PennEngineering®

FASTENERS FOR USE WITH PC BOARDS

BULLETIN K

PEM®

1015
Rev 316

FASTENERS FOR USE WITH PC BOARDS

No matter how sophisticated or advanced, electronic components must be attached reliably and securely if they are to deliver optimum performance. We offer several fastener products for use with PC boards to satisfy component-to-board, board-to-board, and board-to-chassis attachment needs.

ReelFast® surface mount fasteners mount on 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 simply become another board component. This alleviates concerns about potential damage to PC boards due to improper secondary installation operations. The fasteners are provided on tape and reel compatible with existing SMT automated installation equipment. The benefits of using ReelFast® SMT fasteners are: faster assembly; reduced scrap; reduced handling; and reduced risk of board damage.

Broaching fasteners can also offer practical alternatives to "loose" hardware. A broaching fastener is a knurled-shank fastening device that can be pressed into a hole to provide a permanent, strong, threaded or unthreaded attachment point in PC boards. They can also be used in aluminum, acrylic, casting and polycarbonate components. Specially formed axial grooves around the shank of the fastener "broach" or cut into the material, creating a firm, interference-type fit resistant to rotation. In PC boards, broaching fasteners are recommended for use in non-plated holes.

Broach/flare-mount standoffs (Type KFB3) offer a combined broach/flare feature for even greater pullout performance in PC board materials.

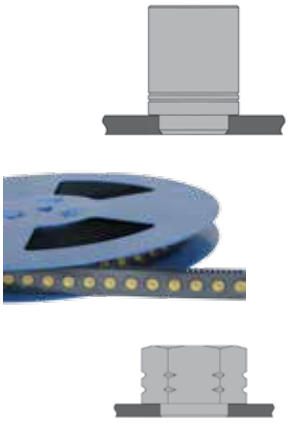
PEM® TRADEMARKS

To be sure that you are getting genuine PEM® brand fasteners, look for the unique PEM product markings and identifiers.

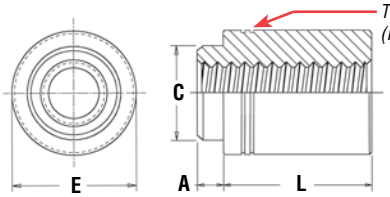
QUICK REFERENCE CHART

PEM Fastener Type	Page No.	Mounting Types				Primary Use							
		Broach	Broach/ Flare	Surface Mount	Clinch/ Broach	Nut	Spacer/ Standoff	Snap Attachment	Stud	Captive Screw	Color Coding	Right Angle Attachment	Sheet Joining
SMTSO/SMTSOB Nut/Spacer/Standoff	4			•		•	•						
KF2/KFS2 Nut	5	•				•							
KFE/KFSE Spacer/Standoff	6	•					•						
KFB3 Standoff	6		•				•						
KSSB Standoff	7	•					•	•					
SMTPFLSM Captive Screw Assembly	8			•						•			
SMTPF Captive Screw with Plastic Knob	9			•						•	•		
PFK Captive Screw	10	•								•			
KFH Stud	11	•							•				
SMTRA Right Angle	12			•								•	
SFK Sheet Joining	13	•			•								•

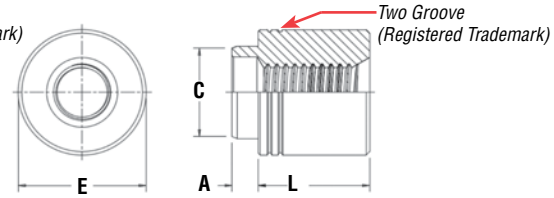
TYPES SMTSO/SMTSOB ReelFast® SURFACE MOUNT NUTS AND SPACERS/STANDOFFS



Type SMTSO

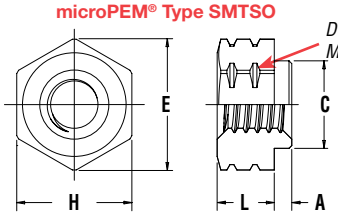


Type SMTSOB



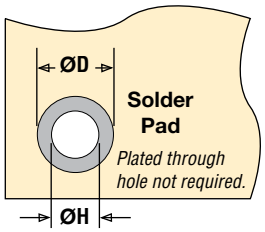
Thread/thru hole sizes 2-56, 4-40, 6-32, 8-32, 116, 143, M2, M2.5, M3, M3.5, M4, 3.6, and 4.2

microPEM® Type SMTSO



Thread sizes 080, S1, S1.2, S1.4 and M1.6

Stencil Masking Examples



All dimensions are in inches.

	Thread Size	Thru Hole +.004 –.003	Type Fastener Material Steel	Type Fastener Material Brass	Thread or Thru Hole Code	Length Code "L" ±.005 (Length code in 32nds of an inch) .062	.125	.250	.375	Min. Sheet Thickness	A Max.	C Max.	E Ref.	E ±.005	H Nom.	ØH Hole Size In Sheet +.003 –.000	ØD Min. Solder Pad
UNIFIED	.060-80 (#0-80)	—	SMTSO	—	080	2	4	—	—	.020	.019	.095	.144		.125	.098	.165
UNIFIED	.086-56 (#2-56)	—	SMTSO	SMTSOB	256	2	4	8 (1)	12 (1)	.060	.060	.142	—	.219	—	.147	.244
UNIFIED	.112-40 (#4-40)	—	SMTSO	SMTSOB	440	2	4	8 (1)	12 (1)	.060	.060	.161	—	.219	—	.166	.244
UNIFIED	.138-32 (#6-32)	—	SMTSO	SMTSOB	632	2	4	8 (1)	12 (1)	.060	.060	.208	—	.281	—	.213	.306
UNIFIED	.164-32 (#8-32)	—	SMTSO	SMTSOB	832	2	4	8 (1)	12 (1)	.060	.060	.245	—	.344	—	.250	.369
UNIFIED	—	.116	SMTSO	SMTSOB	116	2	4	8	12	.060	.060	.161	—	.219	—	.166	.244
UNIFIED	—	.143	SMTSO	SMTSOB	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 Fastener Material Steel	Type Fastener Material Brass	Thread or Thru Hole Code	Length Code "L" ±0.13 (Length code in millimeters) 1	2	3	4	6	8	10	Min. Sheet Thickness	A Max.	C Max.	E Ref.	E ±0.13	H Nom.	ØH Hole Size In Sheet +0.08	ØD Min. Solder Pad
METRIC	S1	—	SMTSO	—	M1	1	2	3	—	—	—	—	0.5	0.48	2.41	3.66	—	3.18	2.5	4.19
METRIC	S1.2	—	SMTSO	—	M1.2	1	2	3	—	—	—	—	0.5	0.48	2.41	3.66	—	3.18	2.5	4.19
METRIC	S1.4	—	SMTSO	—	M1.4	1	2	3	—	—	—	—	0.5	0.48	2.41	3.66	—	3.18	2.5	4.19
METRIC	M1.6 x 0.35	—	SMTSO	—	M1.6	1	2	3	—	—	—	—	0.5	0.48	2.41	3.66	—	3.18	2.5	4.19
METRIC	M2 x 0.4	—	SMTSO	SMTSOB	M2	—	2	3	4 (1)	6 (1)	8 (1)	10 (1)	1.53	1.53	3.6	—	5.56	—	3.73	6.2
METRIC	M2.5 x 0.45	—	SMTSO	SMTSOB	M25	—	2	3	4 (1)	6 (1)	8 (1)	10 (1)	1.53	1.53	4.09	—	5.56	—	4.22	6.2
METRIC	M3 x 0.5	—	SMTSO	SMTSOB	M3	—	2	3	4 (1)	6 (1)	8 (1)	10 (1)	1.53	1.53	4.09	—	5.56	—	4.22	6.2
METRIC	M3.5 x 0.6	—	SMTSO	SMTSOB	M35	—	2	3	4 (1)	6 (1)	8 (1)	10 (1)	1.53	1.53	5.28	—	7.14	—	5.41	7.77
METRIC	M4 x 0.7	—	SMTSO	SMTSOB	M4	—	2	3	4	6 (1)	8 (1)	10 (1)	1.53	1.53	6.22	—	8.74	—	6.35	9.37
METRIC	—	3.6	SMTSO	SMTSOB	3.6	—	2	3	4	6	8	10	1.53	1.53	5.28	—	7.14	—	5.41	7.77
METRIC	—	4.2	SMTSO	SMTSOB	4.2	—	2	3	4	6	8	10	1.53	1.53	6.22	—	8.74	—	6.35	9.37

