5/16	1/2-13
336-17	2	7/8	6	5/16	1/2-13
336-18	2	7/8	7	5/16	1/2-13
336-19	2	7/8	8	5/16	1/2-13
336-20	3	7/8	10	5/16	1/2-13
336-21	1.5	7/8	12	5/16	1/2-13
336-22	1	1-1/8	1-1/2	13/32	5/8-11
336-23	1-1/2	1-1/8	2	13/32	5/8-11
336-24	2	1-1/8	2-1/2	13/32	5/8-11
336-25	2	1-1/8	3	13/32	5/8-11
336-26	2	1-1/8	3-1/2	13/32	5/8-11
336-27	2	1-1/8	4	13/32	5/8-11
336-28	2	1-1/8	5	13/32	5/8-11
336-29	2	1-1/8	6	13/32	5/8-11
336-30	2	1-1/8	7	13/32	5/8-11
336-31	2	1-1/8	8	13/32	5/8-11
336-32	2	1-1/8	10	13/32	5/8-11
336-33	1.5	1-1/8	12	13/32	5/8-11
336-34	2	1-5/16	3	17/32	3/4-10
336-35	2	1-5/16	3-1/2	17/32	3/4-10
336-36	2	1-5/16	4	17/32	3/4-10
336-37	2	1-5/16	5	17/32	3/4-10
336-38	2	1-5/16	6	17/32	3/4-10
336-39	2	1-5/16	7	17/32	3/4-10
336-40	2	1-5/16	8	17/32	3/4-10
336-41	3	1-5/16	10	17/32	3/4-10
336-42	3	1-5/16	12	17/32	3/4-10

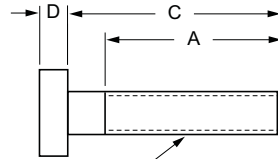
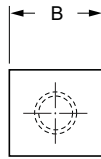


T - BOLT

Medium Carbon Alloy Steel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	T
336-00	1	11/16	1-1/2	1/4	3/8-16
336-01	1-1/2	11/16	2	1/4	3/8-16
336-02	1-3/4	11/16	2-1/2	1/4	3/8-16
336-03	2	11/16	3	1/4	3/8-16
336-04	2	11/16	3-1/2	1/4	3/8-16
336-05	2	11/16	4	1/4	3/8-16
336-06	1-1/4	11/16	5	1/4	3/8-16
336-07	2	11/16	6	1/4	3/8-16
336-08	2	11/16	7	1/4	3/8-16
336-09	2	11/16	8	1/4	3/8-16

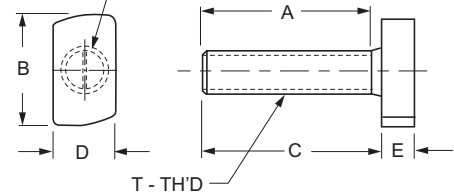
T BOLTS



T-TH'D.

- Special fastener with slot on the end. With a screw driver, the T-head can be turned and locked in the channel.
- The slot also facilitates fastening as the bolt can be steadied or retained in the tight spots or odds positions.

NOTE: NO SLOT ON #10-24. SLOT DIRECTION MAY BE DIFFERENT FROM IMAGE SHOWN.



T - TH'D

STAINLESS STEEL T - BOLT

304 Stainless Steel

P/N	DIMENSIONS				
	A	B	C	D	T
336-50	1	5/16	1-1/2	7/8	1/2-13
336-51	1-1/2	5/16	2	7/8	1/2-13
336-52	2	5/16	2-1/2	7/8	1/2-13
336-53	2	5/16	3	7/8	1/2-13
336-54	2	5/16	4	7/8	1/2-13
336-55	2	5/16	5	7/8	1/2-13
336-56	2	5/16	6	7/8	1/2-13
336-57	2	5/16	8	7/8	1/2-13
336-58	1-1/2	13/32	2	1-1/8	5/8-11
336-59	2	13/32	2-1/2	1-1/8	5/8-11
336-60	2	13/32	3	1-1/8	5/8-11
336-61	2	13/32	4	1-1/8	5/8-11
336-62	2	13/32	5	1-1/8	5/8-11
336-63	2	13/32	6	1-1/8	5/8-11
336-64	2	13/32	8	1-1/8	5/8-11
336-65	1-3/4	17/32	2-1/2	1-5/16	3/4-10
336-66	2	17/32	3	1-5/16	3/4-10
336-67	2	17/32	3-1/2	1-5/16	3/4-10
336-68	2	17/32	4	1-5/16	3/4-10
336-69	2	17/32	5	1-5/16	3/4-10
336-70	2-1/2	17/32	6	1-5/16	3/4-10
336-71	2-1/2	17/32	8	1-5/16	3/4-10

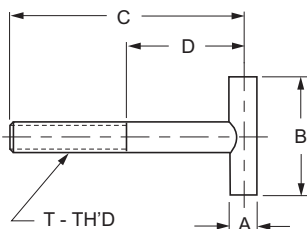
CHANNEL T - BOLTS

Zinc Plate Steel

P/N	DIMENSIONS					
	A	B	C	D	E	T
337-00	.625	3/8	.625	3/16	1/16	#10-24
337-01	.750	3/4	.750	7/16	15/64	1/4-20
337-02	1.000	3/4	1.000	7/16	15/64	1/4-20
337-03	.750	3/4	.750	7/16	15/64	5/16-18
337-04	.875	3/4	.875	7/16	15/64	5/16-18
337-05	1.000	3/4	1.000	7/16	15/64	5/16-18
337-06	1.250	3/4	1.250	7/16	15/64	5/16-18
337-07	1.500	3/4	1.500	7/16	15/64	5/16-18
337-08	1.000	1-1/8	1.500	5/8	11/32	1/2-13
337-09	1.500	1-1/8	2.000	5/8	11/32	1/2-13
337-10	2.000	1-1/8	2.500	5/8	11/32	1/2-13
337-11	2.500	1-1/8	3.000	5/8	11/32	1/2-13
337-12	2.500	1-1/8	3.500	5/8	11/32	1/2-13
337-13	2.500	1-1/8	4.000	5/8	11/32	1/2-13
337-14	2.500	1-1/8	4.500	5/8	11/32	1/2-13
337-15	2.500	1-1/8	5.000	5/8	11/32	1/2-13
337-16	2.500	1-1/8	6.000	5/8	11/32	1/2-13
337-17	1.000	1-1/4	1.500	3/4	1-3/32	5/8-11
337-18	1.500	1-1/4	2.000	3/4	1-3/32	5/8-11
337-19	2.000	1-1/4	2.500	3/4	1-3/32	5/8-11
337-20	2.500	1-1/4	3.000	3/4	1-3/32	5/8-11
337-21	2.500	1-1/4	3.500	3/4	1-3/32	5/8-11
337-22	2.500	1-1/4	4.000	3/4	1-3/32	5/8-11
337-23	2.500	1-1/4	5.000	3/4	1-3/32	5/8-11
337-24	2.500	1-1/4	6.000	3/4	1-3/32	5/8-11

DRIVER STUDS

- T-Straps are used to hold down parts. Ideal for strapping down heavy equipment.
- Used as a hinge in tight-down setup, or simply as clamp down T-Bolt.

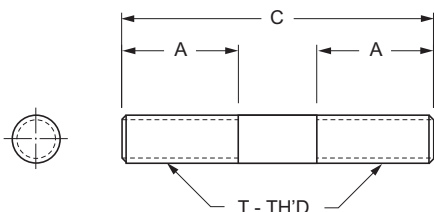


T-STRAP BOLTS

Medium Carbon Steel - Case Hardened to Grade 5 - Zinc Plate Steel

P/N	DIMENSIONS				
	A	B	C	D	T
337-35	1/4	1	2	1/2	1/4-20
337-36	1/4	1	2	1/2	1/4-28
337-37	5/16	1-1/2	2-1/2	1/2	5/16-18
337-38	5/16	1-1/2	2-1/2	1/2	5/16-24
337-39	3/8	2	3-1/2	1-1/2	3/8-16
337-40	3/8	2	3-1/2	1-1/2	3/8-24
337-41	1/2	2	3-1/2	1	1/2-13
337-42	1/2	2	3-1/2	1	1/2-20
337-43	1/2	2	6-1/2	1	1/2-13
337-44	1/2	2	6-1/2	1	1/2-20

- There are no wrench flats on these metric studs.
- Special size and large quantities quoted on request.



METRIC STUDS

Medium Carbon Steel - Case Hardened to Grade 5 - Black Oxide Finish

P/N	DIMENSIONS		
	A	C	T
340-00	20	50	M6 x 1.00
340-02	20	65	M6 x 1.00
340-04	27	80	M6 x 1.00
340-06	27	95	M6 x 1.00

METRIC STUDS - CONTINUED

Medium Carbon Steel - Case Hardened to Grade 5 - Black Oxide Finish

P/N	DIMENSIONS		
	A	C	T
340-08	31	110	M6 x 1.00
340-10	20	50	M8 x 1.25
340-12	20	65	M8 x 1.25
340-14	27	80	M8 x 1.25
340-16	31	95	M8 x 1.25
340-18	31	110	M8 x 1.25
340-20	35	140	M8 x 1.25
340-22	20	50	M10 x 1.50
340-24	20	65	M10 x 1.50
340-26	27	80	M10 x 1.50
340-28	31	95	M10 x 1.50
340-30	35	110	M10 x 1.50
340-32	35	125	M10 x 1.50
340-34	35	140	M10 x 1.50
340-36	35	150	M10 x 1.50
340-38	35	175	M10 x 1.50
340-39	35	200	M10 x 1.50
340-40	20	50	M12 x 1.75
340-42	20	65	M12 x 1.75
340-44	27	80	M12 x 1.75
340-46	31	95	M12 x 1.75
340-48	39	110	M12 x 1.75
340-50	39	125	M12 x 1.75
340-52	39	140	M12 x 1.75
340-54	39	150	M12 x 1.75
340-56	39	175	M12 x 1.75
340-58	39	200	M12 x 1.75
340-60	21	80	M16 x 2.00
340-62	31	95	M16 x 2.00
340-64	47	110	M16 x 2.00
340-65	47	125	M16 x 2.00
340-66	47	150	M16 x 2.00
340-68	47	175	M16 x 2.00
340-70	47	200	M16 x 2.00
340-72	47	250	M16 x 2.00
340-74	47	300	M16 x 2.00
340-76	27	80	M20 x 2.50
340-78	31	95	M20 x 2.50
340-80	47	110	M20 x 2.50
340-82	55	125	M20 x 2.50

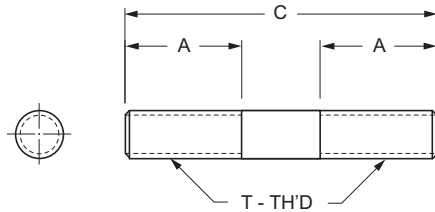


DRIVER STUDS

METRIC STUDS - CONTINUED

Medium Carbon Steel - Case Hardened to Grade 5 - Black Oxide Finish

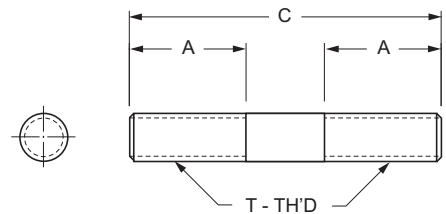
P/N	DIMENSIONS		
	A	C	T
340-84	55	175	M20 x 2.50
340-86	55	200	M20 x 2.50
340-88	55	250	M20 x 2.50
340-90	55	300	M20 x 2.50
340-92	39	100	M24 x 3.00
340-93	55	125	M24 x 3.00
340-94	63	150	M24 x 3.00
340-95	63	175	M24 x 3.00
340-96	63	200	M24 x 3.00
340-97	63	250	M24 x 3.00
340-98	63	300	M24 x 3.00



STAINLESS STEEL DRIVER STUDS - CONTINUED

303 Stainless Steel - No Flats - Rolled Threads

P/N	DIMENSIONS		
	A	C	T
343-15	5/8-11	5	1.75
343-16	5/8-11	6	1.75
343-17	5/8-11	8	1.75
343-18	3/4-10	3	1.75
343-19	3/4-10	4	1.25
343-20	3/4-10	6	2.00
343-21	3/4-10	8	2.00
343-22	3/4-10	10	2.00



STAINLESS STEEL DRIVER STUDS

303 Stainless Steel - No Flats - Rolled Threads

P/N	DIMENSIONS		
	A	C	T
343-00	1.00	3	1/4-20
343-01	1.00	4	1/4-20
343-02	1.00	5	1/4-20
343-03	1.00	3	5/16-18
343-04	1.13	4	5/16-18
343-05	1.13	3	3/8-16
343-06	1.25	4	3/8-16
343-07	1.25	5	3/8-16
343-08	1.25	6	3/8-16
343-09	1.25	8	3/8-16
343-10	1.50	4	1/2-13
343-11	1.50	5	1/2-13
343-12	1.50	6	1/2-13
343-13	1.50	8	1/2-13
343-14	1.75	4	1/2-13

DRIVER STUDS

Tensile Strength 125,000 PSI - Yield 100,000 PSI - Black Oxide Finish

P/N	DIMENSIONS			
	A	C	T	FLATS
345-00	1/2	1-1/2	1/4-20	NO
345-01	3/4	2	1/4-20	NO
345-02	1	2-1/2	1/4-20	NO
345-03	1	3	1/4-20	NO
345-04	1	3-1/2	1/4-20	NO
345-05	1	4	1/4-20	NO
345-06	1	4-1/2	1/4-20	NO
345-07	1	5	1/4-20	NO
345-08	1	5-1/2	1/4-20	NO
345-09	1	6	1/4-20	NO
345-10	1	6-1/2	1/4-20	NO
345-11	1	7	1/4-20	NO
345-12	1	7-1/2	1/4-20	NO
345-13	1	8	1/4-20	NO
345-14	1/2	1-1/2	5/16-18	NO
345-15	3/4	2	5/16-18	NO
345-16	1	2-1/2	5/16-18	NO
345-17	1-1/8	3	5/16-18	NO

DRIVER STUDS - CONTINUED

Tensile Strength 125,000 PSI - Yield 100,000 PSI - Black Oxide Finish

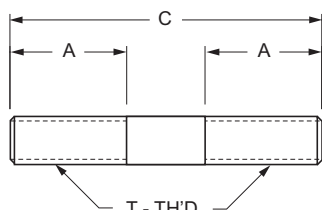
P/N	DIMENSIONS			
	A	C	T	FLATS
345-18	1-1/8	3-1/2	5/16-18	NO
345-19	1-1/8	4	5/16-18	NO
345-20	1-1/8	4-1/2	5/16-18	NO
345-21	1-1/8	5	5/16-18	NO
345-22	1-1/8	5-1/2	5/16-18	NO
345-23	1-1/8	6	5/16-18	NO
345-24	1-1/8	6-1/2	5/16-18	NO
345-25	1-1/8	7	5/16-18	NO
345-26	1-1/8	7-1/2	5/16-18	NO
345-27	1-1/8	8	5/16-18	NO
345-28	1/2	1-1/2	3/8-16	NO
345-29	3/4	2	3/8-16	NO
345-30	1	2-1/2	3/8-16	NO
345-31	1	3	3/8-16	YES
345-32	1-1/4	3-1/2	3/8-16	YES
345-33	1-1/4	4	3/8-16	YES
345-34	1-1/4	4-1/2	3/8-16	YES
345-35	1-1/4	5	3/8-16	YES
345-36	1-1/4	5-1/2	3/8-16	YES
345-37	1-1/4	6	3/8-16	YES
345-38	1-1/4	6-1/2	3/8-16	YES
345-39	1-1/4	7	3/8-16	YES
345-40	1-1/4	7-1/2	3/8-16	YES
345-41	1-1/4	8	3/8-16	YES
345-42	1/2	1-1/2	7/16-14	NO
345-43	3/4	2	7/16-14	NO
345-44	1	2-1/2	7/16-14	NO
345-45	1	3	7/16-14	YES
345-46	1-1/4	3-1/2	7/16-14	YES
345-47	1-3/8	4	7/16-14	YES
345-48	1-3/8	4-1/2	7/16-14	YES
345-49	1-3/8	5	7/16-14	YES
345-50	1-3/8	5-1/2	7/16-14	YES
345-51	1-3/8	6	7/16-14	YES
345-52	1-3/8	6-1/2	7/16-14	YES
345-53	1-3/8	7	7/16-14	YES
345-54	1-3/8	7-1/2	7/16-14	YES
345-55	1-3/8	8	7/16-14	YES
345-56	1/2	1-1/2	1/2-13	NO
345-57	3/4	2	1/2-13	NO

DRIVER STUDS - CONTINUED

Tensile Strength 125,000 PSI - Yield 100,000 PSI - Black Oxide Finish

P/N	DIMENSIONS			
	A	C	T	FLATS
345-58	1	2-1/2	1/2-13	NO
345-59	1	3	1/2-13	YES
345-60	1-1/4	3-1/2	1/2-13	YES
345-61	1-1/2	4	1/2-13	YES
345-62	1-1/2	4-1/2	1/2-13	YES
345-63	1-1/2	5	1/2-13	YES
345-64	1-1/2	5-1/2	1/2-13	YES
345-65	1-1/2	6	1/2-13	YES
345-66	1-1/2	6-1/2	1/2-13	YES
345-67	1-1/2	7	1/2-13	YES
345-68	1-1/2	7-1/2	1/2-13	YES
345-69	1-1/2	8	1/2-13	YES
345-70	1-1/2	9	1/2-13	YES
345-71	1-1/2	10	1/2-13	YES
345-72	1-1/2	12	1/2-13	YES
345-73	1-1/2	14	1/2-13	YES
345-74	1-1/2	16	1/2-13	YES
345-79	1/2	1-1/2	5/8-11	NO
345-80	3/4	2	5/8-11	NO
345-81	1	2-1/2	5/8-11	NO
345-82	1	3	5/8-11	YES
345-83	1-1/4	3-1/2	5/8-11	YES
345-84	1-1/2	4	5/8-11	YES
345-85	1-3/4	4-1/2	5/8-11	YES
345-86	1-3/4	5	5/8-11	YES
345-87	1-3/4	5-1/2	5/8-11	YES
345-88	1-3/4	6	5/8-11	YES
345-89	1-3/4	6-1/2	5/8-11	YES
345-90	1-3/4	7	5/8-11	YES
345-91	1-3/4	7-1/2	5/8-11	YES
345-92	1-3/4	8	5/8-11	YES
345-93	1-3/4	9	5/8-11	YES
345-94	1-3/4	10	5/8-11	YES
345-95	1-3/4	12	5/8-11	YES
345-96	1-3/4	14	5/8-11	YES
345-97	1-3/4	16	5/8-11	YES
345-98	1-3/4	18	5/8-11	YES
345-99	1-3/4	20	5/8-11	YES
346-00	1-3/4	22	5/8-11	YES
346-01	1-3/4	24	5/8-11	YES

DRIVER STUDS



DRIVER STUDS - CONTINUED

Tensile Strength 125,000 PSI - Yield 100,000 PSI - Black Oxide Finish

P/N	DIMENSIONS			
	A	C	T	FLATS
346-02	1	3	3/4-10	YES
346-03	1-1/4	3-1/2	3/4-10	YES
346-04	1-1/2	4	3/4-10	YES
346-05	1-3/4	4-1/2	3/4-10	YES
346-06	2	5	3/4-10	YES
346-07	2	5-1/2	3/4-10	YES
346-08	2	6	3/4-10	YES
346-09	2	6-1/2	3/4-10	YES
346-10	2	7	3/4-10	YES
346-11	2	7-1/2	3/4-10	YES
346-12	2	8	3/4-10	YES
346-13	2	9	3/4-10	YES
346-14	2	10	3/4-10	YES
346-15	2	12	3/4-10	YES
346-16	2	14	3/4-10	YES
346-17	2	16	3/4-10	YES
346-18	2	18	3/4-10	YES
346-19	2	20	3/4-10	YES
346-20	2	22	3/4-10	YES
346-21	2	24	3/4-10	YES
346-22	1	3	7/8-9	YES
346-23	1-1/4	3-1/2	7/8-9	YES
346-24	1-1/2	4	7/8-9	YES
346-25	1-3/4	4-1/2	7/8-9	YES
346-26	2	5	7/8-9	YES
346-27	2-1/4	5-1/2	7/8-9	YES
346-28	2-1/4	6	7/8-9	YES
346-29	2-1/4	6-1/2	7/8-9	YES
346-30	2-1/4	7	7/8-9	YES
346-31	2-1/4	7-1/2	7/8-9	YES
346-32	2-1/4	8	7/8-9	YES
346-33	2-1/4	9	7/8-9	YES
346-34	2-1/4	10	7/8-9	YES
346-35	2-1/4	12	7/8-9	YES

DRIVER STUDS - CONTINUED

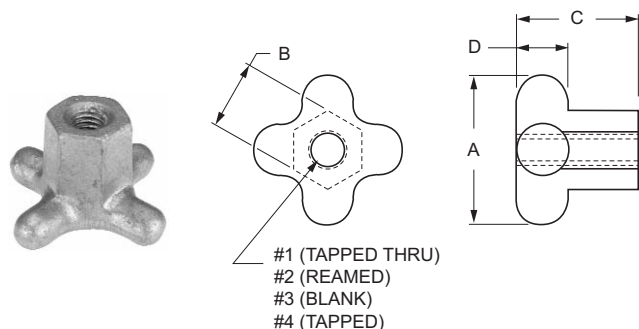
Tensile Strength 125,000 PSI - Yield 100,000 PSI - Black Oxide Finish

P/N	DIMENSIONS			
	A	C	T	FLATS
346-36	2-1/4	14	7/8-9	YES
346-37	2-1/4	16	7/8-9	YES
346-38	2-1/4	18	7/8-9	YES
346-39	2-1/4	20	7/8-9	YES
346-40	2-1/4	22	7/8-9	YES
346-41	2-1/4	24	7/8-9	YES
346-42	1	3	1-8	YES
346-43	1-1/4	3-1/2	1-8	YES
346-44	1-1/2	4	1-8	YES
346-45	1-3/4	4-1/2	1-8	YES
346-46	2	5	1-8	YES
346-47	2-1/4	5-1/2	1-8	YES
346-48	2-1/2	6	1-8	YES
346-49	2-1/2	6-1/2	1-8	YES
346-50	2-1/2	7	1-8	YES
346-51	2-1/2	7-1/2	1-8	YES
346-52	2-1/2	8	1-8	YES
346-53	2-1/2	9	1-8	YES
346-54	2-1/2	10	1-8	YES
346-55	2-1/2	12	1-8	YES
346-56	2-1/2	14	1-8	YES
346-57	2-1/2	16	1-8	YES
346-58	2-1/2	18	1-8	YES
346-59	2-1/2	20	1-8	YES
346-60	2-1/2	22	1-8	YES
346-61	2-1/2	24	1-8	YES

KNOBS

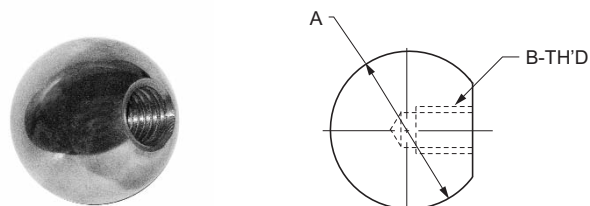
Use these Hand Knobs as a hand knob or a clamping knob. Blank Hand Knobs includes a cast center, eliminating center drilling.

NOTE: Discontinued, available while supplies last.



Hand Knobs Cast Aluminum								
P/N	DIMENSIONS				THREAD			
	A	B	C	D	#1	#2	#3	#4
351-02	1-1/8	1/2	3/4	3/8	1/4-20	-	-	-
*351-04	1-1/8	9/16	3/4	3/8	-	.2500	-	-
351-06	1-1/8	1/2	3/4	3/8	-	-	-	-
351-08	1-1/8	1/2	3/4	3/8	-	-	-	1/4-20
351-10	1-1/2	19/32	7/8	3/8	5/16-18	-	-	-
*351-12	1-1/2	19/32	7/8	3/8	-	.3115	-	-
351-14	1-1/2	19/32	7/8	3/8	-	-	-	-
351-16	1-1/2	19/32	7/8	3/8	-	-	-	5/16-18
351-18	2	11/16	1	3/8	3/8-16	-	-	-
*351-20	2	1-1/8	1	1/2	-	.3740	-	-
351-22	2	11/16	1	3/8	-	-	-	-
351-24	2	11/16	1	3/8	-	-	-	3/8-16
351-26	2-1/2	1-1/16	1-1/2	1/2	1/2-13	-	-	-
*351-28	2-1/2	1-1/8	1-1/2	1/2	-	.4990	-	-
351-30	2-1/2	1-1/16	1-1/2	1/2	-	-	-	-
351-32	2-1/2	1-1/16	1-1/2	1/2	-	-	-	1/2-13
351-38	2-1/2	1-1/16	1-1/2	1/2	-	-	-	-
351-40	2-1/2	1-1/16	1-1/2	1/2	-	-	-	5/8-11
351-42	3	1-1/4	1-3/4	5/8	3/4-10	-	-	-
*351-44	3	1-1/4	1-3/4	1/2	-	.7490	-	-
351-46	3	1-1/4	1-3/4	5/8	-	-	-	-
351-48	3	1-1/4	1-3/4	5/8	-	-	-	3/4-10

- These highly polished balls are turned from solid bar stock.
- The Brass balls offer excellent corrosion resistance to water.
- The Steel and Brass Ball Knobs are used in fixtures, machine tools, jigs and assemblies



BALL KNOBS Steel					
P/N	DIMENSIONS				
	A	B	P/N	A	B
351-50	3/4	10-24	351-68	1-3/8	1/4-20
351-52	3/4	10-32	351-70	1-3/8	1/4-28
351-54	1	10-24	351-72	1-3/8	5/16-18
351-56	1	10-32	351-74	1-3/8	5/16-24
351-58	1	1/4-20	351-76	1-3/8	3/8-16
351-60	1	1/4-28	351-78	1-3/8	3/8-24
351-62	1	5/16-18	351-80	1-3/8	7/16-20
351-64	1	5/16-24	351-82	1-3/8	1/2-13
351-66	1	3/8-16	351-84	1-3/8	1/2-20

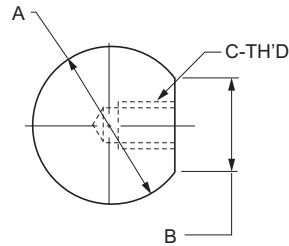
BALL KNOBS Brass					
P/N	DIMENSIONS				
	A	B	P/N	A	B
*351-51	3/4	#10-24	*351-69	1-3/8	1/4-20
*351-53	3/4	#10-32	*351-71	1-3/8	1/4-28
*351-55	1	#10-24	*351-73	1-3/8	5/16-18
*351-57	1	#10-32	*351-75	1-3/8	5/16-24
*351-59	1	1/4-20	*351-77	1-3/8	3/8-16
*351-61	1	1/4-28	*351-79	1-3/8	3/8-24
*351-63	1	5/16-18	*351-81	1-3/8	7/16-20
*351-65	1	5/16-24	*351-83	1-3/8	1/2-13
*351-67	1	3/8-16	*351-85	1-3/8	1/2-20

• - Discontinued available while supplies last..

• - Discontinued available while supplies last..

KNOBS

These classic Ball Knobs are made of plastic, which has a smooth bright finish.



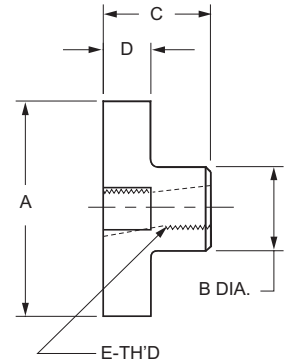
PLASTIC BALL KNOBS

Molded Brass Inserts

P/N	DIMENSIONS			
	A	B	C	THREAD LENGTH
352-05	3/4	3/8	10-24	5/16
352-10	1	1/2	1/4-20	7/16
352-15	1	1/2	1/4-28	7/16
352-20	1	1/2	5/16-18	7/16
352-25	1	1/2	5/16-24	7/16
352-30	1-3/8	5/8	3/8-16	1/2
352-35	1-3/8	5/8	3/8-24	1/2
352-40	1-3/8	5/8	1/2-13	5/8
352-45	1-3/8	5/8	1/2-20	5/8
352-55	1-7/8	3/4	1/2-13	5/8
352-60	1-7/8	3/4	1/2-20	5/8
*352-65	1-7/8	7/8	5/8-18	3/4

* Models molded without metal insert.

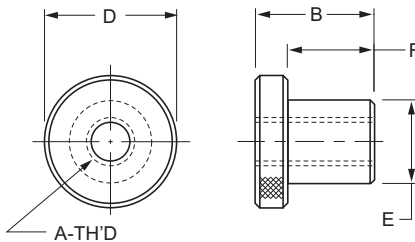
These steel knobs are excellent for fast clamping. The oblong hole lets you tilt and slide the knob onto a stud. For Clamping Action, simply straighten the knob, turn clockwise and the threads will engage. To remove, turn counter clockwise, tilt and slide off. These are not suitable for vibrating equipment.



METRIC QUICK ACTING KNOBS

Black Finish

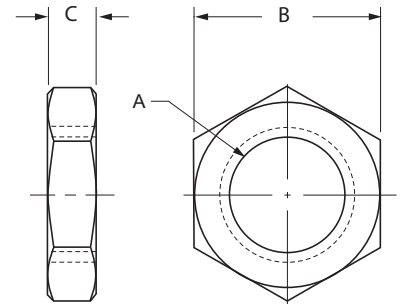
P/N	DIMENSIONS				
	A	B	C	D	E
353-60	30	14	16	8	M6 x 1.00
353-62	38	17	22	10	M8 x 1.25
353-64	50	21	25	13	M10 x 1.50
353-66	64	25	30	14	M12 x 1.75
353-68	76	32	32	16	M16 x 2.00



STEEL KNURLED KNOBS

Black Oxide Finish

P/N	DIMENSIONS				
	A	B	D	E	F
353-00	10-24	5/8	3/4	1/2	3/8
353-05	1/4-20	3/4	1	5/8	1/2
353-10	3/8-16	1-1/8	1-1/4	3/4	5/8
353-15	1/2-13	1-1/4	1-1/2	1	3/4
353-20	5/8-11	1-3/4	2	1-1/4	1-1/8
353-25	3/4-10	2-1/4	2-1/2	1-1/2	1-5/8



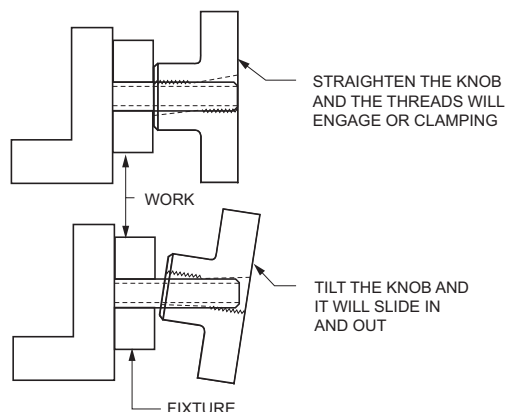
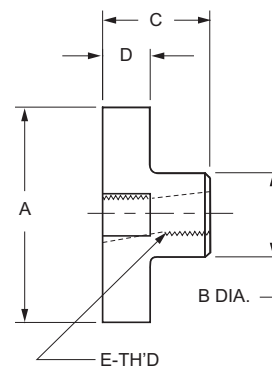
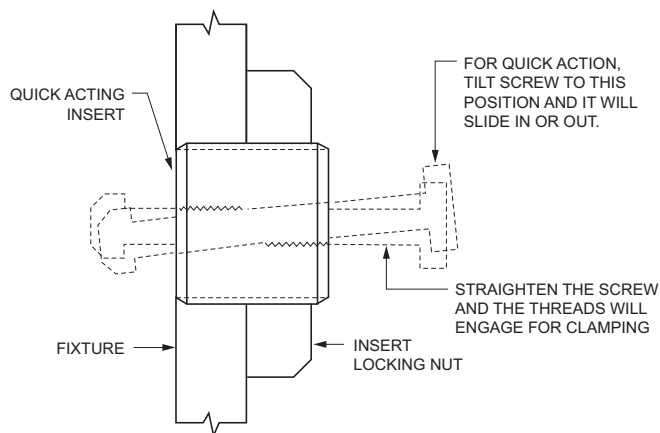
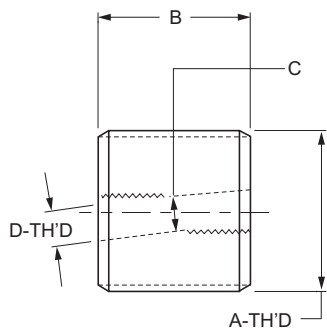
INSERT LOCKING NUTS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			
	USE WITH	A	B	C
353-70	353-80	1/2-20	3/4	3/16
353-71	353-81	5/8-18	1-1/16	1/4
353-72	353-82	3/4-16	1-1/8	5/16
353-73	353-83	1-14	1-1/2	3/8
353-74	353-84	1-1/4-12	1-3/4	7/16

KNOBS

These steel knobs are excellent for fast clamping. The oblong hole lets you tilt and slide the knob onto a stud. For Clamping Action, simply straighten the knob, turn clockwise and the threads will engage. To remove, tilt and slide off. These are not suitable for vibrating equipment.



QUICK ACTING INSERTS

Case Hardened - Black Oxide Finish

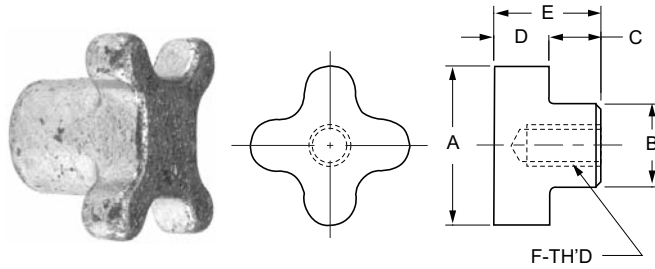
P/N	DIMENSIONS			
	A	B	C	D
353-80	1/2-20	1/2	17/64	1/4-20
353-81	5/8-18	5/8	21/64	5/16-18
353-82	3/4-16	3/4	25/64	3/8-16
353-83	1-14	1	33/64	1/2-13
353-84	1-1/4-12	1-1/4	41/64	5/8-11

QUICK ACTING KNOBS

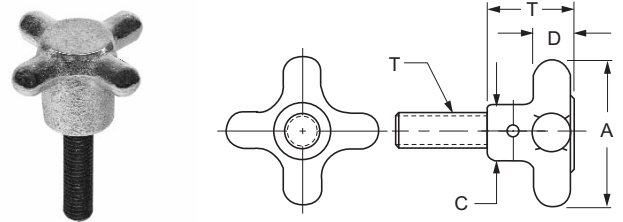
Black Finish

P/N	DIMENSIONS				
	A	B	C	D	E
353-90	1-1/8	9/16	5/8	5/16	1/4-20
353-91	1-1/2	11/16	7/8	3/8	5/16-18
353-92	2	13/16	1	1/2	3/8-16
353-93	2-1/2	1	1-1/8	9/16	1/2-13
353-94	3	1-1/4	1-1/4	5/8	5/8-11
353-95	3	1-1/4	1-1/4	5/8	3/4-10

KNOBS



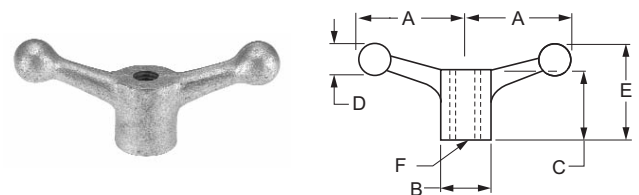
The Classic Cast Iron knob has a round contoured shape and a very comfortable grip. All the knobs are tumbled smooth and zinc plated for corrosion resistance. The screw is pinned to the knob.



PRONG TYPE HAND KNOBS						
Cast Iron						
P/N	DIMENSIONS					
	A	B	C	D	E	F
*354-00	1-1/8	9/16	3/8	5/16	5/8	BLANK
354-02	1-1/8	9/16	3/8	3/8	3/4	.250 RM
354-04	1-1/8	9/16	3/8	3/8	3/4	1/4-20 TAP
354-06	1-1/2	5/8	1/2	3/8	7/8	BLANK
354-08	1-1/2	5/8	1/2	3/8	7/8	.3125 RM
354-10	1-1/2	5/8	1/2	3/8	7/8	5/16-18 TAP
354-12	2	3/4	5/8	1/2	1-1/8	BLANK
354-14	2	3/4	5/8	1/2	1-1/8	.3125 RM
354-15	2	3/4	5/8	1/2	1-1/8	.375 RM
354-18	2	3/4	5/8	1/2	1-1/8	3/8-16 TAP
354-28	2-1/2	1-1/8	1	1/2	1-1/2	BLANK
354-30	2-1/2	1-1/8	1	1/2	1-1/2	.499 RM
354-32	2-1/2	1-1/8	1	1/2	1-1/2	.625 RM
354-34	2-1/2	1-1/8	1	1/2	1-1/2	1/2-13 TAP
354-36	2-1/2	1-1/8	1	1/2	1-1/2	5/8-11 TAP
354-38	3	1-1/4	1-1/4	1/2	1-3/4	BLANK
354-40	3	1-1/4	1-1/4	1/2	1-3/4	.625 RM
354-42	3	1-1/4	1-1/4	1/2	1-3/4	.750 RM
354-44	3	1-1/4	1-1/4	1/2	1-3/4	5/8-11 TAP
**354-46	3	1-1/4	1-1/4	5/8	1-3/4	3/4-10 TAP

- - Discontinued, available while supplies last
- ** - This item (354-46) is Black Oxide Finished.

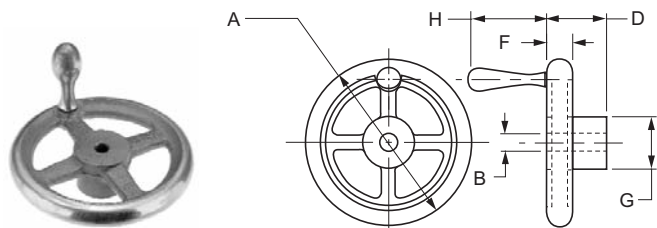
CAST IRON KNOBS					
Cast Iron, Zinc Plated Knob - Black Oxide Finish Screw					
P/N	DIMENSIONS				
	A	B	C	D	T
354-47	2	1-1/8	3/4	1/2	3/8-16 x 1.0
354-48	2	1-1/8	3/4	1/2	3/8-16 x 1.5
354-49	2	1-1/8	3/4	1/2	3/8-16 x 2.0
354-50	2-1/2	1-1/2	1-1/8	1/2	1/2-13 x 1.5
354-51	2-1/2	1-1/2	1-1/8	1/2	1/2-13 x 2.0
354-52	2-1/2	1-1/2	1-1/8	1/2	1/2-13 x 2.5
354-53	2-1/2	1-1/2	1-1/8	1/2	5/8-11 x 2.0
354-54	2-1/2	1-1/2	1-1/8	1/2	5/8-11 x 2.5
354-55	2-1/2	1-1/2	1-1/8	1/2	5/8-11 x 3.0



MACHINE BALL HANDLES						
Maleable Cast Iron - Double Arm						
P/N	DIMENSIONS					
	A	B	C	D	E	F
354-62	2-7/16	1-1/8	1-5/8	3/4	2-1/4	BLANK
354-64	2-7/16	1-1/8	1-5/8	3/4	2-1/4	.500 RM
354-66	2-3/8	1-3/8	1-5/8	3/4	2-1/4	1/2-13 TAP
354-74	3	1-3/8	1-5/8	7/8	2-1/2	BLANK
354-76	3	1-3/8	1-5/8	7/8	2-1/2	.625 RM
354-78	3	1-3/8	1-5/8	7/8	2-1/2	5/8-11 TAP
354-86	4	1-5/8	1-3/4	1	2-15/16	BLANK
354-88	4	1-5/8	1-3/4	1	2-15/16	.750 RM
354-90	4	1-5/8	1-3/4	1	2-15/16	3/4-10 TAP

HANDWHEELS

The Straight Type Handle Wheels are cast, tumbled clean and finished without surface treatment. All Straight Type Hand wheels are 3 and 4 spoke design.



STRAIGHT TYPE HAND WHEELS

No Handle - Cast Iron

P/N	DIMENSIONS					
	A	B	D	F	G	H
*355-01	4	3/8	1-1/8	5/8	1-1/4	-
*355-02	5	3/8	1-1/8	5/8	1-1/2	-
*355-03	6	1/2	1-1/4	3/4	1-5/8	-
*355-04	8	5/8	1-3/8	7/8	1-7/8	-
*355-05	10	5/8	2-1/4	1	2-1/4	-
*355-06	12	3/4	3	1-1/4	3	-
*355-07	14	3/4	3-1/2	1-1/4	3	-

STRAIGHT TYPE HAND WHEELS

Solid Handle - Cast Iron

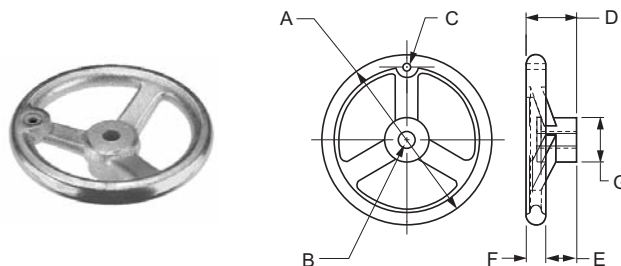
P/N	DIMENSIONS					
	A	B	D	F	G	H
*355-13	4	3/8	1-1/8	5/8	1-1/4	2
*355-14	5	3/8	1-1/8	5/8	1-1/2	2-1/8
*355-15	6	1/2	1-1/4	3/4	1-5/8	2-3/4
*355-16	8	5/8	1-3/8	7/8	1-7/8	3-7/32
*355-17	10	5/8	2-1/4	1	2-1/4	3-7/16
*355-18	12	3/4	3	1-1/4	3	4-1/16
*355-19	14	3/4	3-1/2	1-1/4	3	4-1/16

STRAIGHT TYPE HAND WHEELS

Revolving Handle - Cast Iron

P/N	DIMENSIONS					
	A	B	D	F	G	H
*355-25	4	3/8	1-1/8	5/8	1-1/4	2-1/16
*355-26	5	3/8	1-1/8	5/8	1-1/2	2-1/16
*355-27	6	1/2	1-1/4	3/4	1-5/8	3-1/32
*355-28	8	5/8	1-3/8	7/8	1-7/8	3-9/32
*355-29	10	5/8	2-1/4	1	2-1/4	3-9/32
*355-30	12	3/4	3	1-1/4	3	4-1/8
*355-31	14	3/4	3-1/2	1-1/4	3	4-1/8

Economical Hand Wheels come with round machined rim and two different platings to fit your budget. The hub center is drilled for easy modification and the wheel is tapped and ready for the handle (see part 355-50 - 355-59 and sold separately.) 8" sizes and larger comes with wavy inside rim for better gripping. This wheel has a slim cross section and is well proportioned. These come in three or five spoke models.



HAND WHEELS

Cast Iron - Tumbled and Smoothed

P/N	DIMENSIONS						
	A	B	C	D	E	F	G
355-40	4	3/8	10-24	1-1/2	15/16	9/16	1-1/8
355-42	5	3/8	1/4-20	1-5/8	1	5/8	1-1/4
355-44	6	1/2	5/16-18	1-13/16	1-1/8	11/16	1-3/8
355-46	8	5/8	3/8-16	2-3/16	1-5/16	7/8	1-5/8
355-48	10	5/8	3/8-16	2-3/8	15/16	15/16	1-7/8

HAND WHEELS

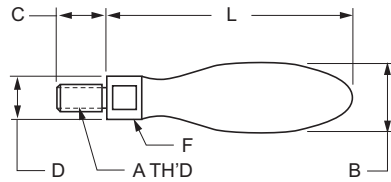
Cast Iron - Chrome Plated

P/N	DIMENSIONS						
	A	B	C	D	E	F	G
355-41	4	3/8	10-24	1-1/2	15/16	9/16	1-1/8
355-43	5	3/8	1/4-20	1-5/8	1	5/8	1-1/4
355-45	6	1/2	5/16-18	1-13/16	1-1/8	11/16	1-3/8
355-47	8	5/8	3/8-16	2-3/16	1-5/16	7/8	1-5/8
355-49	10	5/8	3/8-16	2-3/8	15/16	15/16	1-7/8

• - Discontinued, available while supplies last

HANDWHEELS

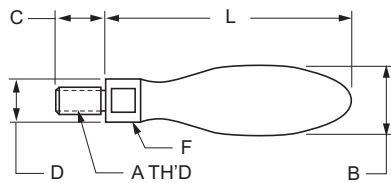
These fixed / revolving steel handles are well proportioned and have comfortable grips.



THREADED HANDLES

Fixed Handle - Chrome Plated

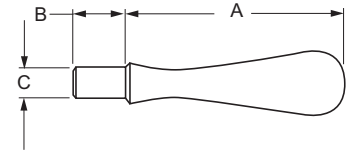
P/N	DIMENSIONS					
	A	B	C	D	E	F
355-50	10-24	1/2	3/8	.32	1-11/16	-
355-52	1/4-20	5/8	1/2	.40	2	-
355-54	5/16-18	13/16	9/16	.51	2-5/8	-
355-56	3/8-16	1	11/16	.63	3-3/16	-
355-58	1/2-13	1-1/4	13/16	.75	3-3/4	-



THREADED HANDLES

Revolving Handle - Chrome Plated

P/N	DIMENSIONS					
	A	B	C	D	E	F
355-51	10-24	1/2	3/8	.32	1-7/8	-
355-53	1/4-20	5/8	1/2	.40	2-1/4	-
355-54	5/16-18	13/16	9/16	.51	2-13/16	-
355-57	3/8-16	1	11/16	.63	3-3/8	-
355-59	1/2-13	1-1/4	13/16	.75	4	-



MACHINE HANDLES

Press Fit - Revolving Handle - Chrome Plated

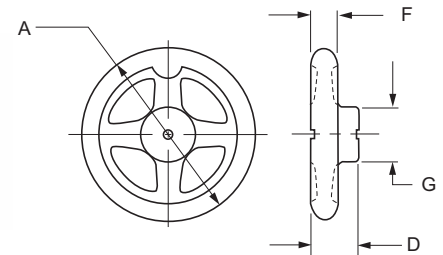
P/N	DIMENSIONS		
	A	B	C
356-02	2-1/16	9/16	5/16
356-04	3-1/32	3/4	3/8
356-06	3-9/32	3/4	7/16
356-08	4-3/16	15/16	1/2

MACHINE HANDLES

Press Fit - Revolving Handle - Chrome Plated

P/N	DIMENSIONS		
	A	B	C
356-10	1-9/32	1/4	7/16
356-12	1-9/16	1/4	7/16
356-14	1-23/32	5/16	7/16
356-18	2-1/8	3/8	9/16
356-24	3-7/32	7/16	11/16
356-30	4-1/16	1/2	15/16

The Aluminum Handwheel is an economical, yet well-made hand wheel. It has a round machined rim. All un-machined surfaces are tumbled smooth.



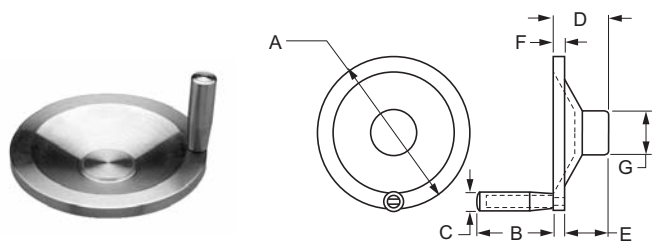
ALUMINUM HANDWHEEL

P/N	DIMENSIONS			
	A	D	F	G
*356-40	4	1-1/8	5/8	1-1/4
*356-44	6	1-1/4	3/4	1-5/8
*356-46	8	1-3/8	7/8	1-7/8
*356-48	10	2-1/4	1	2-1/4

* Discontinued available while supplies last.

HANDWHEELS

The Stainless Steel Handwheel has both a wheel and revolving handle that are completely machined to a smooth finish. The dish type handwheel hub is center drilled to assist in drilling the hole size required.

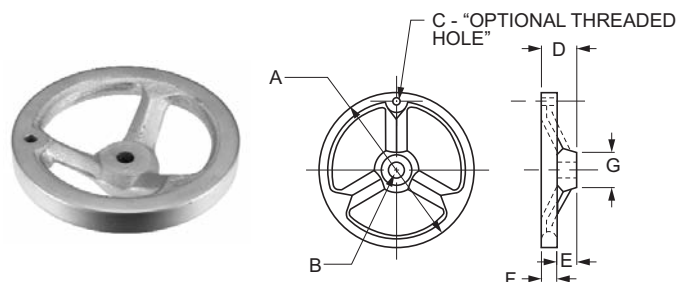


STAINLESS STEEL HANDWHEELS

300 Stainless Steel

P/N	DIMENSIONS						
	A	B	C	D	E	F	G
356-50	3	1.49	.39	1.10	.67	.24	.87
356-52	4	1.57	.47	1.25	.71	.31	1.02
356-54	6	2.50	.75	1.50	.87	.39	1.50
356-56	8	3.00	.87	1.80	.95	.50	1.80
356-58	10	3.00	.87	2.00	1.05	.62	2.00

This high quality cast iron wheel is superbly finished in a polished and satin chrome plating that is rugged in design and construction. The wheel is engineered with three offset spokes and has a square outside rim to enhance appearance. Spokes are angular. Available as two types: one with a hole for a handle and one without. The handle must be ordered separately.



HANDWHEELS

Threaded - Cast Iron - Bright Chrome Plated

P/N	DIMENSIONS						
	A	B	C	D	E	F	G
358-00	4	3/8	1/4-20	1-1/4	3/4	9/16	7/8
358-05	5	3/8	5/16-18	1-7/16	3/4	5/8	1-1/8
358-10	6-1/4	1/2	3/8-16	1-9/16	13/16	3/4	1-1/4
358-15	8	5/8	3/8-16	1-3/4	1	25/32	1-7/16
358-20	10	5/8	1/2-13	2	1-3/16	7/8	1-3/4
358-25	12-5/8	3/4	1/2-13	2-5/32	1-1/4	15/16	2-3/16

HANDWHEELS

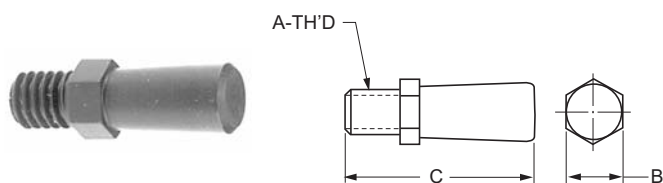
No Hole - Cast Iron - Bright Chrome Plated

P/N	DIMENSIONS						
	A	B	C	D	E	F	G
358-50	4	3/8	-	1-1/4	3/4	9/16	7/8
358-55	5	3/8	-	1-7/16	3/4	5/8	1-1/8
358-60	6-1/4	1/2	-	1-9/16	13/16	3/4	1-1/4
358-65	8	5/8	-	1-3/4	1	25/32	1-7/16
358-70	10	5/8	-	2	1-3/16	7/8	1-3/4
358-75	12-5/8	3/4	-	2-5/32	1-1/4	15/16	2-3/16

FINGER HANDLES

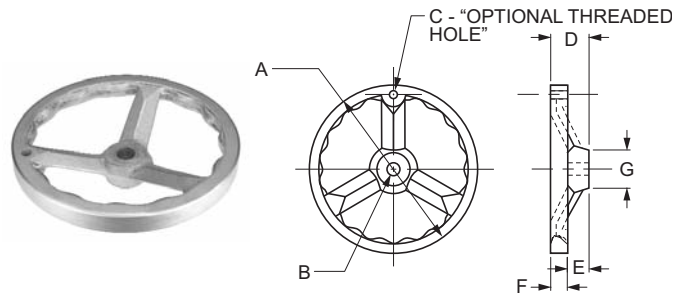
Black Oxide Finish

P/N	DIMENSIONS		
	A	B	C
357-25	10-24	1/4	11/16
357-30	10-32	1/4	11/16
357-35	5/16-18	3/8	1-1/4



HANDWHEELS

A high quality cast iron wheel in polished satin chrome. Specifications similar to 358 series, except that it come with a wavy rim for positive grip. These are ideal where heavy torque may be needed.

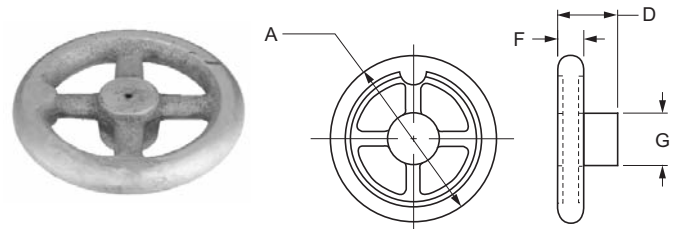


EASY GRIP HANDWHEELS Wavy Rim - Threaded - Cast Iron - Bright Chrome Plated							
P/N	DIMENSIONS						
	A	B	C	D	E	F	G
*359-10	8	5/8	3/8-16	1-3/4	1	25/32	1-7/16
*359-12	10	5/8	1/2-13	2	1-3/16	7/8	1-3/4
*359-14	12-5/8	3/4	1/2-13	2-5/32	1-1/4	15/16	2-3/16

EASY GRIP HANDWHEELS Wavy Rim - No Hole - Cast Iron - Bright Chrome Plated							
P/N	DIMENSIONS						
	A	B	C	D	E	F	G
*359-20	8	5/8	-	1-3/4	1	25/32	1-7/16
*359-22	10	5/8	-	2	1-3/16	7/8	1-3/4
*359-24	12-5/8	3/4	-	2-5/32	1-1/4	15/16	2-3/16

* Discontinued available while supplies last.

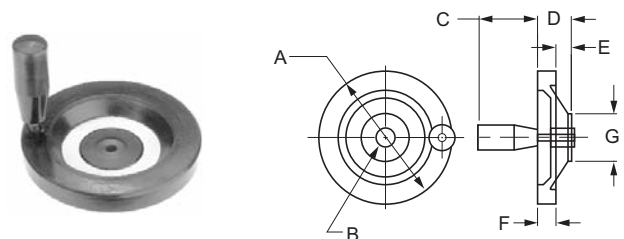
A low cost, yet exceptionally well made hand wheel. It comes with a round outside rim. The hub is center drilled with a 1/8" pilot hole in the hub center for easy modification. All un-modified surfaces are tumbled smooth.



ECONO HANDWHEELS Cast Iron - Chrome Plated				
P/N	DIMENSIONS			
	A	D	F	G
359-50	3	1-1/16	5/8	1
359-55	4	1-1/8	11/16	1-1/4
359-60	5	1-1/8	5/8	1-1/2
359-65	6	1-1/4	3/4	1-5/8
359-70	8	1-3/8	7/8	1-7/8
359-71	10	2-1/4	1	2-1/4

NOTE: Part 359-65 has a Light Zinc plating with NO polish.

The Plastic Handwheel is a strong, solid web hand wheel that is made of Bakelite and contains a steel hub insert with a hole in the center. This piece comes with a plastic revolving handle which needs to be assembled.

