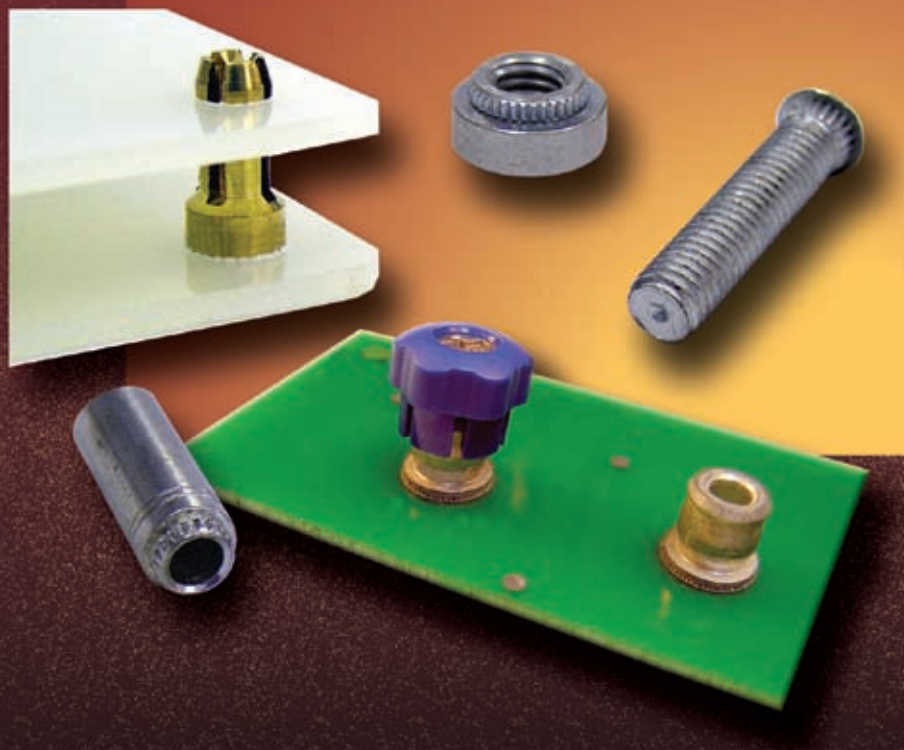
PEM®

FASTENERS FOR USE WITH PC BOARDS

BULLETIN



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Revised 506

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.

SURFACE MOUNT FASTENERS

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: fastener assembly; reduced scrap; reduced handling; reduced risk of board damage that may occur when fasteners are improperly installed with off-line equipment; and reduced loose hardware.

ReelFast Hybrid™ panel fasteners **(Types SMTPR and PSHP)** feature an electro-tin plated steel retainer and a separate metal Phillips drive screw captivated in an ABS cap. Assemblies are completed by snapping the screw into its soldered retainer. A spring action of the cap's plastic "fingers" holds the screw in retracted position. When tightened, the plastic cap completely covers the retainer.

ReelFast spacers/nuts **(Type SMTSO)** are available in threaded and unthreaded sizes and can be used to space or stack boards or to mount boards or attach components.

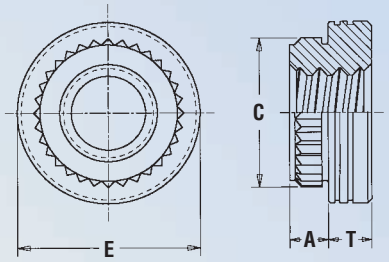
BROACHING FASTENERS

TYPES KF2 AND KFS2 BROACHING NUTS

Part Number Designation

KF2 - 832 - ET

- KF2: Type and Material
- 832: Thread Code
- ET: Finish



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

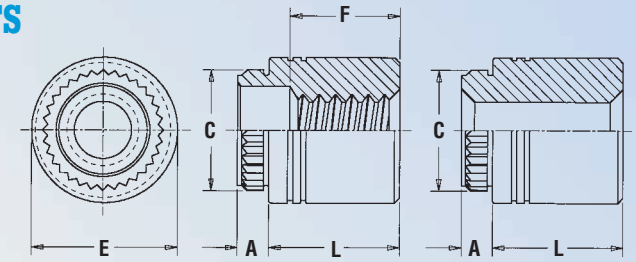
(1) Types KF2 and KFS2 are designed for unplated thru-hole applications. When used in plated thru-hole applications, a tolerance of +.005" -.001" / +0.13mm -0.03mm should be used. However, performance values may be reduced and knurl may damage plating. We recommend using Type KPS6 for plated thru-hole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

TYPES KFE AND KFSE BROACHING STANDOFFS

Part Number Designation

KFE - 632 - 12 - ET

- KFE: Type and Material
- 632: Thread or Thru Hole Code
- 12: Length Code
- ET: Finish



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	24[NS]	NA	NA	.060	.060	.166	.184	.219	.17
	.138-32 (#6-32)	(3)	KFE	KFSE	632	4	8	12	16	20	24[NS]	28[NS]	32[NS]	.060	.060	.213	.231	.281	.22
	(3)	.116	KFE	KFSE	116	4	8	12	16	20	24[NS]	NA	NA	.060	.060	.166	.184	.219	.17
	(3)	.143	KFE	KFSE	143	4	8	12	16	20	24[NS]	28[NS]	32[NS]	.060	.060	.213	.231	.281	.22
	"F" Minimum Thread Length (Where Applicable)					Full			.375 ± .016		.375 Blind								

All dimensions are in millimeters.