(1) Type SMTSOB Fasteners with this length code have a shank counterbore.

NUMBER OF PARTS PER REEL / PITCH (MM) FOR EACH SIZE

Thread/Thru-Hole Size	Length Code 1	2	3	4	6	8	10	12
080	—	3500 / 8	—	2000 / 8	—	—	—	—
256, 440, 632, 116, 143	—	1500 / 12	—	1000 / 12	—	650 / 12	—	300 / 16
832	—	1100 / 16	—	800 / 16	—	500 / 16	—	300 / 16
M1, M1.2, M1.4, M1.6	3500 / 8	2500 / 8	2000 / 8	—	—	—	—	—
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

SMTSO – 440 – 8 ET
SMTSOB – 440 – 8 ET

- SMTSO / SMTSOB: Type and Material
- 440: Thread or Thru Hole Code
- 8: Length Code
- ET: Finish Code

Packaged on 330 mm recyclable reels. Tape width is 24 mm. Supplied with polyimide patch for vacuum pick up. Reels conform to EIA-481.

NOTE ABOUT PLATED AND UNPLATED MOUNTING HOLES

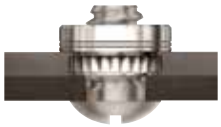
Broaching and broach/flare types are designed for unplated mounting hole applications. If used in plated mounting holes, the stresses involved can damage the plating, push out the plating entirely, or break any traces inside the board that might be connected to the plated hole. When installing into non-plated mounting holes there may even be issues with delamination, measeling or crazing in some instances.

Increasing the mounting hole size +.005" to +.008" /+0.13 mm to +0.2 mm may relieve these conditions. If increasing the mounting hole does not correct the issue then we recommend our surface-mount type fasteners.

It is always recommended that you try the fasteners in your specific application before full production begins. We are happy to provide samples for this purpose.

General recommendations for "Keep Out" areas are the same as our "Min. Distance Hole C/L to Edge" dimensions stated in the dimensional charts of our bulletin.

TYPES KF2 AND KFS2 BROACHING NUTS

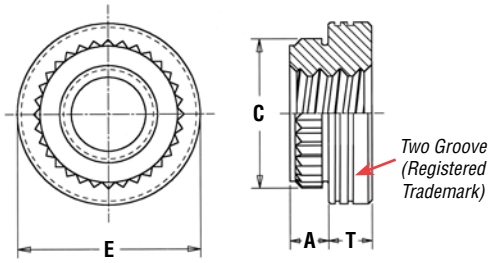


PART NUMBER DESIGNATION

KFS2 – 832

KF2 – 832 – ET

↓ Type and Material ↓ Thread Code ↓ Finish Code



All dimensions are in inches.

	Thread Size	Type		Thread Code	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +.003 –.000	C ±.003	E ±.005	T ±.005	Min. Dist. Hole ℄ 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

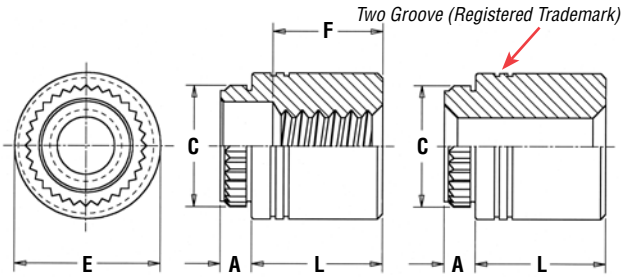
All dimensions are in millimeters.

	Thread Size x Pitch	Type		Thread Code	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +0.08	C ±0.08	E ±0.13	T ±0.13	Min. Dist. Hole ℄ 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	6.81	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

TYPES KFE AND KFSE BROACHING STANDOFFS

PART NUMBER DESIGNATION

KFSE	–	632	–	12		
KFE	–	632	–	12		ET
↓ Type and Material		↓ Thread or Thru Hole Code		↓ Length Code		↓ 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	(1) .750	(1) .875	(1) 1.00	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +.003 –.000	C ±.003	E ±.005	Min. Dist. Hole ℄ To Edge
UNIFIED	.112-40 (#4-40)	—	KFE	KFSE	440	4	8	12	16	20	24	—	—	.060	.060	.166	.184	.219	.17
	.138-32 (#6-32)	—	KFE	KFSE	632	4	8	12	16	20	24	28	32	.060	.060	.213	.231	.281	.22
	—	.116	KFE	KFSE	116	4	8	12	16	20	24	—	—	.060	.060	.166	.184	.219	.17
	—	.143	KFE	KFSE	143	4	8	12	16	20	24	28	32	.060	.060	.213	.231	.281	.22
	"F" Minimum Thread Length (Where Applicable)					Full			.375 ± .016		.375 Blind								

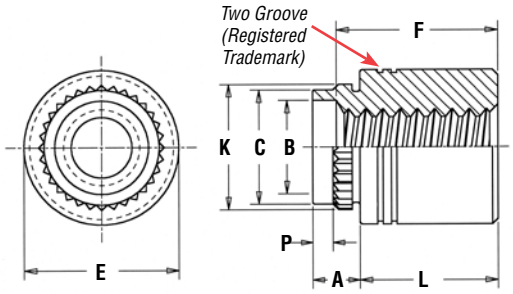
All dimensions are in millimeters.

