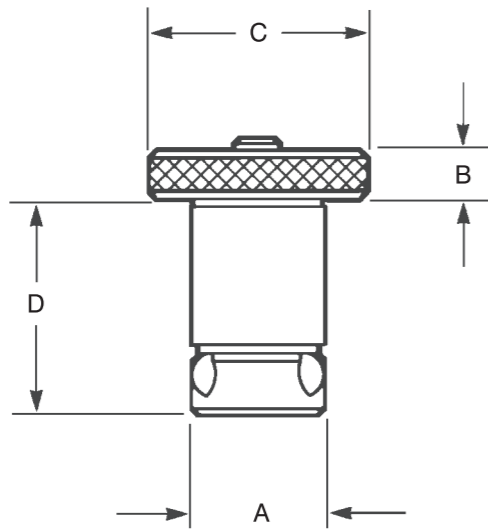




U.S. Patens: 3,498,653
4,135,418

- Material: Shank/Bushing, AISI 4340
Liner, 52100
- Finish: Black Oxide
- Heat Treat: Shanks, HRC 40°-45°
Bushings, HRC 50°-54°
Liners, HRC 62°-64°
- Operating Temperature Range: -30°C to 200°C
- Stainless Steel available in all sizes.



Replacement Kits



- Each Kit Includes:
- Replacement Screw
 - Locking Balls
 - Drive Ball
 - O-Ring

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.

Shank Part Number	Fixture Plate Thickness ± 0.13mm	Shank Diameter (mm) A	Head of Shank		D	Hex Wrench Size for Set Screw	Maximum		Recommended		Repair Kit Part Number
			Height B	Diameter C			Screw Torque (N.m)	Holddown Force (KN)	Screw Torque (N.m)	Holddown Force (KN)	
BL-49655	13	13	6	22	27.6	2.5	1.2	3.3	1	2.7	49955
BL-49656		20		34.6	49956						
BL-49657	16	20	8	32	36.5	3.0	4.5	5.3	3	3.5	49957
BL-49658		25		41.5	49958						
BL-49651	20	20	10	40	39.5	3.0	5.3	13.3	4	10.0	49951
BL-49652		25		44.5	49952						
BL-49661	25	20	10	45	44.0	4.0	11.0	30.0	9	23.0	49961
BL-49662		25		49.0	49962						
BL-49671	30	20	13	50	49.0	5.0	18.0	44.0	15	35.0	49971
BL-49672		25		54.0	49972						
BL-49681	35	20	13	60	51.0	6.0	33.0	68.0	25	52.0	49981
BL-49682		25			56.0						49982
BL-49683		40			71.0						49983
BL-49684		50			81.0						49984
BL-49691	50	20	20	75	64.0	10.0	65.0	88.0	50	67.0	49991
BL-49692		25			69.0						49992
BL-49693		40			84.0						49993
BL-49694		50			94.0						49994



Thumb Screw



Adjustable Handle

FAST ACTING BALL LOCK SHANKS				Ball Lock Shank Diameter (mm)	Fixture Plate Thickness (mm)
Shank with Thumb Screw		Shank with Adjustable Handle			
Part Number		Part Number			
Assembly	T-Screw	Assembly	Handle		
BL-49655-S	BL-43971	BL-49655-H	BL-34360	13	13
BL-49656-S	BL-43972	BL-49656-H	BL-34361		20
BL-49657-S	BL-43974	BL-49657-H	BL-34365	16	20
BL-49658-S	BL-43975	BL-49658-H	BL-34365		25
BL-49651-S	BL-43974	BL-49651-H	BL-34365	20	20
BL-49652-S	BL-43975	BL-49652-H	BL-34365		25
BL-49661-S	BL-43977	BL-49661-H	BL-34378	25	20
BL-49662-S	BL-43978	BL-49662-H	BL-34379		25
BL-49671-S	BL-43980	BL-49671-H	BL-34385	30	20
BL-49672-S	BL-43980	BL-49672-H	BL-34385		25
BL-49681-S	BL-43985	BL-49681-H	BL-34393	35	20
BL-49682-S	BL-43985	BL-49682-H	BL-34393		25

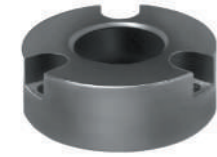


Locating repeatability will determine if one primary and one secondary or two primary liners are needed. With two primary liners, repeatability of ±0.013mm can be maintained if the two holes for receiver bushings are held to a centerline distance of ±0.005mm tolerance.

Note on Installation of Back Mount Style:

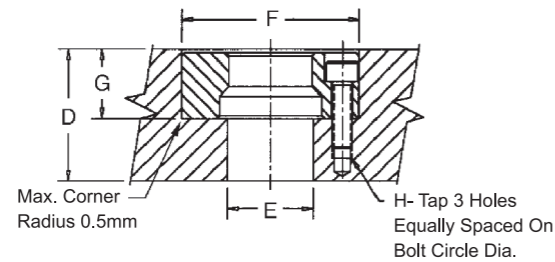
To alleviate the possibility of binding the shank in the bore, the maximum interference fit between bore and bushing O.D. should not exceed 0.013mm.