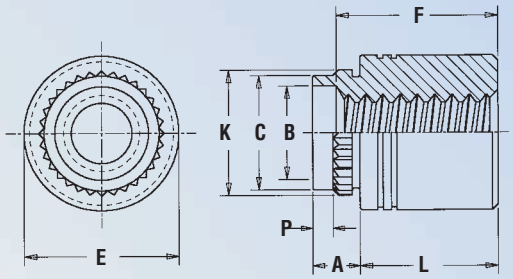
	Thread Size x Pitch	Thru Hole +0.10 −0.08	Type: Carbon Steel	Type: Stainless Steel	Thread or Thru Hole Code	Length "L" ±0.13 (Length Code is in millimeters): 3	4	6	8	10	12	14	16	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +0.08 (1)	C ±0.08	E ±0.13	Min. Dist. Hole C/L To Edge
METRIC	M3 x 0.5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



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	20[NS]	NA	NA	.09	.050-.065	.166	.122	.165	.220	.179	.040	.17
	.138-32 (#6-32)	KFB3	632	2	4	6	8	10	12	16	20[NS]	24	32	.09	.050-.065	.213	.171	.212	.280	.226	.040	.22
	"F" Min. Thread Length			Full						.375 ±.016		.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
	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
	"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.

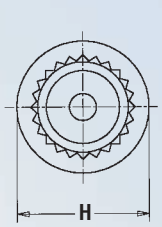
(3) Not applicable. NA - Not Available. NS - Not Stocked. Available on special order.

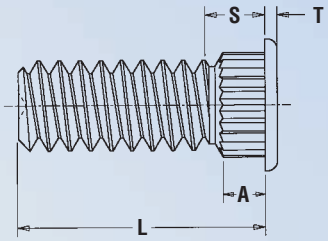
TYPE KFH BROACHING STUDS

Part Number Designation

KFH - 632 - 8 - ET

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





All dimensions are in inches.

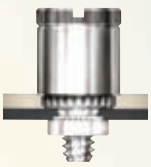
	Thread Size	Type	Thread Code	Length "L" ±.010 (Length Code is in 16ths of an inch) .250	.312	.375	.500	.625	.750	A (Shank) Max.	Min. Sheet Thickness	Hole Size in Sheet +.003 –.000 (1)	Max. Hole Size in Attached Parts	H ±.010	S Max.	T ±.005	Min. Dist. Hole C/L To Edge	D Anvil Hole +.003 –.000
UNIFIED	.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.*

TYPE PFK BOARD-MOUNT PANEL FASTENER ASSEMBLIES

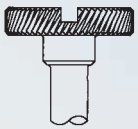


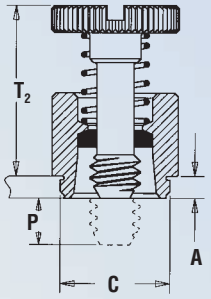
Part Number Designation

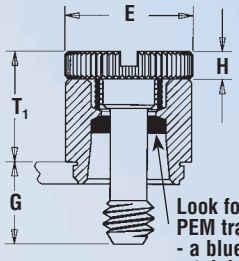
PFK - 632 - 62

- 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. (1)	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				

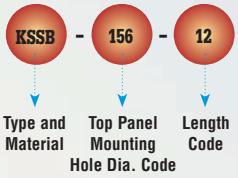
All dimensions are in millimeters

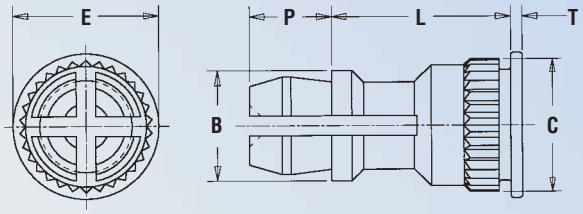
	Thread Size x Pitch	Type	Thread Code	Screw Length Code	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +0.08	C ±0.08	E +0.4 –0.13	G ±0.4	H ±0.13	P Nom. (1)	T_1 Max.	T_2 Nom.	Min. Dist. Hole C/L To Edge	D Anvil Hole +0.08
METRIC	M3 x 0.5	PFK	M3	40	1.53	1.53	6.75	7.19	7.87	6.4	1.83	0	9.15	13.72	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.* *(1) Screw may protrude .005" beyond nominal dimensions.*