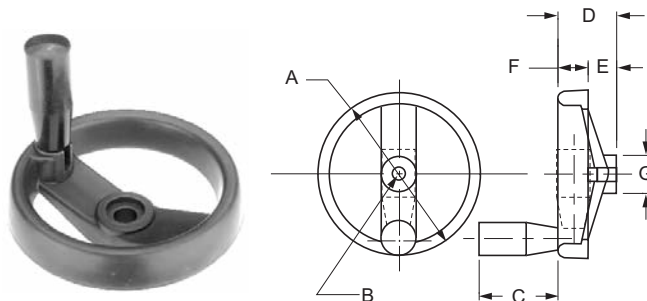


PLASTIC HANDWHEELS Bakelite - Folding Handle - Revolving Handle Included							
P/N	DIMENSIONS						
	A	B	C	D	E	F	G
*359-80	5-1/2	5/16	2-1/2	1-1/4	11/16	5/8	1-13/16
*359-85	6-5/8	3/8	3-1/8	1-1/2	13/16	11/16	2-1/16
*359-90	7-7/8	1/2	3-1/8	1-3/4	1	3/4	2-3/8

* Discontinued available while supplies last.

HANDWHEELS & HANDLES

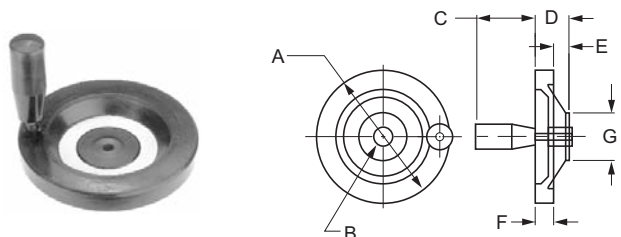
A modern, lightweight wheel with two offset spokes. The durable, high impact black abs plastic handle revolves and is foldable.



PLASTIC HANDWHEELS							
ABS Plastic - Folding Handle - Revolving Handle Included							
P/N	DIMENSIONS						
	A	B	C	D	E	F	G
*260-10	4-15/16	1/2	2	1-3/4	23/32	7/8	1-1/4
*260-20	6-5/16	5/8	2-1/2	1-7/8	25/32	1	1-9/16
*260-30	7-7/8	3/4	3-1/8	2-1/8	1	1-1/8	2

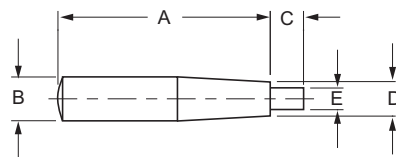
* Discontinued, available while supplies last.

Square style with aluminum trim ring. It is made of Strong Bakelite and has strong construction. This piece has a wave inner ring to make this easier to grip.



PLASTIC HANDWHEELS							
Bakelite - Folding Handle - Revolving Handle Included							
P/N	DIMENSIONS						
	A	B	C	D	E	F	G
*360-50	3-15/16	3/8	2	1-5/8	23/32	1	1-9/16
*360-55	4-15/16	1/2	2-1/2	1-13/16	23/32	1-3/16	1-3/4
*360-60	6-5/16	5/8	3-1/8	2-1/8	23/32	1-1/4	2-1/8

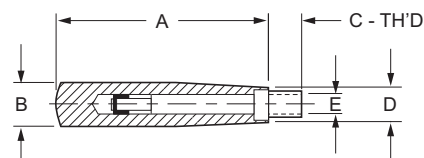
* Discontinued available while supplies last.



SOLID STEEL HANDLE					
Press Fit Type - Satin Chrome Plate					
P/N	DIMENSIONS				
	A	B	C	D	E
361-02	2	1/2	7/16	1/4	13/32
361-04	2-1/2	5/8	9/16	5/16	15/32
361-06	3-1/4	3/4	11/16	3/8	19/32
361-08	3-1/2	1	13/16	1/2	23/32

SOLID STEEL HANDLE					
Threaded Type - Satin Chrome Plate					
P/N	DIMENSIONS				
	A	B	C	D	E
361-12	2	1/2	7/16	1/4-20	13/32
361-14	2-1/2	5/8	9/16	5/16-18	15/32
361-16	3-1/4	3/4	11/16	3/8-16	19/32
361-18	3-1/2	1	13/16	1/2-13	23/32

These handles are similar to the Solid Steel Handle except that this piece revolves. The handle comes in two parts. The core shaft must be press fitted or threaded in to the handwheel before the outer shell is inserted onto the core.



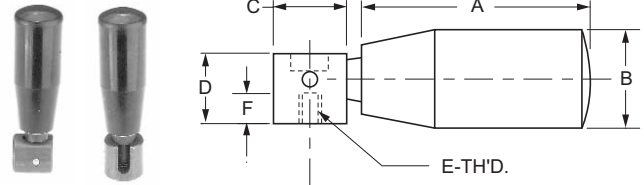
REVOLVING STEEL HANDLE					
Press Fit Type - Satin Chrome Plate					
P/N	DIMENSIONS				
	A	B	C	D	E
361-22	2	5/8	1/2	1/4	15/32
361-24	2-1/2	3/4	9/16	5/16	9/16
361-26	3-1/4	7/8	5/8	3/8	5/8
361-28	4	1	3/4	1/2	23/32

HANDLES

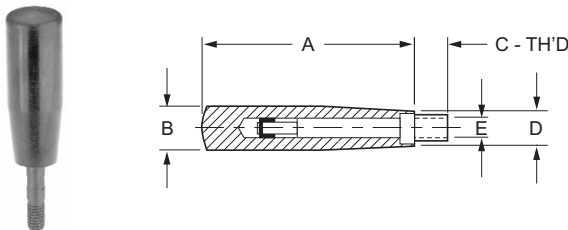
REVOLVING STEEL HANDLE

Threaded Type - Satin Chrome Plate

P/N	DIMENSIONS				
	A	B	C	D	E
361-32	2	5/8	1/2	1/4-20	15/32
361-34	2-1/2	3/4	9/16	5/16-18	9/16
361-36	3-1/4	7/8	5/8	3/8-16	5/8
361-38	4	1	3/4	1/2-13	23/32



This piece is similar to the Revolving Steel Handle. The handle is made of black Bakelite Plastic. The handle outside diameter is larger than the solid steel handle

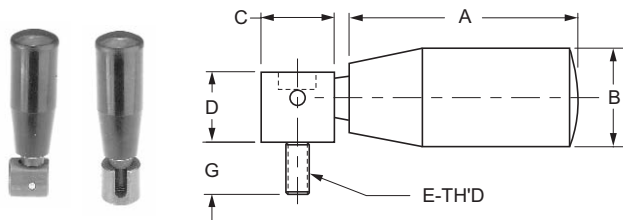


REVOLVING PLASTIC HANDLE

Threaded Type - Black Steel Screw - Bakelite Handle

P/N	DIMENSIONS				
	A	B	C	D	E
361-42	2	7/8	1/2	1/4-20	5/8
361-44	2-1/2	15/16	9/16	5/16-18	23/32
361-46	3-1/4	1	5/8	3/8-16	25/32
361-48	3-15/16	1-3/32	3/4	1/2-13	7/8

The Folding handle comes in threaded hole type and stud type. These can be folded away when not in use.



FOLDING HANDLE

Stud Type - Black Steel Stem - Bakelite Handle

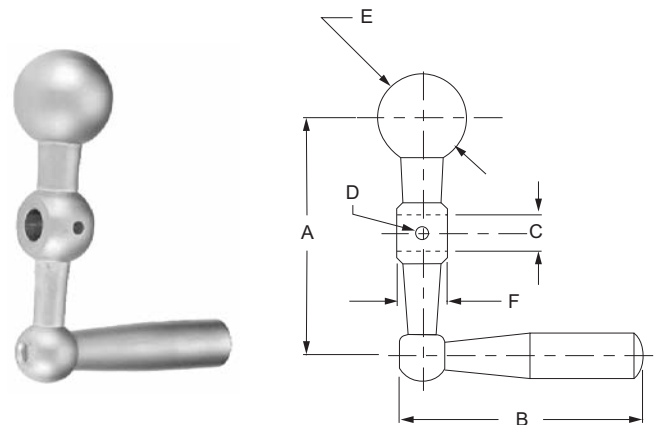
P/N	DIMENSIONS					
	A	B	C	D	E	G
361-52	2	7/8	5/8	5/8	10-24	1/2
361-54	2-1/2	15/16	25/32	25/32	1/4-20	5/8
361-56	3-1/8	1	25/32	25/32	5/16-18	3/4

FOLDING HANDLE

Tapped Type - Black Steel Stem - Bakelite Handle

P/N	DIMENSIONS					
	A	B	C	D	E	F
361-62	2	7/8	5/8	5/8	10-24	5/32
361-64	2-1/2	15/16	25/32	25/32	1/4-20	5/8
361-66	3-1/8	1	25/32	25/32	5/16-18	3/4

The Single Crank Handle is a balanced steel handle, balanced for better control. The center hole is cross drilled in one wall for easy installation. Hole D in the below illustration in one wall only.

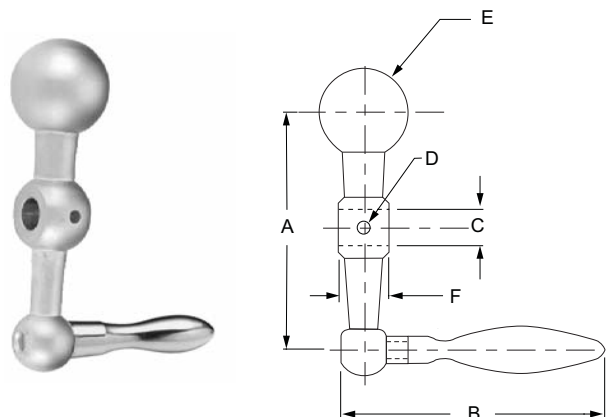


BALANCED STEEL SINGLE CRANK HANDLE

Polished Chrome Plate

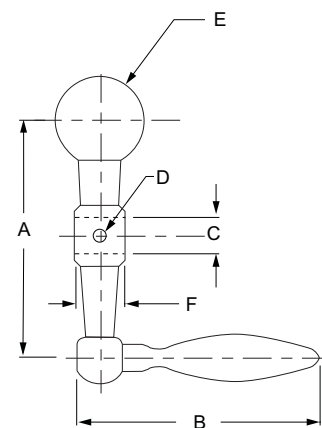
P/N	DIMENSIONS					
	A	B	C	D	E	F
365-02	2	2	5/16	1/8	13/16	7/16
365-03	2-1/2	2-1/4	5/16	1/8	1	9/16
365-04	3-1/8	3-1/4	3/8	5/32	1-1/4	11/16
365-05	4	3-1/4	3/8	5/32	1-1/4	11/16
365-06	5	4	1/2	3/16	1-1/2	7/8
365-07	6-1/8	4	1/2	3/16	1-1/2	7/8

This Balanced Handle is for use as a replacement for Bridgeport Mills. It has a Center Hole cross drilled on one wall.



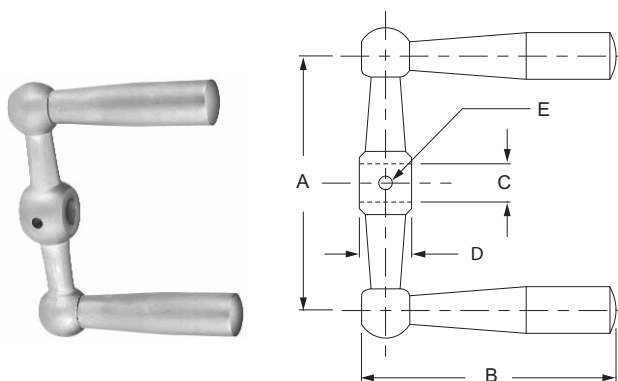
SINGLE CRANK HANDLE							
Revolving Handle - Balanced Steel - Polished Chrome Plate							
P/N	DIMENSIONS						
	A	B	C	D	E	F	KEYWAY
365-10	2-1/2	2-3/4	5/16	1/8	1	9/16	-
365-12	3-1/8	3-1/2	3/8	5/32	1-1/4	11/16	-
365-14	4	3-1/2	3/8	5/32	1-1/4	11/16	-
365-16	5	4-3/16	1/2	3/16	1-1/2	7/8	-
365-18*	6	4-3/16	5/8	3/16	1-1/2	7/8	1/8x1/16

* This art is a new handle for Bridgeport Mills



SINGLE CRANK HANDLE							
Solid Handle - Balanced Steel - Polished Chrome Plate							
P/N	DIMENSIONS						
	A	B	C	D	E	F	KEYWAY
365-11	2-1/2	2-9/16	5/16	1/8	1	9/16	-
365-13	3-1/8	3-1/4	3/8	5/32	1-1/4	11/16	-
365-15	4	3-1/4	3/8	5/32	1-1/4	11/16	-
365-17	5	3-15/16	1/2	3/16	1-1/2	7/8	-
365-19*	6	3-15/16	5/8	3/16	1-1/2	7/8	1/8x1/16

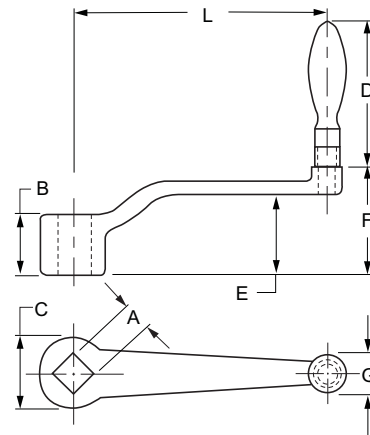
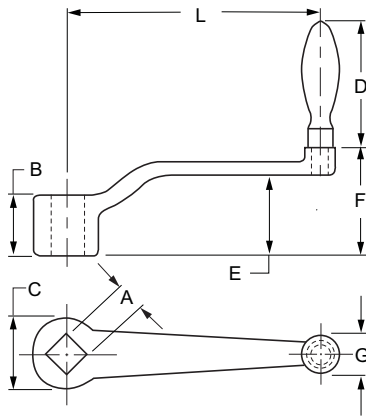
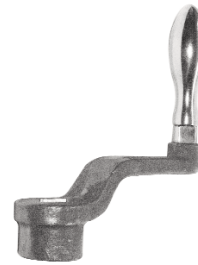
This Double Crank Handle is used for lathe saddle and other applications where small but precise motion is required for greater clamping pressure. A mounting hole is cross drilled in one wall for easy pin installation.



DOUBLE CRANK HANDLE					
Solid Handle - Balanced - Polished Chrome Plate					
P/N	DIMENSIONS				
	A	B	C	D	E
365-22	2	2	5/16	7/16	1/8
365-24	2-1/2	2-1/2	5/16	9/16	1/8
365-26	3-1/4	3-1/4	3/8	11/16	5/32

HANDLES

The Crank Handle is rugged with a comfortable grip.



CRANK HANDLE

Solid Type - Malleable Iron - Chrome Plate

P/N	DIMENSIONS							
	A	B	C	D	E	F	G	L
365-30	1/2	1-1/16	1-1/4	2-5/8	1.50	2.12	5/8	4
365-32	5/8	1-5/16	1-9/16	3-3/16	1.88	2.63	3/4	6
365-34	3/4	1-9/16	1-13/16	3-3/4	2.35	3.22	7/8	8
365-36	7/8	1-13/16	2-1/8	3-3/4	2.76	3.63	7/8	10

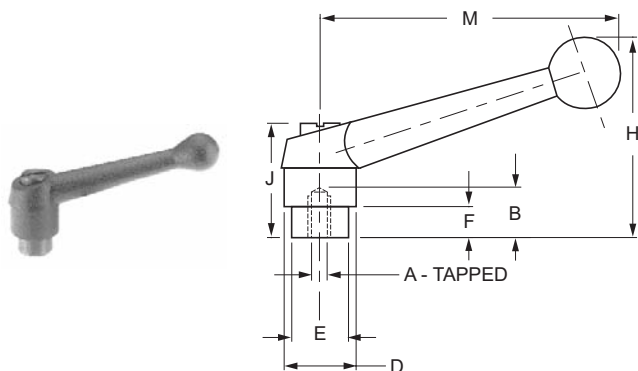
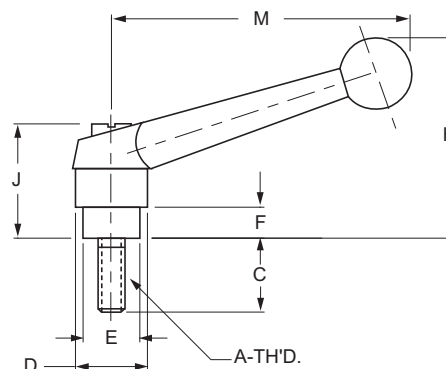
CRANK HANDLE

Revolving Type - Malleable Iron - Chrome Plate

P/N	DIMENSIONS							
	A	B	C	D	E	F	G	L
365-31	1/2	1-1/16	1-1/4	2-13/16	1.50	2.12	5/8	4
365-33	5/8	1-5/16	1-9/16	3-3/8	1.88	2.63	3/4	6
365-35	3/4	1-9/16	1-13/16	4	2.35	3.22	7/8	8
365-37	7/8	1-13/16	2-1/8	4	2.76	3.63	7/8	10



This handsome zinc alloy handle is adjustable to 20 - 45 positions. Then the handle is lifted, the spline is disconnected while the insert or stud remains stationary. The handle can be rotated to the desired position. The release of the handle will re-engage the spline for tightening and loosening action. The Adjustable Handle can be used in tight spots, with no dead angles. It can be easily repositioned out of the way. The Adjustable Handle has convenient positions for maximum leverage and positive grip.



ADJUSTABLE HANDLE

Type A - Zinc Alloy - Black

P/N	DIMENSIONS							
	A	B	D	E	F	H	J	M
367-12	1/8 REAM	7/16	3/4	17/32	1/4	1-13/16	1-1/8	2-9/16
367-13	1/4-20	7/16	3/4	17/32	1/4	1-13/16	1-1/8	2-9/16
367-14	5/16-18	7/16	3/4	17/32	1/4	1-13/16	1-1/8	2-9/16
367-20	M8	7/16	3/4	17/32	1/4	1-13/16	1-1/8	2-9/16
367-22	1/4 REAM	1/2	7/8	5/8	13/32	2-5/16	1-1/2	3-1/8
367-23	5/16-18	1/2	7/8	5/8	13/32	2-5/16	1-1/2	3-1/8
367-24	3/8-16	1/2	7/8	5/8	13/32	2-5/16	1-1/2	3-1/8
367-30	M10	1/2	7/8	5/8	13/32	2-5/16	1-1/2	3-1/8
367-32	5/16 REAM	5/8	1	3/4	13/32	2-5/8	1-11/16	3-3/4
367-33	3/8-16	5/8	1	3/4	13/32	2-5/8	1-11/16	3-3/4
367-34	1/2-13	5/8	1	3/4	13/32	2-5/8	1-11/16	3-3/4
367-40	M12	5/8	1	3/4	13/32	2-5/8	1-11/16	3-3/4
367-42	3/8 REAM	7/8	1-1/4	15/16	15/32	3-1/8	2	4-5/16
367-43	1/2-13	7/8	1-1/4	15/16	15/32	3-1/8	2	4-5/16
367-44	5/8-11	7/8	1-1/4	15/16	15/32	3-1/8	2	4-5/16
367-50	M16	7/8	1-1/4	15/16	15/32	3-1/8	2	4-5/16

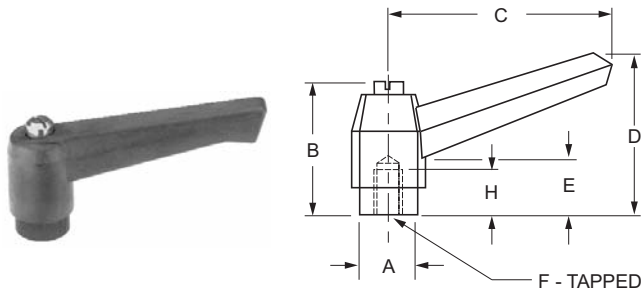
ADJUSTABLE HANDLE

Type B - Zinc Alloy - Black

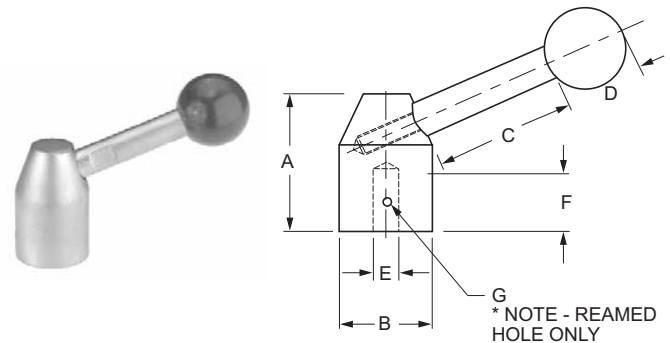
P/N	DIMENSIONS							
	A	C	D	E	F	H	J	M
367-15	5/16-18	3/4	3/4	17/32	1/4	1-13/16	1-1/8	2-9/16
367-16	5/16-18	1	3/4	17/32	1/4	1-13/16	1-1/8	2-9/16
367-17	5/16-18	1-1/2	3/4	17/32	1/4	1-13/16	1-1/8	2-9/16
367-18	5/16-18	2	3/4	17/32	1/4	1-13/16	1-1/8	2-9/16
367-19	M8	2	3/4	17/32	1/4	1-13/16	1-1/8	2-9/16
367-25	3/8-16	3/4	7/8	5/8	13/32	2-5/16	1-1/2	3-1/8
367-26	3/8-16	1	7/8	5/8	13/32	2-5/16	1-1/2	3-1/8
367-27	3/8-16	1-1/2	7/8	5/8	13/32	2-5/16	1-1/2	3-1/8
367-28	3/8-16	2	7/8	5/8	13/32	2-5/16	1-1/2	3-1/8
367-29	M10	2	7/8	5/8	13/32	2-5/16	1-1/2	3-1/8
367-35	1/2-13	1	1	3/4	13/32	2-5/8	1-11/16	3-3/4
367-36	1/2-13	1-1/2	1	3/4	13/32	2-5/8	1-11/16	3-3/4
367-37	1/2-13	2	1	3/4	13/32	2-5/8	1-11/16	3-3/4
367-38	1/2-13	2-1/2	1	3/4	13/32	2-5/8	1-11/16	3-3/4
367-39	M12	3	1	3/4	13/32	2-5/8	1-11/16	3-3/4
367-45	5/8-11	1-1/2	1-1/4	15/16	15/32	3-1/8	2	4-5/16
367-46	5/8-11	2	1-1/4	15/16	15/32	3-1/8	2	4-5/16
367-47	5/8-11	2-1/2	1-1/4	15/16	15/32	3-1/8	2	4-5/16
367-49	M16	3	1-1/4	15/16	15/32	3-1/8	2	4-5/16

HANDLES

The High Impact Plastic Handle is similar to the Adjustable handle, except that the construction is of strong, high impact, reinforced plastic with steel insert. An economical thread design for lighter applications.

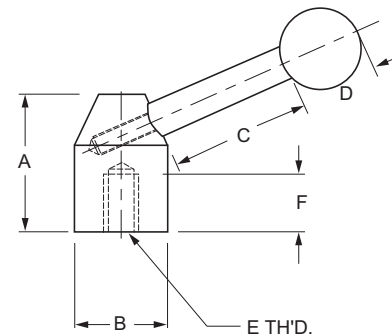
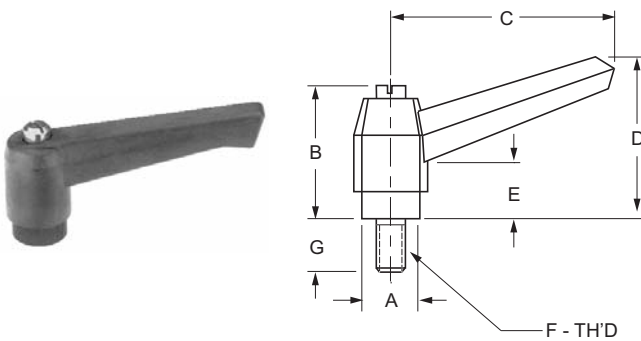


The Lever Handle is a fast, efficient means for obtaining great clamping force. This piece has a plastic ball at the end of the angled lever end.



ADJUSTABLE HANDLE							
Reamed Hole Type - Zinc Alloy - Black ABS Handle - Black Steel Insert							
P/N	DIMENSIONS						
	A	B	C	D	E	F	H
367-52	5/8	1-7/16	2-7/16	1-3/4	5/8	5/16-18	1/2
367-53	5/8	1-7/16	2-7/16	1-3/4	5/8	M8	1/2
367-62	3/4	1-3/4	3-1/8	2-1/8	7/8	3/8-16	5/8
367-63	3/4	1-3/4	3-1/8	2-1/8	7/8	M10	5/8
367-72	1	2-1/8	3-7/8	2-5/8	15/16	1/2-13	3/4

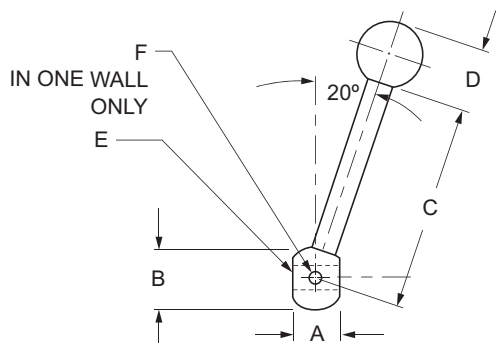
LEVER HANDLE							
Reamed Hole Type - Steel Handle - Bakelite Ball End - Chrome Plate							
P/N	DIMENSIONS						
	A	B	C	D	E	F	G
368-02	1-1/2	1	1-1/2	7/8	3/8	5/8	1/8
368-03	1-1/2	1	3	7/8	3/8	5/8	1/8
368-04	1-7/8	1-1/4	3-1/8	1-1/4	1/2	3/4	5/32
368-05	1-7/8	1-1/4	4.7	1-1/4	1/2	3/4	5/32
368-06	2-3/8	1-9/16	3-7/8	1-1/2	5/8	1	3/16
368-07	2-3/8	1-9/16	6.4	1-1/2	5/8	1	3/16



ADJUSTABLE HANDLE							
Stud Type- Zinc Alloy - Black ABS Handle - Black Steel Insert							
P/N	DIMENSIONS						
	A	B	C	D	E	F	G
367-55	5/8	1-7/16	2-7/16	1-3/4	5/8	5/16-18	3/4
367-56	5/8	1-7/16	2-7/16	1-3/4	5/8	5/16-18	1
367-57	5/8	1-7/16	2-7/16	1-3/4	5/8	M8	1
367-65	3/4	1-3/4	3-1/8	2-1/8	7/8	3/8-16	1
367-66	3/4	1-3/4	3-1/8	2-1/8	7/8	3/8-16	1-1/4
367-67	3/4	1-3/4	3-1/8	2-1/8	7/8	M10	1-1/4
367-75	1	2-1/8	3-7/8	2-5/8	15/16	1/2-13	1-1/4
367-76	1	2-1/8	3-7/8	2-5/8	15/16	1/2-13	1-1/2

LEVER HANDLE						
Tapped Hole Type - Steel Handle - Bakelite Ball End - Chrome Plate						
P/N	DIMENSIONS					
	A	B	C	D	E	F
368-12	1-1/2	1	1-1/2	7/8	1/2-13	9/16
368-13	1-1/2	1	3	7/8	1/2-13	9/16
368-14	1-7/8	1-1/4	3-1/8	1-1/4	5/8-11	11/16
368-15	1-7/8	1-1/4	4.7	1-1/4	5/8-11	11/16
368-16	2-3/8	1-9/16	3-7/8	1-1/2	3/4-10	7/8
368-17	2-3/8	1-9/16	6.4	1-1/2	3/4-10	7/8

The Lever Handle is a fast, efficient means for obtaining great clamping force. This piece has a plastic ball at the end of the angled lever end.



CHROME LEVER CLAMP

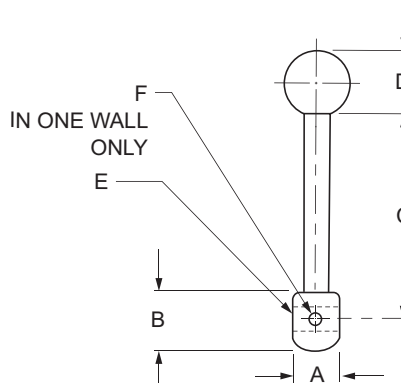
Angled - Reamed Type - Steel Handle - Bakelite Ball End - Chrome Plate

P/N	DIMENSIONS					
	A	B	C	D	E	F
369-00	7/16	5/8	2	3/4	1/4	1/8
369-08	9/16	25/32	2-1/2	13/16	5/16	1/8
369-16	3/4	1	3-1/4	15/16	3/8	5/32
369-24	7/8	1-1/4	4	1-1/4	1/2	3/16
369-32	1-1/8	1-9/16	5	1-1/2	5/8	1/4

CHROME LEVER CLAMP

Angled - Tapped Type - Steel Handle - Bakelite Ball End - Chrome Plate

P/N	DIMENSIONS					
	A	B	C	D	E	F
369-04	7/16	5/8	2	3/4	5/16-18	1/8
369-12	9/16	25/32	2-1/2	13/16	3/8-16	1/8
369-20	3/4	1	3-1/4	15/16	1/2-13	5/32
369-28	7/8	1-1/4	4	1-1/4	5/8-11	3/16
369-36	1-1/8	1-9/16	5	1-1/2	3/4-10	1/4



CHROME LEVER CLAMP

Straight - Reamed Type - Steel Handle - Bakelite Ball End - Chrome Plate

P/N	DIMENSIONS					
	A	B	C	D	E	F
369-02	7/16	5/8	2	3/4	1/4	1/8
369-10	9/16	25/32	2-1/2	13/16	5/16	1/8
369-18	3/4	1	3-1/4	15/16	3/8	5/32
369-26	7/8	1-1/4	4	1-1/4	1/2	3/16
369-34	1-1/8	1-9/16	5	1-1/2	5/8	1/4

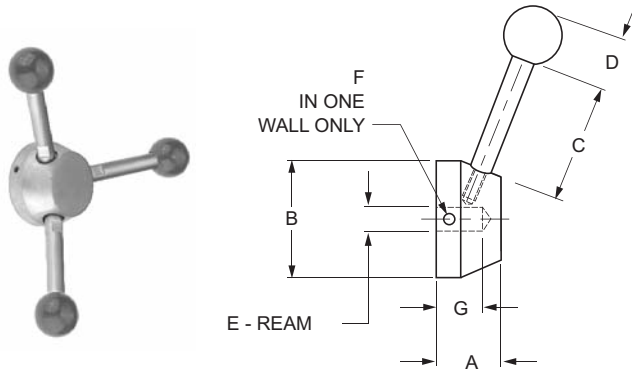
CHROME LEVER CLAMP

Straight - Tapped Type - Steel Handle - Bakelite Ball End - Chrome Plate

P/N	DIMENSIONS					
	A	B	C	D	E	F
369-06	7/16	5/8	2	3/4	5/16-18	1/8
369-14	9/16	25/32	2-1/2	13/16	3/8-16	1/8
369-22	3/4	1	3-1/4	15/16	1/2-13	5/32
369-30	7/8	1-1/4	4	1-1/4	5/8-11	3/16
369-38	1-1/8	1-9/16	5	1-1/2	3/4-10	1/4

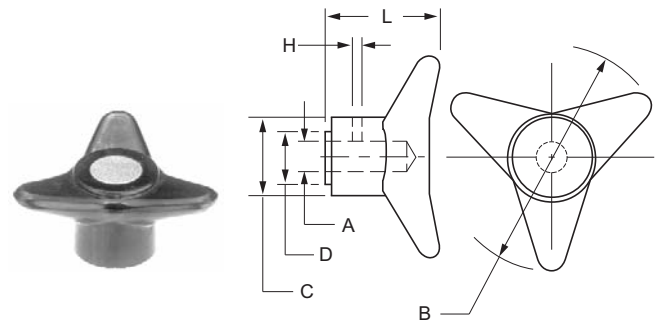
HANDLES

This Handle is for heavy duty applications. It is available in single or tree spoke versions. All handles have a plastic ball at the end of the angled lever end. The mounting is cross drilled to fit a pin for easy fastening.



HEAVY DUTY LEVER CLAMP							
Single Spoke - Steel Handle - Bakelite Ball End - Chrome Plate							
P/N	DIMENSIONS						
	A	B	C	D	E	F	G
*369-50	7/8	1-9/16	1-9/16	3/4	5/16	1/8	5/8
*369-60	1	2	2	1	3/8	3/16	3/4
*369-70	1-3/16	2-3/8	2	1-1/4	1/2	3/16	7/8

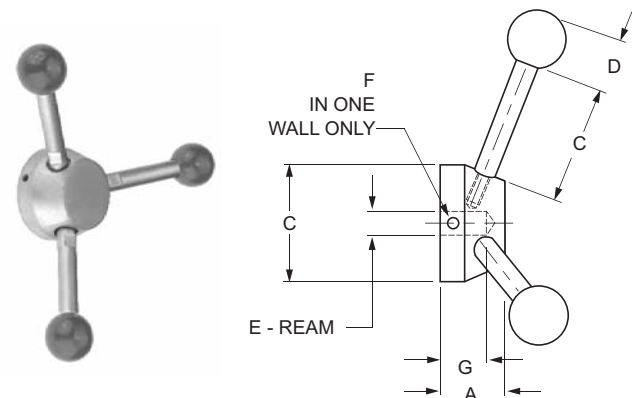
The lobe knob gives you a positive grip and higher torque than any other knob. The Bakelite handle is heat resistant. The insert is made of brass and is cross drilled for easy installation.



HIGH TORQUE THREE LOBE KNOB						
Black Bakelite - Brass Insert						
P/N	DIMENSIONS					
	A	B	C	D	L	H
*369-90	3/8	3-1/8	1-3/16	3/4	1-3/8	1/8
*369-95	1/2	3-15/16	1-3/8	7/8	1-7/8	1/8

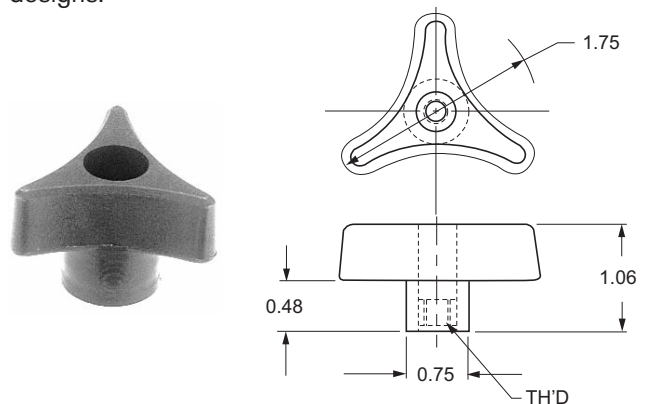
* Discontinued, available while supplies last.

The Three Prong Knobs have a satin finish and an aerodynamic look. All edges have been rounded for a comfortable feel. The hub is extra tall to provide greater knuckle clearance, while durable thermoplastic construction makes this knob ideal for a wide variety of applications. It is furnished with metal inserts for both Blind and Thru Hole designs.



HEAVY DUTY LEVER CLAMP							
Three Spoke - Steel Handle - Bakelite Ball End - Chrome Plate							
P/N	DIMENSIONS						
	A	B	C	D	E	F	G
*369-55	7/8	1-9/16	1-9/16	3/4	5/16	1/8	5/8
*369-65	1	2	2	1	3/8	3/16	3/4
*369-75	1-3/16	2-3/8	2	1-1/4	1/2	3/16	7/8

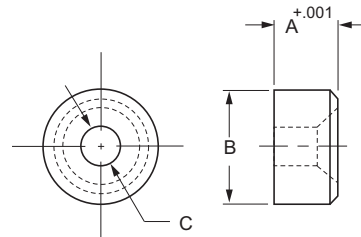
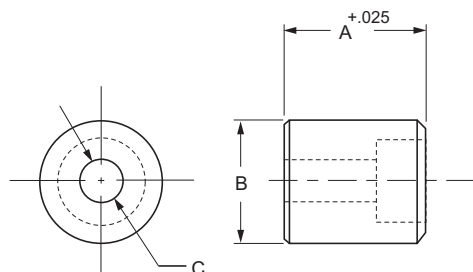
* Discontinued, available while supplies last.



THREE PRONG KNOBS		
Steel Insert		
P/N	DIMENSIONS	
	5/16-18	3/8-16
THRU HOLE	369-96	369-98
BLIND	369-97	369-99

JIG REST BUTTONS

Jig Rest Buttons have precision ground lengths ("A" dimension); final leveling grind is normally not required. Jig Rest Buttons are counterbored for screw mounting.



METRIC JIG REST BUTTONS

Socket Head Cap Screw Size - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS		
	A	B	C
399-70	10mm .3937	16mm .63	M5
399-72	15mm .5906	16mm .63	M5
399-74	10mm .3937	.20mm .79	M6
399-76	15mm .5906	20mm .79	M6
399-78	20mm .7874	20mm .79	M6
399-79	25mm .9643	20mm .79	M6
399-80	15mm .5906	25mm .98	M8
399-82	20mm .7874	25mm .98	M8
399-84	25mm .9843	25mm .98	M8
399-86	20mm .7874	32mm 1.26	M10
399-88	25mm .9843	32mm 1.26	M10
399-90	30mm 1.1811	32mm 1.26	M10
399-92	50mm 1.9685	32mm 1.26	M10

JIG REST BUTTONS

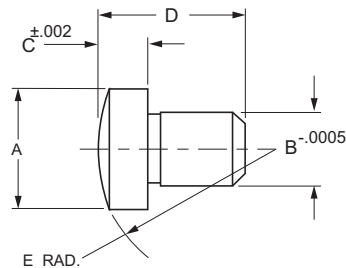
Case Hardened - Black Oxide Finish

P/N	DIMENSIONS		
	A	B	C
400-02	.250	7/16	#6 FHS
400-04	.375	7/16	#6 FHS
400-06	.500	1/2	#6 FHS
400-08	.125	1/2	#8 FHS
400-10	.375	1/2	#10 SHS
400-12	.500	1/2	#10 SHS
400-14	.250	5/8	#10 FHS
400-16	.375	5/8	1/4 SHS
400-18	.500	5/8	1/4 SHS
400-20	.625	5/8	1/4 SHS
400-22	.750	5/8	1/4 SHS
400-24	.875	5/8	1/4 SHS
400-26	1.000	5/8	1/4 SHS
400-28	.375	7/8	1/4 FHS
400-30	.500	7/8	5/16 SHS
400-32	.625	7/8	5/16 SHS
400-34	.750	7/8	5/16 SHS
400-36	.875	7/8	5/16 SHS
400-38	1.000	7/8	5/16 SHS
400-40	1.125	7/8	5/16 SHS
400-42	.375	1-1/4	5/16 FHS
400-44	.500	1-1/4	3/8 SHS
400-46	.750	1-1/4	3/8 SHS
400-48	.875	1-1/4	3/8 SHS
400-50	1.000	1-1/4	3/8 SHS
400-52	1.500	1-1/4	3/8 SHS
400-54	2.000	1-1/4	3/8 SHS
400-56	.375	1-5/8	3/8 FHS
400-58	1.250	1-5/8	1/2 SHS
400-60	1.750	1-5/8	1/2 SHS
400-62	2.250	1-5/8	1/2 SHS

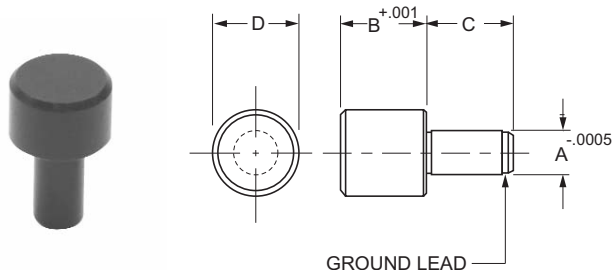
FHS = Flat Head Screw

SHS = Socket Head Screw

SPHERICAL LOCATOR & ROUND REST BUTTONS



Round Rest Buttons are intended for press fit installation. Head thickness ("B" dimension) is precision ground; final leveling grind is normally not required.



SPHERICAL LOCATOR BUTTONS

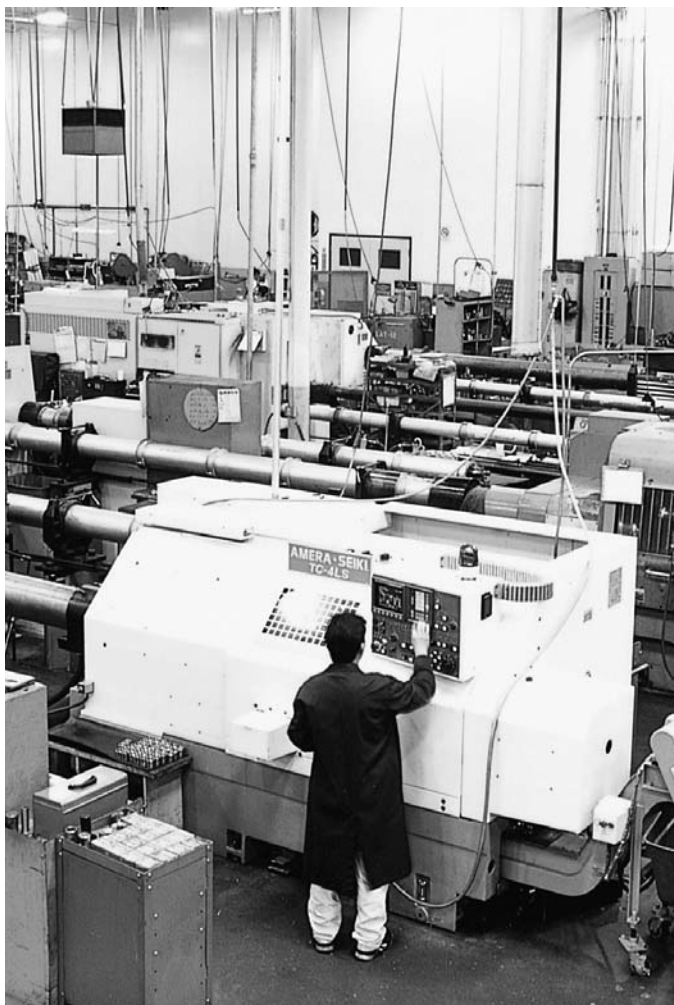
Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	E
400-70	5/16	.1890	1/8	3/8	1/2
400-75	3/8	.2515	3/16	1/2	5/8
400-80	1/2	.3765	3/16	9/16	3/4
400-85	1/2	.3765	1/4	5/8	3/4
400-90	1/2	.3765	3/8	3/4	3/4
400-95	1/2	.3765	1/2	7/8	3/4

ROUND REST BUTTONS

Press Fit - Head Thickness Finish Ground - Case Hardened - Black Oxide Finish

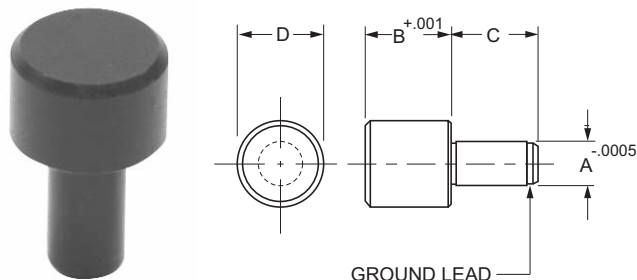
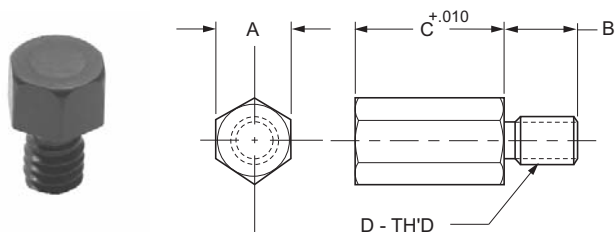
P/N	DIMENSIONS			
	A	B	C	D
401-02	.1885	.250	3/8	3/8
401-04	.1885	.375	3/8	3/8
401-06	.1885	.500	3/8	3/8
401-08	.2510	.250	1/2	1/2
401-10	.2510	.375	1/2	1/2
401-12	.2510	.500	1/2	1/2
401-14	.3135	.250	1/2	9/16
401-16	.3135	.375	1/2	9/16
401-18	.3135	.500	1/2	9/16
401-20	.3760	.250	5/8	5/8
401-22	.3760	.375	5/8	5/8
401-24	.3760	.500	5/8	5/8
401-26	.3760	.625	5/8	5/8
401-28	.3760	.750	5/8	5/8
401-30	.3760	.375	5/8	7/8
401-32	.5010	.500	5/8	7/8
401-34	.5010	.625	5/8	7/8
401-36	.5010	.750	5/8	7/8
401-38	.6260	.375	3/4	1
401-40	.6260	.500	3/4	1
401-42	.6260	.625	3/4	1
401-44	.6260	.750	3/4	1
401-46	.7515	.500	7/8	1-1/4
401-48	.7515	.625	7/8	1-1/4



ROUND REST BUTTONS

All dimensions conform to national jig and fixture component standards.

Round Rest Buttons are intended for press fit installation. Head thickness ("B" dimension) is precision ground; final leveling grind is normally not required.



SCREW REST BUTTONS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
401-49	3/8	3/8	1/4	1/4-20
401-50	3/8	3/8	3/8	1/4-20
401-51	3/8	3/8	1/2	1/4-20
401-52	3/8	3/8	3/4	1/4-20
401-53	3/8	3/8	1	1/4-20
401-54	1/2	1/2	1/4	3/8-16
401-55	1/2	1/2	3/8	3/8-16
401-56	1/2	1/2	1/2	3/8-16
401-57	1/2	1/2	3/4	3/8-16
401-58	1/2	1/2	1	3/8-16
401-59	5/8	5/8	1/4	1/2-13
401-60	5/8	5/8	3/8	1/2-13
401-61	5/8	5/8	1/2	1/2-13
401-62	5/8	5/8	5/8	1/2-13
401-63	5/8	5/8	3/4	1/2-13
401-64	5/8	5/8	1	1/2-13

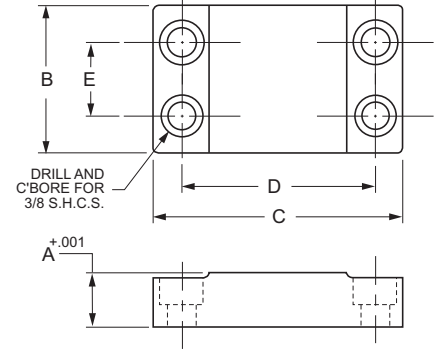
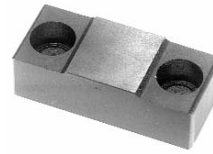
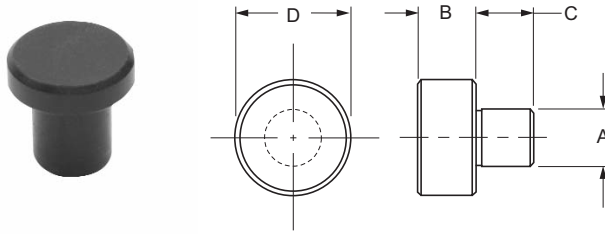
METRIC ROUND REST BUTTONS

Press Fit - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
401-74	6	5	8	10
401-76	6	10	8	10
401-78	6	13	13	12
401-79	8	7	16	16
401-80	8	10	10	16
401-82	8	13	16	16
401-83	8	15	10	16
401-85	10	10	12	20
401-86	12	10	16	24
401-87	12	13	16	24
401-88	12	16	16	24
401-89	16	10	20	30
401-90	16	13	20	30
401-91	16	20	20	30

REST PADS & THREADED INSERTS

Round rest buttons are intended for press fit installation. Head thickness ("B" dimension) is .005 to .015 inch oversize to allow for finish grinding to required size.



ROUND REST BUTTONS

Press Fit - Head Thickness Oversize
Case Hardened - Black Oxide Finish

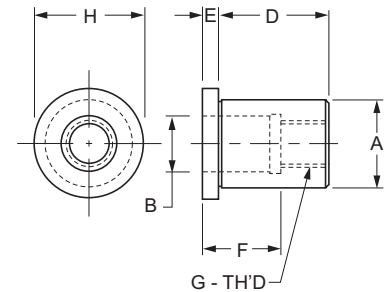
P/N	DIMENSIONS			
	A	B	C	D
402-00	.3135 / .3130	.130 / .140	3/8	1/2
402-05	.3760 / .3755	.505 / .515	3/8	1/2
402-10	.3760 / .3755	.505 / .515	3/8	3/4
402-15	.5010 / .5005	.505 / .515	1/2	1
402-20	.5010 / .5005	.505 / .515	1/2	1-1/4
402-25	.6265 / .6260	.505 / .515	5/8	1-1/2
402-30	.2520 / .2510	.130 / .140	3/8	3/8
402-35	.2520 / .2510	.255 / .265	3/8	3/8
402-40	.2520 / .2510	.130 / .140	3/8	1/2
402-45	.2520 / .2510	.255 / .265	3/8	1/2
402-50	.3770 / .3760	.505 / .515	1/2	1/2
402-55	.3770 / .3760	.755 / .765	1/2	1/2
402-60	.3770 / .3760	1.005 / 1.015	3/4	1/2
402-65	.3770 / .3760	.130 / .140	3/8	5/8
402-70	.3770 / .3760	.255 / .265	1/2	5/8
402-75	.5020 / .5010	.505 / .515	5/8	5/8
402-80	.5020 / .5010	.755 / .765	3/4	5/8
402-85	.5020 / .5010	1.005 / 1.015	1	5/8

REST PADS

Hardened Steel - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	E
403-00	.739	1	2-3/8	1-5/8	*
403-05	.739	2	3-3/8	2-5/8	1

* Rest Pad has only two holes.



THREADED RETAINERS

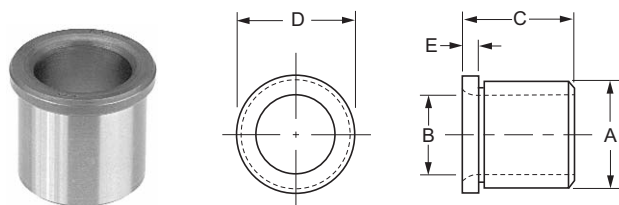
O.D. Ground Oversize - Case Hardened

P/N	DIMENSIONS						
	A	B	D	E	F	G	H
405-00	.457 .452	.3126 .3128	21/32	3/32	1/2	1/4-28	9/16
405-05	.707 .702	.4376 .4378	7/8	1/8	5/8	3/8-24	7/8
405-10	.832 .827	.5626 .5629	1-5/32	5/32	3/4	1/2-20	1
405-15	1.270 1.265	.8751 .8754	1-1/2	1/4	1-1/8	3/4-16	1-9/16

HEADLESS RETAINERS

THREADED RETAINERS O.D. Finnish Ground - Case Hardened							
P/N	DIMENSIONS						
	A	B	D	E	F	G	H
405-25	.4392 .4389	.3126 .3128	21/32	3/32	1/2	1/4-28	9/16
405-30	.6893 .6590	.4376 .4378	7/8	1/8	5/8	3/8-24	7/8
405-35	.8143 .8140	.5626 .5629	1-5/32	5/32	3/4	1/2-20	1
405-40	1.2522 1.2518	.8751 .8754	1-1/2	1/4	1-1/8	3/4-16	1-9/16

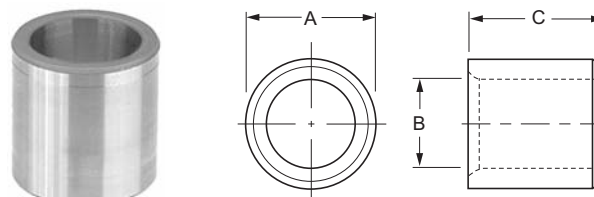
These bushings are used in fixtures and other mating parts in conjunction with locating pins.



SHOULDER RETAINERS O.D. UnGround - Case Hardened					
P/N	DIMENSIONS				
	A	B	C	D	E
407-00	.520/.515	.3126/.3129	1/2	5/8	3/32
407-05	.770/.765	.5002/.5005	3/4	7/8	3/32
407-10	1.020/1.015	.7503/.7506	1	1-1/8	1/8
407-15	1.395/1.390	1.0004/1.0007	1-3/8	1-1/2	1/8

SHOULDER RETAINERS O.D. Finnish Ground - Case Hardened					
P/N	DIMENSIONS				
	A	B	C	D	E
408-00	.5017/.5014	.3126/.3129	1/2	5/8	3/32
408-05	.7518/.7515	.5002/.5005	3/4	7/8	3/32
408-10	1.0018/1.0015	.7503/.7506	1	1-1/8	1/8
408-15	1.3772/1.3768	1.0004/1.0007	1-3/8	1-1/2	1/8

These bushings are used in fixtures and other mating parts in conjunction with locating pins.



