PennEngineering®

FASTENERS FOR USE WITH PC BOARDS

BULLETIN K

PEM®

107
REV. 509A

FASTENERS FOR USE WITH PC BOARDS

Can satisfy component-to-board, board-to-board, and board-to-chassis production fastening needs using less attachment hardware.

BROACHING FASTENERS

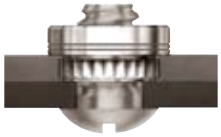
PEM broaching fasteners can be utilized with all types of PC boards, as well as with aluminum, acrylic, and polycarbonate components. They install simply, quickly, and permanently for secure and reliable attachment. Their use eliminates the need for washers, lock washers, nuts, and other excess hardware.

The PEM family of broaching fasteners includes broaching nuts (Types KF2 and KFS2) with permanent threads for board mounting or component attachment; threaded or unthreaded standoffs (Types KFE and KFSE) for stacking or spacing and flare mounted standoffs (Type KFB3) for greater pullout performance; threaded studs (Type KFH) for use as solderable connectors or as permanently mounted mechanical fasteners with external threads; all-metal standoffs (Type KSSB) featuring a spring action to hold a PC board securely without screws or threaded hardware; self-expanding FOILGARD® fasteners (Type KPS6) used in plated thru-holes in multi-layer PC Boards; and one-piece board-mount screw assemblies (Type PFK) with captive screws for easy mounting and removal of PC boards.

GROUNDING STANDOFFS

Grounding standoffs (Types SOAG and SOSG) are designed for clinching into steel or aluminum chassis. The opposite end of the standoff has “gripping teeth” to firmly contact mating PC board.

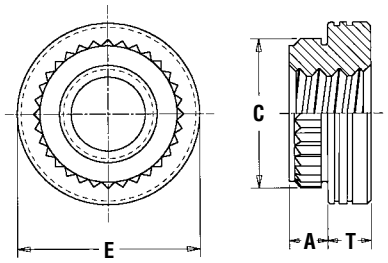
TYPES KF2 AND KFS2 BROACHING NUTS



PART NUMBER DESIGNATION

KF2 – 832 – ET

- KF2 – Type and Material (KF = carbon steel, KFS = stainless steel)
- 832 – Thread Size Code
- ET – Finish Code



All dimensions are in inches.

	Thread Size	Type		Thread Code	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +.003 –.000 (1)	C ±.003	E ±.005	T ±.005	Min. Dist. Hole C/L To Edge
		Carbon Steel	Stainless Steel								
UNIFIED	.086-56 (#2-56)	KF2	KFS2	256	.060	.060	.147	.165	.219	.065	0.16
	.112-40 (#4-40)	KF2	KFS2	440	.060	.060	.166	.184	.219	.065	0.17
	.138-32 (#6-32)	KF2	KFS2	632	.060	.060	.213	.231	.281	.065	0.22
	.164-32 (#8-32)	KF2	KFS2	832	.060	.060	.250	.268	.344	.096	0.25
	.190-32 (#10-32)	KF2	KFS2	032	.060	.060	.272	.290	.375	.127	0.28

All dimensions are in millimeters.

	Thread Size x Pitch	Type		Thread Code	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +0.08 (1)	C ±0.08	E ±0.13	T ±0.13	Min. Dist. Hole C/L To Edge
		Carbon Steel	Stainless Steel								
METRIC	M2 x 0.4	KF2	KFS2	M2	1.53	1.53	3.73	4.19	5.56	1.5	4.2
	M2.5 x 0.45	KF2	KFS2	M2.5	1.53	1.53	4.22	4.68	5.56	1.5	4.4
	M3 x 0.5	KF2	KFS2	M3	1.53	1.53	4.22	4.68	5.56	1.5	4.4
	M4 x 0.7	KF2	KFS2	M4	1.53	1.53	6.4	6.86	8.74	2	6.4
	M5 x 0.8	KF2	KFS2	M5	1.53	1.53	6.9	7.37	9.53	3	7.1

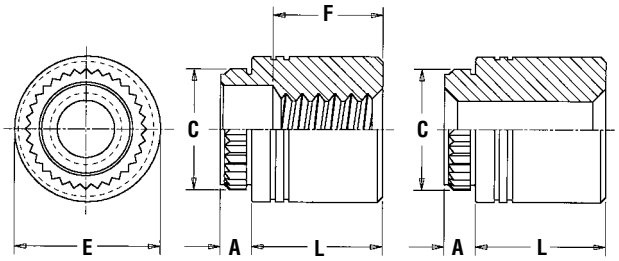
(1) Types KF2 and KFS2 are designed for unplated thru-hole applications. When used in plated thru-hole applications, a tolerance of +.005" -.001"/+0.13mm -0.03mm should be used. However, performance values may be reduced and knurl may damage plating. We recommend using Type KPS6 for plated thru-hole applications.