TYPE KSSB™ BROACHING, SNAP-TOP® STANDOFFS

Part Number Designation





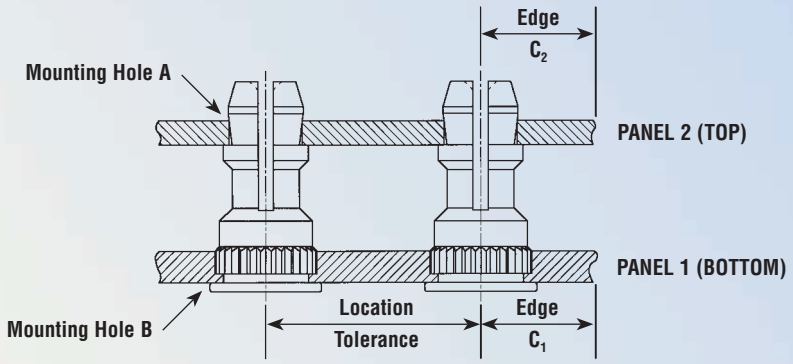
All dimensions are in inches.

	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)				
UNIFIED		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.
	KSSB	.213	PC Board	HRB 65	.050	.220	±.005	.156	PC Board or Metal	No Limit	.040 - .070	.100

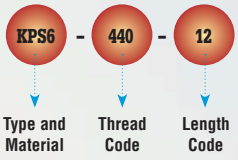
All dimensions are in millimeters.

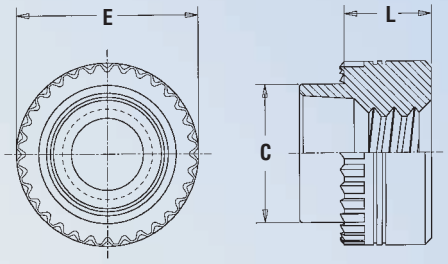
	Type	PANEL 1 (Bottom)						PANEL 2 (Top)				
METRIC		Bottom Mounting Hole B +0.08	Material	Hardness Max.	Thickness Min.	Edge Distance C_1 Min.	Location Tolerance Max.	Top Mounting Hole A +0.08	Material	Hardness Max.	Thickness Range	Edge Distance C_2 Min.
	KSSB	5.4	PC Board	HRB 65	1.25	5.6	±0.13	4	PC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

TYPE KPS6 SELF-EXPANDING, FOILGARD® FASTENERS

(For plated thru-holes)

Part Number Designation





All dimensions are in inches.

	Thread Size	Type	Thread Code	Length "L" ±.005 (Length Code is in 32nds of an inch)				Board Thickness (1)	Plated Hole Size In Board +.004 –.003	C Max.	E ±.005
				.125	.250	.375	.500				
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

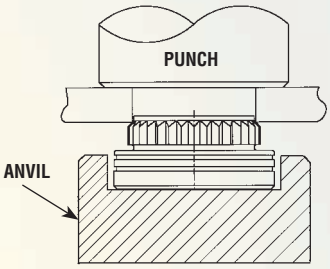
(1) Fasteners for other board thicknesses available on special order.

MATERIAL & FINISH SPECIFICATIONS FOR BROACHING FASTENERS

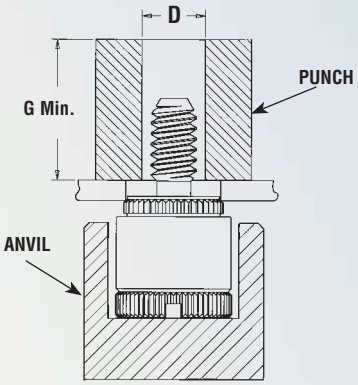
	Threads (1)		Fastener Materials				Standard Finishes			Optional Finish	For Use in Sheet Hardness:				
Type	Internal, ANSI B1.1 2B/ ANSI/ASME B1.13M 6H	External, ANSI B1.1 2A/ ANSI/ASME B1.13M 6g	Carbon Steel	300 Series Stainless Steel	CDA-510 Phosphor Bronze	CDA-353 Brass	Passivated and/or Tested Per ASTM A380	Electro-Plated Bright Tin ASTM B 545, Class B With Preservative Coating	No Finish	Matte Electro-Tin, ASTM B 545, Class A W/ 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 BROACHING FASTENERS



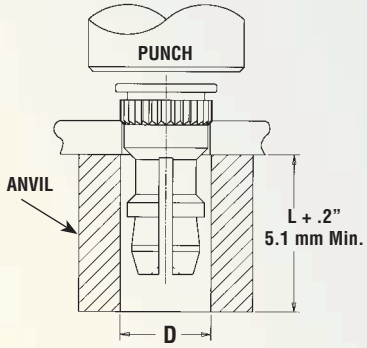
Types KF2, KFS2, KFE, KFSE



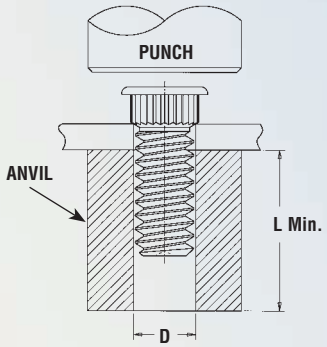
Type PFK

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

1. Punch or drill 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 diagram to the left.
3. With punch and anvil surfaces parallel, apply squeezing force until shoulder contacts the board.