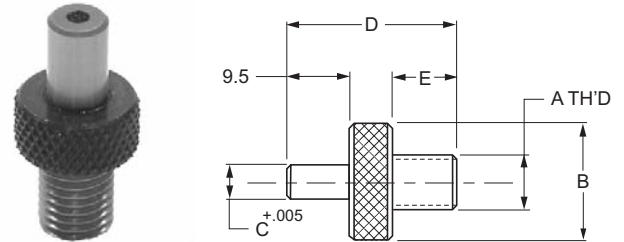
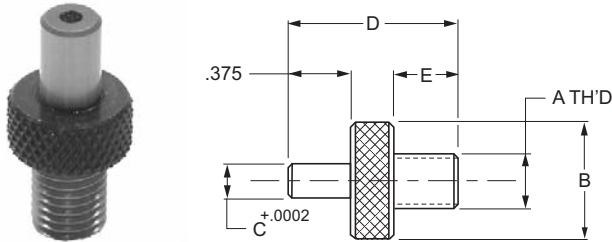
HEADLESS RETAINERS O.D. Unground - Case Hardened			
P/N	DIMENSIONS		
	A	B	C
409-00	.520/.515	.3126/.3129	1/2
409-05	.770/.765	.5002/.5005	3/4
409-10	1.020/1.015	.7503/.7506	1
409-15	1.395/1.390	1.0004/1.0007	1-3/8

HEADLESS RETAINERS O.D. Finnish Ground - Case Hardened			
P/N	DIMENSIONS		
	A	B	C
410-00	.5017/.5014	.3126/.3129	1/2
410-05	.7518/.7515	.5002/.5005	3/4
410-10	1.0018/1.0015	.7503/.7506	1
410-15	1.3772/1.3768	1.0004/1.0007	1-3/8

TAPPED HOLE LOCATION GAGES

- Material: C1144 Hardened and Ground C62/64 Rc
- Black oxide finish on collar only
- English Tapped Hole Location Gages are used to accurately measure the distance between two tapped holes in a work piece
- Shaft size is the same diameter on all gages to simplify calculation of the hole spread
- All diameters are concentric within .0002 T.I.R.
- One Piece construction

- Material: C1144 Hardened and Ground C62/64 Rc
- Black oxide finish on collar only
- Metric Tapped Hole Location Gages are used to accurately measure the distance between two tapped holes in a workpiece
- Shaft size is the same diameter on all gages to simplify calculation of the hole spread
- All diameters are concentric within .0002 T.I.R.
- One Piece construction
- Thread Class: 6G



TAPPED HOLE LOCATION GAGES UNC

P/N	DIMENSIONS				
	A	B	C	D	E
415-00	2-56	5/16	.2500	7/8	1/4
415-01	4-40	5/16	.2500	7/8	1/4
415-03	6-32	5/16	.2500	7/8	1/4
415-04	8-32	5/16	.2500	7/8	1/4
415-05	10-24	5/16	.2500	7/8	1/4
415-06	1/4-20	3/8	.2500	1	3/8
415-07	5/16-18	1/2	.2500	1	3/8
415-08	3/8-16	1/2	.2500	1	3/8
415-10	1/2-13	7/8	.2500	1	3/8
415-11	5/8-11	7/8	.2500	1	3/8

METRIC TAPPED HOLE LOCATION GAGES

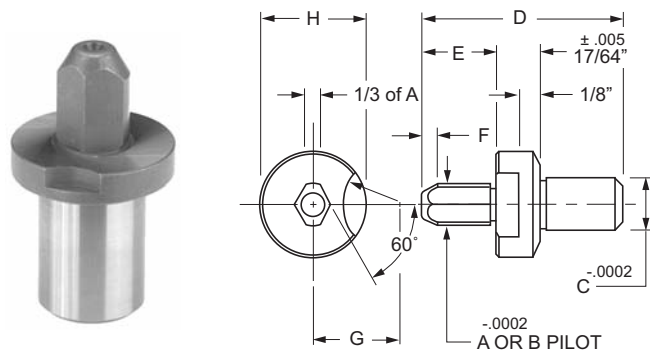
P/N	DIMENSIONS				
	A	B	C	D	E
415-31	M2.0 x .40	7.95	6.35	22	6.35
415-32	M2.5 x .45	7.95	6.35	22	6.35
415-33	M3.0 x .50	7.95	6.35	22	6.35
415-34	M4.0 x .70	7.95	6.35	22	6.35
415-35	M5.0 x .80	9.53	6.35	22	6.35
415-36	M6.0 x 1.00	9.53	6.35	22	6.35
415-37	M8.0 x 1.25	12.70	6.35	28	6.35

TAPPED HOLE LOCATION GAGES UNF

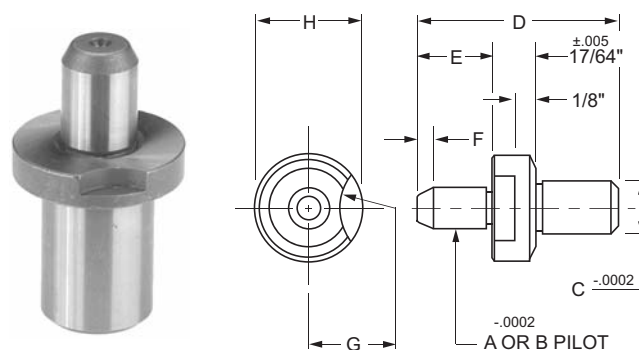
P/N	DIMENSIONS				
	A	B	C	D	E
415-21	10-32	5/16	.2500	7/8	1/4
415-22	1/4-28	3/8	.2500	1	3/8
415-23	5/16-24	1/2	.2500	1	3/8
415-24	3/8-24	1/2	.2500	1	3/8
415-25	1/2-20	7/8	.2500	1	3/8
415-26	5/8-18	7/8	.2500	1	3/8

Use lock screw #1 for all sizes.

These precision locating pins are offered with a choice of "A" or "B" pilot diameters. "B" pilot diameters are .001 smaller than "A" diameters for easier but less critical alignment.



RELIEVED LOCKING SCREW PIN



ROUND LOCKING SCREW PIN

LOCK SCREW LOCATING PINS

Slip Fit - Round and Relieved - Case Hardened

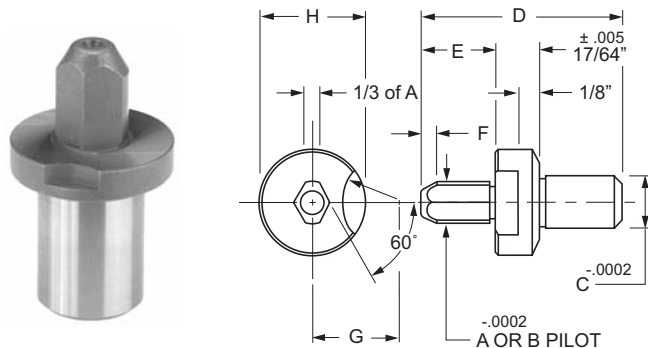
A - PILOT DIAMETER		DIMENSIONS							
RELIEVED PIN P/N	ROUND PIN P/N	A	C	D	E	F*	G	H	USED WITH RETAINER NUMBER
420-00	421-00	.1245	.3125	1-3/16	7/16	3/32	33/64	5/8	410-00 or 408-00
420-01	421-01	.1870	.3125	1-3/16	7/16	3/32	33/64	5/8	410-00 or 408-00
420-02	421-02	.2183	.3125	1-3/16	7/16	3/32	33/64	5/8	410-00 or 408-00
420-03	421-03	.2495	.3125	1-3/16	7/16	3/32	33/64	5/8	410-00 or 408-00
420-04	421-04	.2808	.3125	1-3/16	7/16	3/32	33/64	5/8	410-00 or 408-00
420-05	421-05	.3120	.3125	1-3/16	7/16	3/32	33/64	5/8	410-00 or 408-00
420-06	421-06	.3115	.5000	1-1/2	1/2	1/8	41/64	7/8	410-05 or 408-05
420-07	421-07	.3428	.5000	1-1/2	1/2	1/8	41/64	7/8	410-05 or 408-05
420-08	421-08	.3740	.5000	1-1/2	1/2	1/8	41/64	7/8	410-05 or 408-05
420-09	421-09	.4053	.5000	1-1/2	1/2	1/8	41/64	7/8	410-05 or 408-05
420-10	421-10	.4365	.5000	1-1/2	1/2	1/8	41/64	7/8	410-05 or 408-05
420-11	421-11	.4678	.5000	1-1/2	1/2	1/8	41/64	7/8	410-05 or 408-05
420-12	421-12	.4990	.5000	1-1/2	1/2	1/8	41/64	7/8	410-05 or 408-05
420-13	421-13	.4990	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
420-14	421-14	.5303	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
420-15	421-15	.5615	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
420-16	421-16	.5928	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
420-17	421-17	.6240	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
420-18	421-18	.6553	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
420-19	421-19	.6865	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
420-20	421-20	.7940	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
420-21	421-21	.7940	1.0000	2-5/8	1	9/32	61/64	1-1/2	410-15 or 408-15
420-22	421-22	.9990	1.0000	2-5/8	1	9/32	61/64	1-1/2	410-15 or 408-15

* F dim. is not maintained on small pilot diameters.

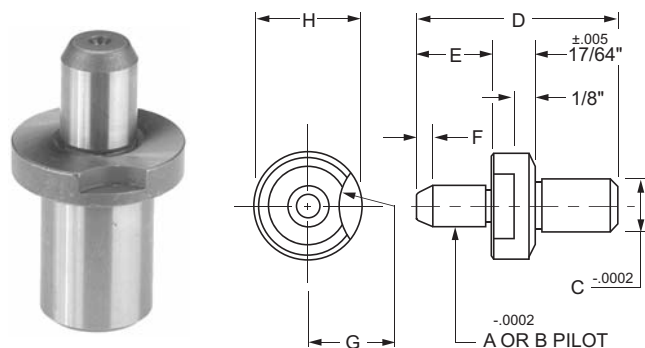
LOCATING PINS

Use lock screw #1 for all sizes.

These precision locating pins are offered with a choice of "A" or "B" pilot diameters. "B" pilot diameters are .001 smaller than "A" diameters for easier but less critical alignment.



RELIEVED LOCKING SCREW PIN



ROUND LOCKING SCREW PIN

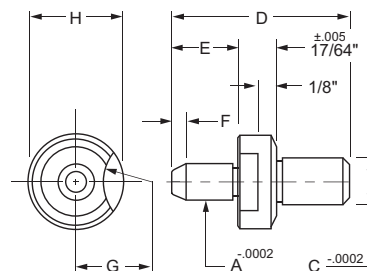
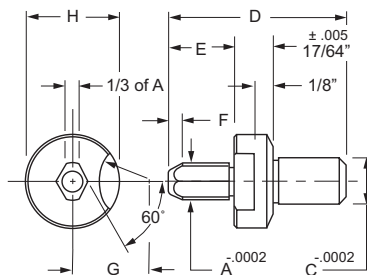
LOCK SCREW LOCATING PINS

Slip Fit - Round and Relieved - Case Hardened

B - PILOT DIAMETER		DIMENSIONS							USED WITH RETAINER NUMBER
RELIEVED PIN P/N	ROUND PIN P/N	B	C	D	E	F*	G	H	
422-00	423-00	.1235	.3125	1-3/16	7/16	3/32	33/64	5/8	410-00 or 408-00
422-01	423-01	.1860	.3125	1-3/16	7/16	3/32	33/64	5/8	410-00 or 408-00
422-02	423-02	.2173	.635	1-3/16	7/16	3/32	33/64	5/8	410-00 or 408-00
422-03	423-03	.2485	.3125	1-3/16	7/16	3/32	33/64	5/8	410-00 or 408-00
422-04	423-04	.2798	.3125	1-3/16	7/16	3/32	33/64	5/8	410-00 or 408-00
422-05	423-05	.3110	.3125	1-3/16	7/16	3/32	33/64	5/8	410-00 or 408-00
422-06	423-06	.3105	.5000	1-1/2	1/2	1/8	41/64	7/8	410-05 or 408-05
422-07	423-07	.3418	.5000	1-1/2	1/2	1/8	41/64	7/8	410-05 or 408-05
422-08	423-08	.3730	.5000	1-1/2	1/2	1/8	41/64	7/8	410-05 or 408-05
422-09	423-09	.4043	.5000	1-1/2	1/2	1/8	41/64	7/8	410-05 or 408-05
422-10	423-10	.4355	.5000	1-1/2	1/2	1/8	41/64	7/8	410-05 or 408-05
422-11	423-11	.4668	.5000	1-1/2	1/2	1/8	41/64	7/8	410-05 or 408-05
422-12	423-12	.4980	.5000	1-1/2	1/2	1/8	41/64	7/8	410-05 or 408-05
422-13	423-13	.4980	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
422-14	423-14	.5293	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
422-15	423-15	.5605	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
422-16	423-16	.5918	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
422-17	423-17	.6230	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
422-18	423-18	.6543	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
422-19	423-19	.6855	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
422-20	423-20	.7480	.7500	1-15/16	11/16	3/16	49/64	1-1/8	410-10 or 408-10
422-21	423-21	.7480	1.0000	2-5/8	1	9/32	61/64	1-1/2	410-15 or 408-15
422-22	423-22	.9980	1.0000	2-5/8	1	9/32	61/64	1-1/2	410-15 or 408-15

* F dim. is not maintained on small pilot diameters.

LOCATING PINS

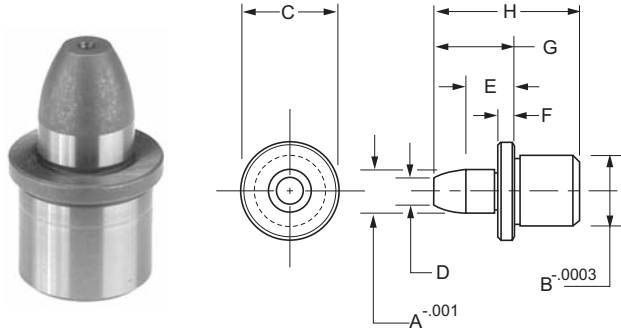


Note: Refer to the Bushing Retainers for these slip type pins.

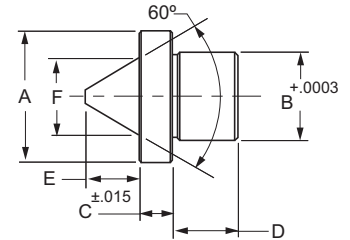
METRIC LOCK SCREW LOCATING PINS									
Slip Fit - Round and Relieved - Case Hardened									
RELIEVED PIN P/N	ROUND PIN P/N	DIMENSIONS							
		NOMINAL	A	C	D	E	F*	G	H
422-31	423-31	6mm	5.961mm .2347	7.938mm .3125	30mm 1-3/16	11mm 7/16	2.5mm 3/32	13mm 33/64	16mm 5/8
422-32	423-32	6mm	5.987mm .2357	7.938mm .3125	30mm 1-3/16	11mm 7/16	2.5mm 3/32	13mm 33/64	16mm 5/8
422-33	423-33	8mm	7.950mm .3130	12.7mm .5000	38mm 1-1/2	12.5mm 1/2	3.18mm 1/8	16.25mm 41/64	22mm 7/8
422-34	423-34	8mm	7.976mm .3140	12.7mm .5000	38mm 1-1/2	12.5mm 1/2	3.18mm 1/8	16.25mm 41/64	22mm 7/8
422-35	423-35	10mm	9.949mm .3917	12.7mm .5000	38mm 1-1/2	12.5mm 1/2	3.18mm 1/8	16.25mm 41/64	22mm 7/8
422-36	423-36	10mm	9.975mm .3927	12.7mm .5000	38mm 1-1/2	12.5mm 1/2	3.18mm 1/8	16.25mm 41/64	22mm 7/8
422-37	423-37	12mm	11.948mm .4704	12.7mm .5000	38mm 1-1/2	12.5mm 1/2	3.18mm 1/8	16.25mm 41/64	22mm 7/8
422-38	423-38	12mm	11.974mm .4717	12.7mm .5000	38mm 1-1/2	12.5mm 1/2	3.18mm 1/8	16.25mm 41/64	22mm 7/8
422-39	423-39	14mm	13.950mm .5492	19.05mm .7500	50mm 1-15/16	17.5mm 11/16	4.75mm 3/16	19.5mm 49/64	28.5mm 1-1/8
422-40	423-40	14mm	13.975mm .5502	19.05mm .7500	50mm 1-15/16	17.5mm 11/16	4.75mm 3/16	19.5mm 49/64	28.5mm 1-1/8
422-41	423-41	16mm	15.949mm .6279	19.05mm .7500	50mm 1-15/16	17.5mm 11/16	4.75mm 3/16	19.5mm 49/64	28.5mm 1-1/8
422-42	423-42	16mm	15.974mm .6289	19.05mm .7500	50mm 1-15/16	17.5mm 11/16	4.75mm 3/16	19.5mm 49/64	28.5mm 1-1/8
422-43	423-43	18mm	17.950mm .7067	19.05mm .7500	50mm 1-15/16	17.5mm 11/16	4.75mm 3/16	19.5mm 49/64	28.5mm 1-1/8
422-44	423-44	18mm	17.975mm .7077	19.05mm .7500	50mm 1-15/16	17.5mm 11/16	4.75mm 3/16	19.5mm 49/64	28.5mm 1-1/8
422-45	423-45	20mm	19.949mm .7854	25.4mm 1.0000	66mm 2-5/8	25.4mm 1	7.1mm 9/32	24.2mm 61/64	38mm 1-1/2
422-46	423-46	20mm	19.975mm .7864	25.4mm 1.0000	66mm 2-5/8	25.4mm 1	7.1mm 9/32	24.2mm 61/64	38mm 1-1/2

* F dim. is not maintained on small pilot diameters.

LOCATING PINS



Cone locator pins and bushings offering medium accuracy, these pins and bushings compensate for misalignment to allow quick assembly of two fixture plates.



PILOT LOCATOR PINS

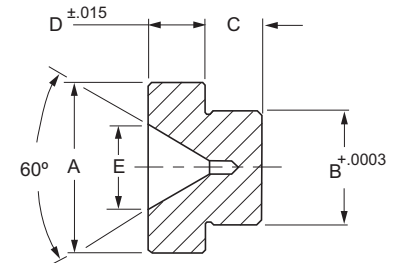
Case Hardened

P/N	DIMENSIONS							
	A	B	C	D	E	F	G	H
425-00	.249	.4078	9/16	5/32	9/32	3/32	15/35	27/32
425-05	.312	.5017	5/8	3/16	9/32	3/32	15/35	27/32
425-10	.624	.8768	1	5/16	3/8	1/8	7/8	1-5/8

CONE LOCATOR PINS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	F
425-25	3/4	.5014	3/16	3/8	5/16	.438
425-30	1	.7515	3/16	9/16	1/2	.676



CONE LOCATOR BUSHINGS

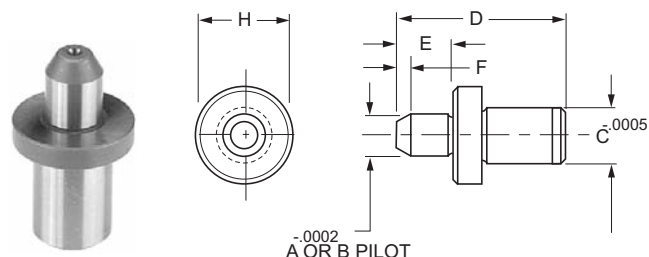
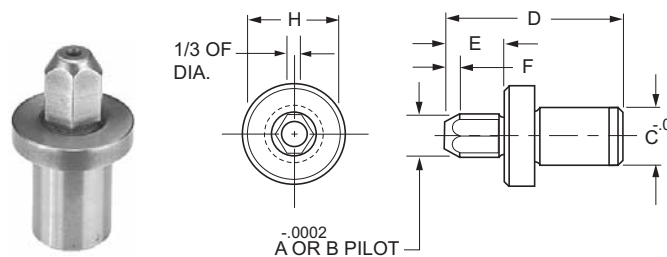
Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	GAP BETWEEN THE HEADS WITH THE PINS AND BUSHINGS ASSEMBLED
425-35	3/4	.5014	1/4	1/4	.370	.050 - .068
425-40	1	.7515	3/8	3/8	.616	.043 - .061



LOCATING PINS

These precision locating pins are offered with a choice of "A" or "B" pilot diameters. "B" pilot diameters are .001 smaller than "A" diameters for easier but less critical alignment.



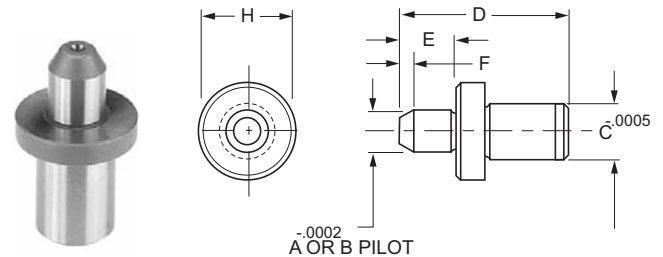
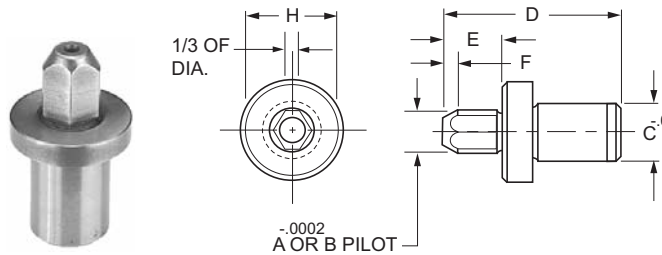
LOCATING PINS						
A-Pilot Diameter - Press Fit - Relieved - Case Hardened						
P/N	DIMENSIONS					
	A	C	D	E	F*	H
430-00	.1870	.3135	1-3/16	7/16	3/32	5/8
430-01	.2183	.3135	1-3/16	7/16	3/32	5/8
430-02	.2495	.3135	1-3/16	7/16	3/32	5/8
430-03	.2808	.3135	1-3/16	7/16	3/32	5/8
430-04	.3120	.3135	1-3/16	7/16	3/32	5/8
430-05	.3115	.5010	1-1/2	1/2	1/8	7/8
430-06	.3428	.5010	1-1/2	1/2	1/8	7/8
430-07	.3740	.5010	1-1/2	1/2	1/8	7/8
430-08	.4053	.5010	1-1/2	1/2	1/8	7/8
430-09	.4365	.5010	1-1/2	1/2	1/8	7/8
430-10	.4678	.5010	1-1/2	1/2	1/8	7/8
430-11	.4990	.5010	1-1/2	1/2	1/8	7/8
430-12	.4990	.7510	1-15/16	11/16	3/16	1-1/8
430-13	.5303	.7510	1-15/16	11/16	3/16	1-1/8
430-14	.5615	.7510	1-15/16	11/16	3/16	1-1/8
430-15	.6240	.7510	1-15/16	11/16	3/16	1-1/8
430-16	.6553	.7510	1-15/16	11/16	3/16	1-1/8
430-17	.6865	.7510	1-15/16	11/16	3/16	1-1/8
430-18	.7490	.7510	1-15/16	11/16	3/16	1-1/8
430-19	.7490	1.0010	2-5/8	1	9/32	1-1/2
430-20	.9990	1.0010	2-5/8	1	9/32	1-1/2

* F dim. is not maintained on small pilot diameters.

LOCATING PINS						
A-Pilot Diameter - Press Fit - Round - Case Hardened						
P/N	DIMENSIONS					
	A	C	D	E	F*	H
431-00	.1870	.3135	1-3/16	7/16	3/32	5/8
431-01	.2183	.3135	1-3/16	7/16	3/32	5/8
431-02	.2495	.3135	1-3/16	7/16	3/32	5/8
431-03	.2808	.3135	1-3/16	7/16	3/32	5/8
431-04	.3120	.3135	1-3/16	7/16	3/32	5/8
431-05	.3115	.5010	1-1/2	1/2	1/8	7/8
431-06	.3428	.5010	1-1/2	1/2	1/8	7/8
431-07	.3740	.5010	1-1/2	1/2	1/8	7/8
431-08	.4053	.5010	1-1/2	1/2	1/8	7/8
431-09	.4365	.5010	1-1/2	1/2	1/8	7/8
431-10	.4678	.5010	1-1/2	1/2	1/8	7/8
431-11	.4990	.5010	1-1/2	1/2	1/8	7/8
431-12	.4990	.7510	1-15/16	11/16	3/16	1-1/8
431-13	.5303	.7510	1-15/16	11/16	3/16	1-1/8
431-14	.5615	.7510	1-15/16	11/16	3/16	1-1/8
431-15	.6240	.7510	1-15/16	11/16	3/16	1-1/8
431-16	.6553	.7510	1-15/16	11/16	3/16	1-1/8
431-17	.6865	.7510	1-15/16	11/16	3/16	1-1/8
431-18	.7490	.7510	1-15/16	11/16	3/16	1-1/8
431-19	.7490	1.0010	2-5/8	1	9/32	1-1/2
431-20	.9990	1.0010	2-5/8	1	9/32	1-1/2

LOCATING PINS

These precision locating pins are offered with a choice of "A" or "B" pilot diameters. "B" pilot diameters are .001 smaller than "A" diameters for easier but less critical alignment.

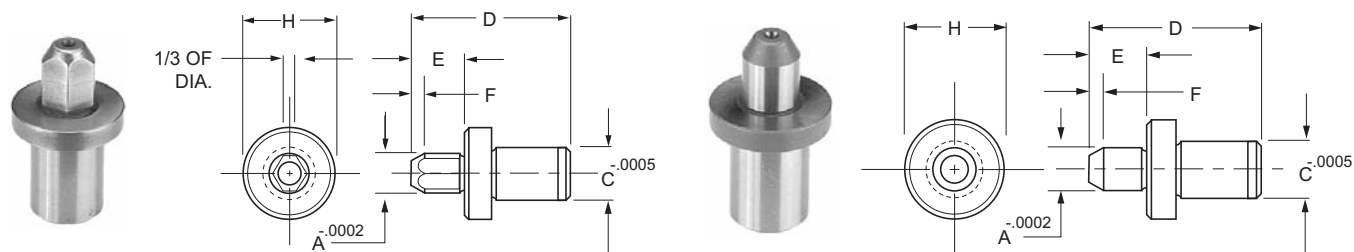


LOCATING PINS						
B-Pilot Diameter - Press Fit - Relieved - Case Hardened						
P/N	DIMENSIONS					
	B	C	D	E	F*	H
432-00	.1860	.3135	1-3/16	7/16	3/32	5/8
432-01	.2173	.3135	1-3/16	7/16	3/32	5/8
432-02	.2485	.3135	1-3/16	7/16	3/32	5/8
432-03	.2798	.3135	1-3/16	7/16	3/32	5/8
432-04	.3110	.3135	1-3/16	7/16	3/32	5/8
432-05	.3105	.5010	1-1/2	1/2	1/8	7/8
432-06	.3418	.5010	1-1/2	1/2	1/8	7/8
432-07	.3730	.5010	1-1/2	1/2	1/8	7/8
432-08	.4043	.5010	1-1/2	1/2	1/8	7/8
432-09	.4355	.5010	1-1/2	1/2	1/8	7/8
432-10	.4668	.5010	1-1/2	1/2	1/8	7/8
432-11	.4980	.5010	1-1/2	1/2	1/8	7/8
432-12	.4980	.7510	1-15/16	11/16	3/16	1-1/8
432-13	.5293	.7510	1-15/16	11/16	3/16	1-1/8
432-14	.5605	.7510	1-15/16	11/16	3/16	1-1/8
432-15	.6230	.7510	1-15/16	11/16	3/16	1-1/8
432-16	.6543	.7510	1-15/16	11/16	3/16	1-1/8
432-17	.6855	.7510	1-15/16	11/16	3/16	1-1/8
432-18	.7480	.7510	1-15/16	11/16	3/16	1-1/8
432-19	.7480	1.0010	2-5/8	1	9/32	1-1/2
432-20	.9980	1.0010	2-5/8	1	9/32	1-1/2

* F dim. is not maintained on small pilot diameters.

LOCATING PINS						
B-Pilot Diameter - Press Fit - Round - Case Hardened						
P/N	DIMENSIONS					
	B	C	D	E	F*	H
433-00	.1860	.3135	1-3/16	7/16	3/32	5/8
433-01	.2173	.3135	1-3/16	7/16	3/32	5/8
433-02	.2485	.3135	1-3/16	7/16	3/32	5/8
433-03	.2798	.3135	1-3/16	7/16	3/32	5/8
433-04	.3110	.3135	1-3/16	7/16	3/32	5/8
433-05	.3105	.5010	1-1/2	1/2	1/8	7/8
433-06	.3418	.5010	1-1/2	1/2	1/8	7/8
433-07	.3730	.5010	1-1/2	1/2	1/8	7/8
433-08	.4043	.5010	1-1/2	1/2	1/8	7/8
433-09	.4355	.5010	1-1/2	1/2	1/8	7/8
433-10	.4668	.5010	1-1/2	1/2	1/8	7/8
433-11	.4980	.5010	1-1/2	1/2	1/8	7/8
433-12	.4980	.7510	1-15/16	11/16	3/16	1-1/8
433-13	.5293	.7510	1-15/16	11/16	3/16	1-1/8
433-14	.5605	.7510	1-15/16	11/16	3/16	1-1/8
433-15	.6230	.7510	1-15/16	11/16	3/16	1-1/8
433-16	.6543	.7510	1-15/16	11/16	3/16	1-1/8
433-17	.6855	.7510	1-15/16	11/16	3/16	1-1/8
433-18	.7480	.7510	1-15/16	11/16	3/16	1-1/8
433-19	.7480	1.0010	2-5/8	1	9/32	1-1/2
433-20	.9980	1.0010	2-5/8	1	9/32	1-1/2

LOCATING PINS



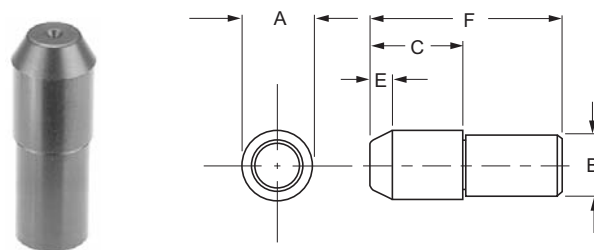
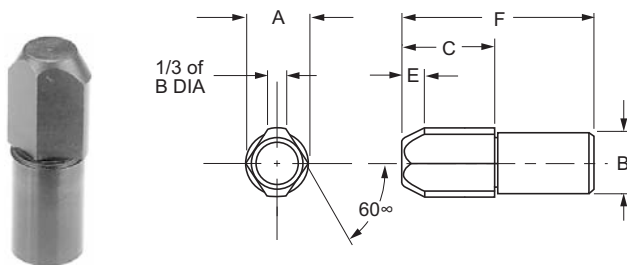
METRIC LOCATING PINS

Press Fit - Round and Relieved - Case Hardened

		DIMENSIONS						
RELIEVED PIN P/N	ROUND PIN P/N	NOMINAL	A	C	D	E	F*	H
432-31	432-61	6mm	5.961mm .2347	7.963mm .3135	30mm 1-3/16	11mm 7/16	3.18mm 1/8	16mm 5/8
432-32	432-62	6mm	5.987mm .2357	7.963mm .3135	30mm 1-3/16	11mm 7/16	3.18mm 1/8	16mm 5/8
432-33	432-63	8mm	7.950mm .3130	12.725mm .5010	38mm 1-1/2	12.5mm 1/2	3.18mm 1/8	22mm 7/8
432-34	432-64	8mm	7.976mm .3140	12.725mm .5010	38mm 1-1/2	12.5mm 1/2	3.18mm 1/8	22mm 7/8
432-35	432-65	10mm	9.949mm .3917	12.725mm .5010	38mm 1-1/2	12.5mm 1/2	3.18mm 1/8	22mm 7/8
432-36	432-66	10mm	9.975mm .3927	12.725mm .5010	38mm 1-1/2	12.5mm 1/2	3.18mm 1/8	22mm 7/8
432-37	432-67	12mm	11.948mm .4704	12.725mm .5010	38mm 1-1/2	12.5mm 1/2	3.18mm 1/8	22mm 7/8
432-38	432-68	12mm	11.974mm .4717	12.725mm .5010	38mm 1-1/2	12.5mm 1/2	3.18mm 1/8	22mm 7/8
432-39	432-69	14mm	13.950mm .5492	12.725mm .5010	38mm 1-1/2	17.5mm 11/16	4.75mm 3/16	28.5mm 1-1/8
432-40	432-70	14mm	13.975mm .5502	12.725mm .5010	38mm 1-1/2	17.5mm 11/16	4.75mm 3/16	28.5mm 1-1/8
432-41	432-71	16mm	15.949mm .6279	19.075mm .7510	50mm 1-15/16	17.5mm 11/16	4.75mm 3/16	28.5mm 1-1/8
432-42	432-72	16mm	15.974mm .6289	19.075mm .7510	50mm 1-15/16	17.5mm 11/16	4.75mm 3/16	28.5mm 1-1/8
432-43	432-73	18mm	17.950mm .7067	19.075mm .7510	50mm 1-15/16	17.5mm 11/16	4.75mm 3/16	28.5mm 1-1/8
432-44	432-74	18mm	17.976mm .7077	19.075mm .7510	50mm 1-15/16	17.5mm 11/16	4.75mm 3/16	28.5mm 1-1/8
432-45	432-75	20mm	19.949mm .7854	25.425mm 1.001	66mm 2-5/8	25.4mm 1	7.1mm 9/32	38mm 1-1/2
432-46	432-76	20mm	19.975mm .7864	25.425mm 1.001	66mm 2-5/8	25.4mm 1	7.1mm 9/32	38mm 1-1/2

* F dim. is not maintained on small pilot diameters.

LOCATING PINS



LOCATING PINS FLANGELESS

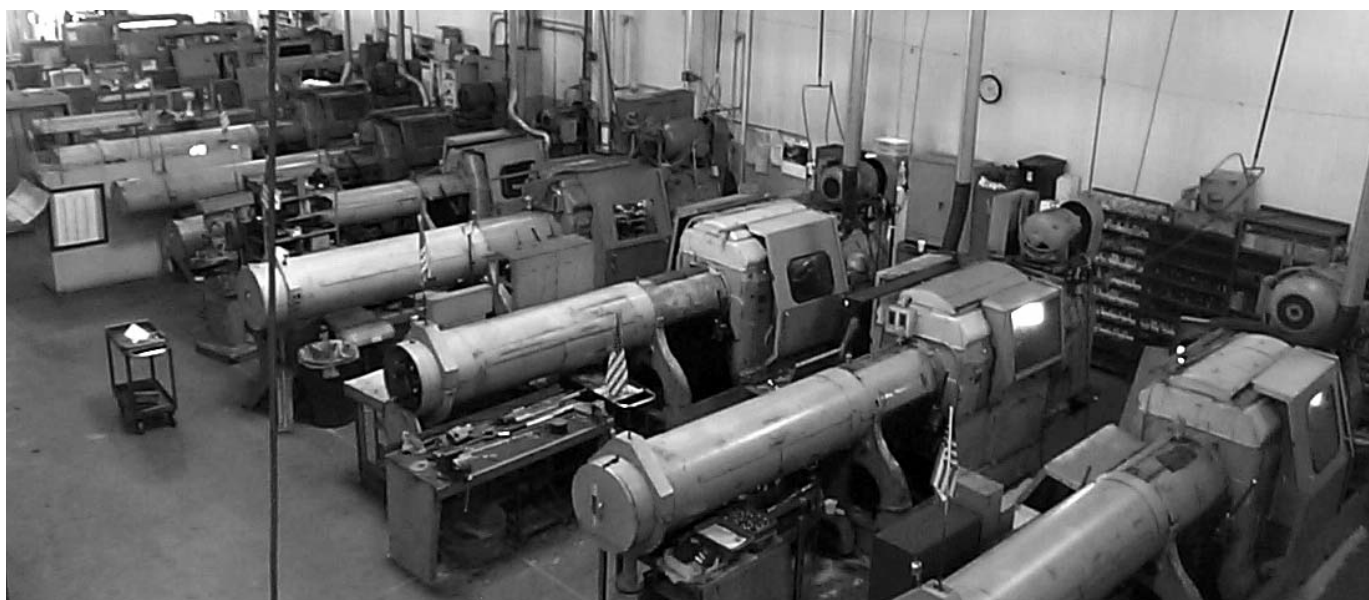
Press Fit - Relieved - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	E	F	HOLE SIZE
433-25	.2493/.2490	.1878/.1876	11/32	3/32	3/4	1/4
433-26	.3118/.3115	.2503/.2501	13/32	3/32	7/8	5/16
433-27	.3743/.3740	.3128/.3126	1/2	1/8	1	3/8
433-28	.4368/.4365	.3753/.3751	19/32	5/32	1-1/4	7/16
433-29	.4993/.4990	.4378/.4376	21/32	5/32	1-3/8	1/2
433-30	.5615/.5610	.5003/.5001	3/4	3/16	1-1/2	9/16
433-31	.6240/.6235	.5628/.5626	27/32	7/32	1-3/4	5/8
433-32	.6865/.6860	.6253/.6251	29/32	7/32	2	11/16
433-33	.7490/.7485	.6885/.6880	1	1/4	2-1/8	3/4
433-34	.8115/.8110	.7510/.7505	1-3/32	9/32	2-1/4	13/16
433-35	.8740/.8735	.8135/.8130	1-5/32	9/32	2-1/2	7/8
433-36	.9365/.9360	.8760/.8755	1-1/4	5/16	2-3/4	15/16
433-37	.9980/.9972	.9385/.9380	1-5/16	5/16	2-7/8	1

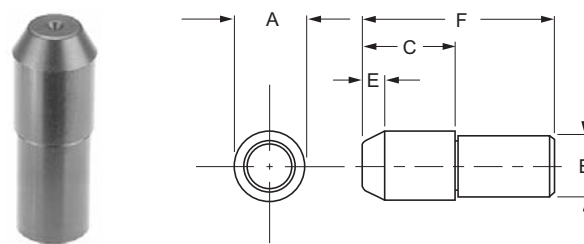
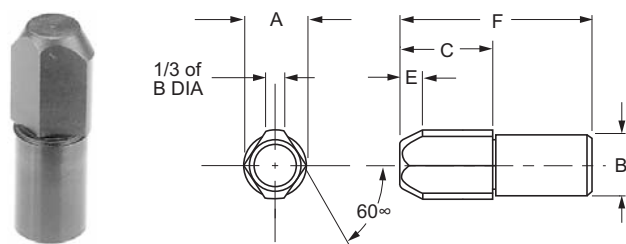
LOCATING PINS FLANGELESS

Press Fit - Round - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	E	F	HOLE SIZE
433-50	.2495/.2492	.1878/.1876	11/32	3/32	3/4	1/4
433-51	.3120/.3117	.2503/.2501	13/32	3/32	7/8	5/16
433-52	.3745/.3742	.3128/.3126	1/2	1/8	1	3/8
433-53	.4370/.4367	.3753/.3751	19/32	5/32	1-1/4	7/16
433-54	.4995/.4992	.4378/.4376	21/32	5/32	1-3/8	1/2
433-55	.5620/.5617	.5003/.5001	3/4	3/16	1-1/2	9/16
433-56	.6240/.6237	.5628/.5626	27/32	7/32	1-3/4	5/8
433-57	.6865/.6862	.6253/.6251	29/32	7/32	2	11/16
433-58	.7490/.7487	.6885/.6880	1	1/4	2-1/8	3/4
433-59	.8115/.8112	.7510/.7505	1-3/32	9/32	2-1/4	13/16
433-60	.8740/.8737	.8135/.8130	1-5/32	9/32	2-1/2	7/8
433-61	.9365/.9362	.8760/.8755	1-1/4	5/16	2-3/4	15/16
433-62	.9985/.9980	.9385/.9380	1-5/16	5/16	2-7/8	1



LOCATING PINS



METRIC LOCATING PINS FLANGELESS

Free Fit - Relieved - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS						
	A		B		C	E	F
	NOM	ACTUAL	NOM	ACTUAL			
433-65	6mm	.2355/.2352	5mm	.1972/.1970	11/32	3/32	3/4
433-66	6mm	.2347/.2344	5mm	.1972/.1970	11/32	3/32	3/4
433-67	6mm	.2332/.2329	5mm	.1972/.1970	11/32	3/32	3/4
433-68	8mm	.3143/.3140	6mm	.2365/.2363	13/32	3/32	7/8
433-69	8mm	.3135/.3132	6mm	.2365/.2363	13/32	3/32	7/8
433-70	8mm	.3120/.3117	6mm	.2365/.2363	13/32	3/32	7/8
433-71	10mm	.3930/.3927	8mm	.3153/.3151	1/2	1/8	1
433-72	10mm	.3922/.3919	8mm	.3153/.3151	1/2	1/8	1
433-73	10mm	.3907/.3904	8mm	.3153/.3151	1/2	1/8	1
433-74	12mm	.4717/.4714	10mm	.3940/.3938	21/32	5/32	1-3/8
433-75	12mm	.4709/.4706	10mm	.3940/.3938	21/32	5/32	1-3/8
433-76	12mm	.4694/.4691	10mm	.3940/.3938	21/32	5/32	1-3/8
433-77	14mm	.5502/.5497	12mm	.4727/.4725	3/4	3/16	1-1/2
433-78	14mm	.5482/.5477	12mm	.4727/.4725	3/4	3/16	1-1/2
433-79	14mm	.5462/.5457	12mm	.4727/.4725	3/4	3/16	1-1/2
433-80	16mm	.6289/.6284	14mm	.5515/.5513	27/32	7/32	1-3/4
433-81	16mm	.6269/.6264	14mm	.5515/.5513	27/32	7/32	1-3/4
433-82	16mm	.6249/.6244	14mm	.5515/.5513	27/32	7/32	1-3/4
433-83	18mm	.7077/.7072	16mm	.6302/.6300	29/32	7/32	2
433-84	18mm	.7057/.7052	16mm	.6302/.6300	29/32	7/32	2
433-85	18mm	.7037/.7032	16mm	.6302/.6300	29/32	7/32	2
433-86	20mm	.7864/.7859	18mm	.7097/.7092	2-31/32	9/32	2-1/4
433-87	20mm	.7844/.7839	18mm	.7097/.7092	2-31/32	9/32	2-1/4
433-88	20mm	.7824/.7819	18mm	.7097/.7092	2-31/32	9/32	2-1/4

METRIC LOCATING PINS FLANGELESS

Press Fit - Round - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS						
	A		B		C	E	F
	NOM	ACTUAL	NOM	ACTUAL			
433-90	6mm	.2357/.2354	5mm	.1972/.1970	11/32	3/32	3/4
433-91	8mm	.3145/.3142	6mm	.2365/.2363	13/32	3/32	7/8
433-92	10mm	.3932/.3929	8mm	.3153/.3151	1/2	1/8	1
433-93	12mm	.4719/.4716	10mm	.3940/.3938	21/32	5/32	1-3/8
433-94	14mm	.5507/.5504	12mm	.4727/.4725	3/4	3/16	1-1/2
433-95	16mm	.6289/.6286	14mm	.5515/.5513	27/32	7/32	1-3/4
433-96	18mm	.7077/.7074	16mm	.6302/.6300	29/32	7/32	2
433-97	20mm	.7864/.7861	18mm	.7097/.7092	1-3/32	9/23	2-1/4

**all
american**
Bushings and
Workholding Solutions

A Pilot Diameter - Round and Relieved - Slip Fit - Case Hardened

RELIEVED PIN P/N	ROUND PIN P/N	DIMENSIONS									
		A	C	D	E	F*	G	H	J	K	USED W/ THREADED RETAINER NUMBER
434-00	434-15	.1870	.3125	1-1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	405-00 or 405-25
434-01	434-16	.2495	.3125	1-1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	405-00 or 405-25
434-02	434-17	.3120	.3125	1-1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	405-00 or 405-25
434-03	434-18	.3115	.4375	1-19/32	1/2	1/8	1/8	1/2	5/8	3/8-24	405-05 or 405-30
434-04	434-19	.3740	.4375	1-19/32	1/2	1/8	1/8	1/2	5/8	3/8-24	405-05 or 405-30
434-05	434-20	.4365	.4375	1-19/32	1/2	1/8	1/8	1/2	5/8	3/8-24	405-05 or 405-30
434-06	434-21	.4990	.5625	2-1/8	11/16	3/16	5/32	5/8	7/8	1/2-20	405-10 or 405-35
434-07	434-22	.5615	.5625	2-1/8	11/16	3/16	5/32	5/8	7/8	1/2-20	405-10 or 405-35
434-08	434-23	.6240	.5625	2-1/8	11/16	3/16	5/32	5/8	7/8	1/2-20	405-10 or 405-35
434-09	434-24	.6240	.8750	2-31/32	1	9/32	1/4	1	1-1/4	3/4-16	405-15 or 405-40
434-10	434-25	.7490	.8750	2-31/32	1	9/32	1/4	1	1-1/4	3/4-16	405-15 or 405-40
434-11	434-26	.9990	.8750	2-31/32	1	9/32	1/4	1	1-1/4	3/4-16	405-15 or 405-40

* F dim. is not maintained on small pilot diameters.

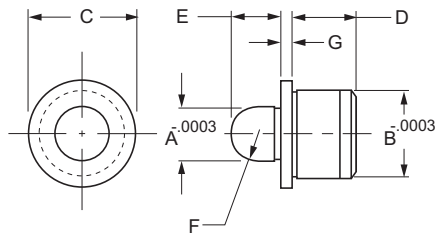
THREADED LOCATING PINS

B - Pilot Diameter - Round and Relieved - Slip Fit - Case Hardened

RELIEVED PIN P/N	ROUND PIN P/N	DIMENSIONS									USED W/ THREADED RETAINER NUMBER
		B	C	D	E	F*	G	H	J	K	
434-27	434-39	.1860	.3125	1-1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	405-00 or 405-25
434-28	434-40	.2485	.3125	1-1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	405-00 or 405-25
434-29	434-41	.3110	.3125	1-1/4	7/16	3/32	3/32	7/16	1/2	1/4-28	405-00 or 405-25
434-30	434-42	.3105	.4375	1-19/32	1/2	1/8	1/8	1/2	5/8	3/8-24	405-05 or 405-30
434-31	434-43	.3730	.4375	1-19/32	1/2	1/8	1/8	1/2	5/8	3/8-24	405-05 or 405-30
434-32	434-44	.4355	.4375	1-19/32	1/2	1/8	1/8	1/2	5/8	3/8-24	405-05 or 405-30
434-33	434-45	.4980	.5625	2-1/8	11/16	3/16	5/32	5/8	7/8	1/2-20	405-10 or 405-35
434-34	434-46	.5605	.5625	2-1/8	11/16	3/16	5/32	5/8	7/8	1/2-20	405-10 or 405-35
434-35	434-47	.6230	.5625	2-1/8	11/16	3/16	5/32	5/8	7/8	1/2-20	405-10 or 405-35
434-36	434-48	.6230	.8750	2-31/32	1	9/32	1/4	1	1-1/4	3/4-16	405-15 or 405-40
434-37	434-49	.7480	.8750	2-31/32	1	9/32	1/4	1	1-1/4	3/4-16	405-15 or 405-40
434-38	434-50	.9980	.8750	2-31/32	1	9/32	1/4	1	1-1/4	3/4-16	405-15 or 405-40



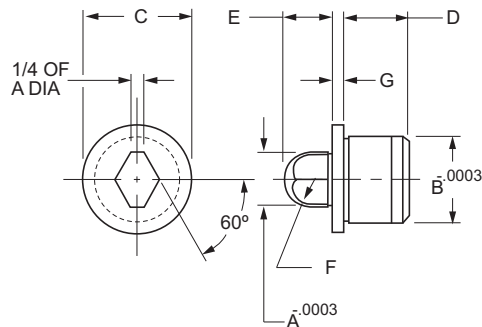
BULLET NOSE PINS



BULLET NOSE PINS

Round - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS							USED W/ LINER P/N
	A	B	C	D	E	F	G	
440-00	.2499	.4078	9/16	3/8	7/32	1/8	1/16	442-00
440-05	.3124	.5017	5/8	3/8	9/32	5/32	1/16	442-05
440-10	.3748	.6267	3/4	1/2	11/32	3/16	1/16	442-10
440-15	.4998	.7518	7/8	1/2	13/32	1/4	1/16	442-15
440-20	.7500	1.0018	1-1/4	1/2	1/2	3/8	1/8	442-20
440-25	.7498	1.0018	1-1/8	3/4	9/16	3/8	1/8	442-25
440-30	.9998	1.3771	1-1/2	3/4	3/4	1/2	1/8	442-30



BULLET NOSE PINS

Relieved - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS							USED W/ LINER P/N
	A	B	C	D	E	F	G	
441-00	.2499	.4078	9/16	3/8	7/32	1/8	1/16	442-00
441-05	.3124	.5017	5/8	3/8	9/32	5/32	1/16	442-05
441-10	.3748	.6267	3/4	1/2	11/32	3/16	1/16	442-10
441-15	.4998	.7518	7/8	1/2	13/32	1/4	1/16	442-15
441-20	.7500	1.0018	1-1/4	1/2	1/2	3/8	1/8	442-20
441-25	.7498	1.0018	1-1/8	3/4	9/16	3/8	1/8	442-25
441-30	.9998	1.3771	1-1/2	3/4	3/4	1/2	1/8	442-30

METRIC BULLET NOSE PINS

Round - Case Hardened - Black Oxide Finish

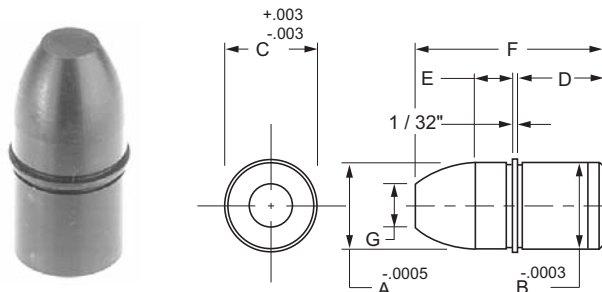
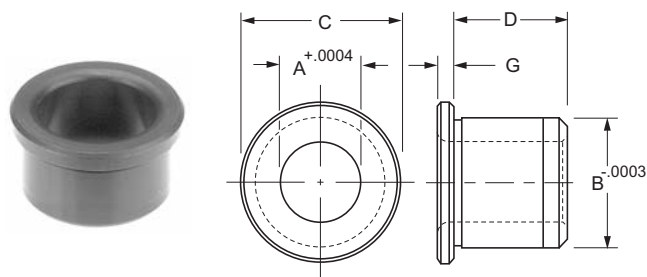
P/N	DIMENSIONS							USED W/ LINER P/N
	A	B	C	D	E	F	G	
440-50	6mm	10mm	13mm	9mm	6mm	3mm	2mm	442-50
440-55	8mm	12mm	15mm	9mm	7mm	4mm	2mm	442-55
440-60	10mm	15mm	18mm	11mm	9mm	5mm	2mm	442-60
440-65	12mm	18mm	22mm	11mm	10mm	6mm	2mm	442-65

METRIC BULLET NOSE PINS

Relieved - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS							USED W/ LINER P/N
	A	B	C	D	E	F	G	
441-50	6mm	10mm	13mm	9mm	6mm	3mm	2mm	442-50
441-55	8mm	12mm	15mm	9mm	7mm	4mm	2mm	442-55
441-60	10mm	15mm	18mm	11mm	9mm	5mm	2mm	442-60
441-65	12mm	18mm	22mm	11mm	10mm	6mm	2mm	442-65

BULLET NOSE LINERS AND DOWELS



LINERS FOR BULLET NOSE PINS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	G
442-00	.2501	.4078	9/16	7/16	1/16
442-05	.3126	.5017	5/8	7/16	1/16
442-10	.3751	.6267	3/4	7/16	1/16
442-15	.5001	.7518	7/8	1/2	1/16
442-20	.7502	1.0018	1-1/4	1/2	1/8
442-25	.7502	1.0018	1-1/8	1/2	1/8
442-30	1.0002	1.3771	1-1/2	11/16	1/8

BULLET NOSE DOWELS

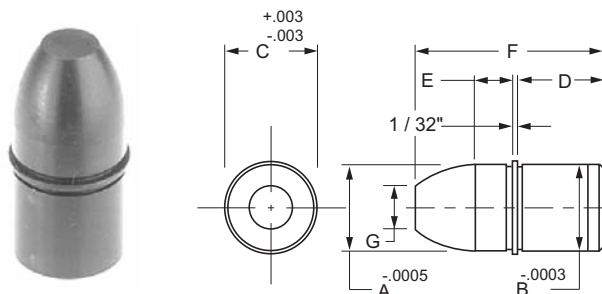
Case Hardened - Black Oxide Finish

P/N	DIMENSIONS							USE WITH LINER P/N
	A	B	C	D	E	F	G	
443-00	.2499	.2516	.280	1/2	.125	.907	1/8	444-00
443-05	.3124	.3141	.344	1/2	.157	.939	5/32	444-05
443-10	.3749	.3766	.407	1/2	.187	1.032	3/16	444-10
443-15	.4999	.5017	.532	1/2	.187	1.094	1/4	444-15

METRIC LINERS FOR BULLET NOSE PINS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	G
442-50	6mm .2363	10mm .3953	13mm .512	8mm .315	2mm .079
442-55	8mm .3151	12mm .4741	15mm .591	8mm .315	2mm .079
442-60	10mm .3938	15mm .5924	18mm .709	10mm .393	2mm .079
442-65	12mm .4725	18mm .7105	22mm .866	10mm .393	2mm .079

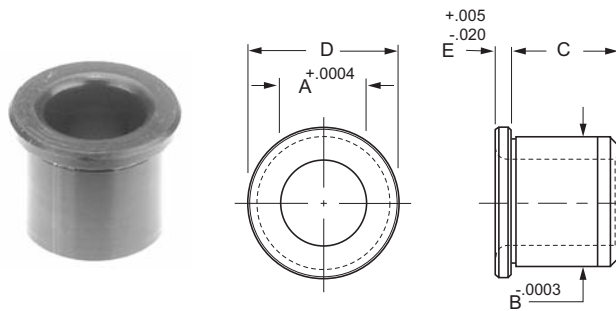


METRIC BULLET NOSE DOWELS

Case hardened - Black Oxide Finish

P/N	DIMENSIONS							Use with liner P/N
	A	B	C	D	E	F	G	
443-20	6mm .2361	6mm .2382	7mm .276	12mm .47	3mm .12	22mm .86	3mm .12	444-20
443-25	8mm .3149	8mm .3170	9mm .354	12mm .47	4mm .15	23mm .91	4mm .15	444-25
443-30	10mm .3936	10mm .3957	11mm .433	12mm .47	5mm .19	25mm .98	5mm .19	444-30
443-35	12mm .4723	12mm .4744	15mm .512	12mm .47	5mm .19	27mm 1.06	6mm .24	444-35

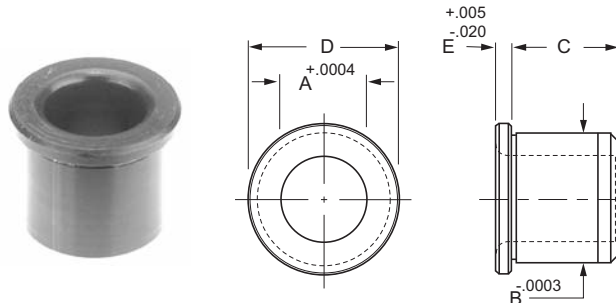
BULLET NOSE LINERS & LOCATING PINS



LINERS FOR BULLET NOSE DOWELS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	E
444-00	.2501	.5017	3/8	.625	.100
444-05	.3626	.5017	3/8	.625	.100
444-10	.3751	.6267	1/2	.750	.100
444-15	.5001	.7518	5/8	.875	.100



METRIC LINERS FOR BULLET NOSE DOWELS

Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	E
444-20	6mm	10mm	7mm	13mm	3mm
	.2363	.3939	.276	.512	.118
444-25	8mm	12mm	7mm	15mm	3mm
	.3151	.4726	.276	.591	.118
444-30	10mm	15mm	9mm	18mm	3mm
	.3938	.5909	.354	.709	.118
444-35	12mm	18mm	12mm	22mm	4mm
	.4725	.7091	.472	.866	.157

Floating Locator Pin Bushings use precise location on one axis while having a floating location on the opposite axis. These are usually used with a fixed locator pin to locate from two holes in a workpiece. Floating Locator Pin Bushings can replace relieved locator pin.

FEATURES & BENEFITS

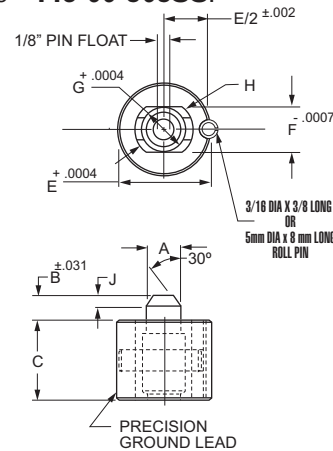
- Hold fixture location to within $\pm .050$.
- Ideal for mastertool coordination.
- Eliminate jig boring.
- Numerical control tooling.

INSTALLATION

- Drill and ream a 3/16 hole, 5mm for metric sizes, for the roll pin.
- Bore mounting hole to provide minimum diametral interference, 0.0003 to 0.0005 inch, .0076 to .0127 mm, is generally adequate.
- Press slotted locator bushing and roll pin together until flush with top of plate. The roll pin sets a precise alignment between slotted hole and layout axis.

MATERIAL

Floating Locator Pin Bushings are available in steel and stainless steel (303, 316, 420, 440, 17-4PH.) For ordering purposes add 303SS, 316SS, 420SS, 440SS or 17-4PH for stainless steel on the end of the part number. Example - **445-00-303SS**.