	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	C ±0.08	E ±0.13	Min. Dist. Hole ℄ To Edge
METRIC	M3 x 0.5	—	KFE	KFSE	M3	3	4	6	8	10	12	14	16	1.53	1.53	4.22	4.68	5.56	4.4
	—	3.6	KFE	KFSE	3.6	3	4	6	8	10	12	14	16	1.53	1.53	5.41	5.87	7.14	5.5
	—	4.2	KFE	KFSE	4.2	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 BROACH/FLARE-MOUNT STANDOFFS

PART NUMBER DESIGNATION

KFB3	–	632	–	12		ET
↓ Type and Material		↓ Thread Code		↓ Length Code		↓ 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	(1) .750	(1) 1.00	A (Shank) Max.	Sheet Thickness	Hole Size in Sheet +.005 –.001	B ±.003	C Max.	E ±.005	K ±.003	P ±.010	Min. Dist. Hole ℄ To Edge
UNIFIED	.112-40 (#4-40)	KFB3	440	2	4	6	8	10	12	16	20	—	—	.09	.050-.065	.166	.122	.165	.219	.179	.040	.17
	.138-32 (#6-32)	KFB3	632	2	4	6	8	10	12	16	20	24	32	.09	.050-.065	.213	.171	.212	.280	.226	.040	.22
	"F" Min. Thread Length (Where Applicable)			Full								.375 Blind										

All dimensions are in millimeters.

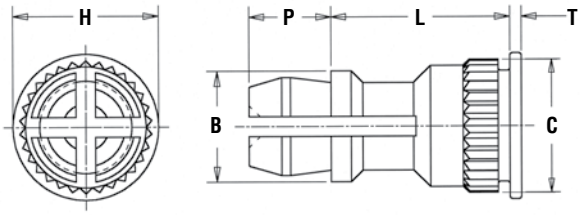
	Thread Size x Pitch	Type	Thread Code	Length "L" ±0.13 (Length Code is in millimeters): 2	3	4	6	8	10	12	14	16	A (Shank) Max.	Sheet Thickness	Hole Size in Sheet +0.13 –0.03	B ±0.08	C Max.	E ±0.13	K ±0.08	P ±0.25	Min. Dist. Hole ℄ To Edge
METRIC	M3 x 0.5	KFB3	M3	2	3	4	6	8	10	12	14	16	2.29	1.27-1.65	4.22	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 (Where Applicable)			Full						9.5 ±0.4											

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

TYPE KSSB BROACHING SNAP-TOP® STANDOFFS

PART NUMBER DESIGNATION

KSSB	–	156	–	12	X
Type and Material		Top Board Mounting Hole Diameter Code		Length Code	Finish Code



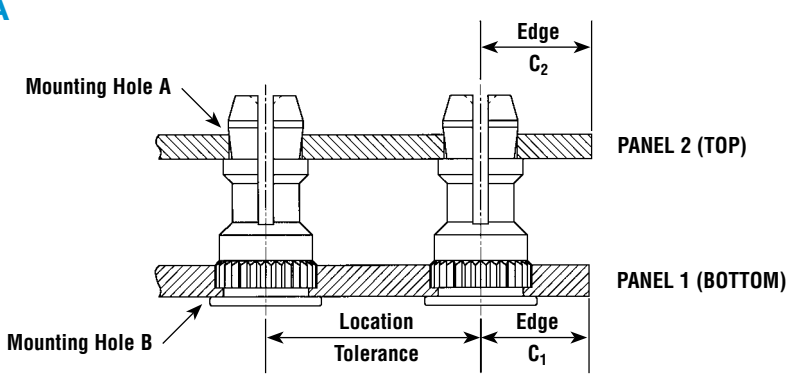
All dimensions are in inches.

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

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	H ±0.13	P ±0.13	T ±0.13
			8	10	12	14	16	18	20	22	25					
METRIC	KSSB	4MM										4.8	5.74	6.35	3.58	0.51

TYPE KSSB APPLICATION DATA



All dimensions are in inches.

		Panel 1						Panel 2				
	Type	Hardness Max. (1)	Bottom Mounting Hole B +.003 -.000	Panel Material	Thickness Min.	Edge Distance C_1 Min.	Location Tolerance	Hardness Max.	Top Mounting Hole A +.003 -.000	Panel Material	Thickness Range (2)	Edge Distance C_2 Min.
UNIFIED	KSSB	HRB 65 / HB 116	.213	PC Board	.050	.220	±.005	No Limit	.156	PC Board or Metal	.040 - .070	.100

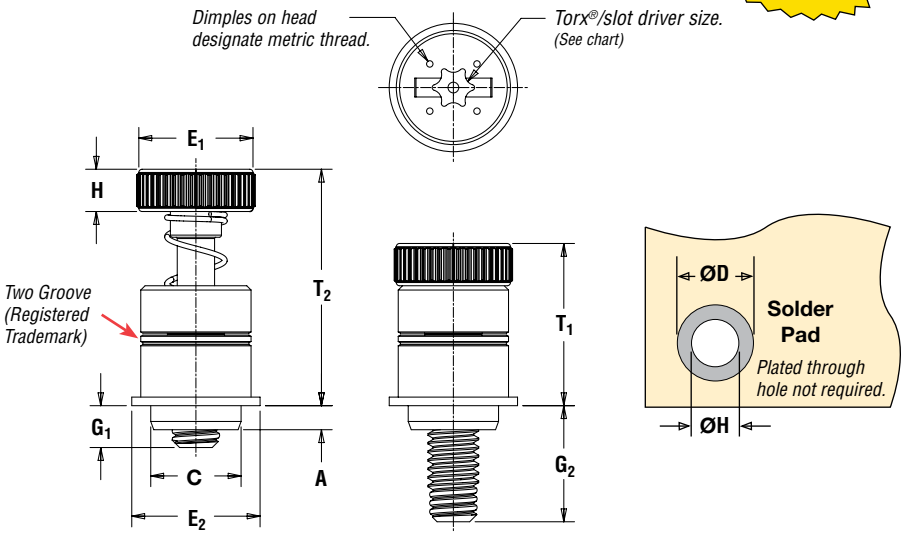
All dimensions are in millimeters.