TYPES KFE AND KFSE BROACHING STANDOFFS

PART NUMBER DESIGNATION

KFE – 632 – 12 ET

- KFE – Type and Material (KFE = carbon steel, KFSE = stainless steel)
- 632 – Thread or Thru Hole Code
- 12 – Length Code
- ET – Finish Code



All dimensions are in inches.

	Thread Size	Thru Hole +.004 −.003	Type: Carbon Steel	Type: Stainless Steel	Thread or Thru Hole Code	Length "L" ±.005 (Length Code is in 32nds of an inch): .125	.250	.375	.500	.625	(2) .750	(2) .875	(2) 1.00	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +.003 −.000 (1)	C ±.003	E ±.005	Min. Dist. Hole C/L To Edge
UNIFIED	.112-40 (#4-40)	(3)	KFE	KFSE	440	4	8	12	16	20	24NS	NA	NA	.060	.060	.166	.184	.219	.17
UNIFIED	.138-32 (#6-32)	(3)	KFE	KFSE	632	4	8	12	16	20	24NS	28NS	32NS	.060	.060	.213	.231	.281	.22
UNIFIED	(3)	.116	KFE	KFSE	116	4	8	12	16	20	24NS	NA	NA	.060	.060	.166	.184	.219	.17
UNIFIED	(3)	.143	KFE	KFSE	143	4	8	12	16	20	24NS	28NS	32NS	.060	.060	.213	.231	.281	.22
UNIFIED	"F" Minimum Thread Length (Where Applicable)					Full			.375 ± .016		.375 Blind								

All dimensions are in millimeters.

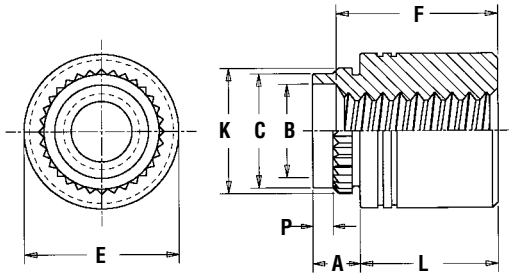
	Thread Size x Pitch	Thru Hole +0.10 −0.08	Type: Carbon Steel	Type: Stainless Steel	Thread or Thru Hole Code	Length "L" ±0.13 (Length Code is in millimeters): 3	4	6	8	10	12	14	16	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +0.08 (1)	C ±0.08	E ±0.13	Min. Dist. Hole C/L To Edge
METRIC	M3 x 0.5	(3)	KFE	KFSE	M3	3	4	6	8	10	12	14	16NS	1.53	1.53	4.22	4.68	5.56	4.4
METRIC	(3)	3.6	KFE	KFSE	3.6	3	4	6NS	8NS	10NS	12NS	14NS	16NS	1.53	1.53	5.41	5.87	7.14	5.5
METRIC	(3)	4.2	KFE	KFSE	4.2NS	3	4	6	8	10	12	14	16	1.53	1.53	6.4	6.86	8.74	7.1
METRIC	"F" Minimum Thread Length (Where Applicable)					Full					9.5 ± 0.4								

TYPE KFB3 FLARE-MOUNTED STANDOFFS

PART NUMBER DESIGNATION

KFB3 – 632 – 12 ET

- KFB3 – Type and Material
- 632 – Thread Code
- 12 – Length Code
- ET – Finish Code



All dimensions are in inches.

	Thread Size	Type	Thread Code	Length "L" ±.005 (Length Code is in 32nds of an inch): .062	.125	.187	.250	.312	.375	.500	.625	(2) .750	(2) 1.00	A (Shank) Max.	Sheet Thickness	Hole Size in Sheet +.005 −.001 (1)	B ±.003	C Max.	E ±.005	K ±.003	P ±.010	Min. Dist. Hole C/L To Edge
UNIFIED	.112-40 (#4-40)	KFB3	440	2	4	6	8	10	12	16	20NS	NA	NA	.09	.050-.065	.166	.122	.165	.220	.179	.040	.17
UNIFIED	.138-32 (#6-32)	KFB3	632	2	4	6	8	10	12	16	20NS	24	32	.09	.050-.065	.213	.171	.212	.280	.226	.040	.22
UNIFIED	"F" Min. Thread Length			Full								.375 Blind										

All dimensions are in millimeters.

	Thread Size x Pitch	Type	Thread Code	Length "L" ±0.13 (Length Code is in millimeters): 2	3	4	6	8	10	12	14	16	A (Shank) Max.	Sheet Thickness	Hole Size in Sheet +0.13 −0.03 (1)	B ±0.08	C Max.	E ±0.13	K ±0.08	P ±0.25	Min. Dist. Hole C/L To Edge
METRIC	M3 x 0.5	KFB3	M3	2	3	4	6	8	10	12	14	16	2.29	1.27-1.65	4.22	3.23	4.2	5.56	4.55	1	4.33
METRIC	M4 x 0.7	KFB3	M4	2	3	4	6	8	10	12	14	16	2.29	1.27-1.65	6.4	5.23	6.33	8.74	6.68	1	6.36
METRIC	"F" Min. Thread Length			Full						9.5 ±0.4											

(1) Types KFE , KFSE, and KFB3 are designed for unplated thru-hole applications. When used in plated thru-hole applications, a tolerance of +.005" -.001"/+0.13mm -0.03mm should be used. However, performance values may be reduced and knurl may damage plating. We recommend using Type KPS6 for plated thru-hole applications.