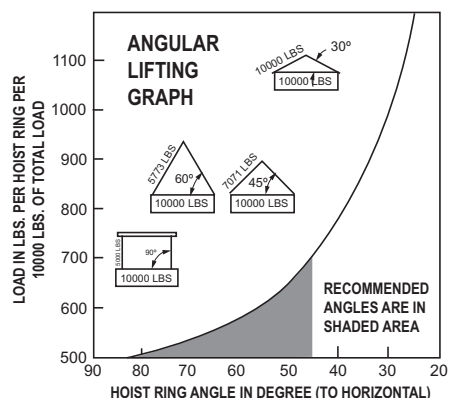
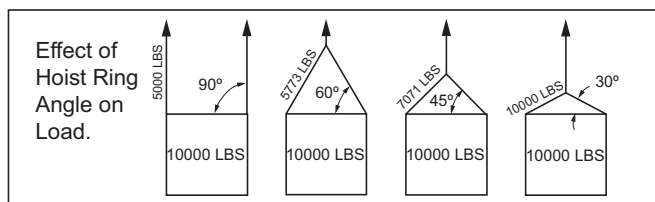
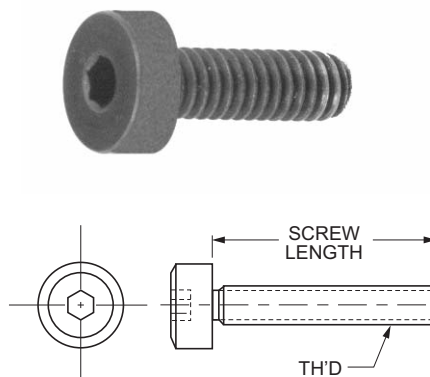
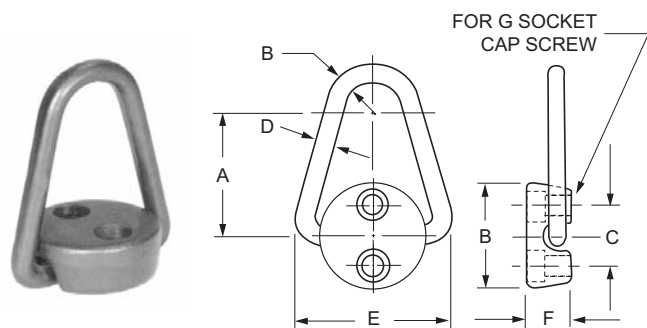


FLOATING LOCATOR PIN BUSHINGS

Case Hardened and Ground - Black Oxide Finish

P/N	DIMENSIONS							
	A	B	C	D	E	F	G	H
445-00	.2500/.2495	.300	.400	.500	1.00	.500	.500	.625
445-05	.3125/.3120	.300	.400	.500	1.00	.500	.500	.625
445-10	.3750/.3745	.300	.400	.500	1.00	.500	.500	.625
445-15	.5000/.4995	.300	.400	.500	1.00	.500	.500	.625
445-20	.6250/.6245	.310	.400	.500	1.00	.500	.500	.625
445-25	.2500/.2495	.300	.900	.500	1.00	.500	.500	.625
445-30	.3125/.3120	.300	.900	.500	1.00	.500	.500	.625
445-35	.3750/.3745	.300	.900	.500	1.00	.500	.500	.625
445-40	.5000/.4995	.300	.900	.500	1.00	.500	.500	.625
445-45	.6250/.6245	.310	.900	.500	1.00	.500	.500	.625

HOIST RINGS



HIGH STRENGTH SOCKET HEAD SCREWS

Forged Alloy Steel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS		
	USED PART NUMBER	SCREW THREAD	SCREW LENGTH
470-60	470-50	5/16-18	1-1/4
470-61	470-51	3/8-16	1-1/4
470-62	470-52	1/2-13	2

FLAT STORAGE HOIST RING

Forged Chrome Moly Steel - Pivots 180° - 6:1 Safety Factor
Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	RATED LOAD	A	B	C	D
470-50	2,000	2	1-3/4	1	5/16
470-51	2,500	2-1/2	2-1/4	1-1/8	3/8
470-52	5,000	3	2-5/8	1-1/2	1/2
P/N	E	F	G	R	
470-50	2-1/2	3/4	5/16	1/2	
470-51	3-3/16	7/8	3/8	5/8	
470-52	3-7/8	1-1/8	1/2	3/4	

Important Note: To achieve maximum load strength. High Strength Head Screws must be used.

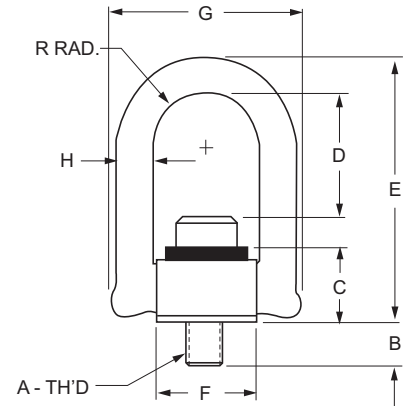
Note: Mounting screws not included.



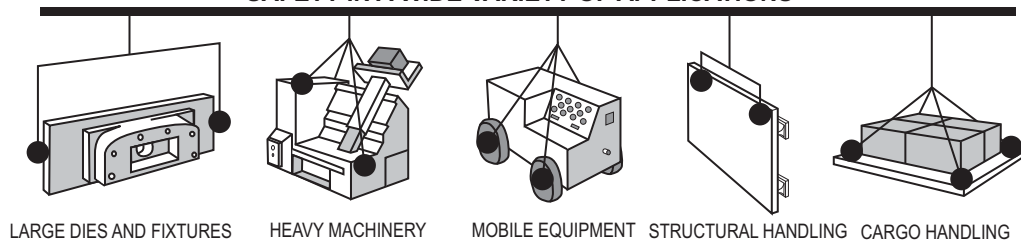
HOIST RINGS

This Hoist Ring is made out of 4140 Aircraft quality high strength alloy steel. It has a minimum tensile strength of 180,000 PSI and is Heat Treated with 100% magnaflux inspection. This Hoist Ring also has corrosion resistant plating and a maximum operating temperature of 400°.

- Heavy Duty
- Swivel 360°
- Pivots 180°
- 5:1 Safety Factor



REPLACES CONVENTIONAL EYEBOLTS FOR MAXIMUM SAFETY IN A WIDE VARIETY OF APPLICATIONS



LARGE DIES AND FIXTURES

HEAVY MACHINERY

MOBILE EQUIPMENT

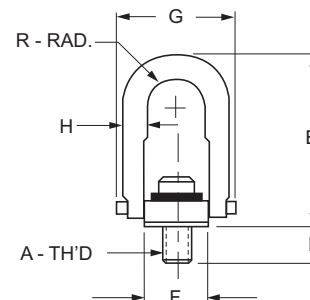
STRUCTURAL HANDLING

CARGO HANDLING

HOIST RINGS												
P/N	BLT REPLACEMENT KIT	DIMENSIONS										
		A - THREAD SIZE	B - THREAD LENGTH	CAPACITY (LBS)	C	D	E	F	G	H	R	TORQUE (FT. LBS)
471-00	471-01	5/16-18	.56	800	.96	1.51	3.23	1.25	2.29	.44	.65	7
471-05	471-06	5/16-18	1.06	800	.96	1.51	3.23	1.25	2.29	.44	.65	7
471-10	471-16	3/8-16	.56	1000	.96	1.45	3.23	1.25	2.29	.44	.65	12
471-15	471-21	3/8-16	1.06	1000	.96	1.45	3.23	1.25	2.29	.44	.65	12
471-20	471-26	1/2-13	1.00	2500	1.50	1.45	3.23	1.25	2.29	.75	1.00	25
471-25	471-28	1/2-13	1.25	2500	1.50	2.56	5.31	1.89	3.50	.75	1.00	28
471-30	471-31	5/8-11	1.00	4000	1.50	2.44	5.31	1.89	3.50	.75	1.00	60
471-35	471-36	5/8-11	1.25	4000	1.50	2.44	5.31	1.89	3.50	.75	1.00	60
471-40	471-41	3/4-10	1.00	5000	1.50	2.31	5.31	1.89	3.50	.75	1.00	100
471-45	471-46	3/4-10	1.50	5000	1.50	2.31	5.31	1.89	3.50	.75	1.00	100
471-50	471-51	3/4-10	1.20	7000	2.05	3.57	7.37	2.81	5.10	1.00	1.40	100
471-55	471-56	3/4-10	1.45	7000	2.05	3.57	7.37	2.81	5.10	1.00	1.40	100
471-60	471-61	7/8-9	1.20	8000	2.05	3.32	7.37	2.81	5.10	1.00	1.40	160
471-65	471-66	1-8	1.45	10000	2.05	3.20	7.37	2.81	5.10	1.00	1.40	230
471-70	471-71	1-8	1.20	10000	2.05	3.20	7.37	2.81	5.10	1.00	1.40	230
471-75	471-76	1-8	2.20	10000	2.05	3.20	7.37	2.81	5.10	1.00	1.40	230
471-80	471-81	1-1/4-7	2.63	15000	2.87	3.74	9.22	3.88	6.75	1.25	2.00	470
471-85	471-86	1-3/8-6	2.63	20000	2.87	3.62	9.22	3.88	6.75	1.25	2.00	670
471-90	471-91	1-1/2-6	2.63	24000	2.87	3.49	9.22	3.88	6.75	1.25	2.00	800

HOIST RINGS

This Hoist Ring is made out of 4140 high strength alloy steel and is safety engineered. The clevis can swivel 360° and can pivot 180°. This Hoist Ring, that replaces conventional eye bolts, has a safety factor of 5:1. The clevis, bolts, pins, bushings are magnetic inspection.



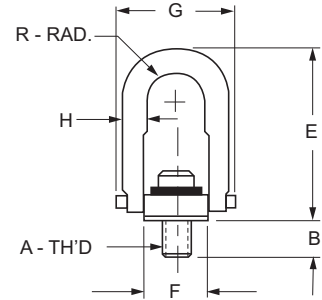
CENTER PULL HOIST RING

Standard Clevis - Black Oxide Finish

P/N	DIMENSIONS									
	A - THREAD SIZE	B - THREAD LENGTH	CAPACITY (LBS)	E	F	G	H	R	TORQUE (FT. LBS)	BOLT KIT P/N
472-00	5/16-18	.54	800	2.67	1.00	1.84	.38	.43	7	472-79
472-02	3/8-16	.54	1000	2.67	1.00	1.84	.38	.43	12	472-80
472-04	1/2-13	1.07	2500	3.75	1.49	2.56	.50	.70	28	472-81
472-06	1/2-13	.78	2500	4.78	1.99	3.52	.75	.88	28	472-82
472-08	1/2-13	1.03	2500	4.78	1.99	3.52	.75	.88	28	472-83
472-10	1/2-13	1.28	2500	4.78	1.99	3.52	.75	.88	28	472-84
472-12	5/8-11	1.03	4000	4.78	1.99	3.52	.75	.88	60	472-85
472-14	5/8-11	1.28	4000	4.78	1.99	3.52	.75	.88	0	472-86
472-16	3/4-10	1.03	5000	4.78	1.99	3.52	.75	.88	100	472-88
472-18	3/4-10	1.53	5000	4.78	1.99	3.52	.75	.88	100	472-89
472-20	3/4-10	1.04	7000	6.52	3.00	5.14	1.00	1.40	100	472-90
472-22	3/4-10	1.54	7000	6.52	3.00	5.14	1.00	1.40	100	472-91
472-24	7/8-9	1.04	8000	6.52	3.00	5.14	1.00	1.40	160	472-92
472-26	1-8	1.29	10000	6.52	3.00	5.14	1.00	1.40	230	472-93
472-28	1-8	1.54	10000	6.52	3.00	5.14	1.00	1.40	230	472-94
472-30	1-8	2.29	10000	6.52	3.00	5.14	1.00	1.40	230	472-95
472-32	1-1/4-7	1.89	15000	8.73	3.00	6.50	1.25	1.75	470	472-96
472-34	1-1/2-6	2.70	24000	12.47	4.87	8.55	1.75	2.25	800	472-97
472-36	2-4-1/2	2.96	30000	12.47	4.87	8.55	1.75	2.25	800	472-98
472-37	2-1/2-8	4.00	50000	16.80	5.75	11.67	2.25	3.00	2100	-
472-38	2-1/2-4	4.00	50000	16.80	5.75	11.67	2.25	3.00	2100	-
472-39	3-4	5.20	75000	19.50	7.25	14.15	2.75	3.75	4300	-

HOIST RINGS

This Hoist Ring is made out of 4140 high strength alloy steel and is safety engineered. The clevis can swivel 360° and can pivot 180°. This Hoist Ring, that replaces conventional eye bolts, has a safety factor of 5:1. The Clevis, bolts, pins, bushings are magnetic inspected.



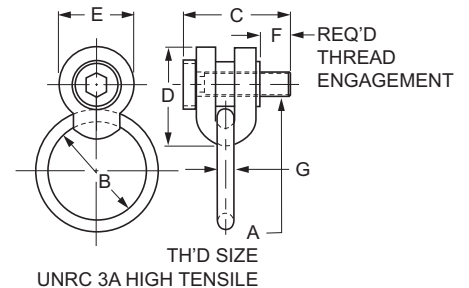
CENTER PULL HOIST RING

Long Clevis - Black Oxide Finish

P/N	DIMENSIONS									
	A - THREAD SIZE	B - THREAD LENGTH	CAPACITY (LBS)	E	F	G	H	R	TORQUE (FT. LBS)	BOLT KIT P/N
472-54	1/2-13	.78	2500	6.72	1.99	3.52	.75	.88	28	472-82
472-56	1/2-13	1.03	2500	6.72	1.99	3.52	.75	.88	28	472-83
472-58	1/2-13	1.28	2500	6.72	1.99	3.52	.75	.88	60	472-84
472-60	5/8-11	1.03	4000	6.72	1.99	3.52	.75	.88	60	472-85
472-62	5/8-11	1.28	4000	6.72	1.99	3.52	.75	.88	100	472-86
472-64	3/4-10	1.03	5000	6.72	1.99	3.52	.75	.88	100	472-88
472-66	3/4-10	1.53	5000	6.72	1.99	3.52	.75	.88	100	472-89
472-68	3/4-10	1.04	7000	8.11	3.00	3.52	1.00	1.40	100	472-90
472-70	3/4-10	1.54	7000	8.11	3.00	5.14	1.00	1.40	100	472-91
472-72	7/8-9	1.04	8000	8.11	3.00	5.14	1.00	1.40	100	472-92
472-74	1-8	1.29	10000	8.11	3.00	5.14	1.00	1.40	160	472-93
472-76	1-8	1.54	10000	8.11	3.00	5.14	1.00	1.40	230	472-94
472-78	1-8	2.29	10000	8.11	3.00	5.14	1.00	1.40	230	472-95

TOOLING

This Hoist Ring is made out of high strength alloy steel and has a 5:1 strength factor. The clevis, ring, bushing and cap screw are magnetic particle inspected. The Clevis is also x-rayed. The swivel and pivot action of the Side Pull Hoist Ring allows you to flip and turn parts without unhooking. You are also able to use almost any hook because of the extra large diameter rings.



SIDE PULL HOIST RING

Zinc Plated Bushing - Black Oxide Finish

REPLACEMENT BOLTS

P/N	DIMENSIONS										
	*CAPACITY (lbs)	A	B	C	D	E	F	G	**THREAD TORQUE (FT. LBS)	P/N	THREAD SIZE
473-11	650	5/16-18	2	2-5/16	2	1-1/2	5/8	3/8	3.5	473-41	5/16-18
473-12	800	3/8-16	2	2-5/8	2	1-1/2	3/4	3/8	4.5	473-42	3/8-16
473-13	1800	1/2-13	3	3-1/2	3-3/16	2-3/8	1	5/8	15.0	473-43	1/2-13
473-14	2500	5/8-11	3	3-7/8	3-3/16	2-3/8	1-1/4	5/8	25.0	473-44	5/8-11
473-15	4100	3/4-10	4	5-3/4	5	3-3/4	1-1/2	1	50.0	473-45	3/4-10
473-16	7100	1-8	4	6	5	3-3/4	1-3/4	1	90.0	473-46	1-8
473-17	14000	1-1/4-7	6	6-7/8	6-13/16	4-5/8	2	1-3/8	150.0	473-47	1-1/4-7
473-18	17200	1-1/2-6	6	7-7/8	6-13/16	4-5/8	2-1/2	1-3/8	250.0	473-48	1-1/2-6
473-19	29000	2-4-1/2	5-1/4 x 10-1/2	8-9/16	6-13/16	4-5/8	3-1/8	1-1/2	300.0	473-49	2-4-1/2

* - Stated load capacity based on specific thread torques are as shown in the chart.

** - It is recommended that these torques be used when installing hoist rings

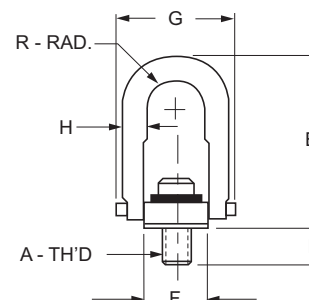
HOIST RINGS

METRIC SIDE PULL HOIST RING Zinc Plated Bushing - Black Oxide Finish										REPLACEMENT BOLTS	
P/N	DIMENSIONS									P/N	THREAD SIZE
	*CAPACITY (kgs)	A	B	C	D	E	F	G	**THREAD TORQUE (kg-m)		
473-51	325	M8 x 1.25	50.8	61.0	50.8	38.1	16.0	9.5	.43	473-91	M8
473-52	500	M10 x 1.50	50.8	63.0	50.8	38.1	20.0	9.5	.60	473-92	M10
473-53	725	M12 x 1.75	76.2	85.0	81.0	60.3	24.0	15.9	2.00	473-93	M12
473-54	1400	M16 x 2.00	76.2	94.0	81.0	60.3	31.0	15.9	3.50	473-94	M16
473-55	2290	M20 x 2.50	101.6	133.0	125.4	95.3	40.0	25.4	7.00	473-95	M20
473-56	3050	M24 x 3.00	101.6	147.0	125.4	95.3	47.0	25.4	12.50	473-96	M24
473-57	4850	M30 x 3.50	127.0	173.8	173.0	117.5	43.6	31.7	34.60	473-97	M30

* - Stated load capacity based on specific thread torques are as shown in the chart.

** - It is recommended that these torques be used when installing hoist rings

This Hoist Ring is made out of 4140 high strength alloy steel and is safety engineered. The clevis can swivel 300° and can pivot 180°. This Hoist Ring, that replaces conventional eye bolts, has a safety factor of 5:1. The clevis, bolts, pins, bushings are magnetic inspection.



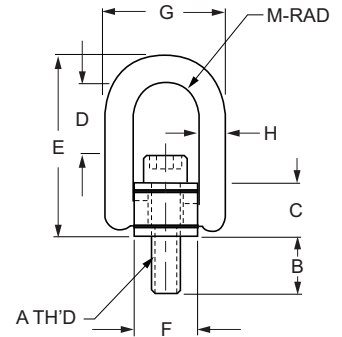
METRIC CENTER PULL HOIST RING Zinc Plated Bushing - Black Oxide Finish										REPLACEMENT BOLTS	
P/N	DIMENSIONS									P/N	THREAD SIZE
	*CAPACITY (kgs)	A	B	E	F	G	H	R	**THREAD LOAD (Nm)		
474-00	400	M8 x 1.25	17.0	67.8	25.4	46.7	9.7	10.9	9.5	474-50	M8
474-01	450	M10 x 1.50	17.0	67.8	25.4	46.7	9.7	10.9	16.0	474-51	M10
474-02	1050	M12 x 1.75	19.0	121.4	50.5	89.4	19.0	22.4	37.0	474-52	M12
474-03	1900	M16 x 2.00	24.0	121.4	50.5	89.4	19.0	22.4	80.0	474-53	M16
474-04	2200	M20 x 2.50	30.0	121.4	50.5	89.4	19.0	22.4	135.0	474-54	M20
474-05	3000	M20 x 2.50	29.0	165.6	76.2	130.6	25.4	35.6	135.0	474-55	M20
474-06	4200	M24 x 3.00	34.0	165.6	76.2	130.6	25.4	35.6	311.0	474-56	M24
474-07	7000	M30 x 3.50	46.0	221.7	81.3	165.1	31.7	44.5	637.2	474-57	M30
474-08	7000	M30 x 3.50	66.0	221.7	81.3	165.1	31.7	44.5	637.2	474-58	M30
474-09	11000	M36 x 4.00	69.0	316.7	106.7	217.2	44.4	57.2	1085.5	474-59	M36
474-10	12500	M42 x 4.50	79.0	316.7	106.7	217.2	44.4	57.2	1085.5	474-60	M42
474-11	13500	M48 x 5.00	79.0	316.7	106.7	217.2	44.4	57.2	1085.5	474-61	M48

* - Stated load capacity based on specific thread torques are as shown in the chart.

** - It is recommended that these torques be used when installing hoist rings

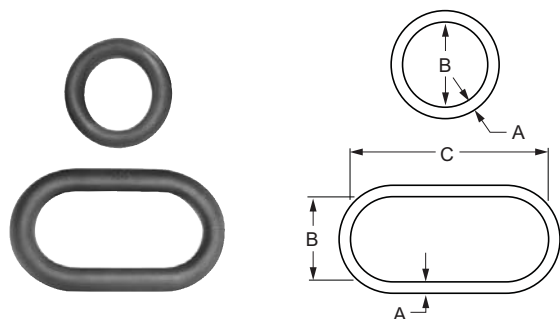
HOIST RINGS

- Material: 4140 Aircraft quality high strength alloy steel with minimum tensile strength of 180,000 psi
- Certified heat treatment with 100% Magnetic Particle Inspection
- Safety Factor: 5:1
- Range Of Movement: 360° Swivel, 180° Pivot



METRIC HEAVY DUTY SAFETY HOIST RING												REPLACEMENT BOLTS
Black Oxide Finish												
P/N	RATED LOAD (kgs)	A	B	C	D	E	F	G	H	M	TORQUE LOAD (Nm)	P/N
474-65	400	M8 x 1.25	16	24.4	38.5	82.0	31.8	58.2	11.1	16.5	9.5	474-64
474-67	400	M8 x 1.25	21	24.4	38.5	82.0	31.8	58.2	11.1	16.5	9.5	474-66
474-69	450	M10 x 1.50	16	24.4	36.5	82.0	31.8	58.2	11.1	16.5	16.0	474-68
474-71	450	M10 x 1.50	26	24.4	36.5	82.0	31.8	58.2	11.1	16.5	16.0	474-70
474-73	1050	M12 x 1.75	25	38.1	65.0	134.9	48.0	88.9	19.1	25.4	37.0	474-72
474-75	1050	M12 x 1.75	32	38.1	65.0	134.9	48.0	88.9	19.1	25.4	37.0	474-74
474-77	1900	M16 x 2.00	25	38.1	62.0	134.9	48.0	88.9	19.1	25.4	80.0	474-76
474-79	1900	M16 x 2.00	32	38.1	62.0	134.9	48.0	88.9	19.1	25.4	80.0	474-78
474-81	2200	M20 x 2.50	25	38.1	58.7	134.9	48.0	88.9	19.1	25.4	135.0	474-80
474-83	2200	M20 x 2.50	38	38.1	58.7	134.9	48.0	88.9	19.1	25.4	135.0	474-82
474-85	4200	M24 x 3.00	28	52.1	85.7	187.2	71.4	129.5	25.4	35.6	311.0	474-84
474-87	4200	M24 x 3.00	38	52.1	85.7	187.2	71.4	129.5	25.4	35.6	311.0	474-86
474-89	4500	M30 x 3.50	38	52.1	79.7	187.2	71.4	129.5	25.4	35.6	311.0	474-88
474-91	4500	M30 x 3.50	48	52.1	79.7	187.2	71.4	129.5	25.4	35.6	311.0	474-90
474-93	7000	M30 x 3.50	67	72.9	95.0	234.2	73.2	171.5	31.8	50.8	637.2	474-92
474-95	11000	M36 x 4.00	67	72.9	88.6	234.2	73.2	171.5	31.8	50.8	1085.5	474-94
474-97	12500	M42 x 4.50	80	72.9	88.6	234.2	73.2	171.5	31.8	50.8	1085.5	
474-99	13500	M48 x 5.00	80	72.9	88.6	234.2	73.2	171.5	31.8	50.8	1085.5	

Standard Tolerances are = $\pm 0.8\text{mm}$

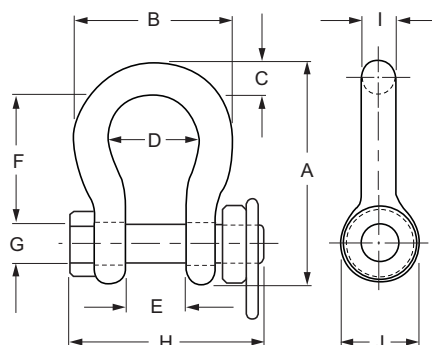
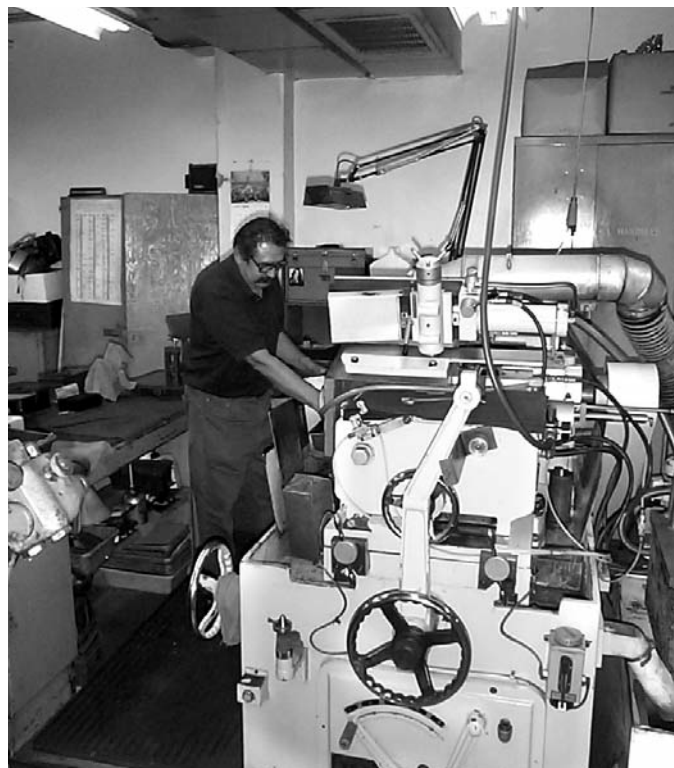


WELDLESS ALLOY RINGS

Black Oxide Finish

P/N	DIMENSIONS				
	WORKING LOAD LIMIT (LBS)	A	B	C	WEIGHT (LBS)
475-00	3,800	3/8	2.00	-	.23
475-01	6,100	5/8	3.00	-	1.00
475-02	18,400	1	4.00	-	3.10
475-03	30,000	1-3/8	6.00	-	10.38
475-04	49,000	1-1/2	5.25	10.5	15.70

Note: Minimum ultimate load is 6 times the working load limit. Rings meet Federal Specification RR-C-271D, Type VI.



BOLT TYPE ANCHOR SHACKLE

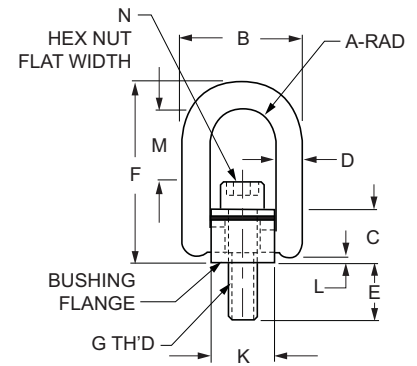
Black Oxide Finish

P/N	DIMENSIONS										
	C - NOMINAL SHACKLE SIZE	WORKING LOAD LIMITS (lbs.)	A	B	D	E	F	G	H	I	J
475-11	3/8	2,000	2.49	1.78	1.03	.66	1.44	.44	2.17	.38	.91
475-12	7/16	3,000	2.91	2.03	1.16	.75	1.69	.50	2.51	.44	1.06
475-13	1/2	4,000	3.28	2.31	1.31	.81	1.88	.63	2.80	.50	1.19
475-14	5/8	6,500	4.19	2.94	1.69	1.06	2.38	.75	3.53	.63	1.50
475-15	7/8	13,000	5.83	4.03	2.28	1.44	3.31	1.00	4.71	.88	2.09
475-16	1-1/8	19,000	7.47	5.16	2.91	1.81	4.25	1.25	5.09	1.13	2.69
475-17	1-1/4	24,000	8.25	5.75	3.25	2.03	4.69	1.38	6.51	1.25	3.00

Note: Minimum ultimate load is 6 times the working load limit. Bolt type anchor shackles supplied with thin bolt & cotter pin. Meet Federal Specification RR-C-271D, Type IVA, grade 3.

HOIST RINGS

- Standard coil thread sizes from 3/4" to 1-1/2"
- Excellent for temporary attachment to steel & construction material
- Range of movement: pivot 180° & swivel 360° to compensate for pitch, pull and sway when lifting unbalanced loads. Load ratings are for lifts in any direction.
- Minimum Safety Factor = 5:1
- Meets OSHA standards
- 100% Magnetic Particle Inspected
- Destructive testing by outside independent laboratories.
- ADB Coil Bolts are included to ensure the integrity of the product.



SUPER-COIL™ HOIST RINGS

Alloy Steel - Black Oxide Finish

P/N	DIMENSIONS												
	RATE LOAD	A	B	C	D	*E	F	**G	K	L	M	N	THREAD LOAD (ft-lbs)
475-20	5,000	1.00	3.50	1.50	.75	4.00	5.31	3/4	1.89	.17	2.31	1-1/8	100
475-21	10,000	1.40	5.10	2.05	1.00	5.00	7.00	1	2.81	.18	2.95	1-1/2	230
475-22	15,000	2.00	6.75	2.87	1.25	6.00	9.22	1-1/4	3.88	.32	3.74	1-7/8	470
475-23	24,000	2.00	6.75	2.87	1.25	7.00	9.22	1-1/2	3.88	.32	3.49	2-1/4	800

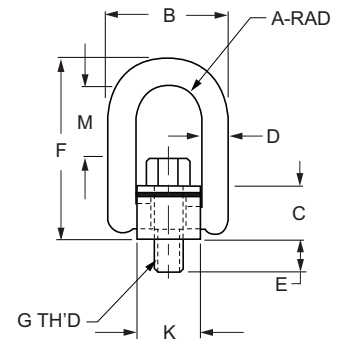
* - Longer projections are available, call for quotations.

** - Standard coil insert or coil nut must be used in conjunction with ADB Super Coil™ Hoist Rings.

Patent No. 4,570,987*** No. 4,641,986*** No. 5,405,210 No. 5,732,991 Other Patents Pending

***Patent Expired

- Pivots 180°/Swivels 360°
- Safety Factor: 5:1
- Minimum tensile strength of 180,000 psi
- 100% Magnetic Particle Inspected



HEAVY DUTY STEEL PLATE HOIST RINGS

Forged Alloy Steel - Black Oxide Finish

P/N	DIMENSIONS										
	*RATE LOAD	A	B	C	D	E	F	G	K	M	THREAD LOAD (ft-lbs)
475-30	10,000	1.40	5.10	2.05	1.00	1	7.00	1-1/4-7	2.81	2.95	230
475-31	10,000	1.40	5.10	2.05	1.00	1-1/2	7.00	1-1/2-6	2.81	2.95	230
475-32	15,000	2.00	6.75	2.87	1.25	1	9.22	1-1/4-7	3.88	3.74	470
475-33	15,000	2.00	6.75	2.87	1.25	1-1/2	9.22	1-1/2-6	3.88	3.74	470

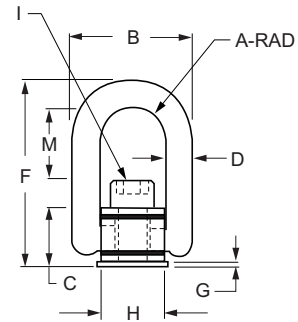
* - Rated load is based on 180,000 psi ultimate tensile strength of bolt or stud. If a bolt with lower strength is used, the applied load must be reduced accordingly.

Patent No. 4,570,987***; 4,641,986***; 5,405,210

***Patent Expired

HOIST RINGS

- Pivots 180°/Swivels 360°
- Safety Factor: 5:1
- Minimum tensile strength of 180,000 psi
- 100% Magnetic Particle Inspected



HEAVY DUTY WELD-MOUNT HOIST RINGS

Forged Alloy Steel - Black Oxide Finish

P/N	DIMENSIONS									
	*RATE LOAD	A	B	C	D	F	G	H	I - SHCS	M
475-35	5,000	1.00	3.50	1.63	.75	5.47	1/4	2.45	5/8-11	2.46
475-36	10,000	1.50	5.10	2.30	1.00	7.64	3/8	3.51	1-8	3.22
475-37	24,000	2.00	6.75	3.12	1.25	9.50	1/2	4.70	1-1/2-6	3.63

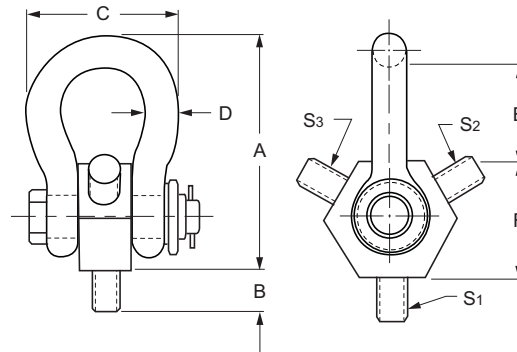
* - Rated Load applies to hoist ring assembly only. Workpiece material must be capable of supporting this weight. Welding should be done by certified welder for maximum safety.

• Patent Numbers: 4,570,987***; 4,641,986***; 5,405,210, 6,953,212

***Patent Expired

Some typical applications for
Universal Lift Rings are:

- Large chucks
- Milling cutters
- Dies
- Broaches
- Motors
- Fixtures
- Small machines
- Machined parts



UNIVERSAL LIFTING RINGS

Forged Alloy Steel - Black Oxide Finish

P/N	DIMENSIONS								
		SCREW SIZE	* CAPACITY (LBS)	A	B	C	D	E	F
475-40	S1	1/4-20	400	3-1/16	1/2	2-1/8	7/16	1-1/4	1-3/8
475-40	S2	5/16-18	800	3-1/16	1/2	2-1/8	7/16	1-1/4	1-3/8
475-40	S3	3/8-16	1,400	3-1/16	1/2	2-1/8	7/16	1-1/4	1-3/8
475-45	S1	1/2-13	2,600	4-1/2	3/4	3	5/8	1-3/4	2
475-45	S2	5/8-11	4,000	4-1/2	3/4	3	5/8	1-3/4	2
475-45	S3	3/4-10	6,000	4-1/2	3/4	3	5/8	1-3/4	2

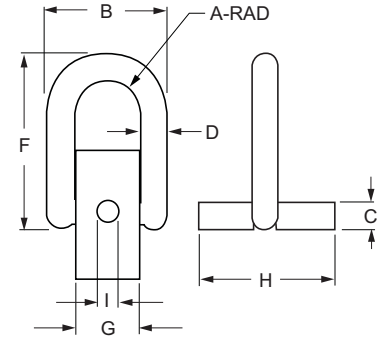
* - CAUTION - Do not apply side load. For straight lift only. Listed capacities are maximum safe working load

Patent No. 4,557,513**

***Patent Expired

HOIST RINGS

- Pivots 180°
- Safety Factor: 5:1
- Minimum tensile strength of 180,000 psi
- 100% Magnetic Particle Inspected



HEAVY DUTY PIVOT LIFT PLATE

Forged Alloy Steel - Black Oxide Finish

P/N	DIMENSIONS								
	*RATE LOAD	A	B	C	D	F	G	H	I
475-50	7,000	1.40	5.10	1.70	1.00	7.33	3.00	5	3/4
475-51	10,000	1.40	5.10	1.70	1.00	7.33	3.00	5	1
475-52	15,000	2.00	6.75	2.50	1.25	8.28	4.00	6-5/8	1-1/4
475-53	24,000	2.00	6.75	2.50	1.25	8.28	4.00	6-5/8	1-1/2

Bolt/Coil insert not included

* - Rated load is based on 180,000 psi ultimate tensile strength of bolt or stud. If a bolt with lower strength is used or workpiece anchor material is incapable of supporting this weight, the applied load must be reduced accordingly.
Patent Numbers - 4,570,987***; 4,641,986***; 5,405,210

***Patent Expired



NOW IN STOCK

UP TO 40% STRONGER

The **Best Value** and **Strongest** side-pull hoist ring available.

AA's **Unique** new hoist ring is **fully rated** at 5:1 in **vertical** as well as conventional **side-pull** and has the highest load rating for a given mounting screw size of any other side-pull ring available

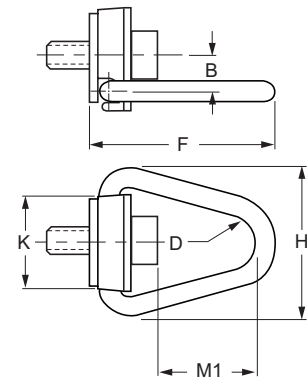
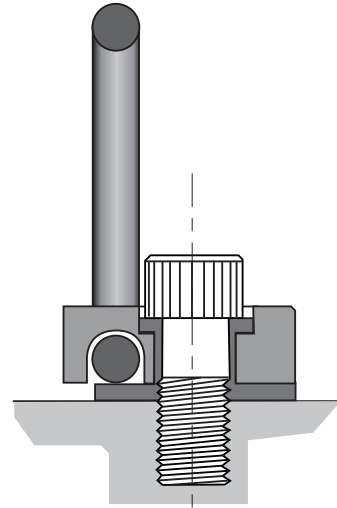
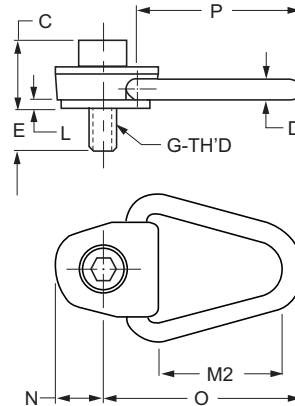
This new patented design stays in one piece even when not threaded into the workpiece

No loose parts that can be lost!!!

Please See Below.

- Self-aligning in the direction of the load
- Rotates 360°
- Minimum of 5:1 safety factor in any direction
- Unit is supplied in one (1) piece so that parts cannot get lost.
- 100% magnetic particle inspected

Patent No. 6,267,422



HEAVY DUTY SIDE PULL HOIST RINGS

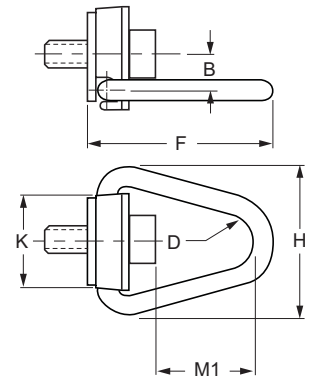
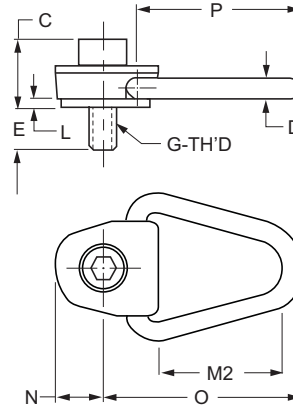
Forged Alloy Steel - Black Oxide Finish

P/N	DIMENSIONS								
	RATED LOAD (LBS)	G	A	B	C	D	E	F	H
475-60	800	5/16-18	3/4	7/8	1-21/64	1/2	.479	4-23/32	3-7/8
475-61	1,000	3/8-16	3/4	7/8	1-25/64	1/2	.479	4-23/32	3-7/8
475-62	2,500	1/2-13	3/4	7/8	1-17/32	1/2	.979	4-23/32	3-7/8
475-63	4,000	5/8-11	3/4	7/8	1-41/64	1/2	.979	4-23/32	3-7/8
475-64	5,000	3/4-10	3/4	7/8	1-25/32	1/2	1.229	4-23/32	3-7/8
475-66	7,000	3/4-10	7/8	1-1/4	2-1/4	3/4	1.250	6-1/4	5-1/4
475-67	8,000	7/8-9	7/8	1-1/4	2-3/8	3/4	1.250	6-1/4	5-1/4
475-68	10,000	1-8	7/8	1-1/4	2-1/2	3/4	1.500	6-1/4	5-1/4
P/N	K	L	M1	M2	N	O	P	THREAD LOAD (FT / LBS)	
475-60	2-3/16	7/32	2-57/64	3-3/16	1-1/4	5-1/8	4-1/4	7	
475-61	2-3/16	7/32	2-27/32	3-3/16	1-1/4	5-1/8	4-1/4	12	
475-62	2-3/16	7/32	2-45/64	3-3/16	1-1/4	5-1/8	4-1/4	28	
475-63	2-3/16	7/32	2-59/64	3-3/16	1-1/4	5-1/8	4-1/4	60	
475-64	2-3/16	7/32	2-15/16	3-3/16	1-1/4	5-1/8	4-1/4	100	
475-66	3-1/8	5/16	4	4-3/16	1-5/8	6-3/4	5-5/8	100	
475-67	3-1/8	5/16	3-7/8	4-3/16	1-5/8	6-3/4	5-5/8	160	
475-68	3-1/8	5/16	3-3/4	4-3/16	1-5/8	6-3/4	5-5/8	230	

HOIST RINGS

- Self-aligning in the direction of the load
- Rotates 360°
- Minimum of 5:1 safety factor in any direction
- Unit is supplied in one (1) piece so that parts cannot get lost.
- 100% magnetic particle inspected

Patent No. 6,267,422



METRIC HEAVY DUTY SIDE PULL HOIST RINGS

Forged Alloy Steel - Black Oxide Finish

P/N	DIMENSIONS								
	RATED LOAD (kg)	G	A	B	C	D	E	F	H
475-75	400	M8 x 1.25	19	22	34	13	14	120	99
475-76	450	M10 x 1.50	19	22	36	13	24	120	99
475-77	1,050	M12 x 1.75	19	22	38	13	37	120	99
475-78	1,900	M16 x 2.00	19	22	42	13	37	120	99
475-79	2,200	M20 x 2.50	19	22	46	13	37	120	99
475-80	3,000	M20 x 2.50	22	32	57	19	39	159	133
475-81	4,200	M24 x 3.00	22	32	61	19	43	159	133
P/N	K	L	M1	M2	N	O	P	THREAD LOAD (Nm)	
475-75	56	5	73	81	32	130	108	9.5	
475-76	56	5	71	81	32	130	108	16.0	
475-77	56	5	69	81	32	130	108	37.0	
475-78	56	5	65	81	32	130	108	80.0	
475-79	56	5	61	81	32	130	108	135.0	
475-80	79	8	83	106	41	171	143	135.0	
475-81	79	8	79	106	41	171	143	311.0	

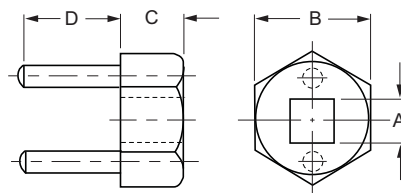
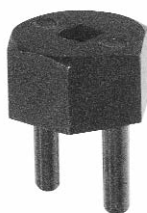
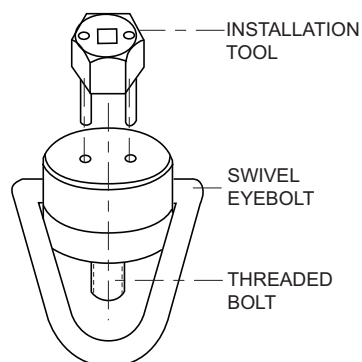
The Swivel Eyebolt™ lifting product has a full swivel and pivoting action which allows for the flipping and turning of the part without unhooking. The patented tamper resistant design is ideal for permanent mounting on OEM applications or on molds, dies and fixtures.

- Tamper Resistant Design
- Swivels 360°, Pivots 180°
- Eliminates Bending (of Eyebolt) Problem
- Forged, Oversized, One-Piece Lift Ring
- Rated at 5:1 Strength Factor
- Load Capacities to 4000 Lbs / 2000 Kg
- Economically Priced



U.S. Patent #5634734

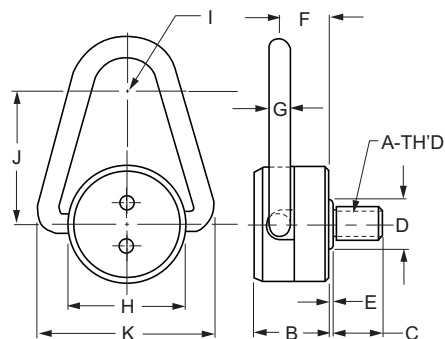
SWIVEL EYEBOLT™ Alloy Steel - Black Oxide Finish			
P/N	DIMENSIONS		
	INSTALLATION TOOL P/N	RECOMMENDED TORQUE	MAXIMUM COUNTERSINK DIAMETER N
476-21	476-41	7 ft. lbs.	1/2
476-22	476-41	20 ft. lbs.	5/8
476-71	476-41	10 Nm	13 mm
476-72	476-41	25 Nm	16 mm
476-25	476-43	35 ft. lbs.	3/4
476-26	476-43	55 ft. lbs.	7/8
476-75	476-43	50 Nm	19 mm
476-76	476-43	80 Nm	22 mm



STAINLESS STEEL SWIVEL EYEBOLT™ 316 Stainless Steel - Passivated			
P/N	DIMENSIONS		
	INSTALLATION TOOL P/N	RECOMMENDED TORQUE	MAXIMUM COUNTERSINK DIAMETER N
476-31	476-41	7 ft. lbs.	1/2
476-32	476-41	20 ft. lbs.	5/8
476-81	476-41	10 Nm	13 mm
476-82	476-41	25 Nm	16 mm
476-33	476-43	35 ft. lbs.	3/4
476-34	476-43	55 ft. lbs.	7/8
476-83	476-43	50 Nm	19 mm
476-84	476-43	80 Nm	22 mm

SWIVEL EYEBOLTS™ INSTALLATION TOOL Black Oxide Finished				
P/N	DIMENSIONS			
	A	B	C	D
476-41	1/4	15/16	.55	11/16
476-43	3/8	1-1/4	.65	1-1/8

SWIVEL EYEBOLTS™



METRIC STAINLESS STEEL SWIVEL EYEBOLTS™

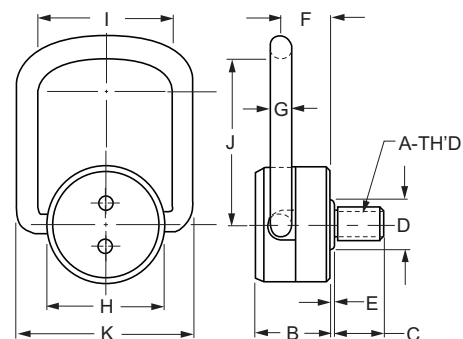
316 Stainless Steel - Passivated

P/N	LOAD CAPACITY(kgs.)	DIMENSIONS				
		A	B	C	D	E
476-81	250	M10 x 1.50	27.8	14.9	19.1	1.2
476-82	350	M12 x 1.75	27.8	19.1	19.1	1.2
P/N	F	G	H	I	J	K
476-81	17.9	7.9	44.5	12.7	50.8	66.7
476-82	17.9	7.9	44.5	12.7	50.8	66.7

SWIVEL EYEBOLTS™

Alloy Steel - Black Oxide Finished

P/N	LOAD CAPACITY(lbs.)	DIMENSIONS				
		A	B	C	D	E
476-21	1000	3/8-16	1-3/32	9/16	3/4	3/64
476-22	2000	1/2-13	1-3/32	3/4	3/4	3/64
P/N	F	G	H	I	J	K
476-21	45/64	5/16	1-3/4	1/2	2	2-5/8
476-22	45/64	5/16	1-3/4	1/2	2	2-5/8



STAINLESS STEEL SWIVEL EYEBOLTS™

316 Stainless Steel - Passivated

P/N	LOAD CAPACITY(lbs.)	DIMENSIONS				
		A	B	C	D	E
476-31	500	3/8-16	1-3/32	9/16	3/4	3/64
476-32	1000	1/2-13	1-3/32	3/4	3/4	3/64
P/N	F	G	H	I	J	K
476-31	45/64	5/16	1-3/4	1/2	2	2-5/8
476-32	45/64	5/16	1-3/4	1/2	2	2-5/8

SWIVEL EYEBOLTS™

Alloy Steel - Black Oxide Finished

P/N	LOAD CAPACITY(lbs.)	DIMENSIONS				
		A	B	C	D	E
476-25	3000	5/8-11	1-33/64	15/16	7/8	1/32
476-26	4000	3/4-10	1-33/64	1-1/8	1	1/32
P/N	F	G	H	I	J	K
476-25	57/64	1/2	2-1/2	2-3/4	3-1/2	3-1/16
476-26	57/64	1/2	2-1/2	2-3/4	3-1/2	3-1/16

METRIC SWIVEL EYEBOLTS™

Alloy Steel - Black Oxide Finished

P/N	LOAD CAPACITY(kgs.)	DIMENSIONS				
		A	B	C	D	E
476-71	500	M10 x 1.50	27.8	14.9	19.1	1.2
476-72	700	M12 x 1.75	27.8	19.1	19.1	1.2
P/N	F	G	H	I	J	K
476-71	17.9	7.9	44.5	12.7	50.8	66.7
476-72	17.9	7.9	44.5	12.7	50.8	66.7

STAINLESS STEEL SWIVEL EYEBOLTS™

316 Stainless Steel

P/N	LOAD CAPACITY(lbs.)	DIMENSIONS				
		A	B	C	D	E
476-33	1500	5/8-11	1-33/64	15/16	7/8	1/32
476-34	2000	3/4-10	1-33/64	1-1/8	1	1/32
P/N	F	G	H	I	J	K
476-33	57/64	1/2	2-1/2	2-3/4	3-1/2	3-1/16
476-34	57/64	1/2	2-1/2	2-3/4	3-1/2	3-1/16

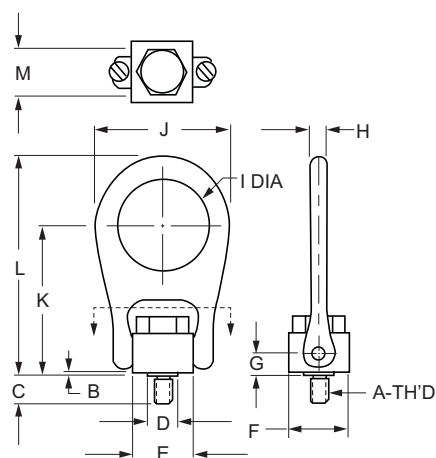
SWIVEL EYEBOLTS™ & HOIST RINGS

METRIC SWIVEL EYEBOLTS™						
Alloy Steel - Black Oxide Finished						
P/N	DIMENSIONS					
	LOAD CAPACITY(kgs.)	A	B	C	D	E
476-75	1500	M16 x 2.00	38.5	23.8	22.2	.8
476-76	2000	M20 x 2.50	38.5	30.2	25.4	.8
P/N	F	G	H	I	J	K
476-75	22.6	12.7	63.5	70.0	88.9	96.8
476-76	22.6	12.7	63.5	70.0	88.9	96.8

METRIC STAINLESS STEEL SWIVEL EYEBOLTS™						
316 Stainless Steel - Passivated						
P/N	DIMENSIONS					
	LOAD CAPACITY(kgs.)	A	B	C	D	E
476-83	750	M16 x 2.00	38.5	23.8	22.2	.8
476-84	1000	M20 x 2.50	38.5	30.2	25.4	.8
P/N	F	G	H	I	J	K
476-83	22.6	12.7	63.5	70.0	88.9	96.8
476-84	22.6	12.7	63.5	70.0	88.9	96.8

Our Forged Center Pull Hoist Ring integrates a solid center brace lift bail into our most popular style product. This design eliminates the possibility of spreading the lift ring in misapplications. Forged hoist rings are ideal for OEM and industrial use.

- Full (over center) swivel and pivot action
- Capacities up to 30,000 lbs.
- 5:1 strength factor-alloy steel
- Made in U.S.A.



FORGED CENTER PULL HOIST RINGS

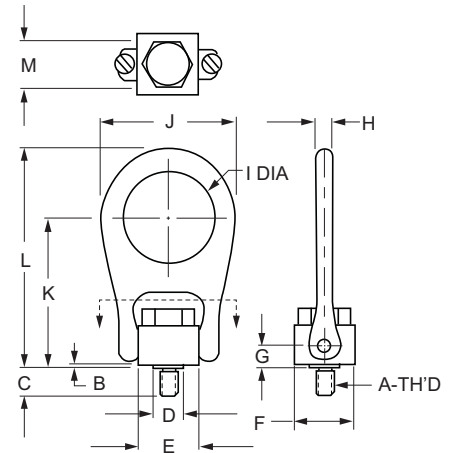
Black Oxide Finish

P/N	DIMENSIONS													HEX SIZE M	TORQUE (ft. lbs)
	LOAD CAPACITY (lbs)	A	B	C	D	E	F	G	H	I	J	K	L		
477-00	800	5/16-18	3/64	15/32	1/2	1	1	11/32	1/4	1-1/2	2-1/4	2-15/32	3-19/32	3/4	7
477-02	800	5/16-18	3/64	5/8	1/2	1	1	11/32	1/4	1-1/2	2-1/4	2-15/32	3-19/32	3/4	7
477-04	1000	3/8-16	3/64	9/16	1/2	1	1	11/32	1/4	1-1/2	2-1/4	2-15/32	3-19/32	3/4	12
477-06	1000	3/8-16	3/64	3/4	1/2	1	1	11/32	1/4	1-1/2	2-1/4	2-15/32	3-19/32	3/4	12
477-08	2500	1/2-13	1/16	11/16	1	2	1-1/2	9/16	3/4	3	4-7/16	4	6-3/8	1-1/4	28
477-10	2500	1/2-13	1/16	1	1	2	1-1/2	9/16	3/4	3	4-7/16	4	6-3/8	1-1/4	28
477-12	4000	5/8-11	1/16	15/16	1	2	1-1/2	9/16	3/4	3	4-7/16	4	6-3/8	1-1/4	60
477-14	4000	5/8-11	1/16	1-1/4	1	2	1-1/2	9/16	3/4	3	4-7/16	4	6-3/8	1-1/4	60
477-16	5000	3/4-10	1/16	1-1/8	1	2	1-1/2	9/16	3/4	3	4-7/16	4	6-3/8	1-1/4	100
477-18	5000	3/4-10	1/16	1-1/2	1	2	1-1/2	9/16	3/4	3	4-7/16	4	6-3/8	1-1/4	100

HOIST RINGS

Our Forged Center Pull Hoist Ring integrates a solid center brace lift bail into our most popular style product. This design eliminates the possibility of spreading the lift ring in misapplications. Forged hoist rings are ideal for OEM and industrial use.

- Full (over center) swivel and pivot action
- Capacities up to 30,000 lbs.
- 5:1 strength factor-alloy steel
- Made in U.S.A.