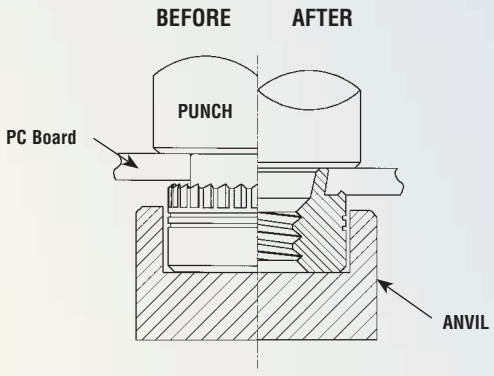
Type KSSB



Type KFH

For Types KSSB and KFH

1. Punch or drill properly sized mounting hole in board.
2. Place fastener into mounting hole as shown in diagram to the left.
3. With punch and anvil surfaces parallel, apply squeezing force until head contacts the board.



Type KPS6

For Type KPS6

1. Punch or drill 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 diagram to the left.
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.

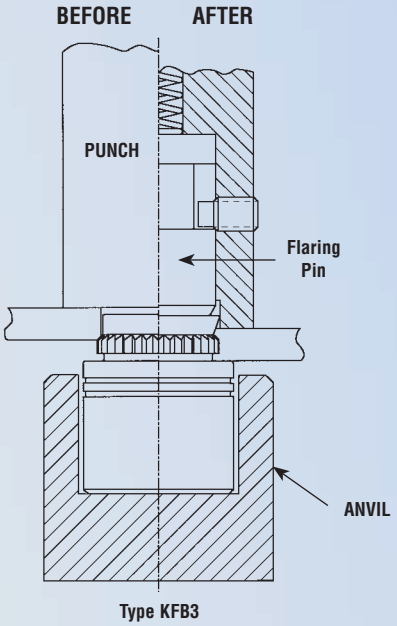
For Type KFB3[1]

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.

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



Type KFB3

Unified.

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	

Metric.

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 FOR BROACHING FASTENERS [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	256	(3)	.060" FR-4 Fiberglass	400	60	6
	KFS2	440	(3)	.060" FR-4 Fiberglass	400	65	15
	KFE	632	(3)	.060" FR-4 Fiberglass	500	80	30
	KFSE	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 FOR BROACHING FASTENERS (1) (Continued)

	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 either manual or automatic 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

GROUNDING STANDOFFS

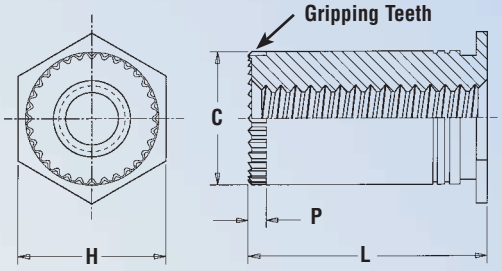
TYPES SOSG AND SOAG

(For installation in metal sheets)

Part Number Designation

SOSG - 6440 - 10

- SOSG: Type and Material
- 6440: Thread Code
- 10: Length Code



All dimensions are in inches.

	Thread Size	Type		Thread Code	Length "L" +.010 -.000 (1) (Length Code is in 32nds of an inch)							Min. Sheet Thick-ness	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 Thick-ness	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

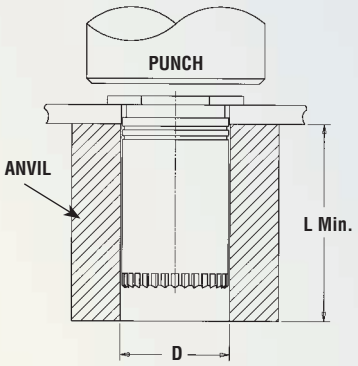
(1) For special lengths greater than .500" / 12 mm, Types SOSG and SOAG are blind threaded.

MATERIAL & FINISH SPECIFICATIONS FOR GROUNDING FASTENERS

	Threads (1)	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	•	•			(2)		•
SOSG	•		•	•		•	
Part Number Codes For Finishes				None	X		

(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.
(2) Aluminum parts have no finish suffix.