		Panel 1						Panel 2				
	Type	Hardness Max. (1)	Bottom Mounting Hole B +0.08	Panel Material	Thickness Min.	Edge Distance C_1 Min.	Location Tolerance	Hardness Max.	Top Mounting Hole A +0.08	Panel Material	Thickness Range (2)	Edge Distance C_2 Min.
METRIC	KSSB	HRB 65 / HB 116	5.41	PC Board	1.27	5.59	±0.13	No Limit	4	PC Board or Metal	1 - 1.8	2.54

(1) HRB - Hardness Rockwell "B" Scale. HB - Hardness Brinell. *(2) Available for thicker boards on special order.*

ReelFast® SURFACE MOUNT CAPTIVE PANEL SCREWS

NEW!



PART NUMBER DESIGNATION

SMTPF	LS	M –	440 –	0	ET
Type	Driver	Anti-cross Thread Feature	Thread Code	Length Code	Finish Code

All dimensions are in inches.

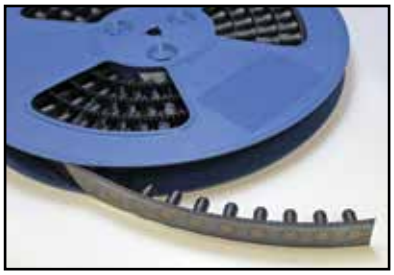
	Thread Size	Type	Thread Code	Screw Length Code	A (Shank) Max.	Min. Sheet Thickness	C Max.	E_1 ±.010	E_2 Nom	G_1 ±.025	G_2 ±.025	H ±.010	T_1 Nom.	T_2 Nom.	ØK Hole Size in Sheet +.003 -.000	ØD Min. Solder Pad	Driver Size
UNIFIED	.112-40 (#4-40)	SMTPFLSM	440	0	.063	.063	.215	.280	.300	.040	.210	.100	.38	.55	.220	.340	T15
				1						.100	.270						
	.138-32 (#6-32)	SMTPFLSM	632	0	.063	.063	.247	.310	.320	.040	.240	.100	.42	.62	.252	.400	T15
				1						.100	.300						

All dimensions are in millimeters.

	Thread Size	Type	Thread Code	Screw Length Code	A (Shank) Max.	Min. Sheet Thickness	C Max.	E_1 ±0.25	E_2 Nom	G_1 ±0.64	G_2 ±0.64	H ±0.25	T_1 Nom.	T_2 Nom.	ØK Hole Size in Sheet +0.08	ØD Min. Solder Pad	Driver Size
METRIC	M3 x 0.5	SMTPFLSM	M3	0	1.6	1.6	5.46	7	7.6	1	5.3	2.5	9.6	14	5.6	8.6	T15
				1						2.5	6.8						
	M3.5 x 0.6	SMTPFLSM	M3.5	0	1.6	1.6	6.27	7.9	8.13	1	6.1	2.5	10.7	15.7	6.4	10.2	T15
				1						2.5	7.62						

NUMBER OF PARTS PER REEL

Thread Size	Screw Length Code	
	-0	-1
440	200	200
632	150	150
M3	200	200
M3.5	150	150



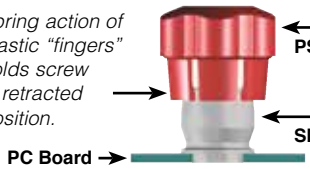
Packaged on 330 mm recyclable reels. Tape width is 24 mm. Supplied with polyimide patch for vacuum pick up. Reels conform to EIA-481.

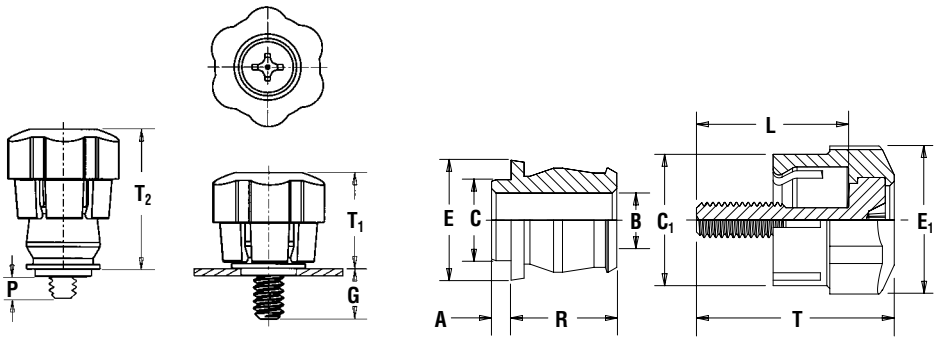
ReelFast® SURFACE MOUNT CAPTIVE PANEL SCREWS

Patented.

When Assembled

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





All dimensions are in inches.

	Thread Size	Screw Part Number: Type	Thread Code	Screw Length Code	Retainer Part Number	Assembly Dimensions: G ± .025	P ± .025	T_1 Nom.	T_2 Nom.	Total Radial Float	Screw Dimensions: C_1 ±.010	E_1 ±.010	L ±.015	T Nom.	Retainer Dimensions: A (Shank) Max.	Min. Sheet Thick.	B ±.003	C Max.	E Nom.	R ±.005
UNIFIED	.112-40 (#4-40)	PSHP	440	0	SMTPR-6-1	.188	.000	.478	.646	.015	.440	.542	.510	.663	.060	.060	.167	.249	.375	.325
				1		.248	.026						.570	.723						
	.138-32 (#6-32)	PSHP	632	0	SMTPR-6-1	.188	.000	.478	.646	.020	.440	.542	.510	.663	.060	.060	.167	.249	.375	.325
				1		.248	.026						.570	.723						

All dimensions are in millimeters.

	Thread Size x Pitch	Screw Part Number: Type	Thread Code	Screw Length Code	Retainer Part Number	Assembly Dimensions: G ± 0.64	P ± 0.64	T_1 Nom.	T_2 Nom.	Total Radial Float	Screw Dimensions: C_1 ±0.25	E_1 ±0.25	L ±0.38	T Nom.	Retainer Dimensions: A (Shank) Max.	Min. Sheet Thick.	B ±0.08	C Max.	E Nom.	R ±0.13
METRIC	M3 x 0.5	PSHP	M3	0	SMTPR-6-1	4.78	0	12.14	16.41	.38	11.18	13.77	12.95	16.84	1.53	1.53	4.24	6.33	9.53	8.26
				1		6.3	.66						14.48	18.36						
	M3.5 x 0.6	PSHP	M3.5	0	SMTPR-6-1	4.78	0	12.14	16.41	.51	11.18	13.77	12.95	16.84	1.53	1.53	4.24	6.33	9.53	8.26
				1		6.3	.66						14.48	18.36						

RETAINER - *Packaged on 330 mm recyclable reels of 465 pieces. Tape width is 24 mm. Supplied with Kapton® patch for vacuum pick up. Reels conform to EIA-481.*

SCREW - *Packaged in bags. Retainers and screws are sold separately.*

PART NUMBER DESIGNATION FOR SCREW

PSHP – 632 – 0 L 001

- PSHP: Type
- 632: Thread Code
- 0: Length Code
- L: Cap Style (Lobed)
- 001: Color Code (Standard Black)

PART NUMBER DESIGNATION FOR RETAINER

SMTPR – 6 – 1 ET

- SMTPR: Type
- 6: Retainer Size
- 1: Shank Code
- ET: Finish Code

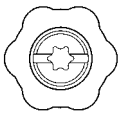
COLOR CAPABILITIES FOR TYPE PSHP SCREW

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 shown here, 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.