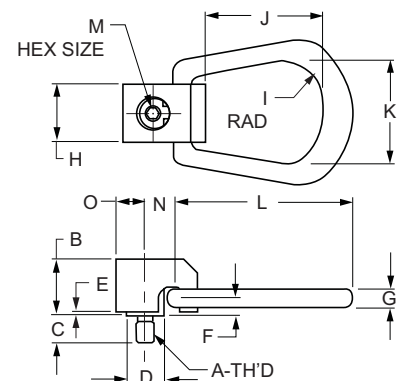
METRIC FORGED CENTER PULL HOIST RINGS

Black Oxide Finish

P/N	LOAD CAPACITY (kgs)	DIMENSIONS												HEX SIZE M	TORQUE (Nm)
		A	B	C	D	E	F	G	H	I	J	K	L		
477-25	400	M8 x 1.25	1.2	12	12.7	25.4	25.4	8.7	6.3	38.1	57.2	62.7	91.3	19	10
477-27	450	M10 x 1.50	1.2	15	12.7	25.4	25.4	8.7	6.3	38.1	57.2	62.7	91.3	19	17
477-29	1,050	M12 x 1.75	1.6	18	25.4	50.8	38.1	14.3	19	76.2	112.7	101.6	161.9	32	37
477-31	1,900	M16 x 2.00	1.6	24	25.4	50.8	38.1	14.3	19	76.2	112.7	101.6	161.9	32	80
477-33	2,150	M20 x 2.50	1.6	30	25.4	50.8	38.1	14.3	19	76.2	112.7	101.6	161.9	32	134

Our Side Swivel Lifting Ring is designed specifically for OEM type applications. It replaces potentially dangerous eyebolts on commercial, military, and industrial lifts requiring full swivel and pivoting action.

- 5:1 strength factor-forged ring
- Unique 3 piece design
- Made in U.S.A.
- Capacities up to 4100 lbs.
- Inch and metric
- OEM pricing



FORGED SIDE PULL HOIST RINGS

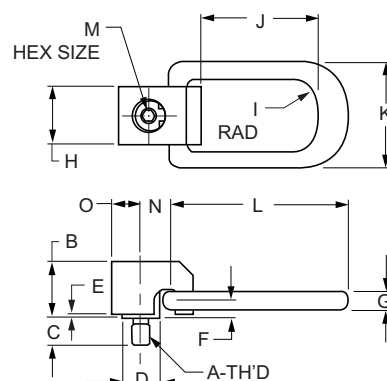
Small Side Swivel - Black Oxide Finish

P/N	LOAD CAPACITY (lbs)	DIMENSIONS												HEX SIZE M	N	O	TORQUE (ft-lbs)
		A	B	C	D	E	F	G	H	I	J	K	L				
478-00	650	5/16-18	15/16	15/32	5/8	1/16	9/32	5/16	1	1	2-1/16	1-3/4	2-31/32	1/4	1/2	1/2	3.5
478-01	800	3/8-16	15/16	9/16	5/8	1/16	9/32	5/16	1	1	2-1/16	1-3/4	2-31/32	1/4	1/2	1/2	4.5

HOIST RINGS

Our Side Swivel Lifting Ring is designed specifically for OEM type applications. It replaces potentially dangerous eyebolts on commercial, military, and industrial lifts requiring full swivel and pivoting action.

- 5:1 strength factor-forged ring
- Unique 3 piece design
- Made in U.S.A.
- Capacities up to 4100 lbs.
- Inch and metric
- OEM pricing



FORGED SIDE PULL HOIST RINGS

Large Side Swivel - Black Oxide Finish

P/N	LOAD CAPACITY (lbs)	DIMENSIONS															
		A	B	C	D	E	F	G	H	I	J	K	L	HEX SIZE M	N	O	TORQUE (ft-lbs)
478-02	1,800	1/2-13	1-37/64	3/4	1	5/64	7/16	1/2	1-5/8	1-1/2	3-1/4	2	4-3/4	3/8	15/16	25/32	15
478-03	2,500	5/8-11	1-37/64	15/16	1	5/64	7/16	1/2	1-5/8	1-1/2	3-1/4	2	4-3/4	3/8	15/16	25/32	25
478-04	4,100	3/4-10	1-37/64	1-1/8	1	5/64	7/16	1/2	1-5/8	1-1/2	3-1/4	2	4-3/4	3/8	15/16	25/32	50

METRIC FORGED SIDE PULL HOIST RINGS

Small Side Swivel - Black Oxide Finish

P/N	LOAD CAPACITY (kgs)	DIMENSIONS															
		A	B	C	D	E	F	G	H	I	J	K	L	HEX SIZE M	N	O	TORQUE (Nm)
478-50	325	M8 x 1.25	23.8	15.8	15.8	1.6	7.2	7.9	25.4	25.4	52.4	44.5	75.4	6	12.7	12.7	4.2
478-51	500	M10 x 1.50	23.8	19.8	15.8	1.6	7.2	7.9	25.4	25.4	52.4	44.5	75.4	6	12.7	12.7	6

METRIC FORGED SIDE PULL HOIST RINGS

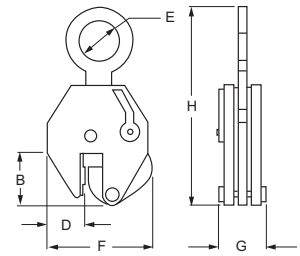
Large Side Swivel - Black Oxide Finish

P/N	LOAD CAPACITY (kgs)	DIMENSIONS															
		A	B	C	D	E	F	G	H	I	J	K	L	HEX SIZE M	N	O	TORQUE (Nm)
478-52	725	M12 x 1.75	40.1	23.8	25.4	2.0	11.1	12.7	66.7	38.1	82.6	50.8	120.7	10	23.8	19.8	20
478-53	1,400	M16 x 2.00	40.1	31.8	25.4	2.0	11.1	12.7	66.7	38.1	82.6	50.8	120.7	10	23.8	19.8	40
478-54	2,290	M20 x 2.50	40.1	39.7	25.4	2.0	11.1	12.7	66.7	38.1	82.6	50.8	120.7	10	23.8	19.8	70

LIFTING CLAMP

Plates can be gripped horizontally, lifted and transported in a vertical position and returned to its horizontal position easily and safely. The Vertical Lifting Clamp is equipped with a cam action locking mechanism to avoid disengagement during operation.

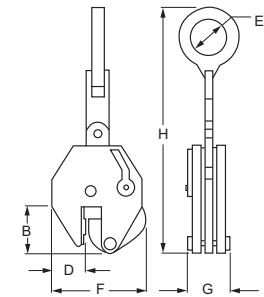
Note: To be used with hardness up to 37HRC



VERTICAL LIFTING CLAMPS								
P/N	DIMENSIONS							
	Capacity lbs / kg	Opening in / mm	B in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm
480-00	1654 / 750	0-.51 / 0-13	1.77 / 45	1.38 / 35	1.18 / 30	3.94 / 100	1.97 / 50	8.07 / 205
480-02	3307 / 1500	0-.87 / 0-22	3.15 / 80	2.36 / 60	2.56 / 65	6.89 / 175	3.15 / 80	13.19 / 335
480-04	6614 / 3000	0-1.18 / 0-30	3.35 / 85	2.76 / 70	2.76 / 70	9.06 / 230	4.53 / 115	16.93 / 430

This clamp is similar to the Vertical Lifting Clamps except for the addition of an additional link that enables the clamps to lift at a wider angle and from any position.

Note: To be used with hardness up to 37HRC

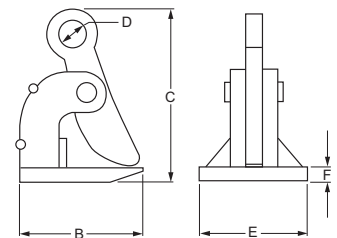


VERTICAL AND HORIZONTAL LIFTING CLAMPS								
P/N	DIMENSIONS							
	Capacity lbs / kg	Opening in / mm	B in / mm	D in / mm	E in / mm	F in / mm	G in / mm	H in / mm
480-10	1654 / 750	0-.51 / 0-13	1.77 / 45	1.38 / 35	1.18 / 30	3.94 / 100	1.97 / 50	10.43 / 265
480-12	3307 / 1500	0-.87 / 0-22	3.15 / 80	2.36 / 60	2.56 / 65	6.89 / 175	3.15 / 80	17.91 / 455
480-14	6614 / 3000	0-1.18 / 0-30	3.35 / 85	2.76 / 70	2.76 / 70	9.06 / 230	4.53 / 115	23.82 / 605

Single plates can be gripped horizontally and easily and safely lifted and transported.

Important: Please remember that the maximum lifting capacity of the clamps is related to the chain angle of the load when using a double leg chain sling.

Note: To be used with hardness up to 37HRC.



Lifting capacity

@ 60°= 100% - @ 90°= 70% - @ 120°= 50%

HORIZONTAL LIFTING CLAMPS							
P/N	DIMENSIONS						
	Capacity lbs / kg	Opening in / mm	B in / mm	C in / mm	D in / mm	E in / mm	F in / mm
480-20	1102 / 500	0-2.36 / 0-60	7.09 / 180	8.86 / 225	1.18 / 30	6.30 / 160	.39 / 10
480-22	3307 / 1500	0-2.36 / 0-60	7.09 / 180	9.06 / 230	1.18 / 30	6.30 / 160	.59 / 15
480-24	6614 / 3000	0-2.36 / 0-60	7.09 / 180	9.25 / 235	1.18 / 30	6.30 / 160	.79 / 20

CAM ROLLERS & PINS



CAM ROLLERS FOR BROWN & SHARPE AUTOMATICS

52100 Steel - Case Hardened

P/N	DIMENSIONS					
	I.D.	O.D.	LENGTH	MODEL & SERIAL NO.	USED ON	REFERENCE NUMBERS
500-00	.2497 - .2494	.5000 - .4995	.345 - .342	OOG 12852 UP TO 542-00-3300	LEAD LEVER, CROSS & VERTICAL SLIDES LEAD LEVER	*91-215-211 **8705
500-00	.2497 - .2494	.5000 - .4995	.345 - .342	OOG 542-00-3300 THROUGH ULTRAMATICS	LEAD LEVER, CROSS & VERTICAL SLIDES LEAD LEVER	*91-215-211 **8705
500-02	.2497 - .2494	.5625 - .5623	.405 - .401	OG 8021 AND UP	LEAD LEVER, CROSS & VERTICAL SLIDES LEAD LEVER	*91-215-211 **8708
500-04	.3132 - .3125	.6253 - .6247	.470 - .465	2G 7352 UP TO 542-3100	LEAD LEVER, CROSS & VERTICAL SLIDES LEAD LEVER	*91-215-220 **8716
500-04	.3132 - .3125	.6253 - .6247	.470 - .465	2G & 3G 542-3100 THROUGH ULTRAMATIC	LEAD LEVER, CROSS & VERTICAL SLIDES LEAD LEVER	*91-215-220 **8716

CAM PINS FOR BROWN & SHARPE AUTOMATICS

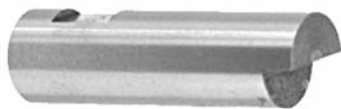
52100 Steel - Case Hardened

P/N	DIMENSIONS				
	O.D.	LENGTH	MODEL & SERIAL NO.	USED ON	REFERENCE NUMBERS
500-16	.2491 - .2488	1.317 - 1.307	OOG 12852 UP TO 542-00-3300	LEAD LEVER, CROSS & VERTICAL SLIDES LEAD LEVER	*91-90-705 **8700
500-18	.2491 - .2488	1.067 - 1.057	OOG 12852 UP TO 542-00-3300	CROSS & VERTICAL SLIDES	*91-90-705 **8704
500-16	.2491 - .2488	1.317 - 1.307	OOG 542-00-3300 THROUGH ULTRAMATICS	LEAD LEVER, CROSS & VERTICAL SLIDES LEAD LEVER	*91-90-1043 **8705
500-18	.2491 - .2488	1.067 - 1.057	OOG 542-00-3300 THROUGH ULTRAMATICS	CROSS & VERTICAL SLIDES	*91-90-700 **8704
500-16	.2491 - .2488	1.317 - 1.307	OG 8021 AND UP	LEAD LEVER, CROSS & VERTICAL SLIDES LEAD LEVER	*8700
500-20	.2491 - .2488	1.255 - 1.245	OG 8021 AND UP	CROSS & VERTICAL SLIDES	*91-90-738 **8709
500-34	.3119 - .3117	1.320 - 1.310	2G 7352 UP TO 542-3100	CROSS & VERTICAL SLIDES	*91-90-752 **8715
500-34	.3119 - .3117	1.320 - 1.310	2G & 3G 542-3100 THROUGH ULTRAMATIC	LEAD LEVER, CROSS & VERTICAL SLIDES LEAD LEVER	*91-90-752 **8715
500-22	.3119 - .3117	1.835 - 1.825	2G & 3G 542-3100 THROUGH ULTRAMATIC	CROSS & VERTICAL SLIDES	*42-17185 **8719

* Reference numbers from Brown & Sharpe

** Reference numbers from Boyar Schultz

CAM ROLLERS & PINS



CAM ROLLERS FOR BROWN & SHARPE AND BOYAR SCHULTZ BOX TOOL

52100 Steel - Case Hardened

P/N	DIMENSIONS				
	I.D.	O.D.	LENGTH	MODEL NUMBER.	REFERENCE NUMBERS
500-06	.1255 .1252	.2815 .2810	.187 .186	OOOG	**5720
500-08	.1568 .1566	.3125 .3120	.1870 .1865	OOG	**5020
500-10	.2506 .2503	.5000 .4995	.2499 .2495	OG	**5120
500-12	.2506 .2503	.6250 .6245	.2499 .2495	2G	**5220
500-14	.3131 .3128	.7500 .7495	.3750 .3745	3G	**5320

CAM PINS FOR BROWN & SHARPE AND BOYAR SCHULTZ BOX TOOL

52100 Steel - Case Hardened

P/N	DIMENSIONS			
	O.D.	LENGTH	MODEL NUMBER.	REFERENCE NUMBERS
500-24	.1245 .1240	.535 .525	OOOG	**5720
500-26	.1562 .1560	.530 .525	OOG	**5020
500-28	.2497 .2495	.725 .720	OG	**5120
500-30	.2497 .2495	.845 .840	2G	**5220
500-32	.3120 .3116	1.098 1.008	3G	**5320

** Reference numbers from Boyar Schultz

DAVENPORT BLANK ROLLERS

52100 Steel - Case Hardened

P/N	DIMENSIONS			
	SOMMA CAT NO.	WIDTH	I.D.	O.D.
500-40	DR 8	1/4	.3125-.3130	15/16
500-42	DR 10	5/16	.3125-.3130	15/16
500-44	DR 12	3/8	.3125-.3130	15/16
500-46	DR 14	7/16	.3125-.3130	15/16
500-48	DR 16	1/2	.3125-.3130	15/16
500-50	DR 18	9/16	.3125-.3130	15/16
500-52	DR 20	5/8	.3125-.3130	15/16
500-54	DR 24	3/4	.3125-.3130	15/16
500-56	DR 28	7/8	.3125-.3130	15/16
500-58	DR 32	1	.3125-.3130	15/16

MASTER SETTINGS RINGS

For true accuracy in setting any applicable internal device. The new concept in master setting rings.

- Guaranteed to $\pm .0001$ accuracy.
- Extra long gaging length.
- 10 micro finish or better.
- Light weight
- Feature color coded aluminum heat shield
- Ideal setting rings for dial bore gages, groove gages, air gages, micrometers, vernier calipers, etc.

NOTE: Larger Sizes are available on request.



MASTER SETTING RINGS			
Gold Color Code - Case Hardened			
P/N	DIMENSIONS		
	SIZE	RING DIMENSIONS	SET PART NUMBER
501-01	.2500	1-1/2 x 1/2	AA P/N - 501-00 COMPLETE 9 PIECE SET .2500 - .5000 1/32 INCREMENTS
501-02	.2812	1-1/2 x 1/2	
501-03	.3125	1-1/2 x 1/2	
501-04	.3437	1-1/2 x 1/2	
501-05	.3750	1-1/2 x 1/2	
501-06	.4062	1-1/2 x 1/2	
501-07	.4375	1-1/2 x 1/2	
501-08	.4687	1-1/2 x 1/2	
501-09	.5000	1-1/2 x 1/2	

MASTER SETTING RINGS			
Green Color Code - Case Hardened			
P/N	DIMENSIONS		
	SIZE	RING DIMENSIONS	SET PART NUMBER
502-01	.5312	1-1/2 x 3/4	AA P/N - 502-00 COMPLETE 8 PIECE SET .5312 - .7500 1/32 INCREMENTS
502-02	.5625	1-1/2 x 3/4	
502-03	.5937	1-1/2 x 3/4	
502-04	.6250	1-1/2 x 3/4	
502-05	.6562	1-1/2 x 3/4	
502-06	.6875	1-1/2 x 3/4	
502-07	.7187	1-1/2 x 3/4	
502-08	.7500	1-1/2 x 3/4	

MASTER SETTING RINGS			
Blue Color Code - Case Hardened			
P/N	DIMENSIONS		
	SIZE	RING DIMENSIONS	SET PART NUMBER
503-01	.7812	1-3/4 x 1	AA P/N - 503-00 COMPLETE 8 PIECE SET .7812 - 1.0000 1/32 INCREMENTS
503-02	.8125	1-3/4 x 1	
503-03	.8437	1-3/4 x 1	
503-04	.8750	1-3/4 x 1	
503-05	.9062	1-3/4 x 1	
503-06	.9375	1-3/4 x 1	
503-07	.9687	1-3/4 x 1	
503-08	1.0000	1-3/4 x 1	

MASTER SETTING RINGS			
Red Color Code - Case Hardened			
P/N	DIMENSIONS		
	SIZE	RING DIMENSIONS	SET PART NUMBER
504-01	1.0312	2-1/8 x 1	AA P/N - 504-00 COMPLETE 8 PIECE SET 1.0312 - 1.2500 1/32 INCREMENTS
504-02	1.0625	2-1/8 x 1	
504-03	1.0937	2-1/8 x 1	
504-04	1.1250	2-1/8 x 1	
504-05	1.1562	2-1/8 x 1	
504-06	1.1875	2-1/8 x 1	
504-07	1.2187	2-1/8 x 1	
504-08	1.2500	2-1/8 x 1	

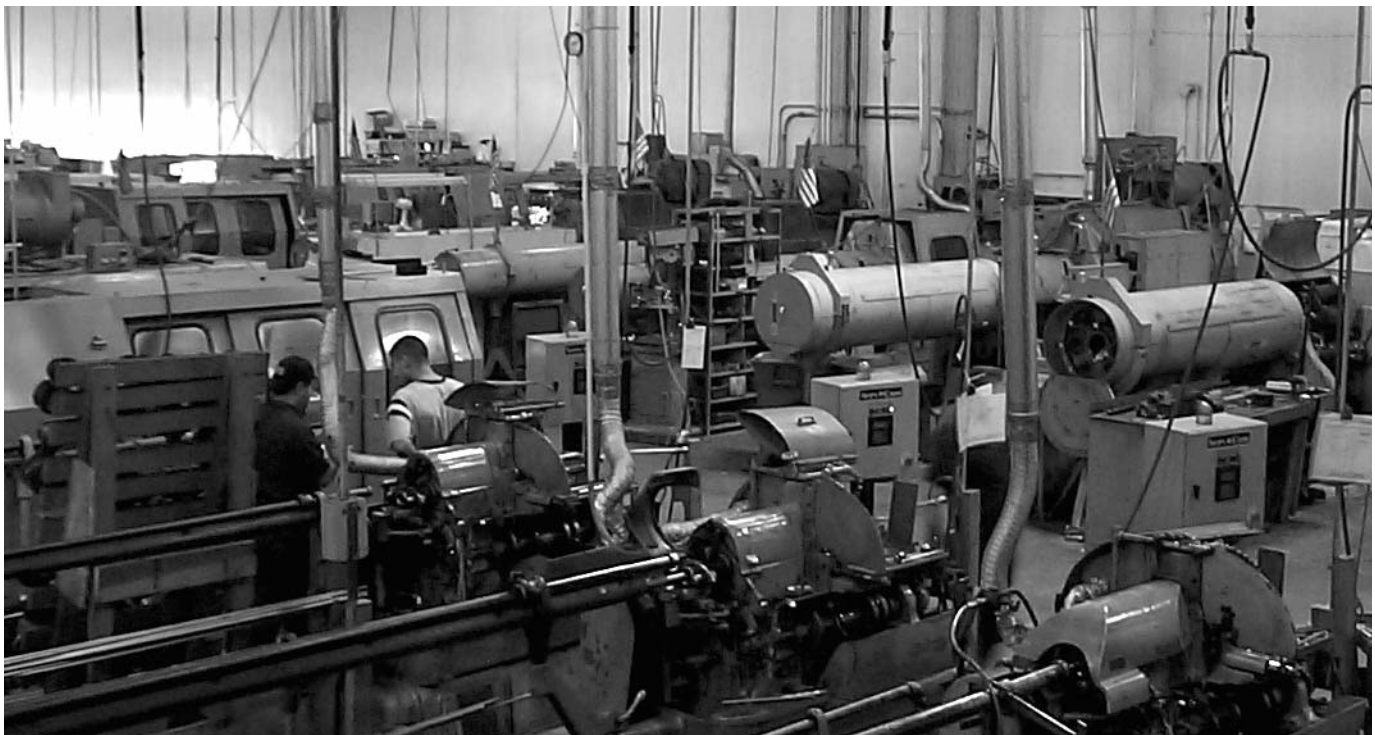
MASTER SETTING RINGS			
Brown Color Code - Case Hardened			
P/N	DIMENSIONS		
	SIZE	RING DIMENSIONS	SET PART NUMBER
505-01	1.2812	2-3/4 x 1	AA P/N - 505-00 COMPLETE 8 PIECE SET 1.2812 - 1.5000 1/32 INCREMENTS
505-02	1.3125	2-3/4 x 1	
505-03	1.3437	2-3/4 x 1	
505-04	1.3750	2-3/4 x 1	
505-05	1.4062	2-3/4 x 1	
505-06	1.4375	2-3/4 x 1	
505-07	1.4687	2-3/4 x 1	
505-08	1.5000	2-3/4 x 1	

MASTER SETTING RINGS

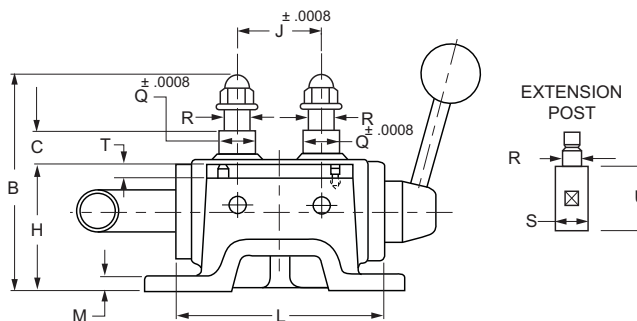
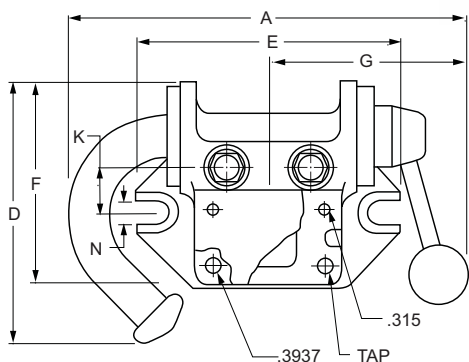
MASTER SETTING RINGS Purple Color Code - Case Hardened			
P/N	DIMENSIONS		
	SIZE	RING DIMENSIONS	SET PART NUMBER
506-01	1.5312	2-3/4 x 1	AA P/N - 506-00 COMPLETE 8 PIECE SET 1.5312 - 1.7500 1/32 INCREMENTS
506-02	1.5625	2-3/4 x 1	
506-03	1.5937	2-3/4 x 1	
506-04	1.6250	2-3/4 x 1	
506-05	1.6562	2-3/4 x 1	
506-06	1.6875	2-3/4 x 1	
506-07	1.7187	2-3/4 x 1	
506-08	1.7500	2-3/4 x 1	

MASTER SETTING RINGS Black Color Code - Case Hardened			
P/N	DIMENSIONS		
	SIZE	RING DIMENSIONS	SET PART NUMBER
507-01	1.7812	3-1/4 x 1	AA P/N - 507-00 COMPLETE 8 PIECE SET 1.7812 - 2.0000 1/32 INCREMENTS
507-02	1.8125	3-1/4 x 1	
507-03	1.8437	3-1/4 x 1	
507-04	1.8750	3-1/4 x 1	
507-05	1.9062	3-1/4 x 1	
507-06	1.9375	3-1/4 x 1	
507-07	1.9687	3-1/4 x 1	
507-08	2.0000	3-1/4 x 1	

METRIC MASTER SETTING RINGS Case Hardened			
P/N	DIMENSIONS		
	SIZE	COLOR CODE	RING DIMENSIONS
501-16	6	GOLD	1-1/2 X 1/2
501-17	7	GOLD	1-1/2 X 1/2
501-18	8	GOLD	1-1/2 X 1/2
501-19	9	GOLD	1-1/2 X 1/2
501-20	10	GOLD	1-1/2 X 1/2
502-15	15	GREEN	1-1/2 X 3/4
503-11	20	BLUE	1-3/4-1
503-15	25	BLUE	1-3/4-1
504-13	30	RED	2-1/8 X 1
505-15	35	BROWN	2-3/4 X 1
506-15	40	PURPLE	2-3/4 X 1
507-15	45	BLACK	3-1/4 X 1
507-20	50	BLACK	3-1/4 X 1

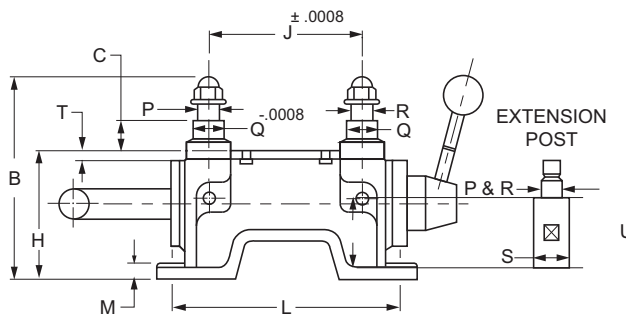
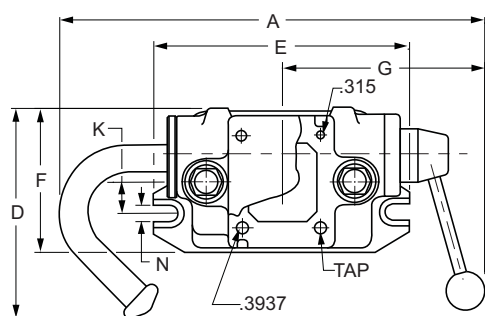


CLAMP JIG



CLAMP JIG

P/N	DIMENSIONS							
	A	B - MIN	B - MAX	C - MIN	C - MAX	D	E	F
508-00	10.5	5.12	6.77	.32	1.97	7.28	6.18	5.28
508-05	11.7	5.51	7.56	.32	2.36	7.28	7.17	5.75
508-10	13.0	5.51	7.56	.32	2.36	7.28	8.74	6.30
P/N	G	H	J	K	L	M	N	T
508-00	5.43	3.27	1.4961	.99	5.16	.59	.59	.39
508-05	6.02	3.66	2.3622	1.38	5.91	.59	.59	.39
508-10	6.69	3.66	3.1496	1.58	7.48	.59	.59	.39



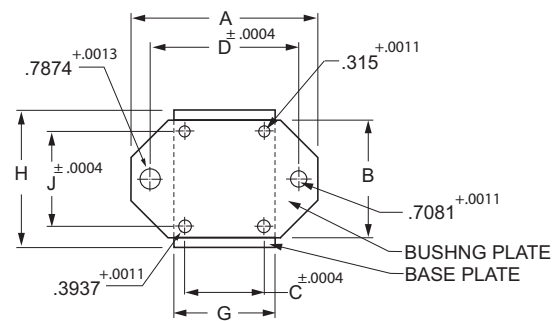
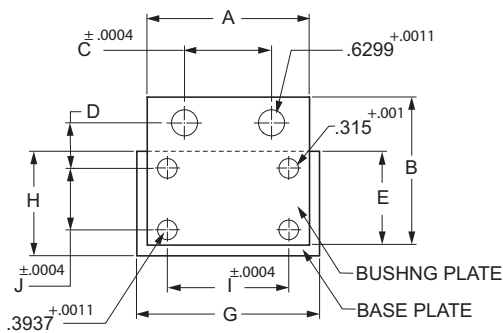
CLAMP JIG

P/N	DIMENSIONS							
	A	B - MIN	B - MAX	C - MIN	C - MAX	D	E	F
508-15	18.6	7.44	10.20	.55	3.31	8.39	10.24	5.98
508-20	20.6	7.44	10.20	.55	3.31	8.59	12.24	6.38
508-25	22.5	8.07	10.83	1.10	3.86	8.98	14.25	7.20
508-30	26.5	8.23	10.98	1.10	3.86	9.53	18.50	8.35
P/N	G	H	J	K	L	M	N	T
508-15	9.45	5.20	5.9055	1.26	8.82	.59	.63	.47
508-20	10.43	5.20	7.8740	1.38	10.83	.59	.63	.47
508-25	11.42	5.28	9.8425	1.42	12.76	.63	.71	.55
508-30	13.39	5.28	13.7795	1.46	17.01	.63	.71	.55

CLAMP JIG

CLAMP JIG									
P/N	*WEIGHT	ADAPTER SURFACE		BUSHING PLATE CAPACITY IN INCHES					
	WITHOUT EXTENSION POSTS (lbs)	RIGHT TO LEFT	LEFT TO RIGHT	MIN.	MAX.	EXTENDED POST - 1.969		EXTENDED POST - 3.937	
						MIN.	MAX.	MIN.	MAX.
508-00	12.5	3.15	1.89	.32	1.95	2.29	3.93	-	-
508-05	19.8	3.74	2.36	.32	2.35	2.29	4.33	-	-
508-10	24.7	5.12	2.95	.32	2.35	2.29	4.33	-	-
508-15	34.8	4.21	4.53	.56	3.30	2.52	5.27	4.49	7.20
508-20	40.7	6.18	5.12	.56	3.30	2.52	5.27	4.49	7.20
508-25	50.2	8.11	5.91	1.11	3.85	3.10	5.82	5.03	7.79
508-30	77.0	12.09	7.09	1.11	3.85	3.10	5.82	5.03	7.79

* Approximate net weight without extension



BUSHING PLATE FOR 508-00 THRU 508-15							
P/N	DIMENSIONS						
	CLAMP JIG P/N	A	B	C	D	E	T
508-35	508-00	3.15	3.19	1.4961	1.85	1.10	.50
508-40	508-05	3.74	3.86	2.3622	2.40	1.18	.50
508-45	508-10	5.12	4.41	3.1496	2.95	1.14	.50

BASE PLATE FOR 508-00 THRU 508-15						
P/N	DIMENSIONS					
	CLAMP JIG P/N	G	H	I	J	T
508-70	508-00	3.39	2.01	2.3622	1.1811	.39
508-75	508-05	4.13	2.56	3.1496	1.5748	.39
508-80	508-10	5.71	3.15	4.7244	2.1654	.39

T = Thickness

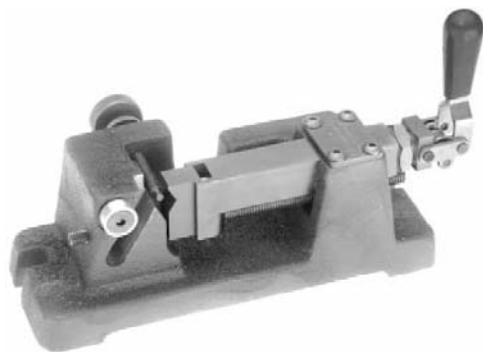
CLAMP JIG EXTENSION POSTS					
2 Each					
P/N	DIMENSIONS				
	*R	*P	S	U	JIG CLAMP P/N
509-05	-	.6299	1.1024	1.969	508-00, 508-05, 508-10
509-10	.7087	.7874	1.1810	1.969	508-15, 508-20 508-25, 508-30
509-15	.7087	.7874	1.1810	3.437	

* - 509-10 and 509-15 will come with two extension posts one with the R size and one with the P size.

BUSHING PLATE FOR 508-20 THRU 508-30							
P/N	DIMENSIONS						
	CLAMP JIG P/N	A	B	C	D	E	T
508-50	508-15	7.48	4.53	5.9055	-	-	.63
508-55	508-20	9.45	5.12	7.8740	-	-	.63
508-60	508-25	11.42	5.91	9.8425	-	-	.63
508-65	508-30	15.35	7.09	13.7795	-	-	.75

BASE PLATE FOR 508-20 THRU 508-30						
P/N	DIMENSIONS					
	CLAMP JIG P/N	G	H	I	J	T
508-85	508-15	4.21	5.43	3.1496	3.7402	.47
508-90	508-20	6.18	5.83	5.1181	4.3307	.47
508-95	508-25	8.11	6.61	7.0866	5.1180	.55
509-00	508-30	12.09	7.80	10.6300	6.2992	.55

WIRE DRILL FIXTURE



- Simple - Fast
- Adjustable
- Economical

Exclusive Features: Drilling wire holes in hexagonal and circular sections can be done in as little as 30 seconds. Model SF-4 is designed and engineered to maintain a high degree of accuracy much more than can be obtained by most other jigs. It converts the work into a simple drilling operation. All wear parts are hardened and ground for maximum accuracy and durability. Quick set-up saves time and money and eliminates expensive tool-up waiting periods. Light weight (7lbs.) and easy action assures time economics. Model SF-4 provides higher production on either long or short runs. The main base is made of mehanite cast iron with a much greater resistance to shock and fracture. Clamp down feature permits fixture to be easily secured to a drill press table.

SF-4 Drill Guides: Because of the wide range of sizes required, Drill Guides for the Model SF-4 are not included in the price of the fixture.

MODEL SF-4 SAFETY WIRE DRILLING FIXTURE	
P/N	DIMENSIONS
	I.D. RANGE
509-54A	#69 THRU 3/64
509-54B	#55 THRU 1/16
509-54C	#52 THRU #40
509-54D	#38 THRU 1/8

All other sizes within this range are special. In addition to the base price, specials are subject to a set-up charge, prorated over the number of drill guides ordered in a specific size. Larger diameters are also available subject to price quotation. A 135° point drill (high speed) or flat bottom drill is suggested for longer drill life. Be sure to specify size of guides desired. All diameters should be carried to the fourth decimal.



When ordering model SF-4 fixture part 509-54:

Be sure to specify size of guides desired. All diameters should be carried to the fourth decimal.



SF-4R Cross Hole Drilling Attachment Part 509-55:

- For drilling cross holes in round stock
- Increases the versatility of the fixture
- Adapted to accept two standard O.D. drill bushings - only one is necessary
- Price of SF-4R attachment does not include drill bushing

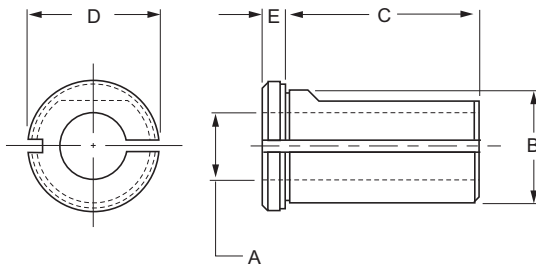
To order slip fixed renewable bushings for the SF-4R attachment, order by sample.

CROSS HOLE DRILLING ATTACHMENT PART 509-55			
O.D.	LENGTH	SYMBOL	I.D. RANGE
3/15	1/2	SF-12-08	#80 - #39
5/16	1/2	SF-20-08	#80 - #10

- Rapid, positive cam-lock action on each part even with dimensional variations.
- Milled 1/2" slot for easy holding.
- Drill guide changes made quickly.
- Variable hole location from APEX with positive stop.
- Simple adjustment to accommodate all sizes 1/4" to 2" hexagons, nuts, bolts, etc. Now you can drill cross holes in round of hex stock.

TOOL HOLDER BUSHINGS

SPLIT STYLE TYPE B: Split the entire length of the bushing for easy clamping by set screws in the turret bore of tool holder, this precision bushing is hardened and ground concentric to provide accurate tool holding.



TOOL HOLDER BUSHINGS

Split type B - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			HEAD DIMENSIONS	
	A	B	C	D	E
520-01	5/16	3/4	1-1/2	1-1/16	3/16
520-02	3/8	3/4	1-1/2	1-1/16	3/16
520-03	1/2	3/4	1-1/2	1-1/16	3/16
520-10	3/8	1	1-3/4	1-3/16	3/16
520-11	1/2	1	1-3/4	1-3/16	3/16
520-12	5/8	1	1-3/4	1-3/16	3/16
520-13	3/4	1	1-3/4	1-3/16	3/16
520-14	3/8	1-1/4	2-1/8	1-7/16	1/4
520-15	1/2	1-1/4	2-1/8	1-7/16	1/4
520-16	5/8	1-1/4	2-1/8	1-7/16	1/4
520-17	3/4	1-1/4	2-1/8	1-7/16	1/4
520-18	7/8	1-1/4	2-1/8	1-7/16	1/4
520-19	1	1-1/4	2-1/8	1-7/16	1/4
520-20	3/8	1-1/2	2-1/2	1-11/16	1/4
520-21	1/2	1-1/2	2-1/2	1-11/16	1/4
520-22	5/8	1-1/2	2-1/2	1-11/16	1/4
520-23	3/4	1-1/2	2-1/2	1-11/16	1/4
520-25	7/8	1-1/2	2-1/2	1-11/16	1/4
520-27	1	1-1/2	2-1/2	1-11/16	1/4
520-28	1-1/4	1-1/2	2-1/2	1-11/16	1/4

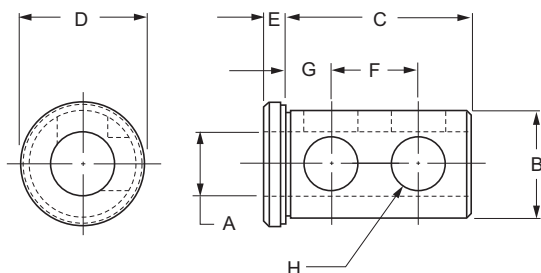
TOOL HOLDER BUSHINGS - CONTINUED

Split type B - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			HEAD DIMENSIONS	
	A	B	C	D	E
520-31	1/2	1-3/4	3	2-1/8	5/16
520-32	5/8	1-3/4	3	2-1/8	5/16
520-33	3/4	1-3/4	3	2-1/8	5/16
520-35	1	1-3/4	3	2-1/8	5/16
520-36	1-1/4	1-3/4	3	2-1/8	5/16
520-37	1-1/2	1-3/4	3	2-1/8	5/16
520-41	1/2	2	3-1/2	2-3/8	5/16
520-42	5/8	2	3-1/2	2-3/8	5/16
520-43	3/4	2	3-1/2	2-3/8	5/16
520-45	1	2	3-1/2	2-3/8	5/16
520-46	1-1/4	2	3-1/2	2-3/8	5/16
520-47	1-1/2	2	3-1/2	2-3/8	5/16
520-48	1-3/4	2	3-1/2	2-3/8	5/16
520-50	1/2	2-1/4	4	2-7/8	3/8
520-51	5/8	2-1/4	4	2-7/8	3/8
520-52	3/4	2-1/4	4	2-7/8	3/8
520-54	1	2-1/4	4	2-7/8	3/8
520-55	1-1/4	2-1/4	4	2-7/8	3/8
520-56	1-1/2	2-1/4	4	2-7/8	3/8
520-57	1-3/4	2-1/4	4	2-7/8	3/8
520-58	2	2-1/4	4	2-7/8	3/8
520-59	2-1/4	2-1/4	4	2-7/8	3/8
520-63	1-1/2	3	4-1/2	3-5/8	7/16
520-64	1-3/4	3	4-1/2	3-5/8	7/16
520-65	2	3	4-1/2	3-5/8	7/16
520-66	2-1/4	3	4-1/2	3-5/8	7/16
520-67	2-1/2	3	4-1/2	3-5/8	7/16

TOOL HOLDER BUSHINGS

SOLID STYLE TYPE J: With two sets of holes 90° apart for proper clearance and positioning on larger diameter tools, these precision ground concentric hardened bushings offer long life and accurate.



TOOL HOLDER BUSHINGS									
Solid type J - Case Hardened - Black Oxide Finish									
P/N	DIMENSIONS			HEAD DIM.		DIMENSIONS			NO. OF HOLES
	A	B	C	D	E	F	G	H	
521-14	3/8	1-1/4	2-1/8	1-7/16	1/4	1	1/2	5/8	2
521-15	1/2	1-1/4	2-1/8	1-7/16	1/4	1	1/2	5/8	2
521-16	5/8	1-1/4	2-1/8	1-7/16	1/4	1	1/2	5/8	2
521-17	3/4	1-1/4	2-1/8	1-7/16	1/4	1	1/2	5/8	2
521-18	7/8	1-1/4	2-1/8	1-7/16	1/4	1	1/2	5/8	2
521-19	1	1-1/4	2-1/8	1-7/16	1/4	1	1/2	5/8	2
521-21	1/2	1-1/2	2-1/2	1-11/16	1/4	1-1/8	11/16	7/8	2
521-22	5/8	1-1/2	2-1/2	1-11/16	1/4	1-1/8	11/16	7/8	2
521-23	3/4	1-1/2	2-1/2	1-11/16	1/4	1-1/8	11/16	7/8	2
521-25	7/8	1-1/2	2-1/2	1-11/16	1/4	1-1/8	11/16	7/8	2
521-27	1	1-1/2	2-1/2	1-11/16	1/4	1-1/8	11/16	7/8	2
521-28	1-1/4	1-1/2	2-1/2	1-11/16	1/4	1-1/8	11/16	7/8	2
521-31	1/2	1-3/4	3	2-1/8	5/16	1-1/4	3/4	7/8	2
521-32	5/8	1-3/4	3	2-1/8	5/16	1-1/4	3/4	7/8	2
521-33	3/4	1-3/4	3	2-1/8	5/16	1-1/4	3/4	7/8	2
521-34	7/8	1-3/4	3	2-1/8	5/16	1-1/4	3/4	7/8	2
521-35	1	1-3/4	3	2-1/8	5/16	1-1/4	3/4	7/8	2
521-36	1-1/4	1-3/4	3	2-1/8	5/16	1-1/4	3/4	7/8	2
521-37	1-1/2	1-3/4	3	2-1/8	5/16	1-1/4	3/4	7/8	2

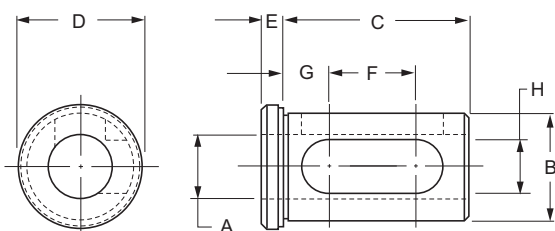
TOOL HOLDER BUSHINGS - CONTINUED

Solid type J - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			HEAD DIM.		DIMENSIONS			NO. OF HOLES
	A	B	C	D	E	F	G	H	
521-43	3/4	2	3-1/2	2-3/8	5/16	1-1/2	3/4	1	2
521-44	7/8	2	3-1/2	2-3/8	5/16	1-1/2	3/4	1	2
521-45	1	2	3-1/2	2-3/8	5/16	1-1/2	3/4	1	2
521-46	1-1/4	2	3-1/2	2-3/8	5/16	1-1/2	3/4	1	2
521-47	1-1/2	2	3-1/2	2-3/8	5/16	1-1/2	3/4	1	2
521-48	1-3/4	2	3-1/2	2-3/8	5/16	1-1/2	3/4	1	2
521-52	3/4	2-1/2	4	2-7/8	3/8	1-3/4	7/8	1-1/4	2
521-54	1	2-1/2	4	2-7/8	3/8	1-3/4	7/8	1-1/4	2
521-55	1-1/4	2-1/2	4	2-7/8	3/8	1-3/4	7/8	1-1/4	4
521-56	1-1/2	2-1/2	4	2-7/8	3/8	1-3/4	7/8	1-1/4	4
521-57	1-3/4	2-1/2	4	2-7/8	3/8	1-3/4	7/8	1-1/4	4
521-58	2	2-1/2	4	2-7/8	3/8	1-3/4	7/8	1-1/4	4
521-59	2-1/4	2-1/2	4	2-7/8	3/8	1-3/4	7/8	1-1/4	4
521-61	1	3	4-1/2	3-5/8	7/16	2	1	1-1/4	2
521-62	1-1/4	3	4-1/2	3-5/8	7/16	2	1	1-1/4	4
521-63	1-1/2	3	4-1/2	3-5/8	7/16	2	1	1-1/4	4
521-64	1-3/4	3	4-1/2	3-5/8	7/16	2	1	1-1/4	4
521-65	2	3	4-1/2	3-5/8	7/16	2	1	1-1/4	4
521-66	2-1/4	3	4-1/2	3-5/8	7/16	2	1	1-1/4	4
521-67	2-1/2	3	4-1/2	3-5/8	7/16	2	1	1-1/4	4

TOOL HOLDER BUSHINGS

SLOTTED STYLE TYPE C: Two elongated slots in this bushing allow the sets screws to firmly hold the tool shank. These are precision concentric ground hardened parts.



TOOL HOLDER BUSHINGS - CONTINUED

Solid type C - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			HEAD DIM.		DIMENSIONS		
	A	B	C	D	E	F	G	H
522-43	3/4	2	4	2-3/8	5/16	2-1/2	11/16	1
522-44	7/8	2	4	2-3/8	5/16	2-1/2	11/16	1
522-45	1	2	4	2-3/8	5/16	2-1/2	11/16	1
522-46	1-1/4	2	4	2-3/8	5/16	2-1/2	11/16	1
522-47	1-1/2	2	4	2-3/8	5/16	2-1/2	11/16	1
522-48	1-3/4	2	4	2-3/8	5/16	2-1/2	11/16	1
522-52	3/4	2-1/2	4-1/2	2-7/8	3/8	2-3/4	11/16	1
522-54	1	2-1/2	4-1/2	2-7/8	3/8	2-3/4	11/16	1
522-55	1-1/4	2-1/2	4-1/2	2-7/8	3/8	2-3/4	11/16	1
522-56	1-1/2	2-1/2	4-1/2	2-7/8	3/8	2-3/4	11/16	1
522-57	1-3/4	2-1/2	4-1/2	2-7/8	3/8	2-3/4	11/16	1
522-58	2	2-1/2	4-1/2	2-7/8	3/8	2-3/4	11/16	1
522-59	2-1/4	2-1/2	4-1/2	2-7/8	3/8	2-3/4	11/16	1
522-61	1	3	5	3-5/8	7/16	3-1/2	3/4	1
522-62	1-1/4	3	5	3-5/8	7/16	3-1/2	3/4	1
522-63	1-1/2	3	5	3-5/8	7/16	3-1/2	3/4	1
522-64	1-3/4	3	5	3-5/8	7/16	3-1/2	3/4	1
522-65	2	3	5	3-5/8	7/16	3-1/2	3/4	1
522-66	2-1/4	3	5	3-5/8	7/16	3-1/2	3/4	1
522-67	2-1/2	3	5	3-5/8	7/16	3-1/2	3/4	1

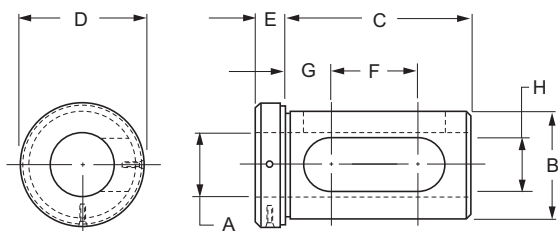
TOOL HOLDER BUSHINGS

Solid type C - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			HEAD DIM.		DIMENSIONS		
	A	B	C	D	E	F	G	H
522-14	3/8	1-1/4	3-1/4	1-7/16	1/4	2	11/16	3/4
522-15	1/2	1-1/4	3-1/4	1-7/16	1/4	2	11/16	3/4
522-16	5/8	1-1/4	3-1/4	1-7/16	1/4	2	11/16	3/4
522-17	3/4	1-1/4	3-1/4	1-7/16	1/4	2	11/16	3/4
522-18	7/8	1-1/4	3-1/4	1-7/16	1/4	2	11/16	3/4
522-19	1	1-1/4	3-1/4	1-7/16	1/4	2	11/16	3/4
522-21	1/2	1-1/2	3-3/8	1-11/16	1/4	2	11/16	7/8
522-22	5/8	1-1/2	3-3/8	1-11/16	1/4	2	11/16	7/8
522-23	3/4	1-1/2	3-3/8	1-11/16	1/4	2	11/16	7/8
522-25	7/8	1-1/2	3-3/8	1-11/16	1/4	2	11/16	7/8
522-27	1	1-1/2	3-3/8	1-11/16	1/4	2	11/16	7/8
522-28	1-1/4	1-1/2	3-3/8	1-11/16	1/4	2	11/16	7/8
522-31	1/2	1-3/4	3-1/2	2-1/8	5/16	2-1/8	11/16	7/8
522-32	5/8	1-3/4	3-1/2	2-1/8	5/16	2-1/8	11/16	7/8
522-33	3/4	1-3/4	3-1/2	2-1/8	5/16	2-1/8	11/16	7/8
522-34	7/8	1-3/4	3-1/2	2-1/8	5/16	2-1/8	11/16	7/8
522-35	1	1-3/4	3-1/2	2-1/8	5/16	2-1/8	11/16	7/8
522-36	1-1/4	1-3/4	3-1/2	2-1/8	5/16	2-1/8	11/16	7/8
522-37	1-1/2	1-3/4	3-1/2	2-1/8	5/16	2-1/8	11/16	7/8

TOOL HOLDER BUSHINGS

CNC STYLE TYPE Z: The set screw in the head enables the use of pre-set tooling. The elongated slot in the body gives interchangeability with all brands of equipment. It also enables the set screw to firmly hold the tool shank. These are hardened, precision concentric ground bushings



TOOL HOLDER BUSHINGS - CONTINUED

Solid type Z - Case Hardened - Black Oxide Finish

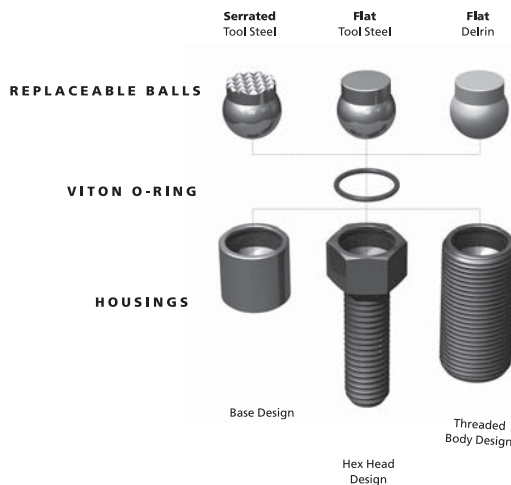
P/N	DIMENSIONS			HEAD DIM.		DIMENSIONS		
	A	B	C	D	E	F	G	H
523-52	3/4	2-1/2	4	2-7/8	3/4	2-1/8	7/8	1
523-54	1	2-1/2	4	2-7/8	3/4	2-1/8	7/8	1
523-55	1-1/4	2-1/2	4	2-7/8	3/4	2-1/8	7/8	1
523-56	1-1/2	2-1/2	4	2-7/8	3/4	2-1/8	7/8	1
523-57	1-3/4	2-1/2	4	2-7/8	3/4	2-1/8	7/8	1
523-58	2	2-1/2	4	2-7/8	3/4	2-1/8	7/8	1
523-59	2-1/4	2-1/2	4	2-7/8	3/4	2-1/8	7/8	1
523-61	1	3	4-1/2	3-5/8	3/4	2-1/4	1	1-1/4
523-62	1-1/4	3	4-1/2	3-5/8	3/4	2-1/4	1	1-1/4
523-63	1-1/2	3	4-1/2	3-5/8	3/4	2-1/4	1	1-1/4
523-64	1-3/4	3	4-1/2	3-5/8	3/4	2-1/4	1	1-1/4
523-65	2	3	4-1/2	3-5/8	3/4	2-1/4	1	1-1/4
523-66	2-1/4	3	4-1/2	3-5/8	3/4	2-1/4	1	1-1/4
523-67	2-1/2	3	4-1/2	3-5/8	3/4	2-1/4	1	1-1/4

TOOL HOLDER BUSHINGS

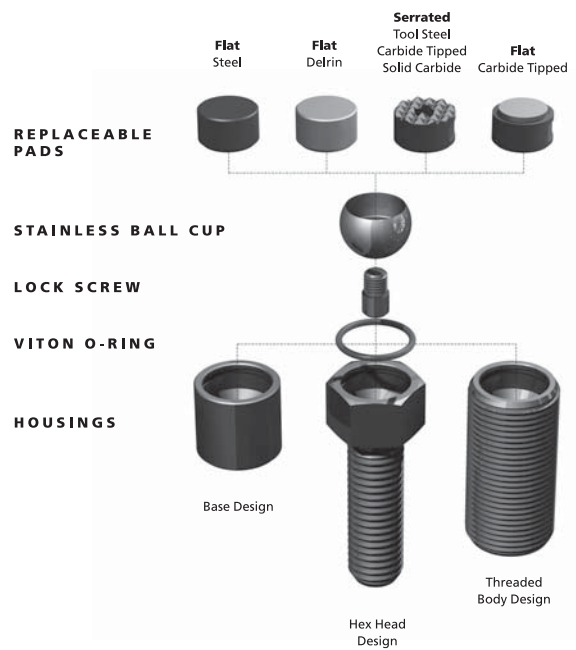
Solid type Z - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			HEAD DIM.		DIMENSIONS		
	A	B	C	D	E	F	G	H
523-21	1/2	1-1/2	3-1/2	1-3/4	5/8	2	11/16	7/8
523-22	5/8	1-1/2	3-1/2	1-3/4	5/8	2	11/16	7/8
523-23	3/4	1-1/2	3-1/2	1-3/4	5/8	2	11/16	7/8
523-25	7/8	1-1/2	3-1/2	1-3/4	5/8	2	11/16	7/8
523-27	1	1-1/2	3-1/2	1-3/4	5/8	2	11/16	7/8
523-28	1-1/4	1-1/2	3-1/2	1-3/4	5/8	2	11/16	7/8
523-31	1/2	1-3/4	3-1/2	2-1/8	5/8	2	11/16	7/8
523-32	5/8	1-3/4	3-1/2	2-1/8	5/8	2	11/16	7/8
523-33	3/4	1-3/4	3-1/2	2-1/8	5/8	2	11/16	7/8
523-34	7/8	1-3/4	3-1/2	2-1/8	5/8	2	11/16	7/8
523-35	1	1-3/4	3-1/2	2-1/8	5/8	2	11/16	7/8
523-36	1-1/4	1-3/4	3-1/2	2-1/8	5/8	2	11/16	7/8
523-37	1-1/2	1-3/4	3-1/2	2-1/8	5/8	2	11/16	7/8
523-43	3/4	2	4	2-3/8	5/8	2-1/8	3/4	1
523-44	7/8	2	4	2-3/8	5/8	2-1/8	3/4	1
523-45	1	2	4	2-3/8	5/8	2-1/8	3/4	1
523-46	1-1/4	2	4	2-3/8	5/8	2-1/8	3/4	1
523-47	1-1/2	2	4	2-3/8	5/8	2-1/8	3/4	1
523-48	1-3/4	2	4	2-3/8	5/8	2-1/8	3/4	1

- These Replaceable Ball Style Swivots are a modular component system that allows the ball to swivel, tilt, pivot, grip, hold, position or secure work pieces. The ball swivels 360 degrees and tilts at varying degrees in any direction from the centerline.
- The different housing styles allows for a variety of mounting options.
- These Replaceable Ball units allow you to easily change the ball when worn or another style is needed for a job.
- Unique design prevents the ball from exceeding the specified degree of swivel - preventing the ball from rolling over in the housing.
- The ball is held in place with a Viton o-ring which allows the ball to be easily changed and keeps out dirt and contaminants.
- Replacement balls and o-rings can be ordered separately. It is recommended the o-ring be replaced when the ball is replaced.