INSTALLATION FOR GROUNDING STANDOFFS



Types SOAG and SOSG

For Types SOAG and SOSG

1. Punch or drill properly sized round mounting hole in sheet.

2. Place barrel end of fastener into mounting hole as shown in diagram to the left.

3. With punch and anvil surfaces parallel, apply squeezing force until the head is embedded and flush with the surface.

PERFORMANCE DATA FOR GROUNDING STANDOFFS (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	SOAG/ SOSG	6440	(3)	.064" 5052-H34 Aluminum	1700	300	25
		8632	(3)	.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) (2)	Torque-out (N•m)
METRIC	SOAG/ SOSG	3.5M3	(3)	1.6 mm 5052-H34 Aluminum	7.6	1330	2.82

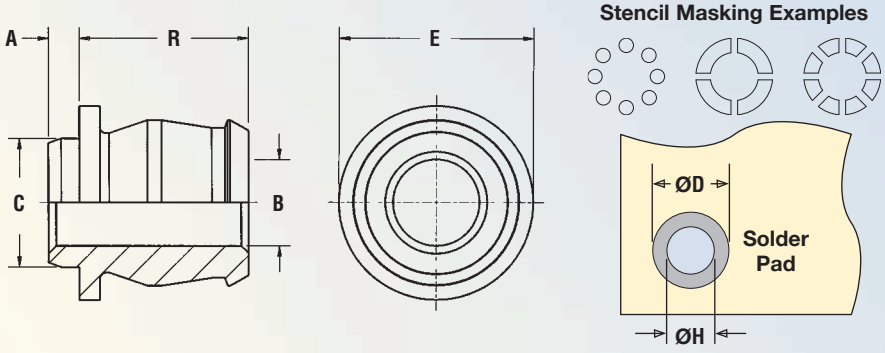
(1) The installation, pushout and torque-out values reported are averages when all installation specifications and procedures are followed. Variations in mounting hole size, sheet material and installation procedure will affect this data. Performance testing of this product in your application is recommended.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

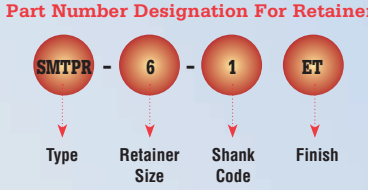
SURFACE MOUNT FASTENERS

ReelFast® SMT PANEL FASTENER COMPONENTS

RETAINER

Packaged on 13" recyclable reels of 465 pieces. Tape width is 24mm. Reels conform to EIA-481. Supplied with Kapton® patch for vacuum pick up.





All dimensions are in inches.

	Retainer Part Number	A (Shank) Max.	Min. Sheet Thickness	B ±.003	C Max.	E Nom.	R ±.005	ØH Hole Size In Sheet +.003 –.000	ØD Min. Solder Pad
UNIFIED	SMTPR-6-1	.060	.060	.167	.249	.375	.325	.250	.396

All dimensions are in millimeters.

	Retainer Part Number	A (Shank) Max.	Min. Sheet Thickness	B ±0.08	C Max.	E Nom.	R ±0.13	ØH Hole Size In Sheet +0.08	ØD Min. Solder Pad
METRIC	SMTPR-6-1	1.53	1.53	4.24	6.33	9.53	8.26	6.35	10.06

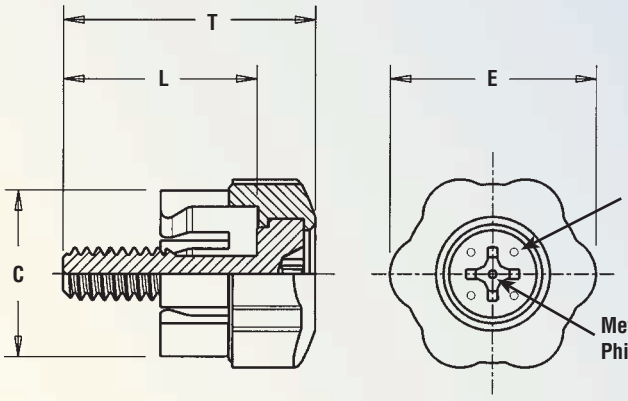
RETAINER MATERIAL: Carbon Steel.

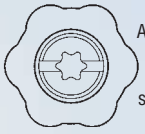
RETAINER STANDARD FINISH: ET - Electro Plated Bright Tin, ASTM B 545, Class A W/ Clear Preservative Coating.

RETAINER OPTIONAL FINISH: DT - Matte Electro-Tin ASTM B 545, Class A W/ Clear Preservative Coating, Annealed.

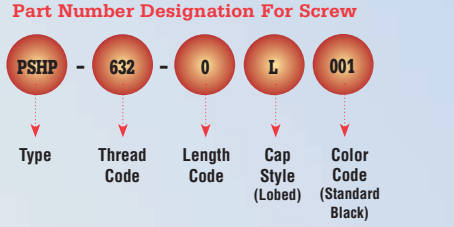
SCREW

Packaged in bags.





Available with six-lobe recess on special order.