Primary Liner		Secondary Liner		Shank Diameter (mm)	Fixture Plate Thickness +0.13 -0.13	Liner O.D. +0.00 -0.01
Part Number	I.D.	Part Number	I.D.			
BL-49755	13.01	BL-49855	13.04	13	13	19.040
BL-49756		BL-49856			20	19.040
BL-49757	16.01	BL-49857	16.04	16	20	25.042
BL-49758		BL-49858			25	25.042
BL-49751	20.01	BL-49851	20.04	20	20	35.042
BL-49752		BL-49852			25	35.042
BL-49761	25.01	BL-49861	25.04	25	20	35.042
BL-49762		BL-49862			25	35.042
BL-49771	30.01	BL-49871	30.04	30	20	45.042
BL-49772		BL-49872			25	45.042
BL-49781	35.01	BL-49881	35.04	35	20	45.042
BL-49782		BL-49882			25	45.042
BL-49783		BL-49883			40	45.042
BL-49784		BL-49884			50	45.042
BL-49791	50.01	BL-49891	50.04	50	20	63.546
BL-49792		BL-49892			25	63.546
BL-49793		BL-49893			40	63.546
BL-49794		BL-49894			50	63.546



Face Mount

- Two styles of receiver bushings are available. Installed bushings should be approximately 0.3mm below subplate surface.



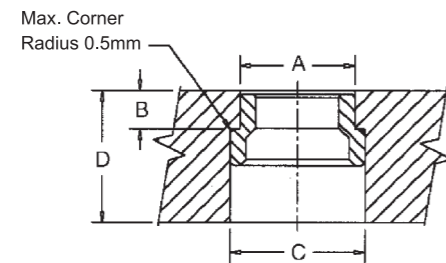
Face Mount Bushing Installation Instructions

*Generally, the face mount receiver bushing is utilized in blind hole applications (Slip Fit).

Face Mount Part Number	Shank Dia. (mm)	Actual O.D. -0.01 -0.02	Clearance Drill Diameter E	Bore +0.003 +0.010 F	Depth +0.025 -0.025 G	Tap Size & Depth H	Bolt Circle Diameter 3 PL Equally Spaced	Min. Subplate Thickness D
BL-49556	13	35	13.5	35	11.91	M4x0.7 x 7	25	20
BL-49557	16	37	21.0	37	11.91	M4x0.7 x 7	29	20
BL-49551	20	45	21.0	45	16.21	M5x0.8 x 9	35	25
BL-49552	25	55	25.5	55	20.32	M6x1.0 x 10	42	30
BL-49553	30	60	30.5	60	22.15	M6x1.0 x 11	48	35
BL-49554	35	70	40.0	70	22.99	M8x1.25 x 17	56	40
BL-49555	50	92	55.0	92	31.50	M10x1.5 x 18	75	50



Back Mount



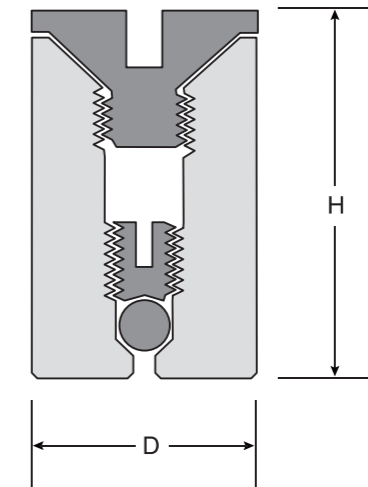
Back Mount Bushing Installation Instructions

*The back mount receiver bushing is used in through hole applications (Light Press Fit).

Back Mount Part Number	Shank Dia. (mm)	Actual O.D. +0.04 +0.03 A	Depth +0.025 -0.025 B	C-Bore ± 0.15 C	Min. Subplate Thickness D
BL-49566	13	20	6.92	26	20
BL-49567	16	22	7.24	29	20
BL-49561	20	28	8.74	33	25
BL-49562	25	35	10.54	41	25
BL-49563	30	42	10.95	49	30
BL-49564	35	48	12.50	55	35
BL-49565	50	67	15.75	76	45

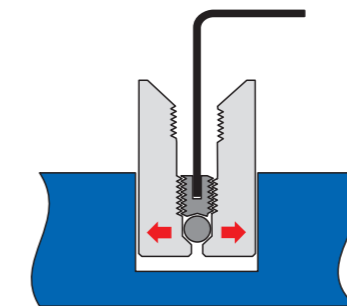


- Material: Steel, hardened to 50°-55° Rockwell C
- Self-Centering and Repeatable to within ±0.013mm
- Top and bottom half of dowel expand separately
- Patented



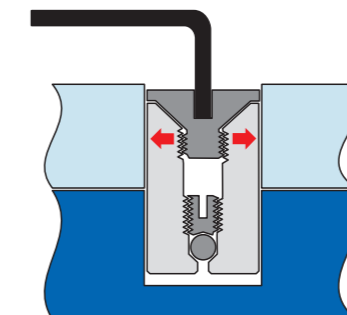
Part Number	Diameter D	Height H	Hex Size
PED-29451	10	20	4
PED-29452	12	24	5
PED-29453	14	28	5
PED-29454	16	32	6
PED-29455	20	40	8

Installation Instructions



Step 1

Remove the top screw, insert the dowel into the locating hole of the first part, and expand the bottom half with a hex wrench.