(2) Blind at shank end with .375 minimum thread length from head end.

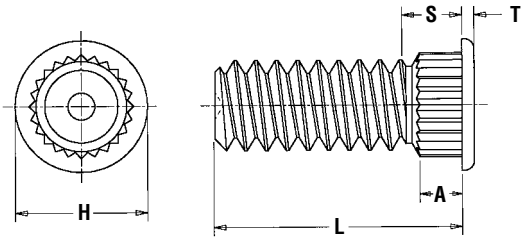
(3) Not applicable. NA - Not Available. NS - Not Stocked. Available on special order.

TYPE KFH BROACHING STUDS

PART NUMBER DESIGNATION

KFH – 632 – 8 ET

- KFH: Type and Material
- 632: Thread Code
- 8: Length Code
- ET: Finish Code



All dimensions are in inches.

	Thread Size	Type	Thread Code	Length "L" ±.010 (Length Code is in 16ths of an inch) .250	.312	.375	.500	.625	.750	A (Shank) Max.	Min. Sheet Thickness	Hole Size in Sheet +.003 −.000 (1)	Max. Hole Size in Attached Parts	H ±.010	S Max.	T ±.005	Min. Dist. Hole C/L To Edge	D Anvil Hole +.003 −.000
UNIFIED	.112-40 (#4-40)	KFH	440	4	5	6	8	10	12	.065	.060	.120	.145	.180	.09	.020	.15	.113
	.138-32 (#6-32)	KFH	632	4	5	6	8	10	12	.065	.060	.140	.170	.200	.09	.020	.19	.140
	.164-32 (#8-32)	KFH	832	4NS	5NS	6	8	10	12	.065	.060	.166	.195	.225	.09	.020	.20	.166
	.190-32 (#10-32)	KFH	032	4NS	5NS	6	8	10	12	.065	.060	.189	.220	.250	.09	.020	.20	.191

All dimensions are in millimeters.

	Thread Size x Pitch	Type	Thread Code	Length "L" ±0.25 (Length Code is in millimeters)						A (Shank) Max.	Min. Sheet Thickness	Hole Size in Sheet +0.08 (1)	Max. Hole Size in Attached Parts	H ±0.25	S Max.	T ±0.13	Min. Dist. Hole C/L To Edge	D Anvil Hole +0.08
METRIC	M3 x 0.5	KFH	M3	6	8	10	12	15	18	1.65	1.53	3	3.7	4.58	2.3	0.51	3.8	3.1
	M4 x 0.7	KFH	M4	6NS	8	10	12	15	18	1.65	1.53	4.2	4.8	5.74	2.3	0.51	5.1	4.1
	M5 x 0.8	KFH	M5	6NS	8NS	10NS	12NS	15	18	1.65	1.53	5	5.8	6.6	2.3	0.51	5.3	5.1

(1) Type KFH studs are designed for unplated thru-hole applications. When used in plated thru-hole applications, a tolerance of +.005" -.001" / +0.13mm -0.03mm should be used. However, performance values may be reduced and knurl may damage plating.
NA - Not Available. NS - Not Stocked. Available on special order.

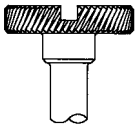
TYPES PFK BOARD-MOUNT PANEL FASTENER ASSEMBLIES

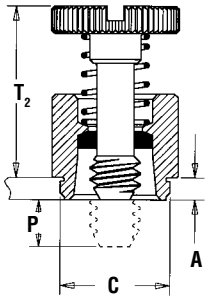
PART NUMBER DESIGNATION

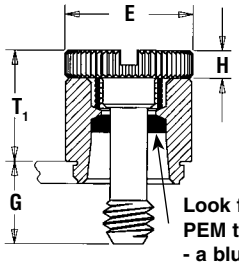
PFK – 632 – 62

- PFK: Type and Material
- 632: Thread Code
- 62: Screw Length Code

Diagonal knurl identifies metric thread sizes







Look for the PEM trademark - a blue plastic retaining ring.*

All dimensions are in inches.

	Thread Size	Type	Thread Code	Screw Length Code	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +.003 -.000	C ±.003	E +.015 −.005	G ±.016	H ±.005	P Nom. (2)	T_1 Max.	T_2 Nom.	Min. Dist. Hole C/L To Edge	D Anvil Hole +.003 −.000
UNIFIED	.112-40 (#4-40)	PFK	440	40	.060	.060	.265	.283	.310	.250	.072	.000	.36	.54	.20	.173
				62NS						.375		.125				
				84NS						.500		.250				
	.138-32 (#6-32)	PFK	632	40	.060	.060	.281	.299	.340	.250	.072	.000	.36	.54	.26	.190
				62						.375		.125				
				84NS						.500		.250				

All dimensions are in millimeters.