(See page 15 for color capabilities)

All dimensions are in inches.

	Type	Thread Code	Screw Length Code	C ±.010	E ±.010	L ±.010	T Nom.	Driver Size
UNIFIED	PSHP	440	0	.440	.542	.510	.663	#1
			1			.570	.723	
	PSHP	632	0	.440	.542	.510	.663	#2
			1			.570	.723	

All dimensions are in millimeters.

	Type	Thread Code	Screw Length Code	C ±0.25	E ±0.25	L ±0.25	T Nom.	Driver Size
METRIC	PSHP	M3	0	11.18	13.77	12.95	16.84	#1
			1			14.48	18.36	
	PSHP	M3.5	0	11.18	13.77	12.95	16.84	#2
			1			14.48	18.36	

CAP MATERIAL: ABS. Temperature limit is 200˚ F / 93˚ C.

SCREW MATERIAL: Carbon Steel.

SCREW FINISH: CN - Bright Nickel over Copper Flash.

Retainer and screw are sold separately.

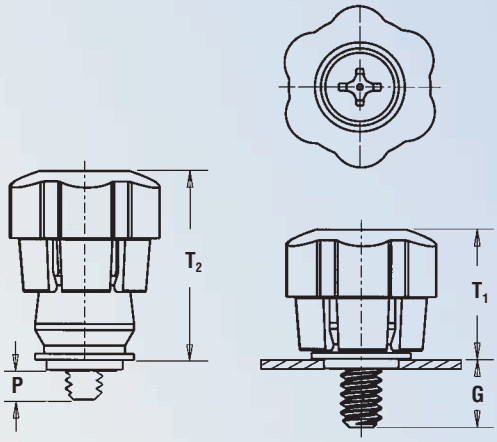
THREADS: External, ANSI B1.1, 2A ANSI/ASME B1.13M, 6g.(1)

(1) As with all external plated threads, Class 2A/6g, the maximum major and pitch, after plating, may equal basic sizes and be gauged to Class 3A/6h, per ANSI B1.1, Section 8, Table 3A and ANSI B1.13M, Section 8, Paragraph 8.2.

ReelFast® SMT PANEL FASTENER ASSEMBLY DATA

- Steel retainer and metal Phillips recess screw.
- Black ABS cap standard.
- Optional molded-thru colors available.

Patented



All dimensions are in inches.

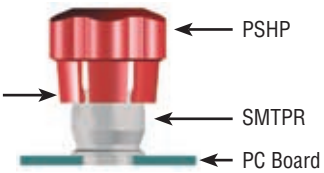
	Thread Size	Screw Part Number			Retainer Part Number	G ± .025	P ± .025	T_1 Nom.	T_2 Nom.	Total Radial Float
		Type	Thread Code	Screw Length Code						
UNIFIED	.112-40 (#4-40)	PSHP	440	0	SMTPR-6-1	.188	.000	.478	.646	.015
				1		.248	.026			
	.138-32 (#6-32)	PSHP	632	0	SMTPR-6-1	.188	.000	.478	.646	.020
				1		.248	.026			

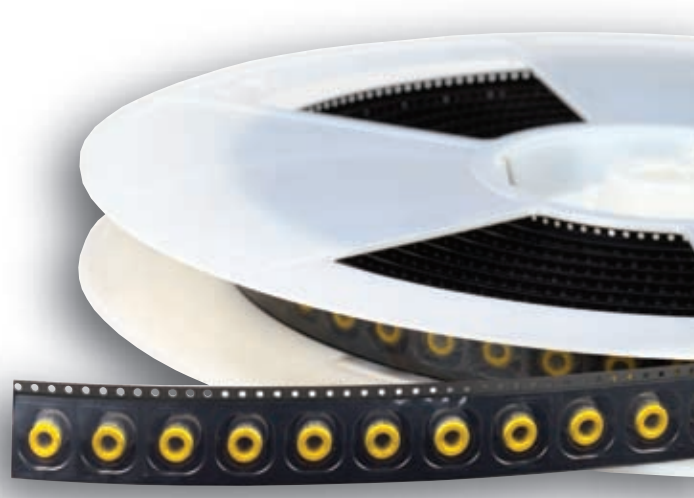
All dimensions are in millimeters.