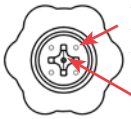
Std. Black #001 Red #002 Orange #003 Yellow #004

Green #005 Blue #006 Violet #007

Non-flammable UL 94-V0 plastic caps are available on special order.

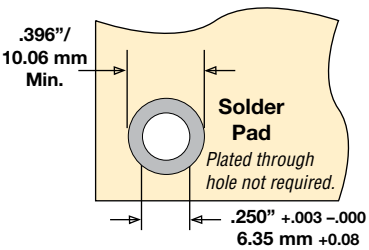


Available with Torx® recess on special order.



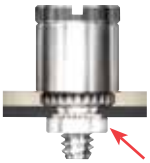
Four dimples on head designate metric thread.

Metal Phillips Recess
#4-40 & M3 = #1
#6-32 & M3.5 = #2



Stencil Masking Examples

TYPE PFK BROACHING CAPTIVE PANEL SCREWS



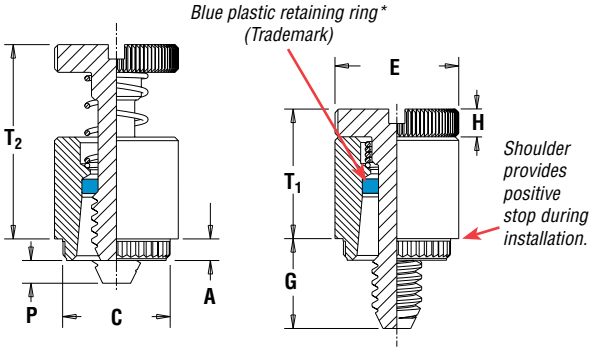
Shown here with self-clinching mating nut

PART NUMBER DESIGNATION

PFK – 632 – 62

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

Diagonal knurl identifies metric thread sizes



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 ±.010	G ±.016	H ±.005	P ±.025	T_1 Max.	T_2 Nom.	Min. Dist. Hole ℄ To Edge
UNIFIED	.112-40 (#4-40)	PFK	440	40	.060	.060	.265	.283	.312	.250	.072	.000	.36	.54	.20
				62						.375		.125			
				84						.500		.250			
	.138-32 (#6-32)	PFK	632	40	.060	.060	.281	.299	.344	.250	.072	.000	.36	.54	.26
				62						.375		.125			
				84						.500		.250			

All dimensions are in millimeters.

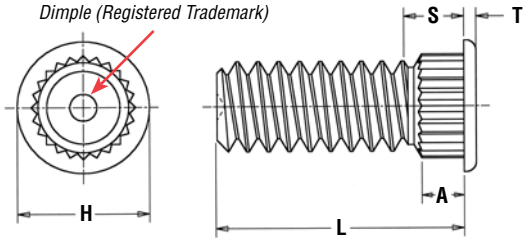
	Thread Size x Pitch	Type	Thread Code	Screw Length Code	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +0.08	C ±0.08	E ±0.25	G ±0.4	H ±0.13	P ±0.64	T_1 Max.	T_2 Nom.	Min. Dist. Hole ℄ To Edge
METRIC	M3 x 0.5	PFK	M3	40	1.53	1.53	6.73	7.19	7.92	6.4	1.83	0	9.14	13.72	5.08
				62						9.5		3.2			
				84						12.7		6.4			

**Retaining rings are plastic with normal 250°F / 120°C temperature limit.*

TYPE KFH BROACHING STUDS

PART NUMBER DESIGNATION

KFH	–	632	–	8	ET
↓		↓		↓	↓
Type and Material		Thread Code		Length Code	Finish Code



All dimensions are in inches.

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

All dimensions are in millimeters.

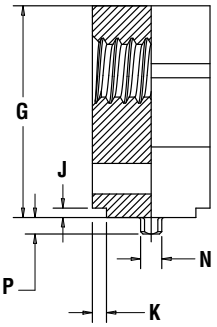
	Thread Size x Pitch	Type	Thread Code	Length "L" ±0.25 (Length Code is in millimeters)						A (Shank) Max.	Min. Sheet Thickness	Hole Size in Sheet +0.08	Max. Hole Size in Attached Parts	H ±0.25	S Max. (1)	T ±0.13	Min. Dist. Hole ℄ To Edge
METRIC	M3 x 0.5	KFH	M3	6	8	10	12	15	18	1.65	1.53	3	3.7	4.58	2.3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

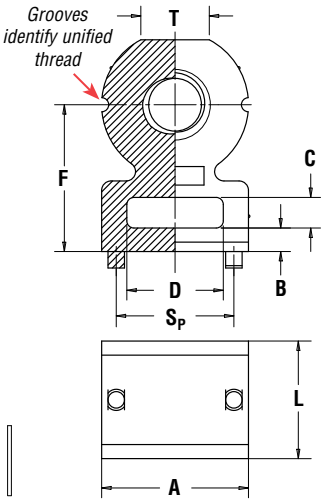
(1) Threads are gaugeable to within 2 pitches of the "S" Max. dimension. A class 3B/5H maximum material commercial nut shall pass up to the "S" Max. dimension.

ReelFast® SURFACE MOUNT RIGHT ANGLE (R'ANGLE®) FASTENERS

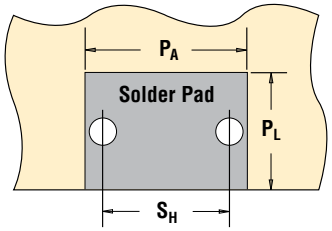
PART NUMBER DESIGNATION

SMTRA	256	–	8	–	6	ET
↓	↓		↓		↓	↓
Type	Thread Code		Height Code		Length Code	Finish Code



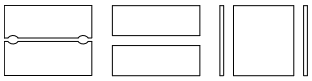


Patented.