	Thread Size x Pitch	Type	Thread Code	Screw Length Code	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +0.08	C ±0.08	E +0.4 −0.13	G ±0.4	H ±0.13	P Nom. (2)	T_1 Max.	T_2 Nom.	Min. Dist. Hole C/L To Edge	D Anvil Hole +0.08
METRIC	M3 x 0.5	PFK	M3	40	1.53	1.53	6.75	7.19	7.87	6.4	1.83	0	9.15	13.72	5.1	4.5
				62NS						9.5		3.2				
				84NS						12.7		6.4				

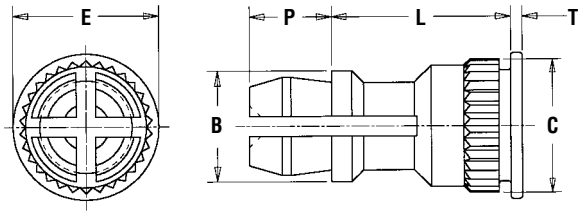
**Retaining rings are plastic with normal 250°F / 120°C temperature limit. (2) Screw may protrude .005"/0.13mm beyond nominal dimensions.*

TYPE KSSB BROACHING SNAP-TOP® STANDOFFS

PART NUMBER DESIGNATION

KSSB – 156 – 12

- KSSB – Type and Material
- 156 – Top Board Mounting Hole Diameter Code
- 12 – Screw Length Code



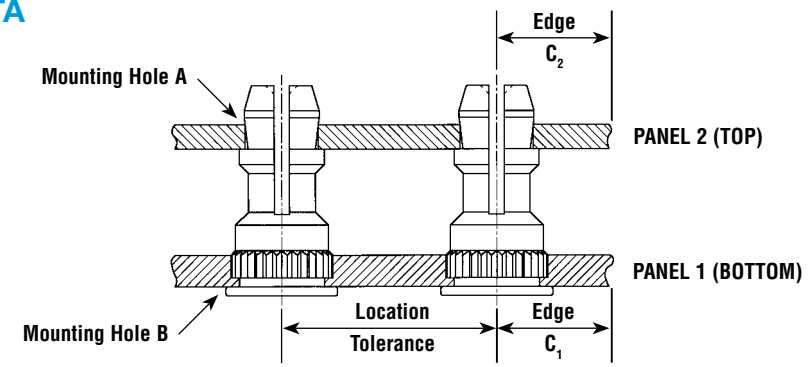
All dimensions are in inches.

	Type	Top Board Mounting Hole Diameter Code	Length "L" ±.005 (Length Code is in 32nds of an inch)										B ±.005	C ±.003	E ±.005	P ±.005	T ±.005	D Anvil Hole +.003 –.000
UNIFIED			.250	.312	.375	.437	.500	.562	.625	.750	.875	1.00						
	KSSB	156	8	10	12	14	16	18	20	24	28	32	.188	.226	.250	.141	.020	.216

All dimensions are in millimeters.

	Type	Top Board Mounting Hole Diameter Code	Length "L" ±0.13 (Length Code is in millimeters)									B ±0.13	C ±0.08	E ±0.13	P ±0.13	T ±0.13	D Anvil Hole +0.08
METRIC	KSSB	4mm	8	10	12	14	16	18	20	22	25	4.8	5.74	6.35	3.58	0.51	5.49

TYPE KSSB APPLICATION DATA



All dimensions are in inches.

	Type	PANEL 1 (Bottom)						PANEL 2 (Top)				
		Bottom Mounting Hole B +.003 –.000	Material	Hardness Max.	Thickness Min.	Edge Distance C_1 Min.	Location Tolerance Max.	Top Mounting Hole A +.003 –.000	Material	Hardness Max.	Thickness Range	Edge Distance C_2 Min.
UNIFIED	KSSB	.213	PC Board	HRB 65	.050	.220	±.005	.156	PC Board or Metal	No Limit	.040 - .070	.100

All dimensions are in millimeters.

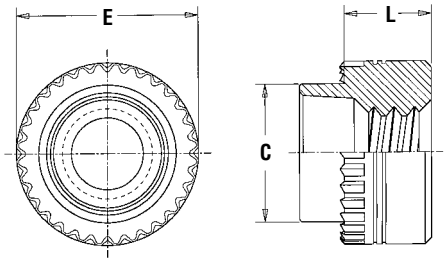
	Type	PANEL 1 (Bottom)						PANEL 2 (Top)				
		Bottom Mounting Hole B +0.08	Material	Hardness Max.	Thickness Min.	Edge Distance C_1 Min.	Location Tolerance Max.	Top Mounting Hole A +0.08	Material	Hardness Max.	Thickness Range	Edge Distance C_2 Min.
METRIC	KSSB	5.4	PC Board	HRB 65	1.25	5.6	±0.13	4	PC Board or Metal	No Limit	1 - 1.8	2.5

TYPE KPS6 SELF-EXPANDING, FOILGARD® FASTENERS
(For plated thru-holes)

PART NUMBER DESIGNATION

KPS6 – 440 – 12

- KPS6 – Type and Material
- 440 – Thread Code
- 12 – Length Code



All dimensions are in inches.