	Thread Size x Pitch	Screw Part Number			Retainer Part Number	G ± 0.64	P ± 0.64	T_1 Nom.	T_2 Nom.	Total Radial Float
		Type	Thread Code	Screw Length Code						
METRIC	M3 x 0.5	PSHP	M3	0	SMTPR-6-1	4.78	0	12.14	16.41	.38
				1		6.3	.66			
	M3.5 x 0.6	PSHP	M3.5	0	SMTPR-6-1	4.78	0	12.14	16.41	.51
				1		6.3	.66			

When Assembled

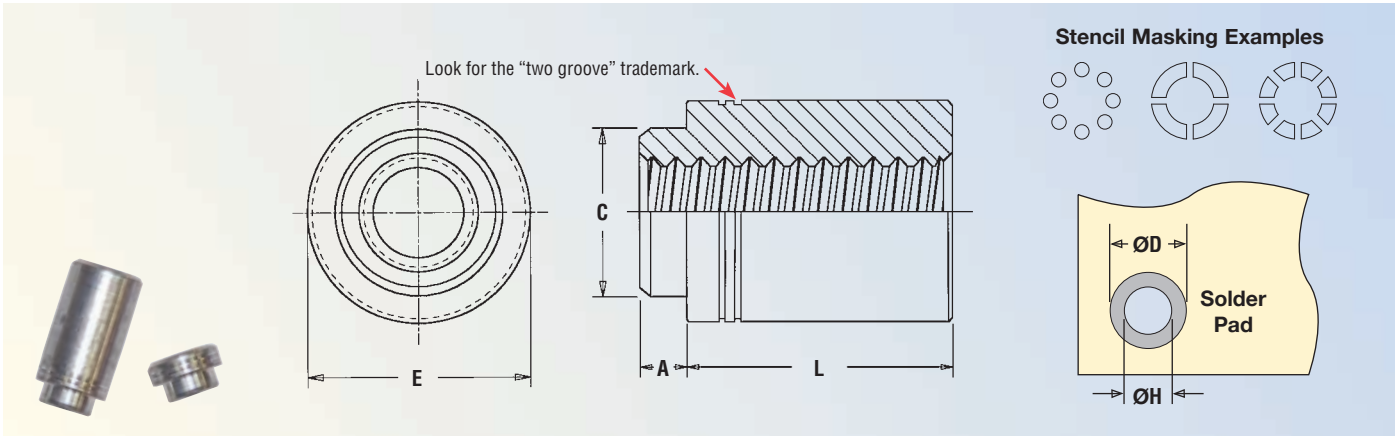
Spring action of plastic "fingers" holds screw in retracted position.





ReelFast® SMT Solutions

TYPE SMTSO ReelFast® SMT SPACERS/NUTS



All dimensions are in inches.

	Thread Size	Thru Hole +.004 –.003	Type	Thread or Thru Hole Code	Length Code "L" ±.005 (Length code in 32nds of an inch)				Min. Sheet Thickness	A Max.	C Max.	E ±.005	ØH Hole Size In Sheet +.003 –.000	ØD Min. Solder Pad
					.065	.125	.250	.375						
UNIFIED	.086-56 (#2-56)	—	SMTSO	256	2	4	8	12	.060	.060	.142	.219	.147	.244
	.112-40 (#4-40)	—	SMTSO	440	2	4	8	12	.060	.060	.161	.219	.166	.244
	.138-32 (#6-32)	—	SMTSO	632	2	4	8	12	.060	.060	.208	.281	.213	.306
	.164-32 (#8-32)	—	SMTSO	832	2	4	8	12	.060	.060	.245	.344	.25	.369
	—	.116	SMTSO	116	2	4	8	12	.060	.060	.161	.219	.166	.244
	—	.143	SMTSO	143	2	4	8	12	.060	.060	.208	.281	.213	.306

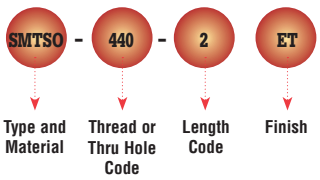
All dimensions are in millimeters.

	Thread Size x Pitch	Thru Hole +0.10 –0.08	Type	Thread or Thru Hole Code	Length Code "L" ±0.13 (Length code in millimeters)						Min. Sheet Thickness	A Max.	C Max.	E ±0.13	ØH Hole Size In Sheet +0.08	ØD Min. Solder Pad
METRIC	M2 x 0.4	—	SMTSO	M2	2	3	4	6	8	10	1.53	1.53	3.6	5.56	3.73	6.2
	M2.5 x 0.45	—	SMTSO	M25	2	3	4	6	8	10	1.53	1.53	4.09	5.56	4.22	6.2
	M3 x 0.5	—	SMTSO	M3	2	3	4	6	8	10	1.53	1.53	4.09	5.56	4.22	6.2
	M3.5 x 0.6	—	SMTSO	M35	2	3	4	6	8	10	1.53	1.53	5.28	7.14	5.41	7.77
	M4 x 0.7	—	SMTSO	M4	2	3	4	6	8	10	1.53	1.53	6.27	8.74	6.4	9.37
	—	3.6	SMTSO	3.6	2	3	4	6	8	10	1.53	1.53	5.28	7.14	5.41	7.77
	—	4.2	SMTSO	4.2	2	3	4	6	8	10	1.53	1.53	6.27	8.74	6.4	9.37

Number Of Parts Per Reel / Pitch (mm) For Each Size

Thread/Thru-Hole Size	Length Code						
	2	3	4	6	8	10	12
256, 440, 632, 116, 143	1500 / 12	—	1000 / 12	—	650 / 12	—	300 / 16
832	1100 / 16	—	800 / 16	—	500 / 16	—	300 / 16
M2, M25, M3, M35, 3.6	1500 / 12	1000 / 12	900 / 12	650 / 12	375 / 16	300 / 16	—
M4, 4.2	1100 / 16	800 / 16	675 / 16	500 / 16	375 / 16	300 / 16	—

Part Number Designation



Packaged on 13" recyclable reels. Tape width is 24mm. Supplied with Kapton® patch for vacuum pick up. Reels conform to EIA-481.