Solder pad can be flush to edge.
Plated through hole not required.

Stencil Masking Examples



All dimensions are in inches.

	Thread Size	Type	Thread Code	Height Code	Length Code	Length L ±.005	Min. Sheet Thickness	Hole Size In Sheet +.003 –.000	A ±.006	B ±.006	C ±.006	D ±.006	Height F ±.006	G ±.006	J Nom.	K Nom.	N Max.	P Max.	S_P ±.003	T Nom.
UNIFIED	.086-56 (#2-56)	SMTRA	256	8	6	.188	.040	.053	.218	.040	.060	.140	.250	.345	.020	.030	.048	.040	.157	.105
	.112-40 (#4-40)	SMTRA	440	9	6	.188	.040	.053	.250	.050	.065	.160	.281	.390	.020	.030	.048	.040	.188	.125
	.138-32 (#6-32)	SMTRA	632	10	8	.250	.040	.053	.312	.050	.065	.205	.312	.450	.020	.030	.048	.040	.250	.145
	.164-32 (#8-32)	SMTRA	832	12	9	.281	.040	.053	.375	.050	.075	.250	.375	.535	.020	.030	.048	.040	.312	.195

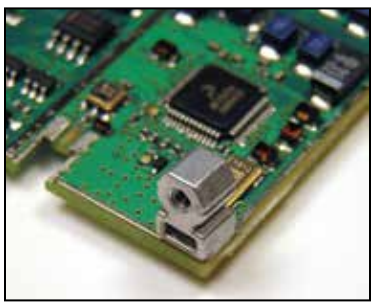
All dimensions are in millimeters.

	Thread Size x Pitch	Type	Thread Code	Height Code	Length Code	Length L ±0.13	Min. Sheet Thickness	Hole Size In Sheet +0.08	A ±0.15	B ±0.15	C ±0.15	D ±0.15	Height F ±0.15	G ±0.15	J Nom.	K Nom.	N Max.	P Max.	S_P ±0.08	T Nom.
METRIC	M2 x 0.4	SMTRA	M2	6	5	5	1	1.35	5.5	1	1.5	3.5	6	8.4	0.5	0.75	1.22	1	4	2.65
	M2.5 x 0.45	SMTRA	M25	6	5	5	1	1.35	5.5	1	1.5	3.5	6	8.4	0.5	0.75	1.22	1	4	2.65
	M3 x 0.5	SMTRA	M3	7	5	5	1	1.35	6.35	1.25	1.65	4	7	9.75	0.5	0.75	1.22	1	4.75	3.2
	M4 x 0.7	SMTRA	M4	9	7	7	1	1.35	9.53	1.25	1.65	6.35	9	13.1	0.5	0.75	1.22	1	7.9	4.8

	Thread Code	Pad Width P_A Min.	Pad Length P_L Min.	Hole Spacing S_H ±.002	Hole Size In Sheet +.003 –.000
UNIFIED	256	.262	.171	.157	.053
	440	.294	.171	.188	.053
	632	.356	.233	.250	.053
	832	.419	.264	.312	.053

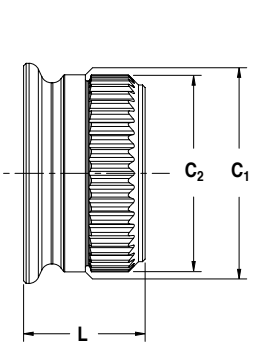
	Thread Code	Pad Width P_A Min.	Pad Length P_L Min.	Hole Spacing S_H ±0.05	Hole Size In Sheet +0.08
METRIC	M2	6.62	4.57	4	1.35
	M25	6.62	4.57	4	1.35
	M3	7.47	4.57	4.75	1.35
	M4	10.65	6.57	7.9	1.35

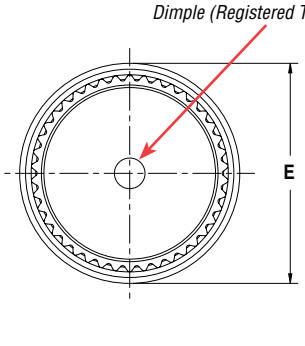
Part Number	Parts Per Reel	Pitch (mm)	Tape Width (mm)
SMTRA256-8-6	375	16	24
SMTRA440-9-6	300	16	24
SMTRA632-10-8	200	20	32
SMTRA832-12-9	200	20	32
SMTRAM2-6-5	375	16	24
SMTRAM25-6-5	375	16	24
SMTRAM3-7-5	300	16	24
SMTRAM4-9-7	200	20	32



TYPE SFK SpotFast® CLINCH/BROACH MOUNT FASTENERS

Patented.

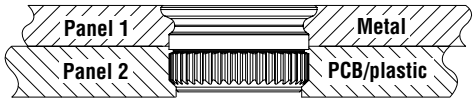




Type and Size	Thickness Code	Panel 1 Thickness ±0.08 mm / ±.003"		Panel 1 Mounting Hole +0.08 mm / +.003" −.000"		Panel 2 Thickness Min. (1)		Panel 2 Mounting Hole +0.08 mm / +.003" −.000"		C_1 Max.		C_2 ±0.08 mm / ±.003"		E Max.		L Max.		Min. Dist Hole ℄ To Edge	
		mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
SFK-3	0.8	0.8	.031	3	.118	1.6	.063	2.5	.098	2.98	.117	2.9	.114	3.53	.139	2.31	.091	3	0.12
SFK-3	1.0	1	.039	3	.118	1.6	.063	2.5	.098	2.98	.117	2.9	.114	3.76	.148	2.51	.099	3	0.12
SFK-3	1.2	1.2	.047	3	.118	1.6	.063	2.5	.098	2.98	.117	2.9	.114	3.76	.148	2.72	.107	3	0.12
SFK-3	1.6	1.6	.063	3	.118	1.6	.063	2.5	.098	2.98	.117	2.9	.114	3.76	.148	3.12	.123	3	0.12
SFK-5	0.8	0.8	.031	5	.197	1.6	.063	4.5	.177	4.98	.196	4.9	.193	5.56	.219	2.31	.091	5.1	0.20
SFK-5	1.0	1	.039	5	.197	1.6	.063	4.5	.177	4.98	.196	4.9	.193	5.56	.219	2.51	.099	5.1	0.20
SFK-5	1.2	1.2	.047	5	.197	1.6	.063	4.5	.177	4.98	.196	4.9	.193	5.56	.219	2.72	.107	5.1	0.20
SFK-5	1.6	1.6	.063	5	.197	1.6	.063	4.5	.177	4.98	.196	4.9	.193	5.56	.219	3.12	.123	5.1	0.20

(1) Fastener will provide flush application at minimum sheet thickness.