	Thread Size	Type	Thread Code	Length "L" ±.005 (Length Code is in 32nds of an inch) .125	.250	.375	.500	Board Thickness (1)	Plated Hole Size In Board +.004 –.003	C Max.	E ±.005
UNIFIED	.112-40 (#4-40)	KPS6	440	4	8	12	16	.056 - .065	.166	.163	.219
	.138-32 (#6-32)	KPS6	632	4	8	12	16	.056 - .065	.213	.210	.281
	.164-32 (#8-32)	KPS6	832	4	8	12	16	.056 - .065	.250	.247	.344
	.190-32 (#10-32)	KPS6	032	4	8	12	16	.056 - .065	.272	.269	.375

All dimensions are in millimeters.

	Thread Size x Pitch	Type	Thread Code	Length "L" ±0.13 (Length Code is in millimeters)						Board Thickness (1)	Plated Hole Size In Board +0.1 –0.08	C Max.	E ±0.13
METRIC	M3 x 0.5	KPS6	M3	3	4	6	8	10	12	1.42 - 1.65	4.22	4.14	5.56
	M4 x 0.7	KPS6	M4	3	4	6	8	10	12	1.42 - 1.65	6.4	6.32	8.74
	M5 x 0.8	KPS6	M5	3	4	6	8	10	12	1.42 - 1.65	6.91	6.84	9.52

(1) Fasteners for other board thicknesses available on special order.

MATERIAL AND FINISH SPECIFICATIONS

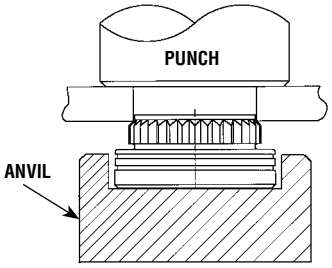
	Threads (1)		Fastener Materials				Standard Finishes			Optional Finish	For Use in Sheet Hardness:				
Type	Internal, ANSI B1.1 2B/ ANSI/ASME B1.13M 6H	External, ANSI B1.1 2A/ ANSI/ASME B1.13M 6g	Carbon Steel	300 Series Stainless Steel	CDA-510 Phosphor Bronze	CDA-353 Brass	Passivated and/or Tested Per ASTM A380	Electro-Plated Bright Tin ASTM B 545, Class B With Clear Preservative Coating	No Finish	Electro-Plated Matte Tin ASTM B 545, Class A With Clear Preservative Coating, Annealed	70 or less on the Rockwell "B" Scale	65 or less on the Rockwell "B" Scale	60 or less on the Rockwell "B" Scale	55 or less on the Rockwell "B" Scale	PC Board
KF2	•		•					•		•			•		•
KFS2	•			•			•				•				•
KFE	•		•					•		•			•		•
KFSE	•			•			•				•				•
KFB3	•					•		•		•		•			•
KFH		•			•			•		•				•	•
KSSB						•			•			•			•
PFK		•		•			•				•				•
KPS6	•			•			•								•
Part Number Codes For Finishes							None	ET	X	DT					

(1) For plated studs, Class 2A/6g, the maximum major and pitch diameter, after plating, may equal basic sizes and can be gauged to Class 3A/4h, per ANSI B1.1, Section 8, Table 3A and ANSI B1.13M, Section 8, Paragraph 8.2.

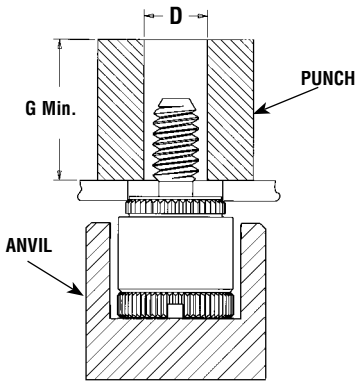
INSTALLATION

For Types KF2, KFS2, KFE, KFSE, and PFK

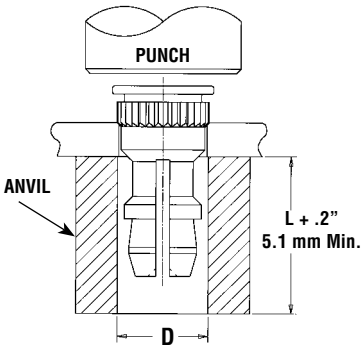
1. Prepare properly sized mounting hole in board.
2. Place fastener into the anvil hole and place the mounting hole over the shank of the fastener as shown in drawing.
3. With punch and anvil surfaces parallel, apply squeezing force until shoulder contacts the board.