Step 2

Replace the top screw, slide the locating hole of the second part over the dowel and expand top half with a hex wrench.

BP

BPA

BC

CP

SU

PT

SVF

ALV

OK- VISE

JER- GENS

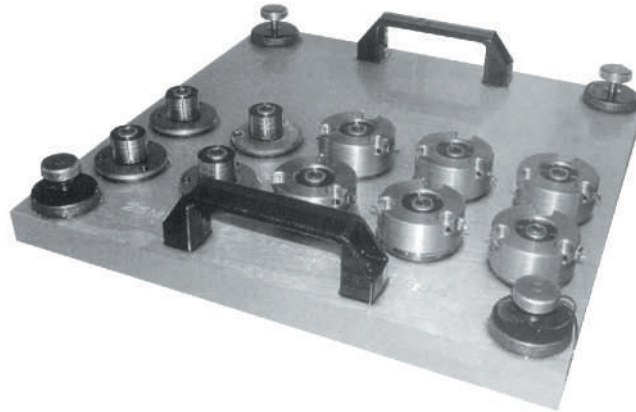
OTHER

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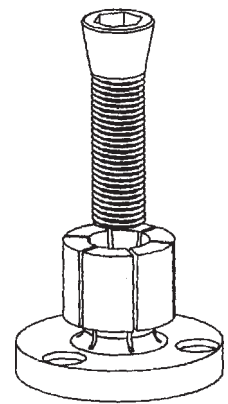
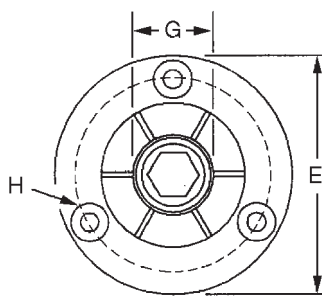
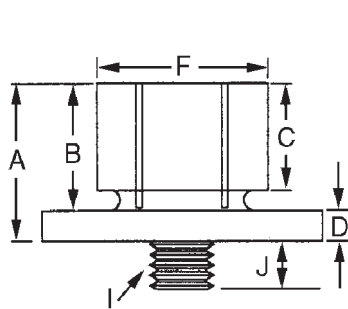
ID EXPANSION CLAMP



- Body Material: Mild Steel
- Low Profile
- Ideal for Secondary Operations on Lathe Parts
- Easily Machined to Size on Lathe or Mill
- Excellent for Palletized Setups
- Allows More Parts Per Workcube or Fixture Plate
- Tighten with Hex Key or Hydraulic Pull Cylinders (Drill clearance hole for longer bolt into hydraulic cylinder)
- Instructions included with each clamp



The ID expansion clamp is the ideal way to hold parts on an inside diameter for multiple machining on a vertical or horizontal machining center. The larger diameter of the clamp is held to a close tolerance for precision locating in a machined pocket on work cubes and fixture plates. The customer machines the mild steel clamp to match the bore of the part ensuring proper fit. Often times the clamps can be remachined for different size jobs.



Part Number	A	B	C	D	+0.00 -0.05 E	F	G ⁺	H [*]	I	J
IEC-68830	21.8	16.0	15.0	5.9	29.72	12.4	8.0	M3 on 20.95 BHC	M4	7.2
IEC-68831	24.9	19.0	15.0	5.9	31.50	14.2	12.2	M3 on 23.1 BHC	M6	11.2
IEC-68832	24.9	19.0	15.0	5.9	37.50	20.0	13.5	M3 on 29.0 BHC	M8	13.2
IEC-68833	28.6	22.2	17.5	6.4	50.00	27.0	18.0	M4 on 39.4 BHC	M10	16.3
IEC-68834	31.8	25.4	20.6	6.4	56.00	35.3	23.0	M4 on 45.5 BHC	M12	20.3
IEC-68835	39.6	31.8	27.0	7.9	69.50	42.0	29.3	M5 on 55.9 BHC	M16	21.4
IEC-68836	39.6	31.8	27.0	7.9	75.50	51.5	29.3	M5 on 63.9 BHC	M16	21.4
IEC-68837	45.5	37.6	32.3	7.9	107.50	77.7	29.3	M6 on 92.6 BHC	M16	19.3

* Three Mounting Screws Included.
 * Minimum diameter the " F " dimension can be machined too.