Can be used as a single flush-mounted pivot point. For more information, please contact our Applications Engineering Department.



Type SFK joining metal to PCB/plastic.

PART NUMBER DESIGNATION

SFK – 3 – 0.8 – ZI

- SFK: Type
- 3: Panel 1 Mounting Hole Code
- 0.8: Thickness Code
- ZI: Finish Code

MATERIAL AND FINISH SPECIFICATIONS

	Threads (1)		Fastener Materials					Standard Finishes			Optional Finish	For Use in Sheet Hardness: (3)				
Type	Internal, ASME B1.1 2B/ ASME B1.13M 6H	External, ASME B1.1 2A/ ASME B1.13M 6g	Carbon Steel	300 Series Stainless Steel	CDA-510 Phosphor Bronze	CDA-353 Brass	Nylon, Temp. Limit 200˚ F/ 93˚ C	Passivated and/or Tested Per ASTM A380	Electro-Plated Tin ASTM B 545, Class B With Clear Preservative Coating, annealed (4)	No Finish	Black Nitride	HRB 70 / HB 125 or Less	HRB 65 / HB 116 or Less	HRB 60 / HB 107 or Less	HRB 55 / HB 96 or Less	PC Board
KF2	•		•						•					•		•
KFS2	•			•				•				•				•
KFE	•		•						•					•		•
KFSE	•			•				•				•				•
KFB3	•					•			•				•			•
KSSB						•				•			•			•
KFH		•			•				•						•	•
PFK Retainer				•				•		•				•	•	•
Screw		•		•				•		•						
Spring				•												
Retaining Ring							•									
Part Number Codes For Finishes								None	ET	X	BN					

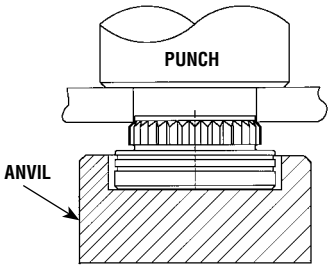
	Threads (1)			Fastener Materials					Standard Finishes (2)			For Use in Sheet Hardness: (3)	
Type	Miniature ISO 1501, 4H6	Internal, ASME B1.1 2B/ ASME B1.13M 6H	External, ASME B1.1 2A/ ASME B1.13M 6g	Carbon Steel	Hardened Carbon Steel	300 Series Stainless Steel	Brass	Zinc Diecast	Zinc Plated 5µm, Colorless	Electro-Plated Tin ASTM B 545, Class A With Clear Preservative Coating, annealed (4)	Bright Nickel Over Copper Flash	HRB 80 / HB 150 or less	PC Board
SMTSO	• S1 to S1.4	• 0-80 to 8-32 M1.6 to M4		•						•			•
SMTSOB		•					•			•			•
SMTRA		•						•		•			•
SMTPFLSM Retainer				•						•			•
Screw			•		•				•				
Spring						•							
PSHP (5)				•							•		
SMTPR				•						•			•
SFK				•					•			•	•
Part Number Codes For Finishes									ZI	ET	CN		

(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/6h, per ASME B1.1 (see notes at end of table C-1) and ASME B1.13M, Section 8, Paragraph 8.2.
(2) See PEM Technical Support section of our web site for related plating standards and specifications.
(3) HRB - Hardness Rockwell "B" Scale. HB - Hardness Brinell.
(4) Optimal solderability life noted on packaging.
(5) ABS cap on PSHP screw has a temperature limit of 200˚ F / 93˚ C.

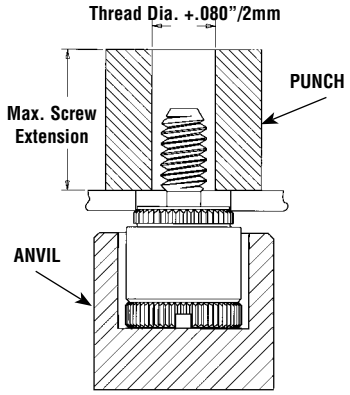
INSTALLATION

For Types KF2/KFS2/KFE/KFSE/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 installation punch and anvil surfaces parallel, apply squeezing force until shoulder contacts the board.



Types KF2/KFS2/ KFE/KFSE



Type PFK

PEMSERTER® Installation Tooling

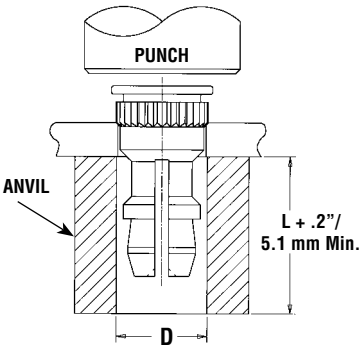
Type	Thread Code	Anvil Part Number	Punch Part Number
PFK	440/M3	975200026	975200060
PFK	632	975200027	975200061

PEMSERTER® Installation Tooling

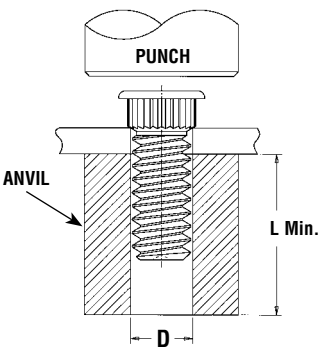
Type	Thread Code	Anvil Part Number	Punch Part Number
KF2/KFS2	080	8015899	975200048
KF2/KFS2	256/440/M2/M2.5/M3	975200904300	
KF2/KFS2	632/M3.5	975200035	
KF2/KFS2	832/M4	975200037	
KF2/KFS2	032/M5	975200905300	

PEMSERTER® Installation Tooling

Type	Thread Code	Anvil Part Number	Punch Part Number
KFE/KFSE	440/116 -4 to -8	975200846300	975200048
KFE/KFSE	440/116 -10 to -12	975200847300	
KFE/KFSE	440/116 -16 to -20	975200848300	
KFE/KFSE	440/116 -20 to -24	975200882300	
KFE/KFSE	M3 -3 to -6	975200846300	
KFE/KFSE	M3 -8 to -10	975200847300	
KFE/KFSE	M3 -12 to -14	975201222300	
KFE/KFSE	M3 -14 to -16	975200848300	
KFE/KFSE	632/143 -4 to -8	975200849300	
KFE/KFSE	632/143 -10 to -12	975200850300	
KFE/KFSE	632/143 -16 to -20	975200851300	
KFE/KFSE	632/143 -22 to -24	975200883300	
KFE/KFSE	632/143 -28 to -32	975200884300	
KFE/KFSE	3.6 -3 to -6	975200849300	975200048
KFE/KFSE	3.6 -8 to -10	975200850300	
KFE/KFSE	3.6 -12 to -16	975200851300	
KFE/KFSE	4.2 -2	975201216300	
KFE/KFSE	4.2 -3 to -6	975201217300	
KFE/KFSE	4.2 -8 to -10	975201218300	
KFE/KFSE	4.2 -12 to -14	975201220300	
KFE/KFSE	4.2 -14 to -16	975201219300	