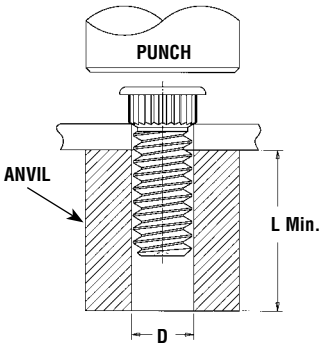
Types KF2, KFS2, KFE, KFSE



Type PFK



Type KSSB



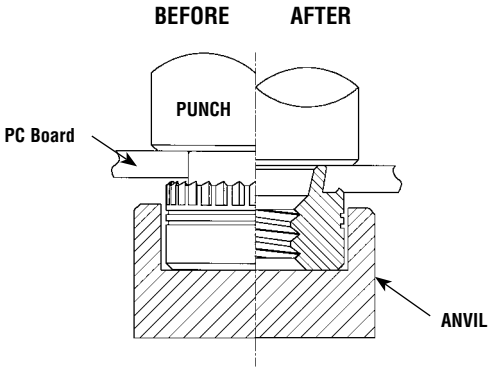
Type KFH

For Types KSSB and KFH

1. Prepare properly sized mounting hole in board.
2. Place fastener into mounting hole as shown in drawing.
3. With punch and anvil surfaces parallel, apply squeezing force until head contacts the board.

For Type KPS6

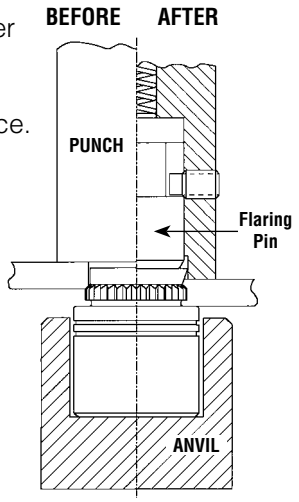
1. Prepare a hole of suitable diameter so that after plating the "plated hole size in board" is as specified in the tabulation on page K-7.
2. Place fastener into the anvil hole and place the mounting hole over the shank of the fastener as shown in drawing.
3. Using a flat punch and anvil, squeeze the fastener with sufficient force so that the tips of the projecting knurl teeth are embedded and the inside shoulder of the knurl contacts the board (most of the knurl will remain visible). As the fastener seats itself in the proper position, the shank will expand outward to complete the installation. Punch and anvil surfaces must be parallel.



Type KPS6

For Type KFB3[1]

1. Punch or drill properly sized round mounting hole in board.
2. Place fastener into the anvil hole and place the mounting hole over the shank of the fastener as shown in diagram to the left.
3. Using a punch flaring tool and a recessed anvil, apply squeezing force until the shoulder of the fastener contacts the board. As the fastener seats itself in the proper position, the punch tool will flare the extended portion of the shank outward to complete the installation. The combination of broaching and flaring provides high pushout performance.



Type KFB3

(1) PennEngineering manufactures and stocks the installation tooling for the KFB3.

Thread Code	Length Code	Anvil	Punch (Flaring Tool)
#4-40	-2	975201213300	975200791400
#4-40	-4 to -8	975200846300	
#4-40	-10 to -12	975200847300	
#4-40	-16 to -20	975200848300	
#4-40	-20 to -24	975200882300	
#6-32	-2	975201215300	975200790400
#6-32	-4 to -8	975200849300	
#6-32	-10 to -12	975200850300	
#6-32	-16 to -20	975200851300	
#6-32	-22 to -24	975200883300	
#6-32	-28 to -32	975200884300	

Thread Code	Length Code	Anvil	Punch (Flaring Tool)
M3	-2	975201213300	975200791400
M3	-3 to -6	975200846300	
M3	-8 to -10	975200847300	
M3	-12 to -14	975201222300	
M3	-14 to -16	975200848300	
M4	-2	975201216300	975201221400
M4	-3 to -6	975201217300	
M4	-8 to -10	975201218300	
M4	-12 to -14	975201220300	
M4	-14 to -16	975201219300	

PERFORMANCE DATA[1]

	Type	Thread Code	Max. Nut Tightening Torque (in. lbs.)	Test Sheet Thickness & Test Sheet Material	Installation (lbs.)	Pushout (lbs.) (2)	Torque-out (in. lbs.)
UNIFIED	KF2, KFS2, KFE, KFSE	256	(3)	.060" FR-4 Fiberglass	400	60	6
		440	(3)	.060" FR-4 Fiberglass	400	65	15
		632	(3)	.060" FR-4 Fiberglass	500	80	30
		832	(3)	.060" FR-4 Fiberglass	700	95	35
		032	(3)	.060" FR-4 Fiberglass	700	100	40
	KFB3	440	(3)	.060" FR-4 Fiberglass	1,000	140	18
		632	(3)	.060" FR-4 Fiberglass	1,500	170	28
	KFH	440	4	.060" FR-4 Fiberglass	400	65	7
		632	8	.060" FR-4 Fiberglass	400	70	11
		832	15	.060" FR-4 Fiberglass	400	80	16
		032	18	.060" FR-4 Fiberglass	400	90	17
	PFK	440	(3)	.060" FR-4 Fiberglass	250	55	(3)
		632	(3)	.060" FR-4 Fiberglass	400	60	(3)
	KPS6	440	(3)	.060" FR-4 Fiberglass (5)	2,500	40	5
		632	(3)	.060" FR-4 Fiberglass (5)	3,300	50	7
		832	(3)	.060" FR-4 Fiberglass (5)	5,000	70	12
		032	(3)	.060" FR-4 Fiberglass (5)	6,000	80	15