- These Replaceable Pad Style Swivots are a modular component system that allows the pad and ball cup to swivel, tilt, clamp, grip, hold, position or secure work pieces. The internal ball cup allows the pad to swivel 360 degrees and tilt at varying degrees in any direction from the centerline.
- The interchangeable parts help to speed set ups and changeovers. The Replaceable Pads allow you to easily change the pad when worn or another style is needed for a job.
- The pad can easily be replaced by unscrewing the lock screw which holds the pad into the ball cup.
- The ball cup is held in place with an o-ring which allows the pad to swivel and keeps out dirt and contaminants.



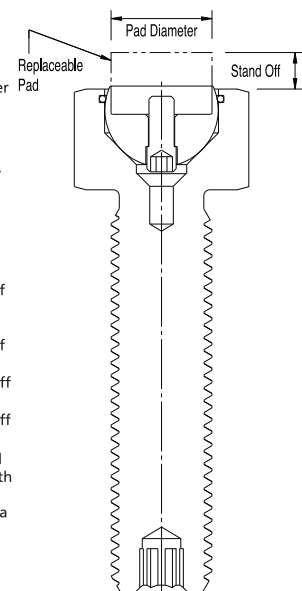
Tightening Torque Calculator

To calculate the approximate tightening torque (in/lb) required to achieve a required force, multiply the force by the appropriate factor listed below. Assumes no lubrication threaded into steel. Use as a guideline only.

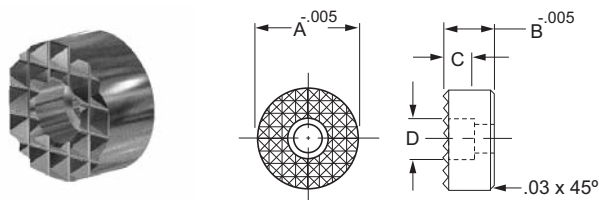
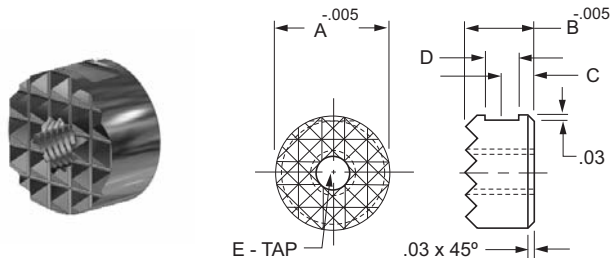
TIGHTEN TORQUE CALCULATOR			
THREAD	FACTOR	THREAD	FACTOR
10-24	.036	1/2-13	.093
10-32	.035	1/2-20	.091
1/4-20	.047	5/8-11	.116
1/4-28	.046	5/8-18	.113
5/16-18	.059	3/4-10	.138
5/16-24	.058	3/4-16	.135
3/8-16	.070	1-8	.183
3/8-24	.068	1-14	.180

To select the proper pad:

1. Determine the diameter of the pad for the housing assembly. This can be found on the following pages under "Replaceable Pad Dia."
 2. Determine the "Stand Off" dimension required using the information below:
 - 3/8" Pad Height provides 1/8" Stand Off
 - 1/2" Pad Height provides 1/4" Stand Off
 - 10mm Pad Height provides 4mm Stand Off
 - 12mm Pad Height provides 6mm Stand Off
 3. Select any Round Fixed Gripper or Rest Pad with the proper diameter and stand off that has a tapped hole.
- If you need additional assistance selecting the proper pad, please feel free to contact us.



GRIPPERS



FIXED GRIPPERS

Round Style - M-2 Speed Steel - Case Hardened - Black Oxide Finish

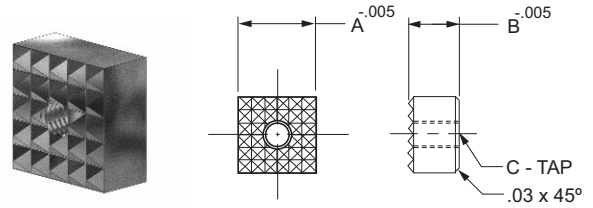
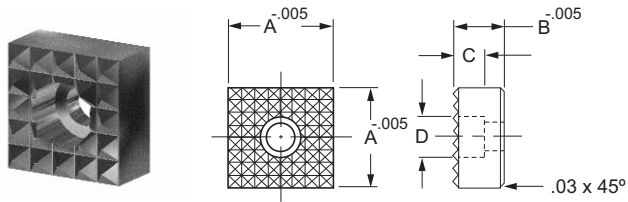
P/N	DIMENSIONS					TOOTH PATTERN
	A	B	C	D	E	
540-02	3/8	3/8	11/64	3/16	10-32	EXTRA FINE
540-021	3/8	1/2	15/64	3/16	10-32	EXTRA FINE
540-05	1/2	3/8	11/64	3/16	10-32	FINE
540-06	1/2	3/8	11/64	3/16	10-32	EXTRA FINE
540-08	1/2	1/2	15/64	3/16	10-32	FINE
540-09	1/2	1/2	15/64	3/16	10-32	COARSE
540-10	1/2	1/2	11/64	3/16	10-32	EXTRA FINE
540-11	1/2	.651	19/64	3/16	10-32	FINE
540-12	5/8	3/8	11/64	3/16	1/4-28	EXTRA FINE
540-13	5/8	3/8	11/64	3/16	1/4-28	COARSE
540-131	5/8	1/2	15/64	3/16	1/4-28	FINE
540-132	5/8	1/2	15/64	3/16	1/4-28	EXTRA FINE
540-133	5/8	1/2	15/64	3/16	1/4-28	COARSE
540-14	5/8	3/8	11/64	3/16	1/4-28	FINE
540-17	3/4	3/8	11/64	3/16	1/4-28	FINE
540-18	3/4	3/8	11/64	3/16	1/4-28	COARSE
540-181	3/4	1/2	15/64	3/16	1/4-28	FINE
540-182	3/4	1/2	15/64	3/16	1/4-28	EXTRA FINE
540-183	3/4	1/2	15/64	3/16	1/4-28	COARSE
540-19	3/4	3/8	11/64	3/16	1/4-28	EXTRA FINE
540-20	1	3/8	11/64	3/16	1/4-28	FINE
540-21	1	3/8	11/64	3/16	1/4-28	COARSE
540-22	1	3/8	11/64	3/16	1/4-28	EXTRA FINE
540-221	1	1/2	15/64	3/16	1/4-28	COARSE
540-222	1	1/2	15/64	3/16	1/4-28	FINE
540-223	1	1/2	15/64	3/16	1/4-28	EXTRA FINE

FIXED GRIPPERS WITH COUNTERBORE

Round Style - M-2 Speed Steel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					TOOTH PATTERN
	A	B	C	D		
540-30	1/2	3/8	7/32	#8 SCHS		FINE
540-31	1/2	3/8	7/32	#8 SCHS		EXTRA FINE
540-32	1/2	1/2	7/32	#8 SCHS		FINE
540-33	1/2	1/2	7/32	#8 SCHS		EXTRA FINE
540-34	5/8	3/8	7/32	#8 SCHS		FINE
540-35	5/8	3/8	7/32	#8 SCHS		EXTRA FINE
540-36	5/8	1/2	7/32	#8 SCHS		FINE
540-37	5/8	1/2	7/32	#8 SCHS		EXTRA FINE
540-38	3/4	3/8	1/4	#10 SCHS		FINE
540-39	3/4	3/8	1/4	#10 SCHS		EXTRA FINE
540-40	3/4	1/2	1/4	#10 SCHS		FINE
540-41	3/4	1/2	1/4	#10 SCHS		EXTRA FINE
540-43	1	1/2	5/16	1/4" SCHS		FINE
540-44	1	1/2	5/16	1/4" SCHS		EXTRA FINE

GRIPPERS



FIXED GRIPPERS WITH COUNTERBORE

Square Style - M-2 Speed Steel - Case Hardened - Black Oxide Finish

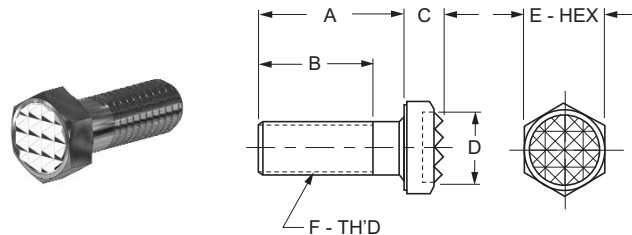
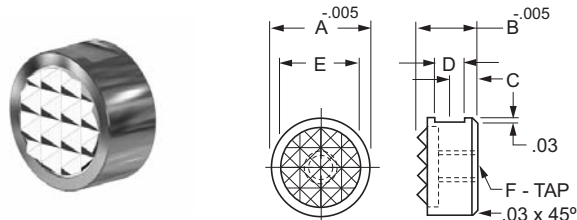
P/N	DIMENSIONS				
	A	B	C	D	TOOTH PATTERN
540-45	1/2	3/8	1/4	#10 SCHS	FINE
540-451	1/2	3/8	1/4	#10 SCHS	EXTRA FINE
540-452	1/2	1/2	1/4	#10 SCHS	FINE
540-453	1/2	1/2	1/4	#10 SCHS	EXTRA FINE
540-454	5/8	3/8	1/4	#10 SCHS	FINE
540-455	5/8	3/8	1/4	#10 SCHS	EXTRA FINE
540-456	5/8	1/2	1/4	#10 SCHS	FINE
540-457	5/8	1/2	1/4	#10 SCHS	EXTRA FINE
540-46	3/4	1/2	1/4	1/4" SCHS	FINE
540-47	3/4	1/2	1/4	1/4" SCHS	EXTRA FINE
540-49	1	1/2	1/4	1/4" SCHS	FINE
540-50	1	1/2	1/2	1/4" SCHS	COARSE
540-51	1	1/2	1/2	1/4" SCHS	EXTRA FINE

FIXED GRIPPERS

Square Style - M-2 Speed Steel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	TOOTH PATTERN
540-55	3/8	3/8	#10-32	EXTRA FINE
540-56	3/8	1/2	#10-32	EXTRA FINE
540-58	1/2	3/8	#10-32	FINE
540-59	1/2	3/8	#10-32	EXTRA FINE
540-591	1/2	1/2	#10-32	FINE
540-592	1/2	1/2	#10-32	EXTRA FINE
540-60	1/2	1/2	#10-32	COARSE
540-601	5/8	3/8	#10-32	FINE
540-602	5/8	3/8	#10-32	EXTRA FINE
540-603	5/8	1/2	#10-32	FINE
540-604	5/8	1/2	#10-32	EXTRA FINE
540-61	3/4	3/8	#10-32	FINE
540-62	3/4	3/8	#10-32	COARSE
540-63	3/4	3/8	#10-32	EXTRA FINE
540-631	3/4	1/2	#10-32	FINE
540-632	3/4	1/2	#10-32	EXTRA FINE
540-64	1	3/8	1/4-28	FINE
540-65	1	3/8	1/4-28	COARSE
540-66	1	3/8	1/4-28	EXTRA FINE
540-67	1	1/2	1/4-28	FINE
540-68	1	1/2	1/4-28	EXTRA FINE

GRIPPERS



FIXED GRIPPERS

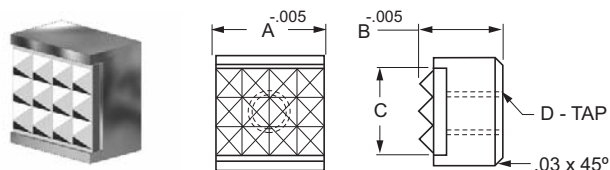
Round Style: Carbide Gripper Pad
Body: Steel Body - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					
	A	B	C	D	E	TOOTH PATTERN
540-72	3/8	3/8	11/64	3/16	#10-32	EXTRA FINE
540-73	3/8	1/2	15/64	3/16	#10-32	EXTRA FILE
540-75	1/2	1/2	15/64	3/16	#10-32	FILE
540-76	1/2	1/2	15/64	3/16	#10-32	EXTRA FINE
540-78	1/2	3/8	11/64	3/16	#10-32	FILE
540-79	1/2	3/8	11/64	3/16	#10-32	EXTRA FINE
540-81	1/2	.651	19/64	3/16	#10-32	FINE
540-84	5/8	3/8	11/64	3/16	1/4-28	FILE
540-85	5/8	3/8	11/64	3/16	1/4-28	EXTRA FINE
540-86	5/8	1/2	15/64	3/16	1/4-28	FINE
540-861	5/8	1-1/2	15/64	3/16	1/4-28	EXTRA FINE
540-87	3/4	3/8	11/64	3/16	1/4-28	FILE
540-88	3/4	3/8	11/64	3/16	1/4-28	EXTRA FINE
540-881	3/4	1/2	15/64	3/16	1/4-28	FILE
540-882	3/4	1/2	15/64	3/16	1/4-28	EXTRA FINE
540-90	1	3/8	11/64	3/16	1/4-28	FINE

THREADED ADJUSTABLE GRIPPERS

Hex Head: Carbide Gripper Pad
Body: Steel Body - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS						
	A	B	C	D	E	F	TOOTH PATTERN
541-000	1/2	1/2	13/64	5/16	7/16	1/4-20	EXTRA FINE
541-00	1	7/8	13/64	5/16	7/16	1/4-20	EXTRA FINE
541-001	1-1/2	1-1/2	13/64	5/16	7/16	1/4-20	EXTRA FINE
541-002	1/2	1/2	1/4	3/8	5/16	5/16-18	FINE
541-01	1	1	1/4	3/8	5/16	5/16-18	FINE
541-011	1-1/2	1-1/2	1/4	3/8	5/16	5/16-18	FINE
541-012	1/2	1/2	9/32	1/2	9/16	3/8-16	FINE
541-02	1	1	9/32	1/2	9/16	3/8-16	FINE
541-03	1-1/2	1-1/8	9/32	1/2	9/16	3/8-16	FINE
541-04	1	1	23/64	5/8	3/4	1/2-13	FINE
541-05	1-1/2	1-1/2	23/64	5/8	3/4	1/2-13	FINE
541-06	1	1	7/16	3/4	15/16	5/8-11	FINE
541-07	2	1-1/2	7/16	3/4	15/16	5/8-11	FINE
541-08	1	1	1/2	1	1-1/8	3/4-10	EXTRA FINE
541-09	2-1/2	1-3/4	1/2	1	1-1/8	3/4-10	EXTRA FINE



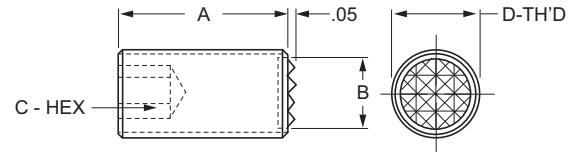
FIXED GRIPPERS

Square Style: Carbide Gripper Pad
Body: Steel Body - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	TOOTH PATTERN
540-95	1/2	3/8	13/32	#10-32	FINE
540-96	1/2	3/8	13/32	#10-32	EXTRA FINE
540-97	1/2	1/2	13/32	#10-32	FINE
540-98	1/2	1/2	13/32	#10-32	EXTRA FINE

GRIPPERS

The threaded body allows the user to adjust the height of the gripper. The internal hex allows for adjustment from the back.

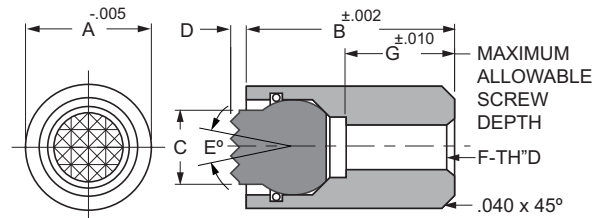


THREADED ADJUSTABLE GRIPPERS

Threaded Body: Carbide Gripper Pad - Body: Steel Body - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS				
	A	B	C	D	TOOTH PATTERN
541-19	1/2	1/4	3/16	3/8-16	EXTRA FINE
541-20	1	1/4	3/16	3/8-16	EXTRA FINE
541-201	2	1/4	3/16	3/8-16	EXTRA FINE
541-202	3	1/4	3/16	3/8-16	EXTRA FINE
541-21	1	3/8	1/4	1/2-13	FINE
541-22	2	3/8	1/4	1/2-13	FINE
541-221	3	3/8	1/4	1/2-13	FINE
541-222	3/4	3/8	1/4	1/2-13	FINE
541-23	1	7/16	5/16	5/8-11	FINE
541-24	2	7/16	5/16	5/8-11	FINE
541-241	3	7/16	5/16	5/8-11	FINE
541-25	1	1/2	3/8	3/4-10	FINE
541-26	2	1/2	3/8	3/4-10	FINE
541-261	3	1/2	3/8	3/4-10	FINE

Cylindrical body allows for installation in small areas. The housing is tapped for backside fastening. A Viton o-ring holds the ball in place while keeping contaminants out and providing smooth ball movement.

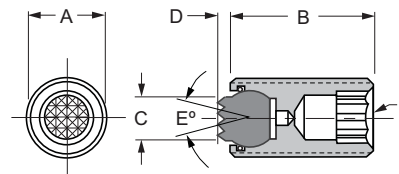


SWIVOTS - REPLACEABLE SWIVEL BALL

Replaceable Ball: M-2 Speed Steel - Case Hardened - Housing: Alloy Steel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS								TOOTH PATTERN	LOAD RATING (LBS)
	A	B	C	D	E	F	G	BALL DIAMETER		
541-30	3/8	5/16	5/32	1/16	28	4-40	1/4	3/16	SUPER FINE	1835
541-31	3/8	7/16	5/32	1/16	28	4-40	5/16	3/16	SUPER FINE	1835
541-32	3/8	11/16	5/32	1/16	28	4-40	5/16	3/16	SUPER FINE	1835
541-33	7/16	3/8	1/4	1/16	28	8/32	5/32	9/32	SUPER FINE	3339
541-34	7/16	15/16	1/4	1/16	28	8/32	1/2	9/32	SUPER FINE	3339
541-35	1/2	1/2	5/16	1/16	28	10-32	5/32	3/8	EXTRA FINE	4697
541-36	1/2	1	5/16	1/16	28	10-32	5/32	3/8	EXTRA FINE	4697
541-37	5/8	3/4	3/8	1/8	34	1/4-28	1/4	1/2	EXTRA FINE	5949
541-38	13/16	7/8	1/2	1/8	40	5/16-24	11/32	5/8	FINE	10925
541-39	15/16	7/8	5/8	1/8	34	3/8-24	9/32	3/4	FINE	13325

The replaceable serrated ball swivel to allow for self-alignment on uneven surfaces. A Viton o-ring holds the ball in place while keeping contaminants out and providing smooth ball movement.



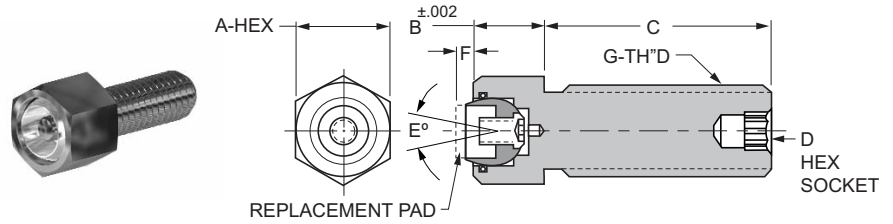
SWIVOTS - REPLACEABLE SWIVEL BALL

Replaceable Ball: M-2 Speed Steel - Case Hardened - Housing: Alloy Steel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS								
	A	B	C	D	E	F	BALL DIAMETER	TOOTH PATTERN	LOAD RATING (LBS)
541-40	3/8-16	1/2	5/32	1/16	28	3/16	3/16	SUPER FINE	1763
541-401	3/8-16	1	5/32	1/16	28	3/16	3/16	SUPER FINE	1763
541-402	3/8-16	2	5/32	1/16	28	3/16	3/16	SUPER FINE	1763
541-403	3/8-16	3	5/32	1/16	28	3/16	3/16	SUPER FINE	1763
541-41	1/2-13	3/4	1/4	1/16	28	9/32	1/4	SUPER FINE	4527
541-411	1/2-13	1	1/4	1/16	28	9/32	1/4	SUPER FINE	4527
541-412	1/2-13	2	1/4	1/16	28	9/32	1/4	SUPER FINE	4527
541-413	1/2-13	3	1/4	1/16	28	9/32	1/4	SUPER FINE	4527
541-42	5/8-11	1	5/16	1/16	28	5/16	5/16	EXTRA FINE	6131
541-43	5/8-11	2	5/16	1/16	28	5/16	5/16	EXTRA FINE	6131
541-431	5/8-11	3	5/16	1/16	28	5/16	25/16	EXTRA FINE	6131
541-432	3/4-10	1	3/8	1/8	34	3/8	1/2	EXTRA FINE	8150
541-433	3/4-10	2	3/8	1/8	34	3/8	1/2	EXTRA FINE	8150
541-434	3/4-10	3	3/8	1/8	34	3/8	1/2	EXTRA FINE	8150
541-435	1-8	1	1/2	1/8	40	3/8	5/8	FINE	14757
541-436	1-8	2	1/2	1/8	40	3/8	5/8	FINE	14757
541-437	1-8	3	1/2	1/8	40	3/8	5/8	FINE	14757

The replaceable pad swivels to allow for self-alignment on uneven surfaces. Select any fixed gripper or rest pad with the proper diameter and tapped hole.

- * F1-stand off 3/8" height pad.
- F2-stand off 1/2" height pad.



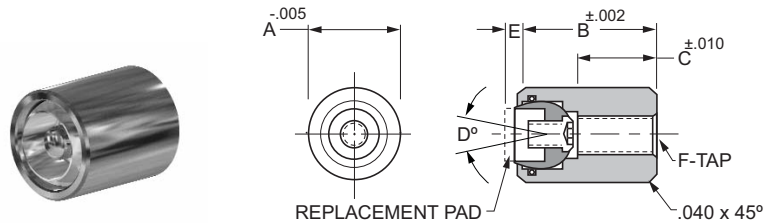
SWIVOTS - REPLACEABLE SWIVEL BALL

Hex Head - Cup for Replaceable Pad: 440C Stainless Steel - Case Hardened - Housing: Alloy Steel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS										
	A	B	C	D	E	F* STAND OFF 1	F* STAND OFF 2	G	BALL DIAMETER	REPLACEMENT PAD DIA.	LOAD RATING (LBS)
541-55	5/8	1/2	1/2	1/8	20	1/8	1/4	3/8-16	1/2	3/8	3446
541-56	5/8	1/2	1	1/8	20	1/8	1/4	3/8-16	1/2	3/8	3446
541-57	5/8	1/2	1-1/2	1/8	20	1/8	1/4	3/8-16	1/2	3/8	3446
541-60	13/16	5/8	1	3/16	24	1/8	1/4	1/2-13	5/8	1/2	5937
541-61	13/16	5/8	1-1/2	3/16	24	1/8	1/4	1/2-13	5/8	1/2	5937
541-65	15/16	11/16	1	1/4	22	1/8	1/4	5/8-11	3/4	5/8	9932
541-66	15/16	11/16	2	1/4	22	1/8	1/4	5/8-11	3/4	5/8	9932
541-70	1-1/8	3/4	1	5/16	20	1/8	1/4	3/4-10	7/8	3/4	14862
541-71	1-1/8	3/4	2-1/2	5/16	20	1/8	1/4	3/4-10	7/8	3/4	14862

The replaceable pad swivels to allow for self-alignment on uneven surfaces. Select any fixed gripper or rest pad with the proper diameter and tapped hole. Housing is tapped in back for backside fastening.

- * E1-stand off 3/8" height pad.
- E2-stand off 1/2" height pad.



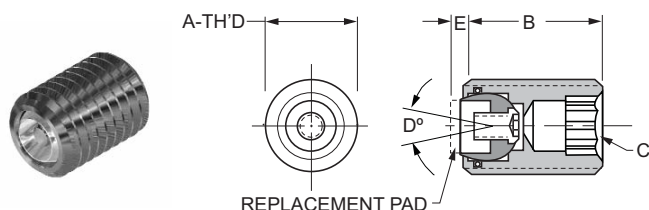
SWIVOTS - REPLACEABLE SWIVEL BALL

Base Design - Cup for Replaceable Pad: 440C Stainless Steel - Case Hardened - Housing: Alloy Steel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS									
	A	B	C	D	E* STAND OFF 1	E* STAND OFF 2	F	BALL DIAMETER	REPLACEMENT PAD DIA.	LOAD RATING (LBS)
541-75	5/8	3/4	15/64	22	1/8	1/4	1/4-28	1/2	3/8	5849
541-76	13/16	7/8	11/32	24	1/8	1/4	5/16-24	5/8	1/2	10925
541-77	15/16	7/8	9/32	22	1/8	1/4	3/8-24	3/4	5/8	13325
541-78	1-1/8	15/16	17/64	20	1/8	1/4	1/2-20	7/8	3/4	18863
541-79	1-1/2	1-1/4	7/16	22	1/8	1/4	1/2-20	7/8	1	34619

The replaceable pad swivels to allow for self-alignment on uneven surfaces. Select any fixed gripper or rest pad with the proper diameter and tapped hole.

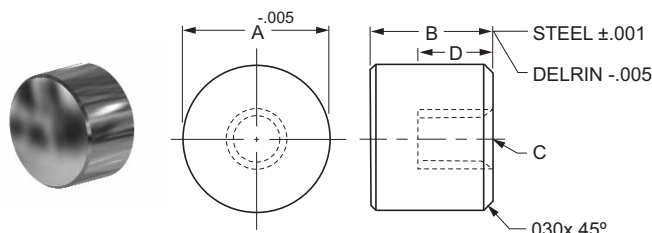
- * E1-stand off 3/8" height pad.
E2-stand off 1/2" height pad.



SWIVOTS - REPLACEABLE SWIVEL BALL

Threaded Body - Cup for Replaceable Pad: 440C Stainless Steel - Case Hardened
Housing: AlloySteel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS			
	A	B	C	D
541-84	3/4-10	1	3/8	32
541-85	3/4-10	2	3/8	32
P/N	E*	E*	REPLACEMENT PAD DIA.	LOAD RATING (LBS)
	STAND OFF 1	STAND OFF 2		
541-84	1/8	1/4	3/8	8150
541-85	1/8	1/4	3/8	8150



REST PADS

8620 Alloy Steel - Case Hardened - Black Oxide Finish

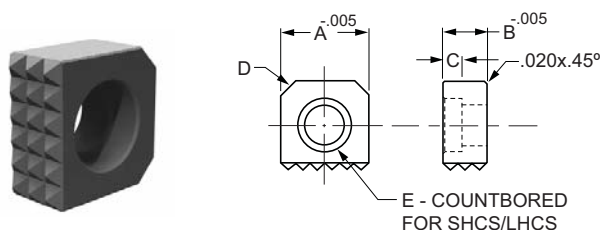
P/N	DIMENSIONS			
	A	B	C	D
541-90	3/8	3/8	3/16	#10-32
541-92	1/2	3/8	3/16	#10-32
541-93	1/2	1/2	3/16	#10-32
541-94	5/8	3/8	3/16	1/4-28
541-96	3/4	3/8	3/16	1/4-28
541-98	1	3/8	3/16	1/4-28

REST PADS

Delrin - Non-Marring and Non-Absorbing

P/N	DIMENSIONS			
	A	B	C	D
541-90D	3/8	3/8	3/16	#10-32
541-92D	1/2	3/8	3/16	#10-32
541-93D	1/2	1/2	3/16	#10-32
541-94D	5/8	3/8	3/16	1/4-28
541-96D	3/4	3/8	3/16	1/4-28
541-98D	1	3/8	3/16	1/4-28

These Square serrated edge grippers have teeth on one side and are counter bored for mounted with socket head cap screws.



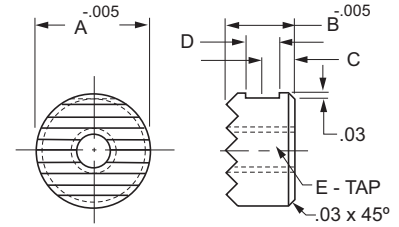
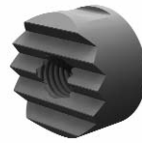
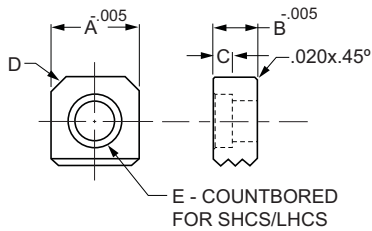
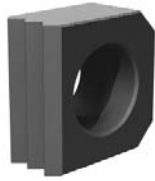
FIXED GRIPPERS

Serrated Edge - M2 High Speed Steel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS					TOOTH PATTERN
	A	B	C	D	E	
542-00	3/8	1/4	.146	1/16 x 45°	#6 SHCS	EXTRA FINE
542-01	3/8	3/8	.146	1/16 x 45°	#6 SHCS	EXTRA FINE
542-02	3/8	1/2	.146	1/16 x 45°	#6 SHCS	EXTRA FINE
542-03	1/2	1/4	.170	3/32 x 45°	#8 SHCS	FINE
542-04	1/2	3/8	.175	3/32 x 45°	#8 SHCS	FINE
542-05	1/2	1/2	.175	3/32 x 45°	#8 SHCS	FINE
542-06	5/8	1/4	.130	1/8 x 45°	1/4" LHCS	FINE
542-07	5/8	3/8	.130	1/8 x 45°	1/4" LHCS	FINE
542-08	5/8	1/2	.130	1/8 x 45°	1/4" LHCS	FINE
542-09	3/4	1/4	.161	1/8 x 45°	5/16" LHCS	FINE
542-10	3/4	3/8	.161	1/8 x 45°	5/16" LHCS	FINE
542-11	3/4	1/2	.161	1/8 x 45°	5/16" LHCS	FINE
542-12	1	1/4	.194	1/8 x 45°	3/8" LHCS	FINE
542-13	1	3/8	.194	1/8 x 45°	3/8" LHCS	FINE
542-14	1	1/2	.194	1/8 x 45°	3/8" LHCS	FINE

GRIPPERS

These square edge grippers have straight serrations on one side and are counter bored for mounted with socket head cap screws.



FIXED GRIPPERS

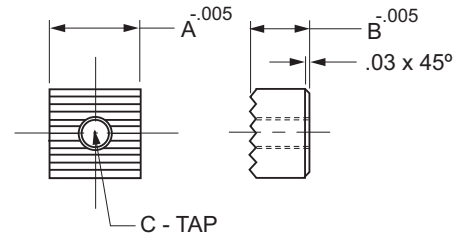
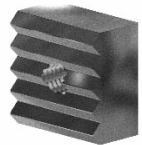
Straight Serrated Edge - M2 High Speed Steel
Case Hardened - Black Oxide Finish

FIXED GRIPPERS						
Straight Serrated Edge - M2 High Speed Steel Case Hardened - Black Oxide Finish						
P/N	DIMENSIONS					TOOTH PATTERN
	A	B	C	D	E	
542-15	3/8	1/4	.200	1/16 x 45°	#6 SHCS	EXTRA FINE
542-16	3/8	3/8	.200	1/16 x 45°	#6 SHCS	EXTRA FINE
542-17	3/8	1/2	.200	1/16 x 45°	#6 SHCS	EXTRA FINE
542-18	1/2	1/4	.220	3/32 x 45°	#8 SHCS	FINE
542-19	1/2	3/8	.220	3/32 x 45°	#8 SHCS	FINE
542-20	1/2	1/2	.220	3/32 x 45°	#8 SHCS	FINE
542-21	5/8	1/4	.130	1/8 x 45°	1/4" LHCS	FINE
542-22	5/8	3/8	.130	1/8 x 45°	1/4" LHCS	FINE
542-23	5/8	1/2	.130	1/8 x 45°	1/4" LHCS	FINE
542-24	3/4	1/4	.161	1/8 x 45°	5/16" LHCS	FINE
542-25	3/4	3/8	.161	1/8 x 45°	5/16" LHCS	FINE
542-26	3/4	1/2	.161	1/8 x 45°	5/16" LHCS	FINE
542-27	1	1/4	.194	1/8 x 45°	3/8" LHCS	FINE
542-28	1	3/8	.194	1/8 x 45°	3/8" LHCS	FINE
542-29	1	1/2	.194	1/8 x 45°	3/8" LHCS	FINE

FIXED GRIPPERS

Round Style - Straight Serrated - M2 High Speed Steel
Case Hardened - Black Oxide Finish

FIXED GRIPPERS						
Round Style - Straight Serrated - M2 High Speed Steel Case Hardened - Black Oxide Finish						
P/N	DIMENSIONS					TOOTH PATTERN
	A	B	C	D	E	
542-40	3/8	3/8	11/64	3/16	#10-32	EXTRA FINE
542-41	3/8	1/2	15/64	3/16	#10-32	EXTRA FINE
542-42	1/2	3/8	11/64	3/16	#10-32	FINE
542-43	1/2	1/2	15/64	3/16	#10-32	FINE
542-44	5/8	3/8	11/64	3/16	1/4-28	FINE
542-45	5/8	1/2	15/64	3/16	1/4-28	FINE
542-46	3/4	3/8	11/64	3/16	1/4-28	FINE
542-47	3/4	1/2	15/64	3/16	1/4-28	FINE
542-48	1	3/8	11/64	3/16	1/4-28	FINE
542-49	1	1/2	15/64	3/16	1/4-28	FINE

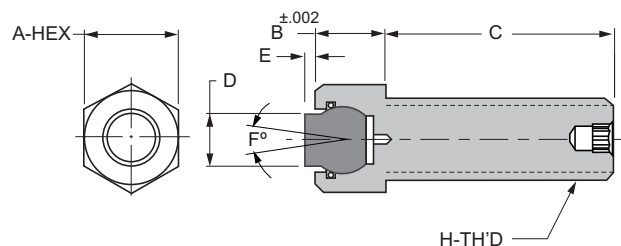


FIXED GRIPPERS

Square Style - Straight Serrated - M2 High Speed Steel
Case Hardened - Black Oxide Finish

FIXED GRIPPERS				
Square Style - Straight Serrated - M2 High Speed Steel Case Hardened - Black Oxide Finish				
P/N	DIMENSIONS			
	A	B	C	TOOTH PATTERN
542-50	3/8	3/8	#10-32	EXTRA FINE
542-51	3/8	1/2	#10-32	EXTRA FINE
542-52	1/2	3/8	#10-32	FINE
542-53	1/2	1/2	#10-32	FINE
542-54	5/8	3/8	#10-32	FINE
542-55	5/8	1/2	#10-32	FINE
542-56	3/4	3/8	#10-32	FINE
542-57	3/4	1/2	#10-32	FINE
542-58	1	3/8	1/4-28	FINE
542-59	1	1/2	1/4-28	FINE

The replaceable flat ball swivels to allow for self-alignment on uneven surfaces. A Viton o-ring holds the ball in place while keeping contaminants out and providing smooth ball movement.

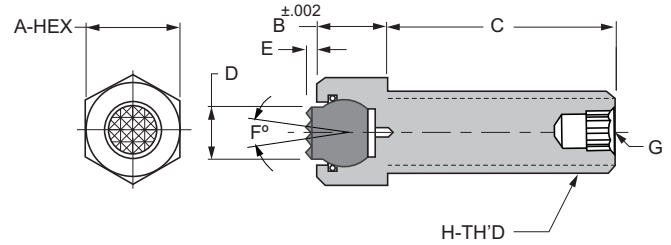


SWIVOTS - REPLACEABLE SWIVEL BALL

Flat Tip - Hex Head - Replaceable Ball: M-2 Speed Steel - Case Hardened - Housing: Alloy Steel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS									
	A	B	C	D	E	F	G	H	BALL DIAMETER	LOAD RATING (LBS)
542-60	3/8	1/4	1/2	5/32	1/16	28	-	10-24	3/16	1176
542-61	3/8	1/4	1	5/32	1/16	28	-	10-24	3/16	1176
542-62	7/16	5/16	1/2	1/4	1/16	28	-	1/4-20	9/32	2441
542-63	7/16	5/16	1	1/4	1/16	28	-	1/4-20	9/32	2441
542-64	7/16	5/16	1-1/2	1/4	1/16	28	-	1/4-20	9/32	2441
542-65	1/2	3/8	1/2	5/16	1/16	28	-	5/16-18	3/8	2792
542-66	1/2	3/8	1	5/16	1/16	28	-	5/16-18	3/8	2792
542-67	1/2	3/8	1-1/2	5/16	1/16	28	1/8	5/16-18	3/8	2792
542-68	5/8	1/2	1/2	3/8	1/8	34	1/8	3/8-16	1/2	3446
542-69	5/8	1/2	1	3/8	1/8	34	1/8	3/8-16	1/2	3446
542-70	5/8	1/2	1-1/2	3/8	1/8	34	1/8	3/8-16	1/2	3446
542-71	13/16	5/8	1	1/2	1/8	40	3/16	1/2-13	5/8	5937
542-72	13/16	5/8	1-1/2	1/2	1/8	40	3/16	1/2-13	5/8	5937
542-73	15/16	11/16	1	5/8	1/8	34	1/4	5/8-11	3/4	9932
542-74	15/16	11/16	2	5/8	1/8	34	1/4	5/8-11	3/4	9932

The replaceable serrated ball swivels to allow for self-alignment on uneven surfaces. A Viton o-ring holds the ball in place while keeping contaminants out and providing smooth ball movement.

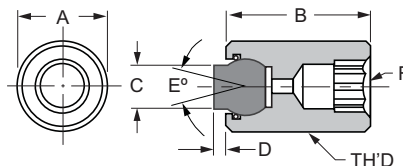


SWIVOTS - REPLACEABLE SWIVEL BALL

Serrated Tip - Hex Head - Replaceable Ball: M-2 Speed Steel - Case Hardened - Housing: Alloy Steel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS										
	A	B	C	D	E	F	G	H	BALL DIAMETER	TOOTH PATTERN	LOAD RATING (LBS)
542-60S	3/8	1/4	1/2	5/32	1/16	28	-	10-24	3/16	EXTRA FINE	1176
542-61S	3/8	1/4	1	5/32	1/16	28	-	10-24	3/16	EXTRA FINE	1176
542-62S	7/16	5/16	1/2	1/4	1/16	28	-	1/4-20	9/32	EXTRA FINE	2441
542-63S	7/16	5/16	1	1/4	1/16	28	-	1/4-20	9/32	EXTRA FINE	2441
542-64S	7/16	5/16	1-1/2	1/4	1/16	28	-	1/4-20	9/32	EXTRA FINE	2441
542-65S	1/2	3/8	1/2	5/16	1/16	28	-	5/16-18	3/8	EXTRA FINE	2792
542-66S	1/2	3/8	1	5/16	1/16	28	-	5/16-18	3/8	EXTRA FINE	2792
542-67S	1/2	3/8	1-1/2	5/16	1/16	28	-	5/16-18	3/8	EXTRA FINE	2792
542-68S	5/8	1/2	1/2	3/8	1/8	34	1/8	3/8-16	1/2	FINE	3446
542-69S	5/8	1/2	1	3/8	1/8	34	1/8	3/8-16	1/2	FINE	3446
542-70S	5/8	1/2	1-1/2	3/8	1/8	34	1/8	3/8-16	1/2	FINE	3446
542-71S	13/16	5/8	1	1/2	1/8	40	3/16	1/2-13	5/8	FINE	5937
542-72S	13/16	5/8	1-1/2	1/2	1/8	40	3/16	1/2-13	5/8	FINE	5937
542-73S	15/16	11/16	1	5/8	1/8	34	1/4	5/8-11	3/4	FINE	9932
542-74S	15/16	11/16	2	5/8	1/8	34	1/4	5/8-11	3/4	FINE	9932

The replaceable flat ball swivels to allow for self-alignment on uneven surfaces. A Viton o-ring holds the ball in place while keeping contaminants out and providing smooth ball movement.

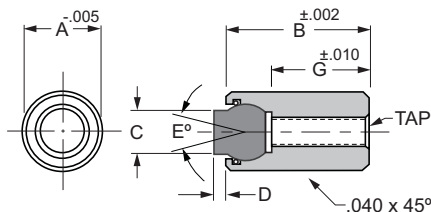


SWIVOTS - REPLACEABLE SWIVEL BALL

Flat Tip - Threaded Body - Replaceable Ball: M-2 Speed Steel - Case Hardened - Housing: Alloy Steel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS							
	A	B	C	D	E	F	BALL DIAMETER	LOAD RATING (LBS)
542-75	3/8-16	1/2	5/32	1/16	28	3/16	3/16	1763
542-751	3/8-16	1	5/32	1/16	28	3/16	3/16	1763
542-752	3/8-16	2	5/32	1/16	28	3/16	3/16	1763
542-753	3/8-16	3	5/32	1/16	28	3/16	3/16	1763
542-76	1/2-13	3/4	1/4	1/16	28	9/32	9/32	4523
542-761	1/2-13	1	1/4	1/16	28	9/32	9/32	4523
542-762	1/2-13	2	1/4	1/16	28	9/32	9/32	4523
542-763	1/2-13	3	1/4	1/16	28	9/32	9/32	4523
542-77	5/8-11	1	5/16	1/16	28	3/8	3/8	6131
542-771	5/8-11	2	5/16	1/16	28	3/8	3/8	6131
542-772	5/8-11	3	5/16	1/16	28	3/8	3/8	6131
542-78	3/4-10	1	3/8	1/8	34	1/2	1/2	8150
542-781	3/4-10	2	3/8	1/8	34	1/2	1/2	8150
542-782	3/4-10	3	3/8	1/8	34	1/2	1/2	8150
542-783	1-8	1	1/2	1/8	40	3/8	5/8	14757
542-784	1-8	2	1/2	1/8	40	3/8	5/8	14757
542-785	1-8	3	1/2	1/8	40	3/8	5/8	14757

The replaceable flat ball swivels to allow for self-alignment on uneven surfaces. A Viton o-ring holds the ball in place while keeping contaminants out and providing smooth ball movement.



SWIVOTS - REPLACEABLE SWIVEL BALL

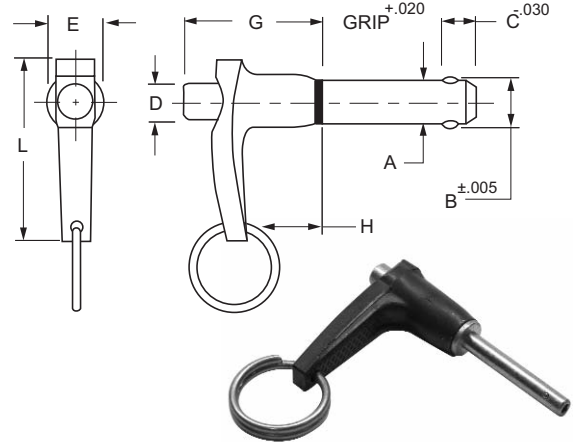
Flat Tip - Base Design - Replaceable Ball: M-2 Speed Steel - Case Hardened - Housing: Alloy Steel - Case Hardened - Black Oxide Finish

P/N	DIMENSIONS							
	A	B	C	D	E	F	BALL DIAMETER	LOAD RATING (LBS)
542-80	3/8	5/16	5/32	1/16	28	1/4	3/16	1835
542-801	3/8	7/16	5/32	1/16	28	5/16	3/16	1835
542-802	3/8	11/16	5/32	1/16	28	5/16	3/16	1835
542-81	7/16	3/8	1/4	1/16	28	5/32	9/32	3339
542-811	7/16	15/16	1/4	1/16	28	1/2	9/32	3339
542-82	1/2	1/2	5/16	1/16	28	5/32	3/8	4697
542-821	1/2	1	5/16	1/16	28	5/8	3/8	4697
542-83	5/8	3/4	3/8	1/8	34	1/4	1/2	5849
542-84	13/16	7/8	1/2	1/8	40	11/32	5/8	10925
542-85	15/16	7/8	1/8	1/8	34	9/32	3/4	13325

SINGLE ACTING KWIK LOK™ PINS

NOTES:

- Heat treat alloy steel 4130 36 to 40 Rc or stainless steel.
- Balls maybe rotated to positions other than shown.
- Ball hardness 58-62 Rc.
- If a four-ball pin is required for greater tension strength, add suffix "F" to standard call out.
Example: 550-13F.
- Carbon Steel and Alloy Steel parts Cad. Plate per QQ-P-416, Typell, Class2.
- Aluminum alloy parts anodize per MIL-C-5541 Type I or II, Class 2 Chemical film per MIL-C-5541 Class1A.
- Add "S" to part # for Stainless.



SINGLE ACTING KWIK LOK™ PINS - SERIES 550 L - HANDLES

DIMENSIONS

NOM. DIA.	A		B	C	D		E		G	H	L		DOUBLE SHEAR STEEL STRENGTH
	MAX	MIN			MAX	MIN	MAX	MIN			MAX	MIN	
3-16	.1885	.1870	.220	.260	.310	.250	.500	.380	1.270	.800	1.800	1.720	4600
1/4	.2485	.2470	.289	.290	.310	.250	.500	.380	1.270	.800	1.800	1.720	8200
5/16	.3110	.3095	.375	.330	.310	.250	.500	.380	1.270	.800	1.800	1.720	12800
3/8	.3735	.3720	.440	.365	.390	.300	.625	.510	1.450	.850	2.030	1.945	18400
1/2	.4985	.4970	.594	.460	.565	.435	.800	.630	1.600	.885	2.360	2.230	32800
5/8	.6235	.6220	.750	.580	.580	.450	.975	.810	1.700	.980	3.070	2.385	51200
3/4	.7485	.7470	.887	.670	.700	.570	1.000	.810	1.720	1.030	3.070	2.465	73600

SPECIFICATIONS

PART NAME	ALLOY STEEL	CORROSION RESISTANT
BODY & SPINDLE	STEEL 4130 (MIL-T-6736 OR MIL-6758)	CRES 17-4PH (AMS 5643) OR PH15-7MO (AMS 5657)
BALLS	CRES 440C (QQ-S-763)	CRES 440C (QQ-S-763)
BUTTONS	MILD STEEL (ASTM-A-108) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)	CRES 303 (ASTM-A-581/582) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)
"B" BUTTON HEAD	MILD STEEL (ASTM-A-108) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)	CRES 303 (ASTM-A-581/582) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)
"TA"/"LA" HEAD	ALUMINUM CASTING 380 (QQ-A-591)	ALUMINUM CASTING 380 (QQ-A-591)
"R" HANDLE RING	CRES 302 (ASTM-A-313)	CRES 302 (ASTM-A-313)
"R" HANDLE HEAD	MILD STEEL (ASTM-A-108)	CRES 303 (ASTM-A-581/582)
COLLAR (ON ALUM. HANDLES ONLY)	MILD STEEL (ASTM-A-108 OR 366)	CRES 300 SERIES (ASTM-A-581/582 OR QQ-S-766)
SPRING/ATTACHING RING	MUSIC WIRE (ASTM-A-228)	CRES 17-4PH (AMS 5678) OR 302 (ASTM-A-313)

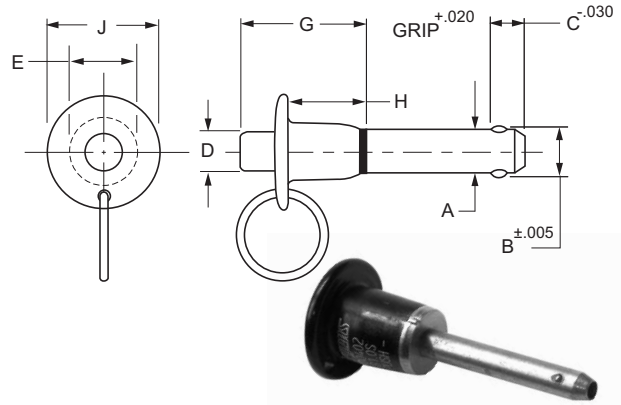
GRIP LENGTHS PART NUMBERS - L TYPE

PIN DIA.	1/2	1	1-1/2	2	2-1/2	3	3-1/2	4	5
3-16	550-00	550-01	550-02	550-03	550-04	550-05	550-06	550-07	550-09
1/4	550-10	550-11	550-12	550-13	550-14	550-15	550-16	550-17	550-19
5/16	550-20	550-21	550-22	550-23	550-24	550-25	550-26	550-27	550-29
3/8	550-30	550-31	550-32	550-33	550-34	550-35	550-36	550-37	550-39
1/2	550-40	550-41	550-42	550-43	550-44	550-45	550-46	550-47	550-49
5/8	550-50	550-51	550-52	550-53	550-54	550-55	550-56	550-57	550-59
3/4	550-60	550-61	550-62	550-63	550-64	550-65	550-66	550-67	550-69

SINGLE ACTING KWIK LOK™ PINS

NOTES:

- Heat treat alloy steel 4130 36 to 40 Rc or stainless steel.
- Balls maybe rotated to positions other than shown.
- Ball hardness 58-62 Rc.
- If a four-ball pin is required for greater tension strength, add suffix "F" to standard call out.
Example: 551-13F.
- Carbon Steel and Alloy Steel parts Cad. Plate per QQ-P-416, Typell, Class2.
- Aluminum alloy parts anodize per MIL-C-5541 Type I or II, Class 2 Chemical film per MIL-C-5541 Class1A.
- Add "S" to part # for Stainless.



SINGLE ACTING KWIK LOK™ PINS - SERIES 551 BUTTON HANDLE

DIMENSIONS

NOM. DIA.	A		B	C	D		E		G	H	J	DOUBLE SHEAR STEEL STRENGTH
	MAX	MIN			MAX	MIN	MAX	MIN				
3-16	.1885	.1870	.220	.260	.310	.250	.500	.380	.55	.800	.760	4600
1/4	.2485	.2470	.289	.290	.310	.250	.500	.380	.55	.800	.760	8200
5/16	.3110	.3095	.375	.330	.310	.250	.500	.380	.62	.800	.760	12800
3/8	.3735	.3720	.440	.365	.390	.300	.625	.510	.62	.850	.850	18400
1/2	.4985	.4970	.594	.460	.565	.435	.800	.630	.81	.885	.850	32800
5/8	.6235	.6220	.750	.580	.580	.450	.975	.810	1.00	.980	.905	51200
3/4	.7485	.7470	.887	.670	.700	.570	1.000	.810	1.20	1.030	.980	73600

SPECIFICATIONS

PART NAME	ALLOY STEEL	CORROSION RESISTANT
BODY & SPINDLE	STEEL 4130 (MIL-T-6736 OR MIL-6758)	CRES 17-4PH (AMS 5643) OR PH15-7MO (AMS 5657)
BALLS	CRES 440C (QQ-S-763)	CRES 440C (QQ-S-763)
BUTTONS	MILD STEEL (ASTM-A-108) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)	CRES 303 (ASTM-A-581/582) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)
"B" BUTTON HEAD	MILD STEEL (ASTM-A-108) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)	CRES 303 (ASTM-A-581/582) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)
"TA"/"LA" HEAD	ALUMINUM CASTING 380 (QQ-A-591)	ALUMINUM CASTING 380 (QQ-A-591)
"R" HANDLE RING	CRES 302 (ASTM-A-313)	CRES 302 (ASTM-A-313)
"R" HANDLE HEAD	MILD STEEL (ASTM-A-108)	CRES 303 (ASTM-A-581/582)
COLLAR (ON ALUM. HANDLES ONLY)	MILD STEEL (ASTM-A-108 OR 366)	CRES 300 SERIES (ASTM-A-581/582 OR QQ-S-766)
SPRING/ATTACHING RING	MUSIC WIRE (ASTM-A-228)	CRES 17-4PH (AMS 5678) OR 302 (ASTM-A-313)

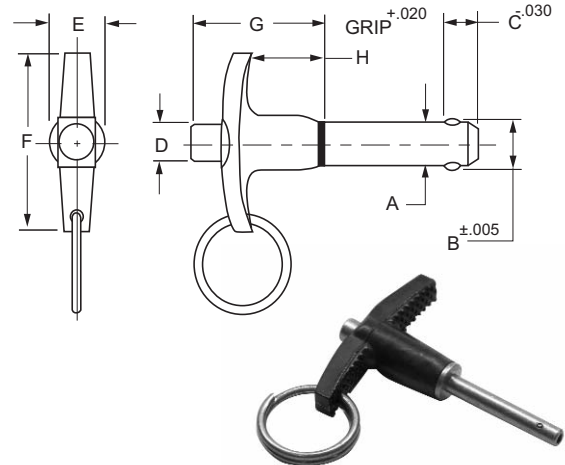
GRIP LENGTHS PART NUMBERS - B TYPE

PIN DIA.	1/2	1	1-1/2	2	2-1/2	3	3-1/2	4	5
3-16	551-00	551-01	551-02	551-03	551-04	551-05	551-06	551-07	551-09
1/4	551-10	551-11	551-12	551-13	551-14	551-15	551-16	551-17	551-19
5/16	551-20	551-21	551-22	551-23	551-24	551-25	551-26	551-27	551-29
3/8	551-30	551-31	551-32	551-33	551-34	551-35	551-36	551-37	551-39
1/2	551-40	551-41	551-42	551-43	551-44	551-45	551-46	551-47	551-49
5/8	551-50	551-51	551-52	551-53	551-54	551-55	551-56	551-57	551-59
3/4	551-60	551-61	551-62	551-63	551-64	551-65	551-66	551-67	551-69

SINGLE ACTING KWIK LOK™ PINS

NOTES:

- Heat treat alloy steel 4130 36 to 40 Rc or stainless steel.
- Balls maybe rotated to positions other than shown.
- Ball hardness 58-62 Rc.
- If a four-ball pin is required for greater tension strength, add suffix "F" to standard call out.
Example: 552-13F.
- Carbon Steel and Alloy Steel parts Cad. Plate per QQ-P-416, Typell, Class2.
- Aluminum alloy parts anodize per MIL-C-5541 Type I or II, Class 2 Chemical film per MIL-C-5541 Class1A.
- Add "S" to part # for Stainless.