MATERIAL: Carbon Steel.

STANDARD FINISH: ET - Electro Plated Bright Tin, ASTM B 545, Class A W/ Clear Preservative Coating.

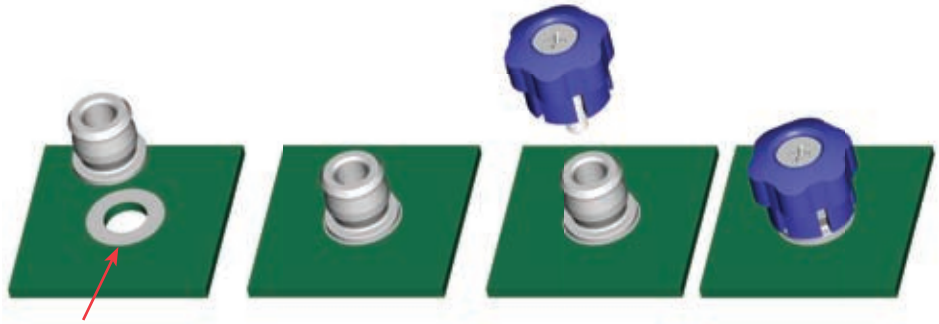
OPTIONAL FINISH: DT - Matte Electro-Tin ASTM B 545, Class A W/ Clear Preservative Coating, Annealed.

THREADS: Internal, ANSI B1.1 2B ANSI/ASME B1.13M, 6H

COLOR CAPABILITIES FOR TYPE PSHP SCREW

The colors shown here (codes #002 thru #007) are non-stocked standards and available on special order. Since actual cap colors may vary slightly from those represented at the right, we recommend that you request samples for color verification. If you require a custom color or you need a "color matched" cap, please contact us.

INSTALLATION – ReelFast® SMT PANEL FASTENER

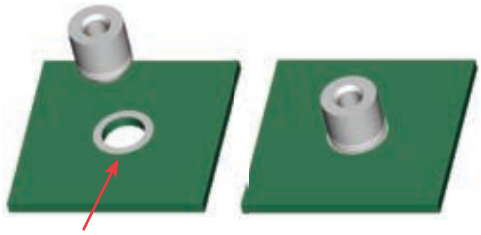


Solder paste applied to pad on PCB.

Solder fastener in place using standard surface mount techniques.

Screw snapped in place.

INSTALLATION – ReelFast® SMT NUTS AND SPACERS



Solder paste applied to pad on PCB.

Solder fastener in place using standard surface mount techniques.

ReelFast™ product performance is dependent upon application variables. We will be happy to provide samples for you to install. If required, we can also test your installed hardware and provide you with specific performance data.

ReelFast® SMT fasteners are recommended for reflow soldering designs, contact our Applications Engineering Department for wave soldering solutions.

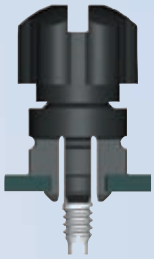
OTHER FASTENERS FOR USE WITH PC BOARDS

TYPE PFS™ SNAP-IN PANEL FASTENER

(See PEM Bulletin PF)

Installs into mounting hole without tools. Just snaps into place.

- **Max. sheet thickness .065”/ 1.65mm.**
- **Standard recess: six-lobe in screw, slot in cap.**
- **Dog point feature on screw.**
- **Molded-thru color with optional colors available.**

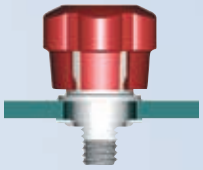


TYPE PFF™ HYBRID™ FLOATING PANEL FASTENER

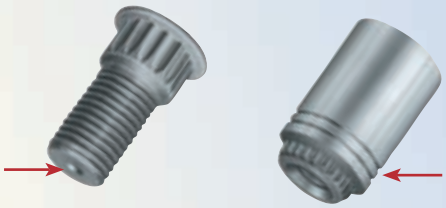
(See PEM Bulletin PF)

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

- **.025”/ 0.64 mm nom. sheet thickness.**
- **Compensates for up to .060”/ 1.52 mm mating hole misalignment.**
- **Tool or finger operation.**
- **Molded-thru color knob with optional colors available.**



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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