	Type	Panel 1 (.060" FR-4 Fiberglass) (4)		Panel 2 (Removable) (4)		
		Installation (lbs.)	Pushout (lbs.)	Max. First On Force (lbs.)	Min. First Off Force (lbs.)	Min. 15th Off Force (lbs.)
UNIFIED	KSSB	500	110	13	3.0	1.0

(1) The installation, pushout and torque-out values reported are averages when all installation specifications and procedures are followed. Variations in mounting hole size, sheet material and installation procedure will affect this data. Performance testing of this product in your application is recommended. We will be happy to provide samples for this purpose.
(2) These are typical values for parts installed in drilled mounting holes. Punched mounting holes yield values approximately 15% less.
(3) Not applicable. *(4) See Application Data drawing on page K-6.* *(5) 1 Mil Cu, .5 Mil Sn/Pb plated thru-hole.*

PERFORMANCE DATA(1)

	Type	Thread Code	Max. Nut Tightening Torque (N•m)	Test Sheet Thickness & Test Sheet Material	Installation (kN)	Pushout (N) (2)	Torque-out (N•m)
METRIC	KF2 KFS2 KFE KFSE	M3	(3)	1.5 mm FR-4 Fiberglass	2.2	290	1.7
		M4	(3)	1.5 mm FR-4 Fiberglass	2.2	420	3.4
		M5	(3)	1.5 mm FR-4 Fiberglass	2.9	440	4.5
	KFB3	M3	(3)	1.5 mm FR-4 Fiberglass	4.4	560	2.03
		M4	(3)	1.5 mm FR-4 Fiberglass	6	680	3.2
	KFH	M3	0.45	1.5 mm FR-4 Fiberglass	1.8	285	0.79
		M4	1.6	1.5 mm FR-4 Fiberglass	1.8	355	1.8
		M5	2.1	1.5 mm FR-4 Fiberglass	1.8	400	1.92
	PFK	M3	(3)	1.5 mm FR-4 Fiberglass	1.1	245	(3)
	KPS6	M3	(3)	1.5 mm FR-4 Fiberglass (5)	9.8	178	.56
		M4	(3)	1.5 mm FR-4 Fiberglass (5)	22.2	312	1.36
		M5	(3)	1.5 mm FR-4 Fiberglass (5)	26.7	356	1.7

	Type	Panel 1 (1.5 mm FR-4 Fiberglass) (4)		Panel 2 (Removable) (4)		
		Installation (kN)	Pushout (N)	Max. First On Force (N)	Min. First Off Force (N)	Min. 15th Off Force (N)
METRIC	KSSB	2.2	484	57.7	13.3	4.4

(1) The installation, pushout and torque-out values reported are averages when all installation specifications and procedures are followed. Variations in mounting hole size, sheet material and installation procedure will affect this data. Performance testing of this product in your application is recommended. We will be happy to provide samples for this purpose.
(2) These are typical values for parts installed in drilled mounting holes. Punched mounting holes yield values approximately 15% less.
(3) Not applicable.
(4) See Application Data drawing on page K-6.
(5) 1 Mil Cu, .5 Mil Sn/Pb plated thru-hole.

PEMSERTER® PRESSES

For best results we recommend using a PEMSERTER® press for installation of PEM Type KF2, KFS2, KFH, AND KPS6 fasteners. For more information on our line of presses call 1-800-523-5321 or check our web site.

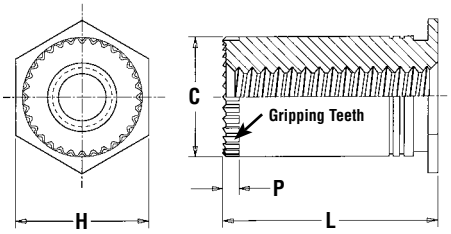
TYPES SOSG AND SOAG (For installation into metal sheets)

All dimensions are in inches.

PART NUMBER DESIGNATION

SOSG – 6440 – 10

- SOSG – Type and Material: SOSG = stainless steel, SOAG = aluminum
- 6440 – Thread Code
- 10 – Length Code



	Thread Size	Type		Thread Code	Length "L" +.010 -.000 (1) (Length Code is in 32nds of an inch)							Min. Sheet Thickness	Hole Size In Sheet +.003 −.000	C +.000 −.005	H ±.005	P Nom.	Min. Dist. Hole C/L To Edge	D Anvil Hole +.003 −.000
		Stainless Steel	Aluminum		.125	.187	.250	.312	.375	.437	.500							
UNIFIED	.112-40 (#4-40)	SOSG	SOAG	6440	4[NS]	6	8	10	12	14	16	.040	.213	.212	.250	.030	.27	.216
	.138-32 (#6-32)	SOSG	SOAG	8632	4[NS]	6[NS]	8	10	12	14	16	.050	.281	.280	.312	.030	.31	.284

All dimensions are in millimeters.