SINGLE ACTING KWIK LOK™ PINS - SERIES 552 T - HANDLES

DIMENSIONS													
NOM. DIA.	A		B	C	D		E		F		G	H	DOUBLE SHEAR STEEL STRENGTH
	MAX	MIN			MAX	MIN	MAX	MIN	MAX	MIN			
3-16	.1885	.1870	.220	.260	.310	.250	.500	.380	1.815	1.750	1.270	.800	4600
1/4	.2485	.2470	.289	.290	.310	.250	.500	.380	1.815	1.750	1.270	.800	8200
5/16	.3110	.3095	.375	.330	.310	.250	.500	.380	1.815	1.750	1.270	.800	12800
3/8	.3735	.3720	.440	.365	.390	.300	.625	.510	2.065	1.935	1.450	.850	18400
1/2	.4985	.4970	.594	.460	.565	.435	.800	.630	2.345	2.220	1.600	.885	32800
5/8	.6235	.6220	.750	.580	.580	.450	.975	.810	3.100	2.250	1.700	.980	51200
3/4	.7485	.7470	.887	.670	.700	.570	1.000	.810	3.100	2.250	1.720	1.030	73600

SPECIFICATIONS

PART NAME	ALLOY STEEL	CORROSION RESISTANT
BODY & SPINDLE	STEEL 4130 (MIL-T-6736 OR MIL-6758)	CRES 17-4PH (AMS 5643) OR PH15-7MO (AMS 5657)
BALLS	CRES 440C (QQ-S-763)	CRES 440C (QQ-S-763)
BUTTONS	MILD STEEL (ASTM-A-108) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)	CRES 303 (ASTM-A-581/582) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)
"B" BUTTON HEAD	MILD STEEL (ASTM-A-108) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)	CRES 303 (ASTM-A-581/582) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)
"TA"/"LA" HEAD	ALUMINUM CASTING 380 (QQ-A-591)	ALUMINUM CASTING 380 (QQ-A-591)
"R" HANDLE RING	CRES 302 (ASTM-A-313)	CRES 302 (ASTM-A-313)
"R" HANDLE HEAD	MILD STEEL (ASTM-A-108)	CRES 303(ASTM-A-581/582)
COLLAR(ON ALUM. HANDLES ONLY)	MILD STEEL (ASTM-A-108 OR 366)	CRES 300 SERIES (ASTM-A-581/582 OR QQ-S-766)
SPRING/ATTACHING RING	MUSIC WIRE (ASTM-A-228)	CRES 17-4PH (AMS 5678) OR 302 (ASTM-A-313)

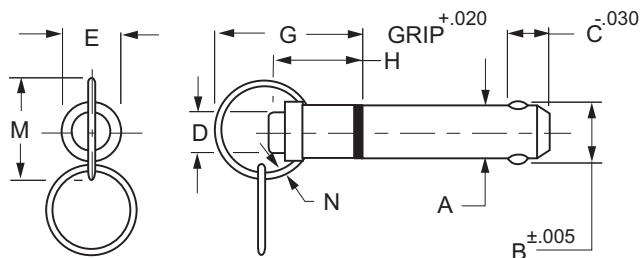
GRIP LENGTHS PART NUMBERS - T TYPE

PIN DIA.	1/2	1	1-1/2	2	2-1/2	3	3-1/2	4	5
3-16	552-00	552-01	552-02	552-03	552-04	552-05	552-06	552-07	552-09
1/4	552-10	552-11	552-12	552-13	552-14	552-15	552-16	552-17	552-19
5/16	552-20	552-21	552-22	552-23	552-24	552-25	552-26	552-27	552-29
3/8	552-30	552-31	552-32	552-33	552-34	552-35	552-36	552-37	552-39
1/2	552-40	552-41	552-42	552-43	552-44	552-45	552-46	552-47	552-49
5/8	552-50	552-51	552-52	552-53	552-54	552-55	552-56	552-57	552-59
3/4	552-60	552-61	552-62	552-63	552-64	552-65	552-66	552-67	551-69

SINGLE ACTING KWIK LOK™ PINS

NOTES:

- Heat treat alloy steel 4130 36 to 40 Rc or stainless steel.
- Balls maybe rotated to positions other than shown.
- Ball hardness 58-62 Rc.
- If a four-ball pin is required for greater tension strength, add suffix "F" to standard call out.
Example: 550-13F.
- Carbon Steel and Alloy Steel parts Cad. Plate per QQ-P-416, Typell, Class2.
- Aluminum alloy parts anodize per MIL-C-5541 Type I or II, Class 2 Chemical film per MIL-C-5541 Class1A.
- Add "S" to part # for Stainless.



SINGLE ACTING KWIK LOK™ PINS - SERIES 553 RING HANDLES

DIMENSIONS

NOM. DIA.	A		B	C	D		E		G	H	M	N	DOUBLE SHEAR STEEL STRENGTH
	MAX	MIN			MAX	MIN	MAX	MIN					
3-16	.1885	.1870	.220	.260	.310	.250	.500	.380	1.270	.800	1.1	.10	4600
1/4	.2485	.2470	.289	.290	.310	.250	.500	.380	1.270	.800	1.1	.10	8200
5/16	.3110	.3095	.375	.330	.310	.250	.500	.380	1.270	.800	1.1	.10	12800
3/8	.3735	.3720	.440	.365	.390	.300	.625	.510	1.450	.850	1.18	.10	18400
1/2	.4985	.4970	.594	.460	.565	.435	.800	.630	1.600	.885	1.35	.12	32800
5/8	.6235	.6220	.750	.580	.580	.450	.975	.810	1.700	.980	1.45	.12	51200
3/4	.7485	.7470	.887	.670	.700	.570	1.000	.810	1.720	1.030	1.8	.15	73600

SPECIFICATIONS

PART NAME	ALLOY STEEL	CORROSION RESISTANT
BODY & SPINDLE	STEEL 4130 (MIL-T-6736 OR MIL-6758)	CRES 17-4PH (AMS 5643) OR PH15-7MO (AMS 5657)
BALLS	CRES 440C (QQ-S-763)	CRES 440C (QQ-S-763)
BUTTONS	MILD STEEL (ASTM-A-108) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)	CRES 303 (ASTM-A-581/582) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)
"B" BUTTON HEAD	MILD STEEL (ASTM-A-108) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)	CRES 303 (ASTM-A-581/582) OR ALUM. 2024/2017 (QQ-A-225/6 OR /5)
"TA"/"LA" HEAD	ALUMINUM CASTING 380 (QQ-A-591)	ALUMINUM CASTING 380 (QQ-A-591)
"R" HANDLE RING	CRES 302 (ASTM-A-313)	CRES 302 (ASTM-A-313)
"R" HANDLE HEAD	MILD STEEL (ASTM-A-108)	CRES 303(ASTM-A-581/582)
COLLAR(ON ALUM. HANDLES ONLY)	MILD STEEL (ASTM-A-108 OR 366)	CRES 300 SERIES (ASTM-A-581/582 OR QQ-S-766)
SPRING/ATTACHING RING	MUSIC WIRE (ASTM-A-228)	CRES 17-4PH (AMS 5678) OR 302 (ASTM-A-313)

GRIP LENGTHS PART NUMBERS - R TYPE

PIN DIA.	1/2	1	1-1/2	2	2-1/2	3	3-1/2	4	5
3-16	553-00	553-01	553-02	553-03	553-04	553-05	553-06	553-07	553-09
1/4	553-10	553-11	553-12	553-13	553-14	553-15	553-16	553-17	553-19
5/16	553-20	553-21	553-22	553-23	553-24	553-25	553-26	553-27	553-29
3/8	553-30	553-31	553-32	553-33	553-34	553-35	553-36	553-37	553-39
1/2	553-40	553-41	553-42	553-43	553-44	553-45	553-46	553-47	553-49
5/8	553-50	553-51	553-52	553-53	553-54	553-55	553-56	553-57	553-59
3/4	553-60	553-61	553-62	553-63	553-64	553-65	553-66	553-67	553-69

SINGLE ACTING KWIK LOK™ PINS

SINGLE ACTING KWIK LOK™

All American Single Acting Kwik Lok™ Pins are certified to MS specifications

P/N	MS NO.	P/N	MS NO.	P/N	MS NO.	P/N	MS NO.
550-01	MS 17986-3-10	551-01	MS 17984-3-10	552-01	MS 17985-3-10	553-01	MS 17987-3-10
550-10	MS 17986-4-05	551-10	MS 17984-4-05	552-10	MS 17985-4-05	553-10	MS 17987-4-05
550-11	MS 17986-4-10	551-11	MS 17984-4-10	552-11	MS 17985-4-10	553-11	MS 17987-4-10
550-12	MS 17986-4-15	551-12	MS 17984-4-15	552-12	MS 17985-4-15	553-12	MS 17987-4-15
550-13	MS 17986-4-20	551-13	MS 17984-4-20	552-13	MS 17985-4-20	553-13	MS 17987-4-20
550-14	MS 17986-4-25	551-14	MS 17984-4-25	552-14	MS 17985-4-25	553-14	MS 17987-4-25
550-15	MS 17986-4-30	551-15	MS 17984-4-30	552-15	MS 17985-4-30	553-15	MS 17987-4-30
550-17	MS 17986-4-40	551-17	MS 17984-4-40	552-17	MS 17985-4-40	553-17	MS 17987-4-40
550-23	MS 17986-5-20	551-23	MS 17984-5-20	552-23	MS 17985-5-20	553-23	MS 17987-5-20
550-24	MS 17986-5-25	551-24	MS 17984-5-25	552-24	MS 17985-5-25	553-24	MS 17987-5-25
550-25	MS 17986-5-30	551-25	MS 17984-5-30	552-25	MS 17985-5-30	553-25	MS 17987-5-30
550-27	MS 17986-5-40	551-27	MS 17984-5-40	552-27	MS 17985-5-40	553-27	MS 17987-5-40
550-31	MS 17986-6-10	551-31	MS 17984-6-10	552-31	MS 17985-6-10	553-31	MS 17987-6-10
550-32	MS 17986-6-15	551-32	MS 17984-6-15	552-32	MS 17985-6-15	553-32	MS 17987-6-15
550-33	MS 17986-6-20	551-33	MS 17984-6-20	552-33	MS 17985-6-20	553-33	MS 17987-6-20
550-34	MS 17986-6-25	551-34	MS 17984-6-25	552-34	MS 17985-6-25	553-34	MS 17987-6-25
550-35	MS 17986-6-30	551-35	MS 17984-6-30	552-35	MS 17985-6-30	553-35	MS 17987-6-30
550-37	MS 17986-6-40	551-37	MS 17984-6-40	552-37	MS 17985-6-40	553-37	MS 17987-6-40
550-41	MS 17986-8-10	551-41	MS 17984-8-10	552-41	MS 17985-8-10	553-41	MS 17987-8-10
550-42	MS 17986-8-15	551-42	MS 17984-8-15	552-42	MS 17985-8-15	553-42	MS 17987-8-15
550-43	MS 17986-8-20	551-43	MS 17984-8-20	552-43	MS 17985-8-20	553-43	MS 17987-8-20
550-44	MS 17986-8-25	551-44	MS 17984-8-25	552-44	MS 17985-8-25	553-44	MS 17987-8-25
550-45	MS 17986-8-30	551-45	MS 17984-8-30	552-45	MS 17985-8-30	553-45	MS 17987-8-30
550-47	MS 17986-8-40	551-47	MS 17984-8-40	552-47	MS 17985-8-40	553-47	MS 17987-8-40
550-53	MS 17986-10-20	551-53	MS 17984-10-20	552-53	MS 17985-10-20	553-53	MS 17987-10-20
550-54	MS 17986-10-25	551-54	MS 17984-10-25	552-54	MS 17985-10-25	553-54	MS 17987-10-25
550-55	MS 17986-10-30	551-55	MS 17984-10-30	552-55	MS 17985-10-30	553-55	MS 17987-10-30
550-56	MS 17986-10-35	551-56	MS 17984-10-35	552-56	MS 17985-10-35	553-56	MS 17987-10-35
550-57	MS 17986-10-40	551-57	MS 17984-10-40	552-57	MS 17985-10-40	553-57	MS 17987-10-40
550-58	MS 17986-10-50	551-58	MS 17984-10-50	552-58	MS 17985-10-50	553-58	MS 17987-10-50
550-63	MS 17986-12-20	551-63	MS 17984-12-20	552-63	MS 17985-12-20	553-63	MS 17987-12-20
550-64	MS 17986-12-25	551-64	MS 17984-12-25	552-64	MS 17985-12-25	553-64	MS 17987-12-25
550-65	MS 17986-12-30	551-65	MS 17984-12-30	552-65	MS 17985-12-30	553-65	MS 17987-12-30
550-66	MS 17986-12-35	551-66	MS 17984-12-35	552-66	MS 17985-12-35	553-69	MS 17987-12-35
550-67	MS 17986-12-40	551-67	MS 17984-12-40	552-67	MS 17985-12-40	553-67	MS 17987-12-40
550-69	MS 17986-12-50	551-69	MS 17984-12-50	552-69	MS 17985-12-50	553-69	MS 17987-12-50

POSITIVE LOCK PINS

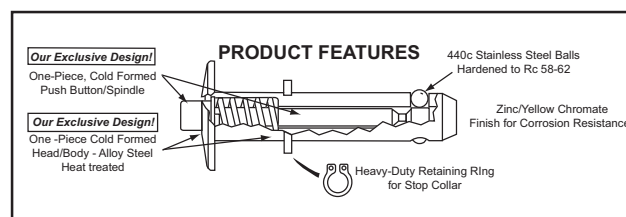
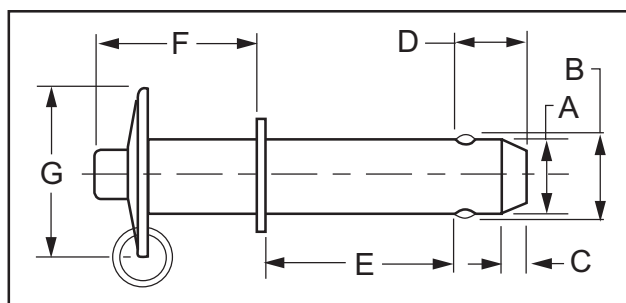
QUICK RELEASE SOLUTIONS POSITIVE LOCK PINS

P/N	STOCK SIZES DIAMETER X EFF. LENGTH	APPROXIMATE WEIGHT/POUNDS PER 100 PIECES
555-00	1/4 x 1/2	2.84
555-01	1/4 x 3/4	3.19
555-02	1/4 x 1	3.54
555-03	1/4 x 1-1/4	3.89
555-04	1/4 x 1-1/2	4.24
555-05	5/16 x 1	5.37
555-06	5/16 x 1-1/4	5.90
555-07	5/16 x 1-1/2	6.42
555-08	5/16 x 1-3/4	6.94
555-09	5/16 x 2	7.44
555-10	3/8 x 1	7.70
555-11	3/8 x 1-1/4	8.48
555-12	3/8 x 1-1/2	9.25
555-13	3/8 x 1-3/4	10.03
555-14	3/8 x 2	10.80
555-15	3/8 x 2-1/4	11.58
555-16	3/8 x 2-1/2	12.35
555-17	1/2 x 1	13.65
555-18	1/2 x 1-1/2	16.45
555-19	1/2 x 1-3/4	17.85
555-20	1/2 x 2	19.25
555-21	1/2 x 2-1/2	22.05
555-22	1/2 x 3	24.85
555-23	1/2 x 3-1/2	27.65

The newest addition to our family, Positive Lock Pins have a push button that initiates ball action and retraction. Positive locking design combines secure fastening with “quick release” ease of removal. Double ball design increases retention capabilities.

Our unique design features a one-piece, cold formed spindle. See product features below!

Stocked in heat treated alloy steel for strength and durability. Standard finish is Zinc and Yellow Chromate. Other finishes available.



* Unless otherwise noted, all dimensions are for reference only.

SPECIFICATIONS

A SHANK DIAMETER	B BALL HEIGHT	C CHAMFER LNTH & DEG	D END LENGTH	E EFFECTIVE LENGTH	F TOP LENGTH	G HEAD DIAMETER	H DOUBLE SHEAR/PNDS
1/4 (.2455/.2485)	.284/.294	.093 x 22*	.312	As Required	.870	.700	8.200
5/16 (.308/.311)	.370/.380	.125 x 22*	.312	As Required	.870	.800	12.800
3/8 (.3705/.3735)	.435/.445	.125 x 22*	.375	As Required	.900	.860	18.400
1/2 (.4955/.4985)	.589/.599	.125 x 22*	.437	As Required	1.125	1.000	32.800



Locates

The Ball Lock™ System accurately positions your workpiece...to within ± 0.0005 repeatability, minimizing the need to indicate your fixture.

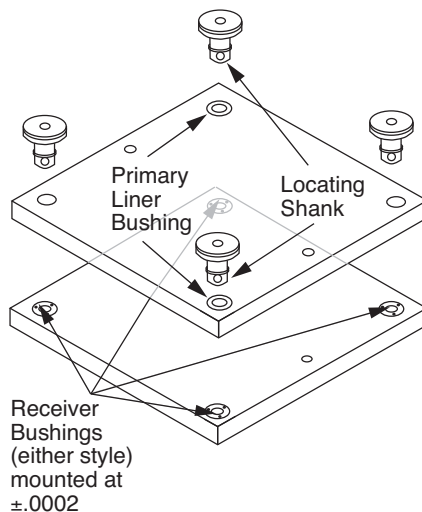


Locks

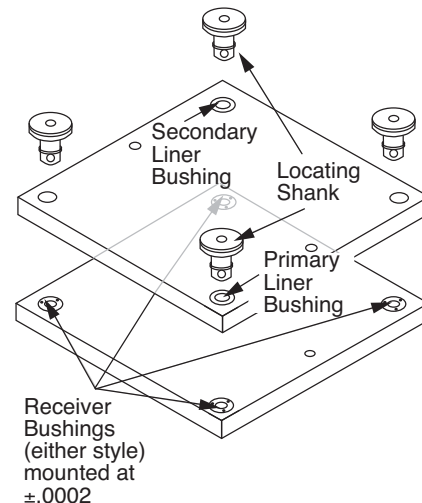
The Ball Lock™ System securely holds fixture plates to subplates with up to 20,000 lbs. of hold-down force per shank.

The Ball Lock Mounting System is designed to speed accurate locating and locking of fixture plates and subplates. The system consists of three parts: a Locating Shank, a Liner bushing, and a Receiver bushing. Using the Ball Lock Mounting System is a simple three step process. Install receiver bushings in your machine table or

Mounting Configuration For ± 0.0005 Accuracy



Mounting Configuration For ± 0.0015 Accuracy



subplate, and liner bushings in your fixture plate; then insert the locating shanks through the liners and into the receivers to provide accurate location. A couple of turns of the set screw in each of the locating shanks provides positive holding force. Eighteen locating shanks, two types of receiver bushings, and two types of liner bushings are available

to suit your individual requirements.

It is recommended that the use of the Ball Lock Mounting System for locating and clamping of fixture plates be incorporated in a systematic process. All fixture plates should have two locating points positioned as far apart as possible. There is no advantage to having more than two locating

Most Commonly Asked Questions

Q. What is the Ball Lock System?

- A. A means of locating and locking two flat surfaces together. These are usually a fixture plate and a subplate.

Q. How does it locate the plate?

- A. It locates in the same manner as locating pins. In other words, there are two precision bores (receiver bushings) located on two precision pins (shanks).

Q. How many shanks (pins) do I need to locate the plate or part?

- A. Two shanks are the maximum needed to locate. Anything more is a hindrance rather than a help. (This also applies to locating pins.)

Q. How does it lock?

- A. The Ball Lock system achieves its holding force by a combination of force generators. A threaded screw exerts force onto a center ball which, in turn, directs this force onto threeballs that register on a taper seat.

Q. How many do I need to lock the part?

- A. This would depend on the particular application, but in most cases, we would recommend that at least four shanks be used (two shanks to locate and lock, and two shanks to lock only).

Q. If I should only locate on two shanks, how do I install the other two shanks without causing interference?

- A. This is accomplished by only using liner bushings for the locating shanks and drilling a clearance hole

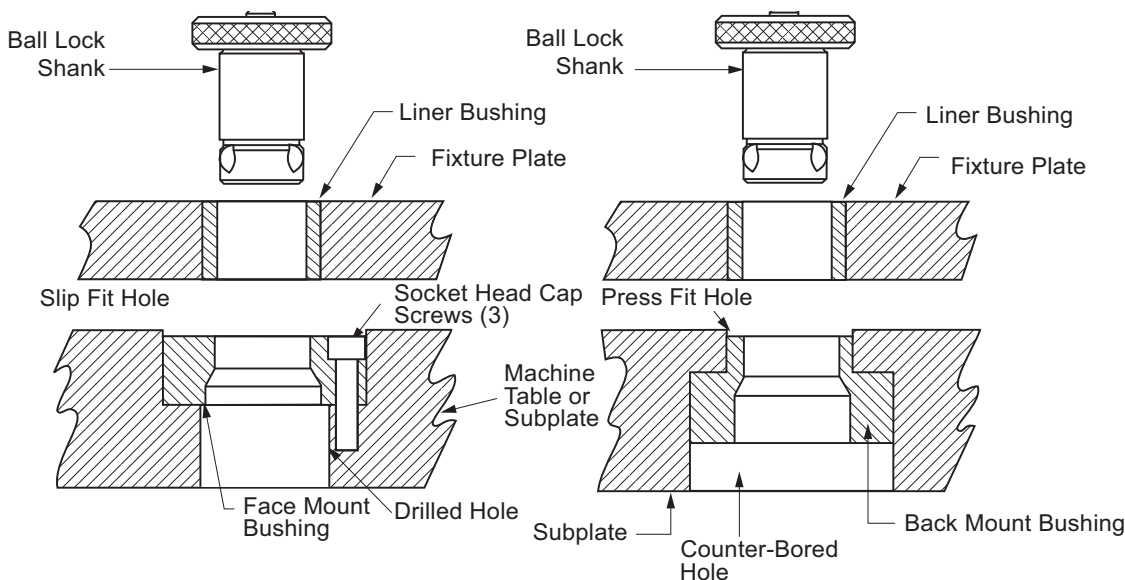
(shank diameter plus approximately .030") for the remaining shanks.

Q. How close a repeatability can I expect?

- A. If the center distance between the two locating holes (receiver bushings) is held to ± 0.0002 " tolerance, and two primary liner bushings are used, then repeatability of ± 0.0005 " can be maintained.

Q. What is the difference between the primary and the secondary liner bushings?

- A. The only difference between the primary and the secondary liner bushings is that the secondary liner bushing has an oversized I.D. to accommodate the wider center distance tolerance on your fixture.



Mounting Method With Face Mount Bushing

Mounting Method With Back Mount Bushing

points. If more than two flanged shanks are required to provide additional hold-down force, omit liner bushings in the additional holes in the fixture plate and allow .030 over the nominal size. The additional clearance will insure that these holes have no influence on the locating holes.

How Accurate Does Your Positioning Have to Be?

The center distance of the receiver bushings in the machine table, tombstone, or subplate should be as accurate as possible (± 0.002 recommended). Accurate location will insure a sound base for interchangeability of numerous fixture plates. For accurate

repeatability within .0005 of true position, both of the liner bushings in the fixture plate should be primary liners and the center distance tolerance should be ± 0.002 . For slightly less accurate repeatability (within .0015 of true position), use one primary and one secondary liner with a center distance tolerance of ± 0.001 .

Q. Is there a preferable location for the liner bushing?

A. The location of the liner bushing is not critical, but in order to be consistent, we recommend that wherever possible, locate the liner bushings at bottom left and top right.

Q. What are the advantages of using the Ball Lock System over the conventional method of dowel pins and cap screws?

A. Both locating and locking are accomplished in the same motion. Two and one half turns are the maximum needed to lock (whereas a 1/2-13 cap screw with one and a half diameters of thread engagement would need ten turns to lock). On C.N.C. machines, the repeatability of fixture locations makes indicating of the fixture unnecessary.

Q. If I need to recess the fixture plate in order to have a clear surface, what do I have to do?

A. Counterbore the fixture plate to a diameter large enough to allow easy removal of the shank. Note: The thickness of the plate section under the head of the shank is critical! It must conform to plate thickness recommended in the catalog.

Q. What if my plate is thinner than the recommended thickness?

A. It is possible that by adjusting the depth of the counterbore for the receiver bushing, you can still use the Ball Lock System. If there are any questions on this type of application, please call 1-800-423-2431.

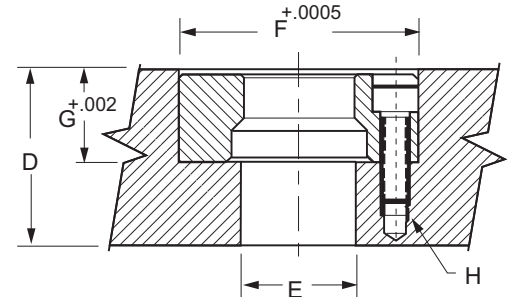
Q. Can I use the shanks in a heated environment?

A. The shank is made of alloy steel, heat treated to 40-45Rc and should stand temperatures up to 400° F. However, the "O" Ring that retains the balls could disintegrate. **Note!** Be aware that thermal expansion of your plate could affect the center distance tolerance and repeatability.

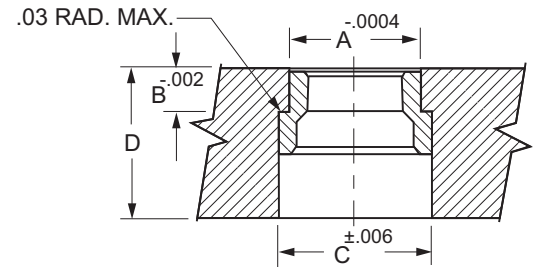
Two styles of receiver bushings are available. Generally, the face mount receiver bushing is utilized in blind hole applications (Slip Fit). The back mount receiver bushing is used in through hole applications (Light Press Fit).

Note: Installed bushings should be approximately .012" below subplate surface. **See reference below for installation of back mount style bushings.**

FACE MOUNT



BACK MOUNT



RECEIVER BUSHINGS - FACE MOUNTED INSTRUCTIONS

Heated Treated - Black Oxide Finish.

P/N	INSTALLATION DIMENSIONS							
	Shank Diameter	Actual O.D.	Min. Subplate Thickness D	E	F	G	*H	Bolt Cir Cle Meter 3 PL Equally Spaced
610-13	13mm	1.3750	3/4	11/16	1.3750	.469	8-32 x 5/16	.984
610-16	16mm	1.4370	3/4	13/16	1.4370	.469	8-32 x 5/16	1.125
610-20	20mm	1.6873	1-1/8	13/16	1.6873	.637	10-32 x 3/8	1.362
610-25	25mm	2.0623	1-1/4	1	2.0623	.799	1/4-28 x 1/2	1.644
610-30	30mm	2.2654	1-1/4	1-3/16	2.2654	.871	1/4-28 x 3/4	1.876
610-35	35mm	2.6873	1-3/8	1-9/16	2.6873	.904	5/16-24 x 7/8	2.178
610-50	50mm	3.4998	1-13/16	2-5/32	3.4998	1.239	3/8-24 x 1	2.916

RECEIVER BUSHINGS - BACK MOUNTED

Heated Treated - Black Oxide Finish.

P/N	INSTALLATION DIMENSIONS				
	Shank Diameter	A	B	C	Minimum Subplate Thickness D
610-14	13mm	.7870	.277	1.000	3/4
610-17	16mm	.8760	.285	1.155	3/4
610-21	20mm	1.0950	.345	1.280	7/8
610-26	25mm	1.3763	.416	1.593	1
610-31	30mm	1.6264	.432	1.906	1-1/4
610-36	35mm	1.8764	.493	2.155	1-5/16
610-51	50mm	2.6269	.621	2.988	1-3/4

* Cap Screws Supplied with Face Mount Bushings.

Locating repeatability will determine if one primary and one secondary or two primary liners are needed. With two primary liners, repeatability of $\pm.0005$ " can be maintained if the two holes for receiver bushings are held to a centerline distance of $\pm.0002$ " tolerance.

Note on Installation of Back Mount Style:

To alleviate the possibility of binding the shank in the bore, the maximum interference fit between bore and bushing O.D. should not exceed .0005".



LINERS

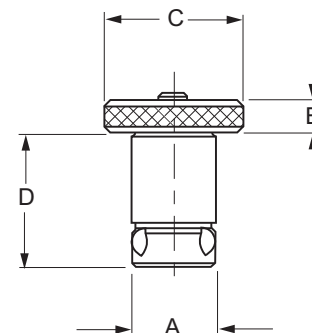
Heated Treated - Black Oxide Finish.

PRIMARY LINER P/N	SECONDARY LINER P/N	DIMENSIONS		
		FIXTURE PLATE THICKNESS $\pm.005$	SHANK DIAMETER	LINER O.D. -.0004
610-66	610-68	.50	13mm	.7518
610-67	610-69	.75	13mm	.7518
610-54	610-57	.50	16mm	1.0018
610-55	610-58	.75	16mm	1.0018
610-61	610-63	.75	20mm	1.3772
610-62	610-64	1.00	20mm	1.3772
610-71	610-73	.75	25mm	1.3772
610-72	610-74	1.00	25mm	1.3772
610-81	610-83	.75	30mm	1.7523
610-82	610-87	1.00	30mm	1.7523
610-91	610-95	.75	35mm	1.7523
610-92	610-96	1.00	35mm	1.7523
610-93	610-97	1.50	35mm	1.7523
610-94	610-98	2.00	35mm	1.7523
611-01	611-05	.75	50mm	2.5025
611-02	611-06	1.00	50mm	2.5025
611-03	611-07	1.50	50mm	2.5025
611-04	611-08	2.00	50mm	2.5025

BALL LOCK MOUNTING SYSTEMS™

FEATURES:

- Material: Shank/Bushing, 4340
Liner, 52100
- Finish: Black Oxide
- Heat Treat: Shanks, 40-45 Rc
Bushings, 50-54 Rc
Liners, 62-64 Rc
- Stainless Steel Available in 13 & 16mm sizes
- Available for High Temperature Applications (800° F Max)



U.S. Patent No's. 3,498,653, 4,135,415

Any Ball Lock application requires at least two sets of shanks, receiver bushings and liners. The liners are placed into the fixture plate to insure extremely accurate positioning. If more than two shanks are required (to provide additional hold down force), omit the liner bushing so that these additional holes will not interfere with your primary locating holes



BALL LOCK REPAIR KITS

Each Kit Includes:

- Replacement Screw
- Locking Balls
- Drive Ball
- O-Ring

BALL LOCK MOUNT SYSTEM - LOCATING SHANKS AND REPAIR KITS

Case Hardened - Black Oxide Finish.

P/N	DIMENSIONS								
	FIXTURE PLATE THICKNESS ±.005	A	B	C	D	MAXIMUM HOLDDOWN FORCE (lbs)	MAXIMUM SCREW TORQUE (ft/lb)	HEX WRENCH SIZE FOR SET SCREW	REPAIR KIT P/N
611-10	.50	13mm	.25	.87	1.08	750	1.2	3/32	612-10
611-11	.75	13mm	.25	.87	1.33	750	1.2	3/32	612-11
611-15	.50	16mm	.32	1.50	1.15	1200	3	1/8	612-15
611-16	.75	16mm	.32	1.50	1.40	1200	3	1/8	612-16
611-20	.75	20mm	.38	1.75	1.53	3000	4	1/8	612-20
611-21	1.00	20mm	.38	1.75	1.78	3000	4	1/8	612-21
611-25	.75	25mm	.38	2.00	1.70	7000	9	5/32	612-25
611-26	1.00	25mm	.38	2.00	1.95	7000	9	5/32	612-26
611-30	.75	30mm	.50	2.25	1.88	10000	15	3/16	612-30
611-31	1.00	30mm	.50	2.25	2.13	10000	15	3/16	612-31
611-35	.75	35mm	.50	2.25	1.97	15500	25	1/4	612-35
611-36	1.25	35mm	.50	2.25	2.22	15500	25	1/4	612-36
611-37	1.50	35mm	.50	2.25	2.72	15500	25	1/4	612-37
611-38	2.00	35mm	.50	2.25	3.22	15500	25	1/4	612-38
611-50	.75	50mm	.75	3.00	2.45	20000	50	3/8	612-50
611-51	1.00	50mm	.75	3.00	2.70	20000	50	3/8	612-51
611-52	1.50	50mm	.75	3.00	3.20	20000	50	3/8	612-52
611-53	2.00	50mm	.75	3.00	3.70	20000	50	3/8	612-53

E-Z LOK external threads are standard size and pitch to permit use of standard drills and taps. No special top sizes or installation tools are required.

Installation is easy as 1-2-3



Use E-Z LOK Thread Inserts for:

- Jigs and Fixtures
- Bolster Plates
- Dies
- Machine Tools
- Metal Patterns
- Farm Machinery
- Engine Blocks
- Parts Salvage
- Stripped Threads in any material

Power drive tools are available for volume installation...See insert tables for catalog numbers and sizes. **Automatic self-locking external thread with pre-applied, use activated Loctite®.**

E-Z LOK inserts will not back out or vibrate loose. Immediately on installation, micro-encapsulated Loctite begins to set and the newly installed insert can be fastened to within minutes. The adhesive continues to cure overnight until completely set. The adhesive seals against liquids and gases to pressures of 6,000 psi and bonds to virtually all metals.

Q: What's the difference between E-Z LOK and coil threaded inserts?

A: There are two primary differences: design and installation.

DESIGN:

As the name implies, coil inserts are steel wire coiled in a spring-like design. E-Z LOK threaded inserts are screw machined out of solid steel.

INSTALLATION:

To install a coil insert, you must have a special drill, special tap, and special installation tool. If a tap breaks or the installation tool is misplaced, the coil inserts can't be installed until a new tap or installation tool is purchased. E-Z LOK threaded inserts have standard size/pitch threads so they can be installed using standard tools probably already in your toolbox. For example, to install an E-Z LOK 651-05 (which has a 1/2-13 external thread), you would simply drill the hole with a standard 27/64 drill and then tap the hole with a standard 1/2-13 tap. Once that's done, the insert is threaded into the hole like an ordinary fastener using a screwdriver, bolt and jam nut, or an E-Z LOK drive tool. See Below.

EASY REMOVAL:

Use a standard screw and bolt extractor to back out a damaged insert and then replace it with a new insert. Removal is simply a matter of overcoming the resistance to torque-out which has been produced by the thread locking material.



Drill hole with standard drill.

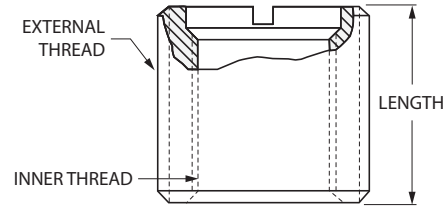


Tap hole with standard tap.



Turn E-Z Lok home flush with bolt.

E-Z LOK THREAD INSERTS™



E-Z LOK THREAD INSERT

Course Thread Sizes - Carbon Steel

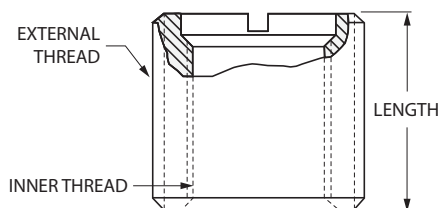
P/N	DIMENSIONS						
	INTERNAL THREAD	EXTERNAL THREAD	LENGTH INCHES	TAP DRILL SIZE	TAP SIZE	MINIMUM FULL THREAD DEPTH	DRIVE TOOL CATALOG NUMBER
651-00	4-40	10-32	.250	5/32	10-32	9/32	---
651-01	6-32	1/4-20	.280	7	1/4-20	11/32	---
651-02	8-32	5/16-18	.290	F	5/16-18	7/16	651-81
651-03	10-24	3/8-16	.406	5/16	3/8-16	15/32	651-82
651-04	1/4-20	7/16-14	.437	23/64	7/16-14	1/2	651-83
651-05	5/16-18	1/2-13	.484	27/64	1/2-13	9/16	651-84
651-06	3/8-16	9/16-12	.515	31/64	9/16-12	19/32	651-85
651-07	7/16-14	5/8-11	.656	17/32	5/8-11	23/32	651-86
651-08	1/2-13	3/4-10	.656	21/32	3/4-10	3/4	651-87
651-09	9/16-12	3/4-10	.656	21/32	3/4-10	3/4	651-87
651-10	5/8-11	7/8-9	.687	49/64	7/8-9	13/16	651-88
651-11	5/8-11	7/8-9	1.125	49/64	7/8-9	1-1/4	651-88
651-12	3/4-10	1-8	.781	7/8	1-8	7/8	651-89
651-13	7/8-9	1-1/4-7	1.125	1-7/64	1-1/4-7	1-1/4	---
651-14	8-1	1-3/8-12	1.250	1-9/32	1-3/8-12	1-3/8	---

E-Z LOK THREAD INSERT

Fine Thread Sizes - Carbon Steel

P/N	DIMENSIONS						
	INTERNAL THREAD	EXTERNAL THREAD	LENGTH INCHES	TAP DRILL SIZE	TAP SIZE	MINIMUM FULL THREAD DEPTH	DRIVE TOOL CATALOG NUMBER
651-15	10-32	3/8-16	.406	5/16	3/8-16	15/32	651-82
651-16	1/4-28	7/16-14	.437	23/64	7/16-14	1/2	651-83
651-17	5/16-24	1/2-13	.484	27/64	1/2-13	9/16	651-84
651-18	3/8-24	9/16-12	.515	31/64	9/16-12	19/32	651-85
651-19	7/16-20	5/8-11	.656	17/32	5/8-11	23/32	651-86
651-20	1/2-20	3/4-10	.656	21/32	3/4-10	3/4	651-87
651-21	9/16-18	3/4-10	.656	21/32	3/4-10	3/4	651-87
651-22	5/8-18	7/8-9	.687	49/64	7/8-9	13/16	651-88
651-23	3/4-16	1-8	.781	7/8	1-8	7/8	651-89
651-24	7/8-14	1-1/4-7	1.125	1-7/64	1-1/4-7	1-1/4	---
651-25	1-14	1-3/8-12	1.125	1-9/32	1-3/8-12	1-3/8	---

E-Z LOK THREAD INSERTS™



METRIC E-Z LOK THREAD INSERT

Metric Internal / U.S. External - Carbon Steel

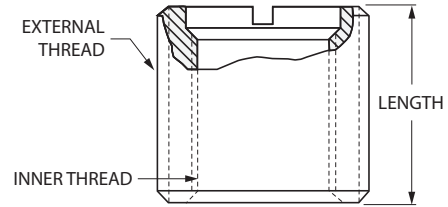
P/N	DIMENSIONS						
	INTERNAL THREAD	EXTERNAL THREAD	LENGTH INCHES	TAP DRILL SIZE	TAP SIZE	MINIMUM FULL THREAD DEPTH	DRIVE TOOL CATALOG NUMBER
651-26	M6 x 1.00	3/8-16	.406	5/16	3/8-16	15/32	651-83
651-27	M8 x 1.25	1/2-13	.484	27/64	1/2-13	9/16	651-84
651-28	M10 x 1.50	9/16-12	.515	31/64	9/16-12	19/32	651-85
651-26	M10 x 1.25	9/16-12	.515	31/64	9/16-12	19/32	651-85
651-30	M12 x 1.75	3/4-10	.656	21/32	3/4-10	3/4	651-86
651-31	M14 x 2.00	7/8-9	.687	49/64	7/8-9	13/16	651-88
651-32	M16 x 2.00	1-8	.781	7/8	1-8	7/8	651-89

METRIC E-Z LOK THREAD INSERT

Metric Internal / Metric External - Carbon Steel

P/N	DIMENSIONS						
	INTERNAL THREAD	EXTERNAL THREAD	LENGTH INCHES	TAP DRILL SIZE	TAP SIZE	MINIMUM FULL THREAD DEPTH	DRIVE TOOL CATALOG NUMBER
651-33	M3 x .50	M6 x 1.00	6.5mm	5.1mm	M6 x 1.00	7.8mm	---
651-34	M4 x .70	M8 x 1.25	7.5mm	6.9mm	M8 x 1.25	9.0mm	651-81
651-35	M5 x .80	M8 x 1.25	7.5mm	6.9mm	M8 x 1.25	9.0mm	651-81
651-36	M6 x 1.00	M10 x 1.50	10.5mm	8.6mm	M10 x 1.50	12.0mm	651-83
651-37	M8 x 1.25	M12 x 1.75	12.5mm	10.4mm	M12 x 1.75	14.5mm	651-84
651-38	M10 x 1.50	M16 x 2.00	17.0mm	14.0mm	M16 x 2.00	19.0mm	651-85
651-39	M12 x 1.75	M16 x 2.00	17.0mm	14.0mm	M16 x 2.00	19.0mm	651-86
651-40	M16 x 2.00	M24 x 3.00	20.0mm	21.0mm	M24 x 3.00	24.0mm	651-88

E-Z LOK THREAD INSERTS™



STAINLESS STEEL E-Z LOK THREAD INSERT

Course Thread Sizes - 303 Stainless Steel - Passivated

P/N	DIMENSIONS						
	INTERNAL THREAD	EXTERNAL THREAD	LENGTH INCHES	TAP DRILL SIZE	TAP SIZE	MINIMUM FULL THREAD DEPTH	DRIVE TOOL CATALOG NUMBER
651-41	4-40	10-32	.250	5/32	10-32	9/32	---
651-42	6-32	1/4-20	.280	7	1/4-20	11/32	---
651-43	8-32	5/16-18	.290	F	5/16-18	7/16	651-81
651-44	10-24	3/8-16	.406	5/16	3/8-16	15/32	651-82
651-45	1/4-20	7/16-14	.437	23/64	7/16-14	1/2	651-83
651-46	5/16-18	1/2-13	.484	27/64	1/2-13	9/16	651-84
651-47	3/8-16	9/16-12	.515	31/64	9/16-12	19/32	651-85
651-48	7/16-14	5/8-11	.656	17/32	5/8-11	23/32	651-86
651-49	1/2-13	3/4-10	.656	21/32	3/4-10	3/4	651-87
651-50	5/8-11	7/8-9	.687	49/64	7/8-9	13/16	651-88
651-51	3/4-10	1-8	.781	7/8	1-8	7/8	651-89

STAINLESS STEEL E-Z LOK THREAD INSERT

Fine Thread Sizes - 303 Stainless Steel - Passivated

P/N	DIMENSIONS						
	INTERNAL THREAD	EXTERNAL THREAD	LENGTH INCHES	TAP DRILL SIZE	TAP SIZE	MINIMUM FULL THREAD DEPTH	DRIVE TOOL CATALOG NUMBER
651-52	10-32	3/8-16	.406	5/16	3/8-16	15/32	651-82
651-53	1/4-28	7/16-14	.437	23/64	7/16-14	1/2	651-83
651-54	5/16-24	1/2-13	.484	27/64	1/2-13	9/16	651-84
651-55	3/8-24	9/16-12	.515	31/64	9/16-12	19/32	651-85
651-56	7/16-20	5/8-11	.656	17/32	5/8-11	23/32	651-86
651-57	1/2-20	3/4-10	.656	21/32	3/4-10	3/4	651-87

E-Z LOK THREAD INSERTS™

EXTRA HEAVY WALL E-Z LOK THREAD INSERT

Course Thread Sizes - Carbon Steel

P/N	DIMENSIONS						
	INTERNAL THREAD	EXTERNAL THREAD	LENGTH INCHES	TAP DRILL SIZE	TAP SIZE	MINIMUM FULL THREAD DEPTH	DRIVE TOOL CATALOG NUMBER
651-58	1/4-20	1/2-13	.484	27/64	1/2-13	9/16	651-83
651-59	5/16-18	9/16-12	.515	31/64	9/16-12	19/32	651-84
651-60	3/8-16	5/8-11	.656	17/32	5/8-11	23/32	651-85
651-61	1/2-13	7/8-9	.687	49/64	7/8-9	13/16	---
651-62	5/8-11	1-8	.781	7/8	1-8	7/8	---

E-Z Lok prepackage kits contains a range of sizes that are ideal for shop storage or carrying in a tool box for field applications. Refills are available packed in five or ten to a carton, depending on the size requested.



E-Z LOK THREAD INSERT KITS

Carbon Steel

P/N	DIMENSIONS				
	KIT THREAD TYPE	INSERT P/N	QUANTITY OF INSERTS	INTERNAL THREAD	EXTERNAL THREAD
651-70	COARSE THREAD #10 TO 1/2	651-03	10	10-24	3/8-16
		651-04	10	1/4-20	7/16-14
		651-05	10	5/16-18	1/2-13
		651-06	10	3/8-16	9/16-12
		651-08	6	1/2-13	3/4-10
651-71	COARSE THREAD 1/2 TO 1	651-08	6	1/2-13	3/4-10
		651-10	7	5/8-11	7/8-9
		651-12	7	3/4-10	1-8
		651-14	2	1-8	1-3/8-12
651-72	FINE THREAD #10 TO 1/2	651-15	10	10-32	3/8-16
		651-16	10	1/4-28	7/16-14
		651-17	10	5/16-24	1/2-13
		651-18	10	3/8-24	9/16-12
		651-20	6	1/2-20	3/4-10
651-73	FINE THREAD 1/2 TO 1	651-20	6	1/2-20	3/4-10
		651-22	7	5/8-18	7/8-9
		651-23	7	3/4-16	1-8
		651-25	2	1-14	1-3/8-12

E-Z LOK THREAD INSERTS™

E-Z Lok prepackage kits contains a range of sizes that are ideal for shop storage or carrying in a tool box for field applications. Refills are available packed in five or ten to a carton, depending on the size requested.



METRIC E-Z LOK THREAD INSERT KITS

Carbon Steel

P/N	DIMENSIONS				
	KIT THREAD TYPE	INSERT P/N	QUANTITY OF INSERTS	INTERNAL THREAD	EXTERNAL THREAD
651-74	METRIC INTERNAL US EXTERNAL M6 X 1.00 TO M12 X 1.75	651-26	10	M6 x 1.00	3/8-16
		651-27	10	M8 x 1.25	1/2-13
		651-28	10	M10 x 1.50	9/16-12
		651-30	6	M12 x 1.75	3/4-10
651-75	METRIC INTERNAL METRIC EXTERNAL M3 X .05 TO M8 X 1.25	651-33	10	M3 x .50	M6 x 1.00
		651-34	10	M4 x .70	M8 x 1.25
		651-35	10	M5 x .80	M8 x 1.25
		651-36	10	M6 x 1.00	M10 x 1.50
		651-37	10	M8 x 1.25	M12 x 1.75
651-76	METRIC INTERNAL METRIC EXTERNAL M8 X 1.25 TO M6 X 2.00	651-37	10	M8 x 1.25	M12 x 1.75
		651-38	10	M10 x 1.50	M16 x 2.00
		651-39	8	M12 x 1.75	M16 x 2.00
		651-40	5	M16 x 2.00	M20 x 3.00

STAINLESS STEEL E-Z LOK THREAD INSERT KITS

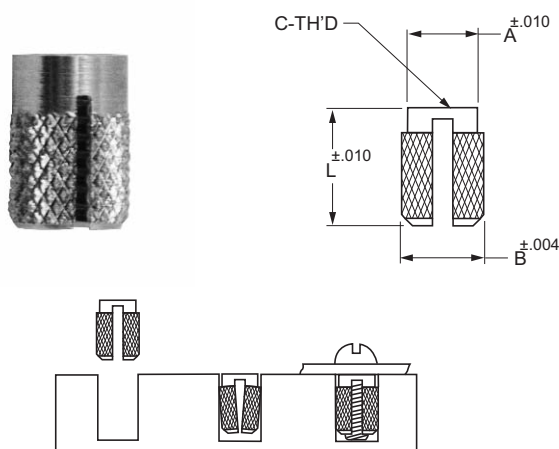
303 Stainless Steel - Passivated

P/N	DIMENSIONS				
	KIT THREAD TYPE	INSERT P/N	QUANTITY OF INSERTS	INTERNAL THREAD	EXTERNAL THREAD
651-77	COARSE THREAD #10 TO 1/2	651-44	10	10-24	3/8-16
		651-45	10	1/4-20	7/16-14
		651-46	10	5/16-18	1/2-13
		651-47	10	3/8-16	9/16-12
		651-49	6	1/2-13	3/4-10
651-78	FINE THREAD #10 TO 1/2	651-52	10	10-32	3/8-16
		651-53	10	1/4-28	7/16-14
		651-54	10	5/16-24	1/2-13
		651-55	10	3/8-24	9/16-12
		651-57	6	1/2-20	3/4-10

E-Z LOK 240 SERIES:

FOR CORED OR DRILLED HOLES IN PLASTICS

This diamond knurled insert was designed to replace molded-in inserts and threads in plastic castings. Installed "cold", press inserts sharply reduce the cost of moldings. The number of "shots" per hour is multiplied; reject waste caused by misaligned and faulty inserts is cut and no re-tapping to clean threads is necessary. In addition to providing clean threads, press inserts also provide screw-locking action unattainable in molded-in inserts. Along with this self-locking feature, you also have an insert that is not critical to hole depth and does not require any secondary operation to secure the fastener in the hole.



E-Z LOK THREAD INSERTS FOR PLASTICS

240 Series - Flush Mounted - Brass

P/N	DIMENSIONS				
	A	B	C	L	STARTING HOLE
652-01	.094	.104	0-80	.125	.094(3/32)
652-02	.125	.135	2-65	.156	.125(1/8)
652-03	.156	.166	4-40	.188	.156(5/32)
652-04	.187	.199	6-32	.250	.188(3/16)
652-05	.218	.230	8-32	.313	.219(7/32)
652-06	.250	.262	10-32	.375	.250(1/4)
652-07	.250	.262	10-24	.375	.250(1/4)
652-08	.312	.326	1/4-20	.500	.313(5/16)
652-09	.375	.389	5/16-18	.563	.375(3/8)
652-10	.437	.451	3/8-16	.625	.438(7/16)

STAINLESS STEEL E-Z LOK THREAD INSERTS FOR PLASTICS

240 Series - Flush Mounted - 303 Stainless Steel - Passivated

P/N	DIMENSIONS				
	A	B	C	L	STARTING HOLE
652-02S	.125	.135	2-65	.156	.125(1/8)
652-03S	.156	.166	4-40	.188	.156(5/32)
652-04S	.187	.199	6-32	.250	.188(3/16)
652-05S	.218	.230	8-32	.313	.219(7/32)
652-06S	.250	.262	10-32	.375	.250(1/4)
652-07S	.250	.262	10-24	.375	.250(1/4)
652-08S	.312	.326	1/4-20	.500	.313(5/16)
652-09S	.375	.389	5/16-18	.563	.375(3/8)
652-10S	.437	.451	3/8-16	.625	.438(7/16)

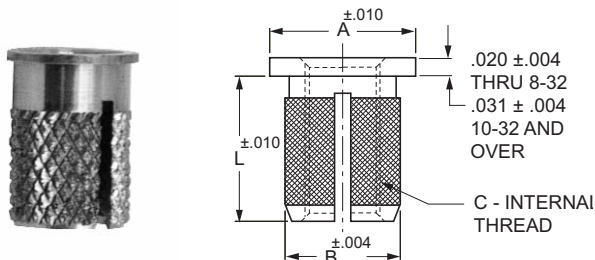
METRIC E-Z LOK THREAD INSERTS FOR PLASTICS

240 Series - Flush Mounted - Brass

P/N	DIMENSIONS				
	A	B	C	L	STARTING HOLE
652-11	.156	.166	M3 x .5	.188	.156(5/32)
652-12	.187	.199	M3.5 x .6	.250	.188(3/16)
652-13	.218	.230	M4 x .7	.313	.219(7/32)
652-14	.250	.262	M5 x .8	.375	.250(1/4)
652-15	.312	.326	M6 x 1.0	.500	.313(5/16)

E-Z LOK 260 SERIES:

Where headed inserts are required, this variation of the standard 240 fills the bill. Recommended for use in terminal strips and like applications in electronic assemblies.



E-Z LOK THREAD INSERTS FOR PLASTICS

260 Series - Flange Mounted - Brass

P/N	DIMENSIONS				
	A	B	C	L	STARTING HOLE
652-16	.187	.135	2-56	.156	.125(1/8)
652-17	.218	.166	4-40	.188	.156(5/32)
652-18	.249	.199	6-32	.250	.188(3/16)
652-19	.280	.230	8-32	.313	.219(7/32)
652-20	.312	.262	10-32	.375	.250(1/4)
652-21	.375	.326	1/4-20	.500	.313(5/16)
652-22	.437	.389	5/16-18	.563	.375(3/8)
652-23	.500	.451	3/8-16	.625	.438(7/16)

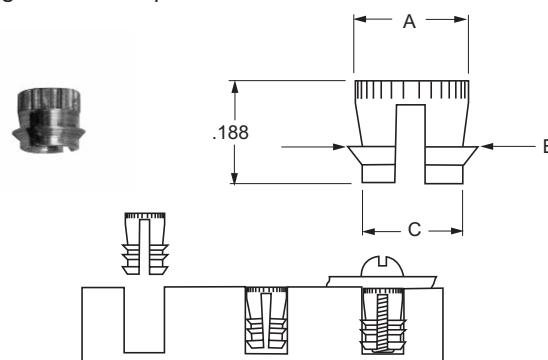
STAINLESS STEEL E-Z LOK THREAD INSERTS FOR PLASTICS

260 Series - Flange Mounted - 303 Stainless Steel - Passivated

P/N	DIMENSIONS				
	A	B	C	L	STARTING HOLE
652-16S	.187	.135	2-56	.156	.125(1/8)
652-17S	.218	.166	4-40	.188	.156(5/32)
652-18S	.249	.199	6-32	.250	.188(3/16)
652-19S	.280	.230	8-32	.313	.219(7/32)
652-20S	.312	.262	10-32	.375	.250(1/4)
652-21S	.375	.326	1/4-20	.500	.313(5/16)

E-Z LOK 170 SERIES:

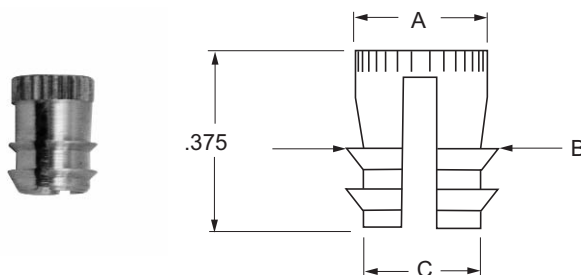
Finserts provide strong metal threads for wood, composition board and thermoplastics such as nylon, polystyrene, cellulose acetate and cycloc. By distributing stress over a greater surface area, firm, permanent fastening is assured. The fins give higher holding strength in softer materials. Available with one, two or three fins for varying material thickness, Finserts prevent splintering, splitting and thread pullout.



E-Z LOK FINserts FOR PLASTICS & WOOD

170 Series - Brass

P/N	THREAD SIZE	DIMENSIONS			
		A	B	C	STARTING HOLE
652-50	6-32	.210	.237	.189	.205(#5)
652-51	8-32	.236	.263	.215	.234(15/64)
652-52	10-32	.263	.290	.242	.261(G)

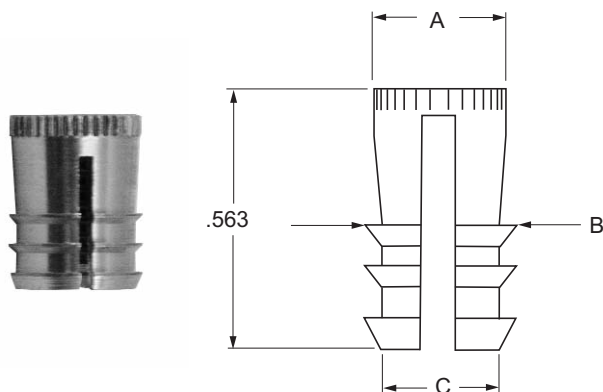


E-Z LOK FINserts FOR PLASTICS & WOOD

270 Series - Brass

P/N	THREAD SIZE	DIMENSIONS			
		A	B	C	STARTING HOLE
652-53	6-32	.210	.237	.189	.205(#5)
652-54	8-32	.236	.263	.215	.234(15/64)
652-55	10-32	.263	.290	.242	.261(G)
652-56	10-24	.263	.290	.242	.261(G)
652-57	1/4-20	.330	.357	.309	.328(21/64)

E-Z LOK THREAD INSERTS™

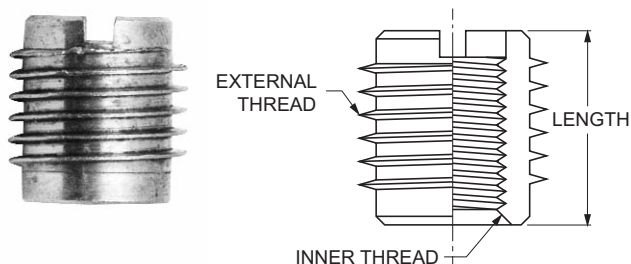


E-Z LOK FINSETS FOR PLASTICS & WOOD

370 Series - Brass

P/N	DIMENSIONS				
	THREAD SIZE	A	B	C	STARTING HOLE
652-58	10-32	.347	.368	.318	.344(11/32)
652-59	1/4-20	.409	.431	.381	.406(13/32)
652-60	5/16-18	.471	.493	.443	.443(15/32)

- External knife threads provide superior holding power in hard and soft woods, particle board and all wood products.
- Use wherever field assembly or disassembly could lead to thread erosion or stripping.
- The long pilot assures straight driving into a drilled hole.
- Install with screw driver, bolt and nut, tapping head, or E-Z LOK drive tool.

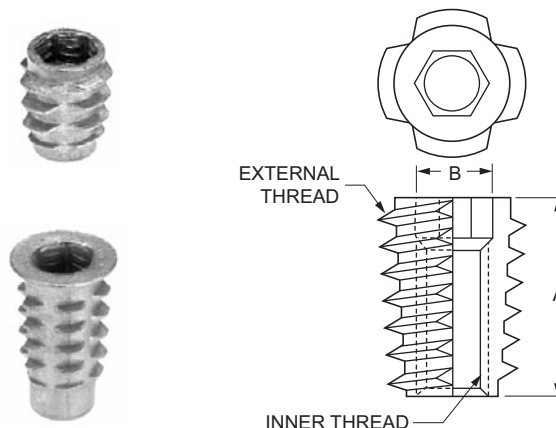


E-Z LOK KNIFE THREAD INSERTS FOR WOOD

Carbon Steel

INSERT P/N	DIMENSIONS				
	INTERNAL THREAD	LENGTH	MAJOR DIAMETER EXTERNAL THREAD	HOLE SIZE	DRIVE TOOL P/N
652-70	4-40	.375	.350	1/4	---
652-71	6-32	.375	.350	1/4	651-80
652-72	8-32	.375	.350	1/4	651-81
652-73	10-24	.500	.453	3/8	651-82
652-74	10-32	.500	.453	3/8	651-83
652-75	1/4-20	.500	.453	3/8	651-84
652-76	5/16-18	.625	.600	1/2	651-85
652-77	3/8-16	.625	.600	1/2	651-86

- An inexpensive insert for use in ready-to-assemble furniture, drawer pulls and wherever ease of assembly or avoidance of thread stripping is desired.
- Install with hex drive wrench or E-Z LOK drive tool.



E-Z LOK HEXDRIVE THREAD INSERTS FOR WOOD

Flanged - Die Cast - Zinc Alloy

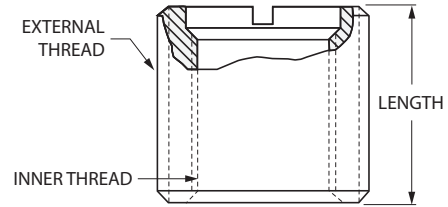
INSERT P/N	DIMENSIONS				
	INTERNAL THREAD	LENGTH	HOLE SIZE	HEX SIZE	DRIVE TOOL P/N
652-80	8-32	10mm	6mm	M4	651-90
652-81	1/4-20	13mm	9mm	M6	651-91
652-82	1/4-20	20mm	9mm	M6	651-92

E-Z LOK HEXDRIVE THREAD INSERTS FOR WOOD

Flush - Die Cast - Zinc Alloy

INSERT P/N	DIMENSIONS				
	INTERNAL THREAD	LENGTH	HOLE SIZE	HEX SIZE	DRIVE TOOL P/N
652-83	1/4-20	13mm	9mm	M6	651-93
652-84	1/4-20	20mm	9mm	M6	651-94

E-Z LOK THREAD INSERTS™



STAINLESS STEEL METRIC E-Z LOK THREAD INSERT

Metric Internal - US External - 303 Stainless Steel - Passivated

P/N	DIMENSIONS						
	INTERNAL THREAD	EXTERNAL THREAD	LENGTH INCHES	TAP DRILL SIZE	TAP SIZE	MINIMUM FULL THREAD DEPTH	DRIVE TOOL CATALOG NUMBER
653-00	M6 x 1.00	3/8-16	.406	5/16	3/8-16	15/32	651-83
653-01	M8 x 1.25	1/2-13	.484	27/64	1/2-13	9/16	651-84
653-02	M10 x 1.50	9/16-12	.515	31/64	9/16-12	19/32	651-85
653-03	M10 x 1.25	9/16-12	.515	31/64	9/16-12	19/32	651-85
653-04	M12 x 1.75	3/4-10	.656	21/32	3/4-10	3/4	651-86
653-05	M14 x 2.00	7/8-9	.687	49/64	7/8-9	13/16	651-87
653-06	M16 x 2.00	1-8	.781	7/8	1-8	7/8	651-88

STAINLESS STEEL METRIC E-Z LOK THREAD INSERT

Metric Internal - Metric External - 303 Stainless Steel - Passivated

P/N	DIMENSIONS						
	INTERNAL THREAD	EXTERNAL THREAD	LENGTH INCHES	TAP DRILL SIZE	TAP SIZE	MINIMUM FULL THREAD DEPTH	DRIVE TOOL CATALOG NUMBER
653-07	M3 x .50	M6 x 1.00	6.5mm	5.1mm	M6 x 1.00	7.8mm	---
653-08	M4 x .70	M8 x 1.25	7.5mm	6.9mm	M8 x 1.25	9.0mm	651-81
653-09	M5 x .80	M8 x 1.25	7.5mm	6.9mm	M8 x 1.25	9.0mm	651-81
653-10	M6 x 1.00	M10 x 1.50	10.5mm	8.6mm	M10 x 1.50	12.0mm	651-83
653-11	M8 x 1.25	M12 x 1.75	12.5mm	10.4mm	M12 x 1.75	14.5mm	651-84
653-12	M10 x 1.50	M16 x 2.00	17.0mm	14.0mm	M16 x 2.00	19.0mm	651-85
653-13	M12 x 1.75	M16 x 2.00	17.0mm	14.0mm	M16 x 2.00	19.0mm	651-86
653-14	M16 x 2.00	M24 x 3.00	20.0mm	21.0mm	M24 x 3.00	24.0mm	651-88

E-Z Lok prepackage kits contains a range of sizes that are ideal for shop storage or carrying in a tool box for field applications. Refills are available packed in five or ten to a carton, depending on the size requested.

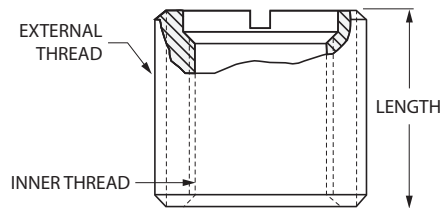


STAINLESS STEEL METRIC E-Z LOK THREAD INSERT KITS					
303 Stainless Steel - Passivated					
P/N	DIMENSIONS				
	KIT THREAD TYPE	INSERT P/N	QUANTITY OF INSERTS	INTERNAL THREAD	EXTERNAL THREAD
653-20	METRIC INTERNAL US EXTERNAL M6 X 1.00 TO M12 X 1.75	653-00	10	M6 x 1.00	3/8-16
		653-01	10	M8 x 1.25	1/2-13
		653-02	10	M10 x 1.50	9/16-12
		653-04	6	M12 x 1.75	3/4-10
653-22	METRIC INTERNAL METRIC EXTERNAL M3 X .05 TO M8 X 1.25	653-07	10	M3 x .50	M6 x 1.00
		653-08	10	M4 x .70	M8 x 1.25
		653-09	10	M5 x .80	M8 x 1.25
		653-10	10	M6 x 1.00	M10 x 1.50
		653-11	10	M8 x 1.25	M12 x 1.75
653-24	METRIC INTERNAL METRIC EXTERNAL M8 X 1.25 TO M16 X 2.00	653-11	10	M8 x 1.25	M12 x 1.75
		653-12	10	M10 x 1.50	M16 x 2.00
		653-13	8	M12 x 1.75	M16 x 2.00
		653-14	5	M16 x 2.00	M20 x 3.00



E-Z LOK THREAD INSERTS™

Ideal for applications where thread insert size and weight are an issue, Thin Wall thread inserts pack all the advantages of traditional E-Z LOK inserts into a smaller diameter design. Available with internal thread sizes from #10 through 1/2", Thin Wall thread inserts install with standard drills, taps and wrenches. Standard size and pitch external threads eliminate the need for special tap or drill sizes installation tools. Self locking external threads with pre-applied Loctite® keep Thin Walls from backing out or vibrating loose. Immediately upon installation, the micro-encapsulated Loctite begins to set and the newly installed insert can be fastened to within minutes. In addition, the adhesive seals against liquids and gases to pressures of 6,000 psi and bonds to virtually all metals.



THIN WALL E-Z LOK THREAD INSERT

Coarse Thread - Carbon Steel

P/N	DIMENSIONS						
	INTERNAL THREAD	EXTERNAL THREAD	LENGTH INCHES	TAP DRILL SIZE	TAP SIZE	MINIMUM FULL THREAD DEPTH	DRIVE TOOL CATALOG NUMBER
653-30	10-24	5/16-18	.272	I	5/16-18	.375	651-82
653-31	1/4-20	3/8-16	.332	Q	3/8-16	.437	651-83
653-32	5/16-18	7/16-14	.397	X	7/16-14	.500	651-84
653-33	3/8-16	1/2-13	.493	29/64	1/2-13	.560	651-85
653-34	7/16-14	9/16-12	.516	33/64	9/16-12	.620	651-86
653-35	1/2-13	5/8-11	.578	37/64	5/8-11	.680	651-87

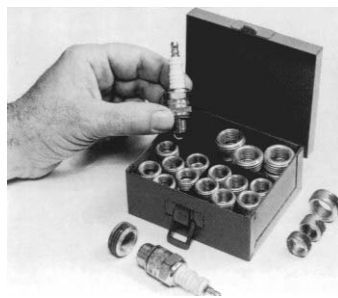
THIN WALL E-Z LOK THREAD INSERT

Fine Thread - Carbon Steel

P/N	DIMENSIONS						
	INTERNAL THREAD	EXTERNAL THREAD	LENGTH INCHES	TAP DRILL SIZE	TAP SIZE	MINIMUM FULL THREAD DEPTH	DRIVE TOOL CATALOG NUMBER
653-36	10-32	5/16-18	.272	I	5/16-18	.375	651-82
653-37	1/4-28	3/8-16	.332	Q	3/8-16	.437	651-83
653-38	5/16-24	7/16-14	.397	X	7/16-14	.500	651-84
653-39	3/8-24	1/2-13	.493	29/64	1/2-13	.560	651-85
653-40	7/16-20	9/16-12	.516	33/64	9/16-12	.620	651-86
653-41	1/2-20	5/8-11	.578	37/64	5/8-11	.680	651-87

E-Z LOK THREAD INSERTS™

Use these inserts to repair stripped threads in spark plug ports. Open or closed end to repair stripped threads for VW cylinder head studs.



METRIC AUTOMOTIVE DESIGN E-Z LOK THREAD INSERT

Spark Plug Sizes - Carbon Steel

P/N	DIMENSIONS				
	INTERNAL THREAD	EXTERNAL THREAD	LENGTH INCHES	TAP DRILL SIZE	TAP SIZE
653-50	M10 x 1.00	9/16-18	.453	33/64	9/16-18
653-51	M12 x 1.25	5/8-18	.453	37/64	5/8-18
653-52	M12 x 1.25	5/8-18	.703	37/64	5/8-18
653-53	M14 x 1.25	M18 x 1.50	11.5mm	16.5mm	M18 x 1.50
653-54	M14 x 1.25	3/4-16	.328	11/16	3/4-16
653-55	M14 x 1.25	3/4-16	.453	11/16	3/4-16
653-56	M14 x 1.25	3/4-16	.703	11/16	3/4-16
653-57	M18 x 1.50	1-12	.453	59/64	1-12

METRIC AUTOMOTIVE DESIGN E-Z LOK THREAD INSERT

VW Case Savers - Carbon Steel

P/N	DIMENSIONS				
	INTERNAL THREAD	EXTERNAL THREAD	LENGTH INCHES	TAP DRILL SIZE	TAP SIZE
653-58 (OPENED)	M10 x 1.00	9/16-12	1.000	31/64	9/16-12
653-59 (CLOSED)	M10 x 1.00	9/16-12	1.000	31/64	9/16-12

AUTOMOTIVE DESIGN E-Z LOK THREAD INSERT

Cummins Head Bolts - Carbon Steel

P/N	DIMENSIONS					
	INTERNAL THREAD	EXTERNAL THREAD	LENGTH INCHES	TAP DRILL SIZE	TAP SIZE	MINIMUM FULL THREAD DEPTH
*653-60	11/16-16	7/8-14	2.000	13/64	7/8-14	2-3/16

* Discontinued but available while supplies last.

E-Z LOK THREAD INSERTS™

E-Z Lok prepackage kits contains a range of sizes that are ideal for shop storage or carrying in a tool box for field applications. Refills are available packed in five or ten to a carton, depending on the size requested.



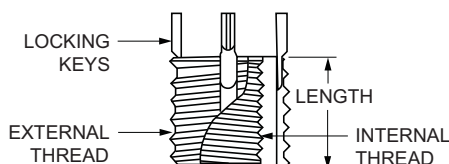
E-Z LOK THREAD INSERT KITS					
Carbon Steel					
P/N	DIMENSIONS				
	KIT THREAD TYPE	INSERT P/N	QUANTITY OF INSERTS	INTERNAL THREAD	EXTERNAL THREAD
653-65	COARSE THREAD #10 TO 7/16	651-03	10	10-24	3/8-16
		651-04	10	1/4-20	7/16-14
		651-05	10	5/16-18	1/2-13
		651-06	10	3/8-16	9/16-12
		651-08	8	7/16-14	5/8-11
653-66	COARSE THREAD 1/2 TO 1	651-08	6	1/2-13	3/4-10
		651-10	7	5/8-11	7/8-9
		651-12	7	3/4-10	1-8
		651-14	2	1-8	1-3/8-12
653-67	FINE THREAD #10 TO 7/16	651-15	10	10-24	3/8-16
		651-16	10	1/4-20	7/16-14
		651-17	10	5/16-18	1/2-13
		651-18	10	3/8-16	9/16-12
		651-19	2	7/16-14	5/8-11

KEYLOCKING THREADED INSERTS



GENERAL INFORMATION

Acme Keylocking Threaded Inserts are used to quickly repair stripped, damaged or worn out threads with new stronger threads or for use in original equipment. Acme Inserts are easy to install and easy to remove. No special tools are required. The Keys are driven down into the threads of the surrounding base material, locking the insert in place.



Features:

- Easy installation and removal
- Installed with standard drills and taps
- No pre-winder tool required
- No tang to break-off
- Solid one-piece construction
- Positive mechanical lock against rotation
- May be used in many types of material
- Available in Thinwall, Heavy Duty, Extra Heavy Duty and Solid styles
- Full range of Inch and Metric sizes in coarse or fine pitch threads
- Available in bulk quantities or kits

Material:

Carbon Steel Inserts _ C1215 or equivalent
Stainless Steel Inserts – 303 or equivalent
Keys – 302 or equivalent

Finish:

Carbon Steel Inserts - Parkerized
Stainless Steel Inserts - Passivated

Tolerances:

± 0.010 inch or ± 0.25 mm unless specified otherwise.

Dimensions:

Inch Inserts are specified in inches and Metric Inserts are in millimeters. Metric/Inch Inserts have a metric internal diameter while all other dimensions are in inches.

Keys:

Inserts with an internal thread size of 5/16 or M7 and larger are furnished with 4 locking keys. Smaller sizes have 2 locking keys.

Specials:

We have the capabilities of producing special Keylocking Inserts to your specific requirements.

Notice:

The information contained in this catalog is for guidance only. We reserve the right to make changes to our products without notice. Acme Keylocking Threaded Inserts are commercial grade. They are not manufactured to any National or International Standards.

DISCLAIMER:

SELLER MAKES NO OTHER WARRANTY WHATEVER, EXPRESSED OR IMPLIED AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED AND EXCLUDED FROM ALL TRANSACTIONS AND SHALL NOT APPLY TO THE GOODS SOLD.

REMEDY:

Our obligation is limited to the repair or replacement of defective parts or, at our option, the refund of the purchase price. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES IN THE NATURE OF PENALTIES.

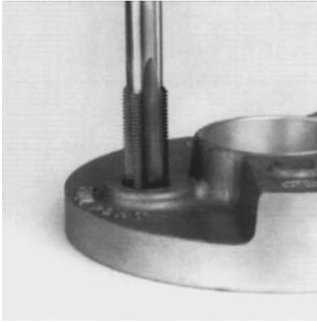
Installation:



1. Drill out old threads with a standard drill. Countersink with a standard (82° - 100°) countersink.

Note:

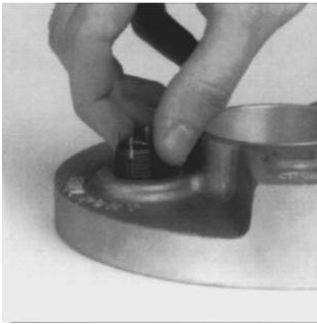
Drill is oversize, see charts for proper dimensions.



2. Tap new threads with a standard tap.

Note:

See charts for proper size and depth.



3. Screw in the insert until it is slightly below the surface.



4. Drive keys down with several hammer taps on the proper installation tool.



5. Properly installed insert.

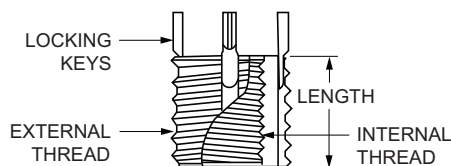
Removal:

If necessary, Acme Keylocking Inserts can be removed without damage to the parent material:

1. Drill out material between keys and internal thread with a standard drill to specified depth (refer to charts for proper size and depth).
2. Bend the keys inward and break off.
3. Remove the old insert using a screw extractor or similar device.
4. Install a replacement insert into the original tapped hole.



KEYLOCKING THREADED INSERTS

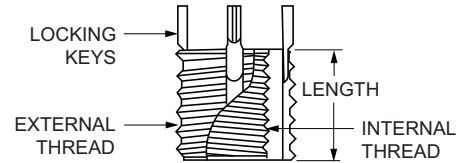


HEAVY DUTY THREADED INSERTS

Alloy Steel - Cadmium Plate

P/N	DIMENSIONS			INSTALLATION					REMOVAL	
	INTERNAL THREAD CLASS 3B	EXTERNAL THREAD CLASS 2A	LENGTH	TAP DRILL SIZE	C'SINK DIA. +.010	THREAD TOP SIZE CLASS 2B	THREAD TOP MIN. DEPTH	INSTALLATION TOOL P/N	DRILL SIZE	DRILL DEPTH
659-00	8-32	5/16-18	.31	I	.32	5/16-18	.37	647-00	7/32	1/8
659-01	10-24	3/8-16	.31	Q	.38	3/8-16	.37	647-01	9/32	1/8
661-01	10-32	3/8-16	.31	Q	.38	3/8-16	.37	647-01	9/32	1/8
659-02	1/4-20	7/16-14	.37	X	.44	7/16-14	.43	647-02	11/32	3/49
661-02	1/4-28	7/16-14	.37	X	.44	7/16-14	.43	647-02	11/32	3/49
659-03	5/16-18	1/2-13	.43	29/64	.51	1/2-13	.50	647-03	13/32	3/16
661-03	5/16-24	1/2-13	.43	29/64	.51	1/2-13	.50	647-03	13/32	3/16
659-04	3/8-16	9/16-12	.50	33/64	.57	9/16-12	.56	647-04	15/32	3/16
661-04	3/8-24	9/16-12	.50	33/64	.57	9/16-12	.56	647-04	15/32	3/16
659-05	7/16-14	5/8-11	.62	37/64	.63	5/8-11	.68	647-05	17/32	3/16
661-05	7/16-20	5/8-11	.62	37/64	.63	5/8-11	.68	647-05	17/32	3/16
659-06	1/2-13	3/4-16	.62	45/64	.76	3/4-16	.68	647-06	21/32	3/16
661-06	1/2-20	3/4-16	.62	45/64	.76	3/4-16	.68	647-06	21/32	3/16
659-07	9/16-12	3/4-16	.81	45/64	.76	3/4-16	.94	647-07	21/32	3/16
661-07	9/16-18	3/4-16	.81	45/64	.76	3/4-16	.94	647-07	21/32	3/16
659-08	5/8-11	7/8-14	.87	53/64	.88	7/8-14	1.00	647-08	25/32	5-16
661-08	5/8-18	7/8-14	.87	53/64	.88	7/8-14	1.00	647-08	25/32	5-16
659-09	3/4-10	1-1/8-12	1.12	1-1/16	1.14	1-1/8-12	1.31	647-09	31/32	5/16
661-09	3/4-16	1-1/8-12	1.12	1-1/16	1.14	1-1/8-12	1.31	647-09	31/32	5/16
659-10	7/8-9	1-1/4-12	1.25	1-3/16	1.27	1-1/4-12	1.44	647-10	1-3/32	5/16
661-10	7/8-14	1-1/4-12	1.25	1-3/16	1.27	1-1/4-12	1.44	647-10	1-3/32	5/16
659-11	1-8	1-3/8-12	1.37	1-5/16	1.39	1-3/8-12	1.56	647-11	1-7/32	5/16
661-11	1-12	1-3/8-12	1.37	1-5/16	1.39	1-3/8-12	1.56	647-11	1-7/32	5/16
661-12	1-14	1-3/8-12	1.37	1-5/16	1.39	1-3/8-12	1.56	647-11	1-7/32	5/16
659-13	1-1/8-7	1-1/2-12	1.62	1-7/16	1.52	1-1/2-12	1.84	647-13	1-11/32	5/16
661-13	1-1/8-12	1-1/2-12	1.62	1-7/16	1.52	1-1/2-12	1.84	647-13	1-11/32	5/16
659-14	1-1/4-7	1-5/8-12	1.81	1-9/16	1.64	1-5/8-12	2.06	647-14	1-15/32	5/16
661-14	1-1/4-12	1-5/8-12	1.81	1-9/16	1.64	1-5/8-12	2.06	647-14	1-15/32	5/16
659-16	1-1/2-6	1-7/8-12	2.00	1-13/16	1.89	1-7/8-12	2.28	647-16	1.23/32	5/16
661-16	1-1/2-12	1-7/8-12	2.00	1-13/16	1.89	1-7/8-12	2.28	647-16	1.23/32	5/16

KEYLOCKING THREADED INSERTS



THINWALL THREADED INSERTS

Alloy Steel - Cadmium Plate

P/N	DIMENSIONS			INSTALLATION					REMOVAL	
	INTERNAL THREAD CLASS 3B	EXTERNAL THREAD CLASS 2A	LENGTH	TAP DRILL SIZE	C'SINK DIA. +.010	THREAD TOP SIZE CLASS 2B	THREAD TOP MIN. DEPTH	INSTALLATION TOOL P/N	DRILL SIZE	DRILL DEPTH
659-21	10-24	5/16-18	.31	I	.32	5/16-18	.37	647-21	7/32	5/32
661-21	10-32	5/16-18	.31	I	.32	5/16-18	.37	647-21	7/32	5/32
659-22	1/4-20	3/8-16	.37	Q	.38	3/8-16	.43	647-22	9/32	3/16
661-22	1/4-28	3/8-16	.37	Q	.38	3/8-16	.43	647-22	9/32	3/16
659-23	5/16-18	7/16-14	.43	X	.44	7/16-14	.50	647-23	11/32	3/16
661-23	5/16-24	7/16-14	.43	X	.44	7/16-14	.50	647-23	11/32	3/16
659-24	3/8-16	1/2-13	.50	29-64	.51	1/2-13	.56	647-24	13/32	3/16
661-24	3/8-24	1/2-13	.50	29-64	.51	1/2-13	.56	647-24	13/32	3/16
659-25	7/16-14	9/16-12	.56	33/64	.57	9/16-12	.62	647-25	15/32	3/16
661-25	7/16-20	9/16-12	.56	33/64	.57	9/16-12	.62	647-25	15/32	3/16
659-26	1/2-13	5/8-11	.62	37/64	.63	5/8-11	.68	647-26	17/362	3/16
661-26	1/2-20	5/8-11	.62	37/64	.63	5/8-11	.68	647-26	17/362	3/16



KEYLOCKING THREADED INSERTS

EXTRA HEAVY DUTY THREADED INSERTS

Alloy Steel - Cadmium Plate

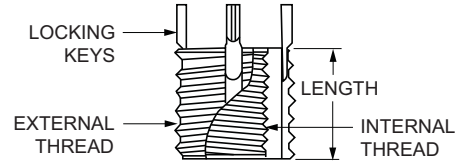
P/N	DIMENSIONS			INSTALLATION					REMOVAL	
	INTERNAL THREAD CLASS 3B	EXTERNAL THREAD CLASS 2A	LENGTH	TAP DRILL SIZE	C'SINK DIA. +.010	THREAD TOP SIZE CLASS 2B	THREAD TOP MIN. DEPTH	INSTALLATION TOOL P/N	DRILL SIZE	DRILL DEPTH
659-31	6-32	5/16-18	.31	I	.32	5/16-18	.37	647-31	7/32	1/8
659-32	8-32	3/8-16	.31	Q	.38	3/8-16	.37	647-32	9/32	1/8
659-33	10-24	7/16-14	.31	X	.44	7/16-14	.37	647-33	11/32	3/16
661-33	10-32	7/16-14	.31	X	.44	7/16-14	.37	647-33	11/32	3/16
659-34	1/4-20	1/2-13	.37	29/64	.51	1/2-13	.43	647-34	13/32	3/16
661-34	1/4-28	1/2-13	.37	29/64	.51	1/2-13	.43	647-34	13/32	3/16
659-35	5/16-18	9/16-12	.43	33/64	.57	9/16-12	.50	647-35	15/32	3/16
661-35	5/16-24	9/16-12	.43	33/64	.57	9/16-12	.50	647-35	15/32	3/16
659-36	3/8-16	5/8-11	.50	37/64	.63	5/8-11	.56	647-36	17/32	3/16
661-36	3/8-24	5/8-11	.50	37/64	.63	5/8-11	.56	647-36	17/32	3/16
659-37	7/16-14	3/4-16	.62	45/64	.76	3/4-16	.68	647-37	21/32	3/16
661-37	7/16-20	3/4-16	.62	45/64	.76	3/4-16	.68	647-37	21/32	3/16
659-38	1/2-13	7/8-14	.68	53/64	.88	7/8-14	.75	647-38	25/32	5/16
661-38	1/2-20	7/8-14	.68	53/64	.88	7/8-14	.75	647-38	25/32	5/16
659-39	9/16-12	7/8-14	.81	53/64	.88	7/8-14	.94	647-39	25/32	5/16
661-39	9/16-18	7/8-14	.81	53/64	.88	7/8-14	.94	647-39	25/32	5/16
659-40	5/8-11	1-12	.87	15/16	1.02	1-12	1.00	647-40	27/32	5/16
661-40	5/8-18	1-12	.87	15/16	1.02	1-12	1.00	647-40	27/32	5/16
659-41	3/4-10	1-1/4-12	1.12	1-3/16	1.27	1-1/4-12	1.31	647-41	1-3/32	5/16
661-41	3/4-16	1-1/4-12	1.12	1-3/16	1.27	1-1/4-12	1.31	647-41	1-3/32	5/16
659-42	7/8-9	1-3/8-12	1.25	1-5/16	1.39	1-3/8-12	1.44	647-42	1-7/32	5/16
661-42	7/8-14	1-3/8-12	1.25	1-5/16	1.39	1-3/8-12	1.44	647-42	1-7/32	5/16
659-43	1-8	1-1/2-12	1.37	1-7/16	1.52	1-1/2-12	1.56	647-43	1-11/32	5/16
661-43	1-12	1-1/2-12	1.37	1-7/16	1.52	1-1/2-12	1.56	647-43	1-11/32	5/16

METRIC THINWALL THREADED INSERTS

Alloy Steel - Cadmium Plate

P/N	DIMENSIONS			INSTALLATION					REMOVAL	
	INTERNAL THREAD CLASS 6H	EXTERNAL THREAD CLASS 6G	LENGTH	TAP DRILL SIZE	C'SINK DIA. +.25	THREAD TOP SIZE CLASS 6H	THREAD TOP MIN. DEPTH	INSTALLATION TOOL P/N	DRILL SIZE	DRILL DEPTH
659-51	M5 x .80	M8 x 1.25	8	6.90	8.25	M8 x 1.25	9.5	647-51	5.5	4.00
659-52	M6 x 1.00	M10 x 1.25	10	8.80	10.25	M10 x 1.25	11.5	647-52	7.5	4.75
659-53	M8 x 1.25	M12 x 1.25	12	10.80	12.25	M12 x 1.25	13.5	647-53	9.5	4.75
661-53	M8 x 1.00	M12 x 1.25	12	10.80	12.25	M12 x 1.25	13.5	647-53	9.5	4.75
659-55	M10 x 1.50	M14 x 1.50	14	12.80	14.25	M14 x 1.50	15.5	647-55	11.5	4.75
661-55	M10 x 1.25	M14 x 1.50	14	12.80	14.25	M14 x 1.50	15.5	647-55	11.5	4.75
659-56	M12 x 1.75	M16 x 1.50	16	14.75	16.25	M16 x 1.50	17.5	647-56	13.5	4.75
661-56	M12 x 1.25	M16 x 1.50	16	14.75	16.25	M16 x 1.50	17.5	647-56	13.5	4.75

KEYLOCKING THREADED INSERTS



METRIC EXTRA HEAVY DUTY THREADED INSERTS

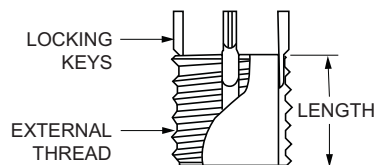
Alloy Steel - Cadmium Plate

P/N	DIMENSIONS			INSTALLATION					REMOVAL	
	INTERNAL THREAD CLASS 6H	EXTERNAL THREAD CLASS 6G	LENGTH	TAP DRILL SIZE	C'SINK DIA. +.25	THREAD TOP SIZE CLASS 6H	THREAD TOP MIN. DEPTH	INSTALLATION TOOL P/N	DRILL SIZE	DRILL DEPTH
659-63	M4 x .70	M8 x 1.25	8	6.90	8.25	M8 x 1.25	9.5	647-63	5.50	4.00
659-64	M5 x .80	M10 x 1.25	10	8.80	10.25	M10 x 1.25	12.5	647-64	7.50	4.75
659-65	M6 x 1.00	M12 x 1.25	12	10.80	12.25	M12 x 1.25	14.5	647-65	9.50	4.75
659-66	M8 x 1.25	M14 x 1.50	14	12.80	14.25	M14 x 1.50	16.5	647-66	11.50	4.75
661-66	M8 x 1.00	M14 x 1.50	14	12.80	14.25	M14 x 1.50	16.5	647-66	11.50	4.75
659-67	M10 x 1.50	M16 x 1.50	16	14.75	16.25	M16 x 1.50	18.5	647-67	13.50	4.75
661-67	M10 x 1.25	M16 x 1.50	16	14.75	16.25	M16 x 1.50	18.5	647-67	13.50	4.75
659-69	M12 x 1.75	M18 x 1.50	18	16.75	18.25	M18 x 1.50	20.5	647-69	15.50	4.75
661-69	M12 x 1.25	M18 x 1.50	18	16.75	18.25	M18 x 1.50	20.5	647-69	15.50	4.75
659-70	M14 x 2.00	M20 x 1.50	20	18.75	20.25	M20 x 1.50	22.5	647-70	17.50	4.75
661-70	M14 x 1.50	M20 x 1.50	20	18.75	20.25	M20 x 1.50	22.5	647-70	17.50	4.75
659-71	M16 x 2.00	M22 x 1.50	22	20.50	22.25	M22 x 1.50	24.5	647-71	17.75	6.36
661-71	M16 x 1.50	M22 x 1.50	22	20.50	22.25	M22 x 1.50	24.5	647-71	17.75	6.36
661-72	M18 x 1.50	M24 x 1.50	24	22.50	24.25	M24 x 1.50	26.5	647-72	19.75	6.36
659-73	M20 x 2.50	M30 x 2.00	30	28.00	30.25	M30 x 2.00	34.5	647-73	25.75	6.36
661-73	M20 x 1.50	M30 x 2.00	30	28.00	30.25	M30 x 2.00	34.5	647-73	25.75	6.36
661-74	M22 x 1.50	M32 x 2.00	32	30.00	32.25	M32 x 2.00	36.5	647-74	27.75	6.36
659-75	M24 x 3.00	M33 x 2.00	33	31.00	33.25	M33 x 2.00	37.5	647-75	28.75	6.36
661-75	M24 x 2.00	M33 x 2.00	33	31.00	33.25	M33 x 2.00	37.5	647-75	28.75	6.36

KEYLOCKING THREADED INSERTS

These solid style Inserts are ideal for:

- Salvaging expensive castings.
- Relocating holes that have been drilled or tapped in the wrong location.
- Filling holes that are too large
- No need to alter original bolt size.



SOLID THREADED INSERTS

Alloy Steel - Cadmium Plate

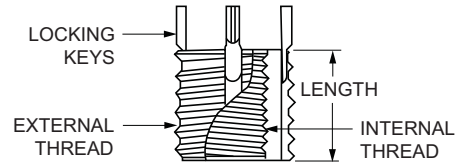
P/N	DIMENSIONS		INSTALLATION					REMOVAL	
	EXTERNAL THREAD CLASS 2B	LENGTH	TAP DRILL SIZE	C'SINK DIA. +.010	THREAD TOP SIZE CLASS 2B	THREAD TOP MIN. DEPTH	INSTALLATION TOOL P/N	DRILL SIZE	DRILL DEPTH
660-01	5/16-18	.31	I	.32	5/16-18	.37	648-01	7/32	1/8
660-02	3/8-16	.31	Q	.38	3/8-16	.37	648-02	9/32	1/8
660-03	7/16-14	.37	X	.44	7/16-14	.43	648-03	11/32	3/16
660-04	1/2-13	.43	29/64	.51	1/2-13	.50	648-04	13/32	3/16
660-05	9/16-12	.50	33/64	.57	9/16-12	.56	648-05	15/32	3/16
660-06	5/8-11	.62	37/64	.63	5/8-11	.68	648-06	17/32	3/16
660-07	3/4-16	.68	45/64	.76	3/4-16	.75	648-07	21/32	3/16
660-08	7/8-14	.87	53/64	.88	7/8-14	1.00	648-08	25/32	5/16
660-09	1-12	.87	15/16	1.02	1-12	1.00	648-09	27/32	5/16
660-10	1-1/8-12	1.12	1-1/16	1.14	1-1/8-12	1.31	648-10	31/32	5/16
660-11	1-1/4-12	1.25	1-3/16	1.27	1-1/4-12	1.44	648-11	1-3/32	5/16
660-12	1-3/8-12	1.37	1-5/16	1.39	1-3/8-12	1.56	648-12	1-7/32	5/16

METRIC SOLID THREADED INSERTS

Alloy Steel - Cadmium Plate

P/N	DIMENSIONS		INSTALLATION					REMOVAL	
	EXTERNAL THREAD CLASS 6G	LENGTH	TAP DRILL SIZE	C'SINK DIA. +.25	THREAD TOP SIZE CLASS 6H	THREAD TOP MIN. DEPTH	INSTALLATION TOOL P/N	DRILL SIZE	DRILL DEPTH
660-21	M8 x 1.25	8	6.90	8.25	M8 x 1.25	9.5	648-21	5.50	4.00
660-22	M10 x 1.25	10	8.80	10.25	M10 x 1.25	12.5	648-22	7.50	4.75
660-23	M12 x 1.25	12	10.80	12.25	M12 x 1.25	14.5	648-23	9.50	4.75
660-24	M14 x 1.50	14	12.80	14.25	M14 x 1.50	16.5	648-24	11.50	4.75
660-25	M16 x 1.50	16	14.75	16.25	M16 x 1.50	18.5	648-25	13.50	4.75
660-26	M18 x 1.50	18	16.75	18.25	M18 x 1.50	20.5	648-26	15.50	4.75
660-27	M20 x 1.50	20	18.75	20.25	M20 x 1.50	22.5	648-27	17.50	4.75
660-28	M22 x 1.50	22	20.50	22.25	M22 x 1.50	24.5	648-28	17.75	6.35
660-29	M24 x 1.50	24	22.50	24.25	M24 x 1.50	26.5	648-29	19.75	6.35
660-30	M30 x 2.00	30	28.00	30.25	M30 x 2.00	34.5	648-30	25.75	6.35
660-31	M32 x 2.00	32	30.00	32.25	M32 x 2.00	36.5	648-31	27.75	6.35
660-32	M33 x 2.00	33	31.00	33.25	M33 x 2.00	37.5	648-32	28.75	6.35

KEYLOCKING THREADED INSERTS



METRIC THINWALL THREADED INSERTS

Metric internal / US external - Alloy Steel - Cadmium Plate

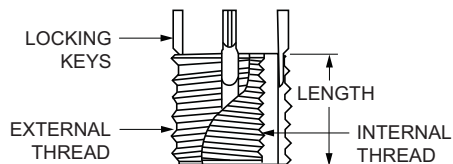
P/N	DIMENSIONS			INSTALLATION					REMOVAL	
	INTERNAL THREAD CLASS 6H	EXTERNAL THREAD CLASS 2A	LENGTH	TAP DRILL SIZE	C'SINK DIA. +.25	THREAD TOP SIZE CLASS 2B	THREAD TOP MIN. DEPTH	INSTALLATION TOOL P/N	DRILL SIZE	DRILL DEPTH
662-43	M6 x 1.00	3/8-16	.31	Q	.38	3/8-16	.37	648-43	9/32	1/8
662-44	M8 x 1.25	1/2-13	.43	29/64	.51	1/2-13	.50	648-44	13/32	3/16
662-45	M10 x 1.50	5/8-11	.50	37/64	.63	5/8-11	.56	648-45	17/32	3/16
662-47	M12 x 1.75	3/4-16	.62	45/64	.76	3/4-16	.68	648-47	21/32	3/16
662-48	M14 x 2.00	7/8-14	.81	53/64	.88	7/8-14	.94	648-48	25/32	5/16
662-49	M16 x 2.00	1-12	.87	15/16	1.02	1-12	1.00	648-49	27/32	5/16

STAINLESS STEEL HEAVY DUTY THREADED INSERTS

303 Stainless Steel - Passivated

P/N	DIMENSIONS			INSTALLATION					REMOVAL	
	INTERNAL THREAD CLASS 3B	EXTERNAL THREAD CLASS 2A	LENGTH	TAP DRILL SIZE	C'SINK DIA. +.010	THREAD TOP SIZE CLASS 2B	THREAD TOP MIN. DEPTH	INSTALLATION TOOL P/N	DRILL SIZE	DRILL DEPTH
663-00	8-32	5/16-18	.31	I	.32	5/16-18	.37	647-00	7/32	1/8
663-01	10-24	3/8-16	.31	Q	.38	3/8-16	.37	647-01	9/32	1/8
665-01	10-32	3/8-16	.31	Q	.38	3/8-16	.37	647-01	9/32	1/8
663-02	1/4-20	7/16-14	.37	X	.44	7/16-14	.43	647-02	11/32	3/49
665-02	1/4-28	7/16-14	.37	X	.44	7/16-14	.43	647-02	11/32	3/49
663-03	5/16-18	1/2-13	.43	29/64	.51	1/2-13	.50	647-03	13/32	3/16
665-03	5/16-24	1/2-13	.43	29/64	.51	1/2-13	.50	647-03	13/32	3/16
663-04	3/8-16	9/16-12	.50	33/64	.57	9/16-12	.56	647-04	15/32	3/16
665-04	3/8-24	9/16-12	.50	33/64	.57	9/16-12	.56	647-04	15/32	3/16
663-05	7/16-14	5/8-11	.62	37/64	.63	5/8-11	.68	647-05	17/32	3/16
665-05	7/16-20	5/8-11	.62	37/64	.63	5/8-11	.68	647-05	17/32	3/16
663-06	1/2-13	3/4-16	.62	45/64	.76	3/4-16	.68	647-06	21/32	3/16
665-06	1/2-20	3/4-16	.62	45/64	.76	3/4-16	.68	647-06	21/32	3/16
663-07	9/16-12	3/4-16	.81	45/64	.76	3/4-16	.68	647-07	21/32	3/16
665-07	9/16-18	3/4-16	.81	45/64	.76	3/4-16	.94	647-07	21/32	3/16
663-08	5/8-11	7/8-14	.87	53/64	.88	7/8-14	1.00	647-08	25/32	5-16
665-08	5/8-18	7/8-14	.87	53/64	.88	7/8-14	1.00	647-08	25/32	5-16
663-09	3/4-10	1-1/8-12	1.12	1-1/16	1.14	1-1/8-12	1.31	647-09	31/32	5/16
665-09	3/4-16	1-1/8-12	1.12	1-1/16	1.14	1-1/8-12	1.31	647-09	31/32	5/16
663-10	7/8-9	1-1/4-12	1.25	1-3/16	1.27	1-1/4-12	1.44	647-10	1-3/32	5/16
665-10	7/8-14	1-1/4-12	1.25	1-3/16	1.27	1-1/4-12	1.44	647-10	1-3/32	5/16
663-11	1-8	1-3/8-12	1.37	1-5/16	1.39	1-3/8-12	1.56	647-11	1-7/32	5/16
665-11	1-12	1-3/8-12	1.37	1-5/16	1.39	1-3/8-12	1.56	647-11	1-7/32	5/16

KEYLOCKING THREADED INSERTS

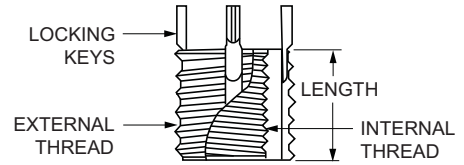


STAINLESS STEEL THINWALL THREADED INSERTS

303 Stainless Steel - Passivated

P/N	DIMENSIONS			INSTALLATION					REMOVAL	
	INTERNAL THREAD CLASS 3B	EXTERNAL THREAD CLASS 2A	LENGTH	TAP DRILL SIZE	C'SINK DIA. +.010	THREAD TOP SIZE CLASS 2B	THREAD TOP MIN. DEPTH	INSTALLATION TOOL P/N	DRILL SIZE	DRILL DEPTH
663-21	10-24	5/16-18	.31	I	.32	5/16-18	.37	647-21	7/32	5/32
665-21	10-32	5/16-18	.31	I	.32	5/16-18	.37	647-21	7/32	5/32
663-22	1/4-20	3/8-16	.37	Q	.38	3/8-16	.43	647-22	9/32	3/16
665-22	1/4-28	3/8-16	.37	Q	.38	3/8-16	.43	647-22	9/32	3/16
663-23	5/16-18	7/16-14	.43	X	.44	7/16-14	.50	647-23	11/32	3/16
665-23	5/16-24	7/16-14	.43	X	.44	7/16-14	.50	647-23	11/32	3/16
663-24	3/8-16	1/2-13	.50	29-64	.51	1/2-13	.56	647-24	13/32	3/16
665-24	3/8-24	1/2-13	.50	29-64	.51	1/2-13	.56	647-24	13/32	3/16
663-25	7/16-14	9/16-12	.56	33/64	.57	9/16-12	.62	647-25	15/32	3/16
665-25	7/16-20	9/16-12	.56	33/64	.57	9/16-12	.62	647-25	15/32	3/16
663-26	1/2-13	5/8-11	.62	37/64	.63	5/8-11	.68	647-26	17/32	3/16
665-26	1/2-20	5/8-11	.62	37/64	.63	5/8-11	.68	647-26	17/32	3/16

KEYLOCKING THREADED INSERTS

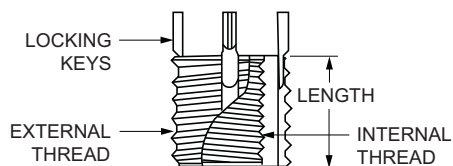


STAINLESS STEEL EXTRA HEAVY DUTY THREADED INSERTS

303 Stainless Steel - Passivated

P/N	DIMENSIONS			INSTALLATION					REMOVAL	
	INTERNAL THREAD CLASS 3B	EXTERNAL THREAD CLASS 2A	LENGTH	TAP DRILL SIZE	C'SINK DIA. +.010	THREAD TOP SIZE CLASS 2B	THREAD TOP MIN. DEPTH	INSTALLATION TOOL P/N	DRILL SIZE	DRILL DEPTH
663-31	6-32	5/16-18	.31	I	.32	5/16-18	.37	647-31	7/32	1/8
663-32	8-32	3/8-16	.31	Q	.38	3/8-16	.37	647-32	9/32	1/8
663-33	10-24	7/16-14	.31	X	.44	7/16-14	.37	647-33	11/32	3/16
665-33	10-32	7/16-14	.31	X	.44	7/16-14	.37	647-33	11/32	3/16
663-34	1/4-20	1/2-13	.37	29/64	.51	1/2-13	.43	647-34	13/32	3/16
665-34	1/4-28	1/2-13	.37	29/64	.51	1/2-13	.43	647-34	13/32	3/16
663-35	5/16-18	9/16-12	.43	33/64	.57	9/16-12	.50	647-35	15/32	3/16
665-35	5/16-24	9/16-12	.43	33/64	.57	9/16-12	.50	647-35	15/32	3/16
663-36	3/8-16	5/8-11	.50	37/64	.63	5/8-11	.56	647-36	17/32	3/16
665-36	3/8-24	5/8-11	.50	37/64	.63	5/8-11	.56	647-36	17/32	3/16
663-37	7/16-14	3/4-16	.62	45/64	.76	3/4-16	.68	647-37	21/32	3/16
665-37	7/16-20	3/4-16	.62	45/64	.76	3/4-16	.68	647-37	21/32	3/16
663-38	1/2-13	7/8-14	.68	53/64	.88	7/8-14	.75	647-38	25/32	5/16
665-38	1/2-20	7/8-14	.68	53/64	.88	7/8-14	.75	647-38	25/32	5/16
663-39	9/16-12	7/8-14	.81	53/64	.88	7/8-14	.94	647-39	25/32	5/16
665-39	9/16-18	7/8-14	.81	53/64	.88	7/8-14	.94	647-39	25/32	5/16
663-40	5/8-11	1-12	.87	15/16	1.02	1-12	1.00	647-40	27/32	5/16
665-40	5/8-18	1-12	.87	15/16	1.02	1-12	1.00	647-40	27/32	5/16
663-41	3/4-10	1-1/4-12	1.12	1-3/16	1.27	1-1/4-12	1.31	647-41	1-3/32	5/16
665-41	3/4-16	1-1/4-12	1.12	1-3/16	1.27	1-1/4-12	1.31	647-41	1-3/32	5/16
663-42	7/8-9	1-3/8-12	1.25	1-5/16	1.39	1-3/8-12	1.44	647-42	1-7/32	5/16
665-42	7/8-14	1-3/8-12	1.25	1-5/16	1.39	1-3/8-12	1.44	647-42	1-7/32	5/16
663-43	1-8	1-1/2-12	1.37	1-7/16	1.52	1-1/2-12	1.56	647-43	1-11/32	5/16
665-43	1-12	1-1/2-12	1.37	1-7/16	1.52	1-1/2-12	1.56	647-43	1-11/32	5/16

KEYLOCKING THREADED INSERTS



STAINLESS STEEL METRIC THINWALL THREADED INSERTS

303 Stainless Steel - Passivated

P/N	DIMENSIONS			INSTALLATION					REMOVAL	
	INTERNAL THREAD CLASS 6H	EXTERNAL THREAD CLASS 6G	LENGTH	TAP DRILL SIZE	C'SINK DIA. +.25	THREAD TOP SIZE CLASS 6H	THREAD TOP MIN. DEPTH	INSTALLATION TOOL P/N	DRILL SIZE	DRILL DEPTH
663-51	M5 x .80	M8 x 1.25	8	6.90	8.25	M8 x 1.25	9.5	647-51	5.5	4.00
663-52	M6 x 1.00	M10 x 1.25	10	8.80	10.25	M10 x 1.25	11.5	647-52	7.5	4.75
663-53	M8 x 1.25	M12 x 1.25	12	10.80	12.25	M12 x 1.25	13.5	647-53	9.5	4.75
665-53	M8 x 1.00	M12 x 1.25	12	10.80	12.25	M12 x 1.25	13.5	647-53	9.5	4.75
663-55	M10 x 1.50	M14 x 1.50	14	12.80	14.25	M14 x 1.50	15.5	647-55	11.5	4.75
665-55	M10 x 1.25	M14 x 1.50	14	12.80	14.25	M14 x 1.50	15.5	647-55	11.5	4.75
663-56	M12 x 1.75	M16 x 1.50	16	14.75	16.25	M16 x 1.50	17.5	647-56	13.5	4.75
665-56	M12 x 1.25	M16 x 1.50	16	14.75	16.25	M16 x 1.50	17.5	647-56	13.5	4.75

STAINLESS STEEL METRIC EXTRA HEAVY DUTY THREADED INSERTS

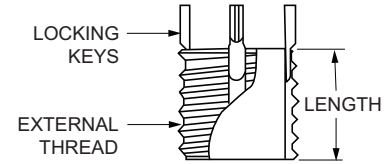
303 Stainless Steel - Passivated

P/N	DIMENSIONS			INSTALLATION					REMOVAL	
	INTERNAL THREAD CLASS 6H	EXTERNAL THREAD CLASS 6G	LENGTH	TAP DRILL SIZE	C'SINK DIA. +.25	THREAD TOP SIZE CLASS 6H	THREAD TOP MIN. DEPTH	INSTALLATION TOOL P/N	DRILL SIZE	DRILL DEPTH
663-63	M4 x .70	M8 x 1.25	8	6.90	8.25	M8 x 1.25	9.5	647-63	5.50	4.00
663-64	M5 x .80	M10 x 1.25	10	8.80	10.25	M10 x 1.25	12.5	647-64	7.50	4.75
663-65	M6 x 1.00	M12 x 1.25	12	10.80	12.25	M12 x 1.25	14.5	647-65	9.50	4.75
663-66	M8 x 1.25	M14 x 1.50	14	12.80	14.25	M14 x 1.50	16.5	647-66	11.50	4.75
665-66	M8 x 1.00	M14 x 1.50	14	12.80	14.25	M14 x 1.50	16.5	647-66	11.50	4.75
663-67	M10 x 1.50	M16 x 1.50	16	14.75	16.25	M16 x 1.50	18.5	647-67	13.50	4.75
665-67	M10 x 1.25	M16 x 1.50	16	14.75	16.25	M16 x 1.50	18.5	647-67	13.50	4.75
663-69	M12 x 1.75	M18 x 1.50	18	16.75	18.25	M18 x 1.50	20.5	647-69	15.50	4.75
665-69	M12 x 1.25	M18 x 1.50	18	16.75	18.25	M18 x 1.50	20.5	647-69	15.50	4.75
663-70	M14 x 2.00	M20 x 1.50	20	18.75	20.25	M20 x 1.50	22.5	647-70	17.50	4.75
665-70	M14 x 1.50	M20 x 1.50	20	18.75	20.25	M20 x 1.50	22.5	647-70	17.50	4.75
663-71	M16 x 2.00	M22 x 1.50	22	20.50	22.25	M22 x 1.50	24.5	647-71	17.75	6.36
665-71	M16 x 1.50	M22 x 1.50	22	20.50	22.25	M22 x 1.50	24.5	647-71	17.75	6.36
665-72	M18 x 1.50	M24 x 1.50	24	22.50	24.25	M24 x 1.50	26.5	647-72	19.75	6.36
663-73	M20 x 2.50	M30 x 2.00	30	28.00	30.25	M30 x 2.00	34.5	647-73	25.75	6.36
665-73	M20 x 1.50	M30 x 2.00	30	28.00	30.25	M30 x 2.00	34.5	647-73	25.75	6.36
665-74	M22 x 1.50	M32 x 2.00	32	30.00	32.25	M32 x 2.00	36.5	647-74	27.75	6.36
663-75	M24 x 3.00	M33 x 2.00	33	31.00	33.25	M33 x 2.00	37.5	647-75	28.75	6.36
665-75	M24 x 2.00	M33 x 2.00	33	31.00	33.25	M33 x 2.00	37.5	647-75	28.75	6.36

KEYLOCKING THREADED INSERTS

These solid style Inserts are ideal for:

- Salvaging expensive castings.
- Relocating holes that have been drilled or tapped in the wrong location.
- Filling holes that are too large
- No need to alter original bolt size.



STAINLESS STEEL SOLID THREADED INSERTS

303 Stainless Steel - Passivated

P/N	DIMENSIONS		INSTALLATION					REMOVAL	
	EXTERNAL THREAD CLASS 2B	LENGTH	TAP DRILL SIZE	C'SINK DIA. +.010	THREAD TOP SIZE CLASS 2B	THREAD TOP MIN. DEPTH	INSTALLATION TOOL P/N	DRILL SIZE	DRILL DEPTH
664-01	5/16-18	.31	I	.32	5/16-18	.37	648-01	7/32	1/8
664-02	3/8-16	.31	Q	.38	3/8-16	.37	648-02	9/32	1/8
664-03	7/16-14	.37	X	.44	7/16-14	.43	648-03	11/32	3/16
664-04	1/2-13	.43	29/64	.51	1/2-13	.50	648-04	13/32	3/16
664-05	9/16-12	.50	33/64	.57	9/16-12	.56	648-05	15/32	3/16
664-06	5/8-11	.62	37/64	.63	5/8-11	.68	648-06	17/32	3/16
664-07	3/4-16	.68	45/64	.76	3/4-16	.75	648-07	21/32	3/16
664-08	7/8-14	.87	53/64	.88	7/8-14	1.00	648-08	25/32	5/16
664-09	1-12	.87	15/16	1.02	1-12	1.00	648-09	27/32	5/16
664-10	1-1/8-12	1.12	1-1/16	1.14	1-1/8-12	1.31	648-10	31/32	5/16
664-11	1-1/4-12	1.25	1-3/16	1.27	1-1/4-12	1.44	648-11	1-3/32	5/16
664-12	1-3/8-12	1.37	1-5/16	1.39	1-3/8-12	1.56	648-12	1-7/32	5/16