	Thread Size x Pitch	Type		Thread Code	Length "L" +0.25 (Length Code is in millimeters) (1)						Min. Sheet Thickness	Hole Size In Sheet +0.08	C −0.13	H ±0.25	P Nom.	Min. Dist. Hole C/L To Edge	D Anvil Hole +0.08
		Stainless Steel	Aluminum															
METRIC	M3 x 0.5	SOSG	SOAG	3.5M3	3[NS]	4[NS]	6	8	10	12	1	5.4	5.39	6.4	0.76	6.8	5.5

(1) For special lengths greater than .500" / 12 mm, Types SOSG and SOAG are blind threaded.

MATERIAL AND FINISH SPECIFICATIONS

	Threads (2)	Fastener Materials		Standard Finishes		For Use in Sheet Hardness:	
Type	Internal, ANSI B1.1 2B/ANSI/ASME B1.13M 6H	7075-T6 Aluminum	300 Series Stainless Steel	Passivated and/or Tested Per ASTM A380	No Finish	70 or less on the Rockwell "B" Scale	50 or less on the Rockwell "B" Scale
SOAG	•	•			(3)		•
SOSG	•		•	•		•	
Part Number Codes For Finishes				None	X		

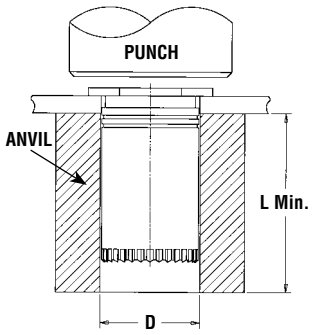
(2) For plated studs, Class 2A/6g, the maximum major and pitch diameter, after plating, may equal basic sizes and can be gauged to Class 3A/4h, per ANSI B1.1, Section 8, Table 3A and ANSI B1.13M, Section 8, Paragraph 8.2.

(3) Aluminum parts have no finish suffix.

INSTALLATION

For Types SOAG and SOSG

1. Prepare properly sized round mounting hole in sheet.
2. Place barrel end of fastener into mounting hole as shown in drawing.
3. With punch and anvil surfaces parallel, apply squeezing force until the head is embedded and flush with the surface.



Types SOAG and SOSG

PERFORMANCE DATA[4]

	Type	Thread Code	Max. Nut Tightening Torque (in. lbs.)	Test Sheet Thickness & Test Sheet Material	Installation (lbs.)	Pushout (lbs.) (5)	Torque-out (in. lbs.)
UNIFIED	SOAG/ SOSG	6440	(6)	.064" 5052-H34 Aluminum	1700	300	25
		8632	(6)	.064" 5052-H34 Aluminum	1700	400	45

	Type	Thread Code	Max. Nut Tightening Torque (N•m)	Test Sheet Thickness & Test Sheet Material	Installation (kN)	Pushout (N) (5)	Torque-out (N•m)
METRIC	SOAG/ SOSG	3.5M3	(6)	1.6 mm 5052-H34 Aluminum	7.6	1330	2.82

(4) The installation, pushout and torque-out values reported are averages when all installation specifications and procedures are followed. Variations in mounting hole size, sheet material and installation procedure will affect this data. Performance testing of this product in your application is recommended. We will be happy to provide samples for this purpose.

(5) These are typical values for parts installed in drilled mounting holes. Punched mounting holes yield values approximately 15% less.

(6) Not applicable.

SURFACE MOUNT FASTENERS

(See PEM® Bulletin SMT)

PEM® ReelFast® SMT surface mount fasteners mount to PC boards in the same manner and at the same time as other surface mount components prior to the automated reflow solder process. The fasteners are provided on tape and reel compatible with existing SMT automated installation equipment. The benefits are:

- Faster assembly
- Reduced scrap
- Reduced handling
- Reduced risk of board damage that may occur when fasteners are improperly installed with off-line equipment
- Reduced loose hardware.

R'ANGLE® Fasteners

Spacers/Nuts

Panel Fasteners

TYPE PF11MW™ FLOATING ACCESS HARDWARE

(See PEM® Bulletin PF)

Unique flare mount feature allow fasteners to "float" in mounting hole.

- Compensates for up to .060"/1.52mm mating thread misalignment.
- Installs into any panel material.
- Appropriate for close center-line-to-edge applications.

For more information on these and other PEM products, visit our PEMNET™ Resource Center at www.pemnet.com

To be sure that you are getting genuine PEM® brand fasteners, look for our "dimple", or "two groove" registered trademarks.

RoHS compliance information can be found on our website.

Specifications subject to change without notice.
Check our website for the most current version of this bulletin.

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