Type KSSB



Type KFH

For Types KSSB/KFH

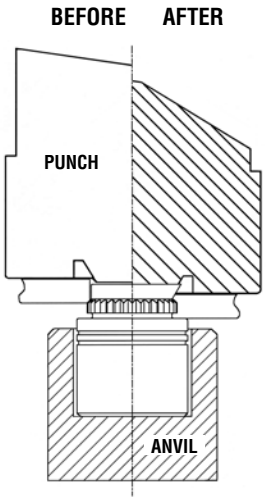
1. Prepare properly sized mounting hole in board.
2. Place fastener into mounting hole as shown in drawing.
3. With installation punch and anvil surfaces parallel, apply squeezing force until head contacts the board.

Part Number	D +.003" –.000"
KFH-440-L	.113"
KFH-632-L	.140"
KFH-832-L	.166"
KFH-032-L	.191"
KSSB-156-L	.216"

Part Number	D +0.08mm
KFH-M3-L	3.1mm
KFH-M4-L	4.1mm
KFH-M5-L	5.1mm
KSSB-4mm-L	5.49mm

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

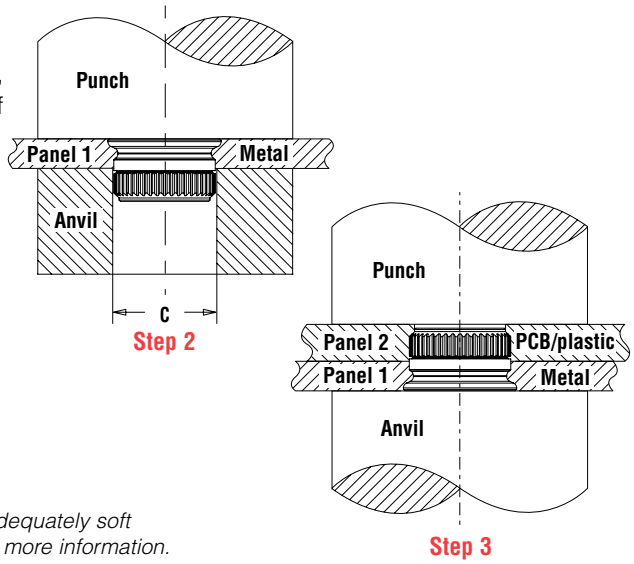
(1) PennEngineering manufactures and stocks the installation tooling for the KFB3.

Thread Code	Length Code	Anvil	Punch (Flaring Tool)
#4-40	-2	975201213300	975201231400
#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	975201232400
#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	975201231400
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	

For Type SFK

Step 1. Prepare properly sized mounting hole in both panels.
Step 2. Using only Panel 1, with the punch and anvil surfaces parallel, apply squeezing force until the fastener is flush with the top of Panel 1.
Step 3. Place Panel 2 over fastener and apply squeezing force.



ANVIL DIMENSIONS

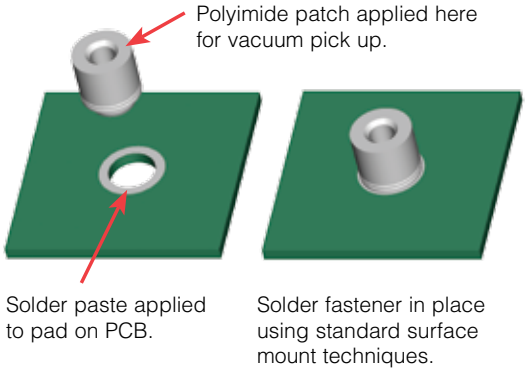
Size	C ±0.13/±.003 (mm) / (in.)	Punch Part No.	Anvil Part No.*
SFK-3	3.05 / .120	975200048	970200229300
SFK-5	5.05 / .199	975200048	970200020300

** Part number for anvil used in Step 2*

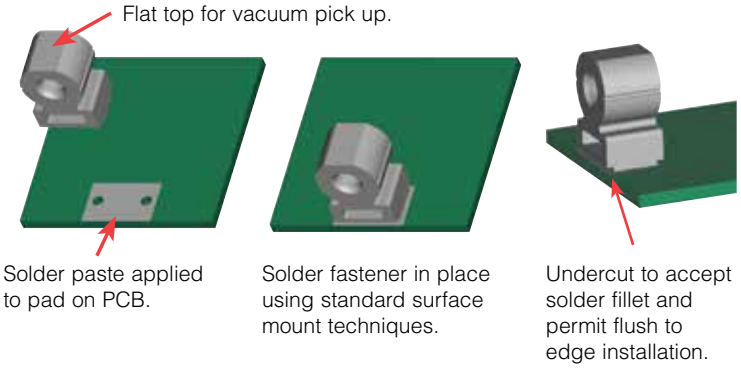
NOTE: *Fastener can be installed in both sheets at once when metal panel is adequately soft compared to the non-metal panel. E-mail techsupport@pemnet.com for more information.*

INSTALLATION

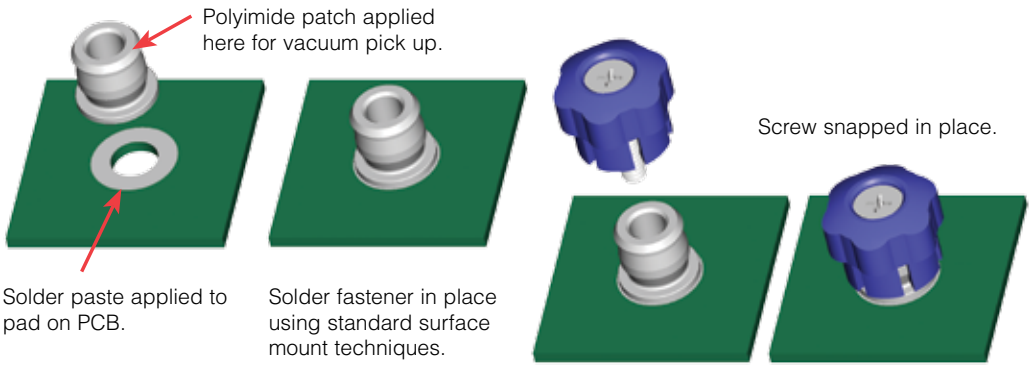
For SMT Nuts and Standoffs



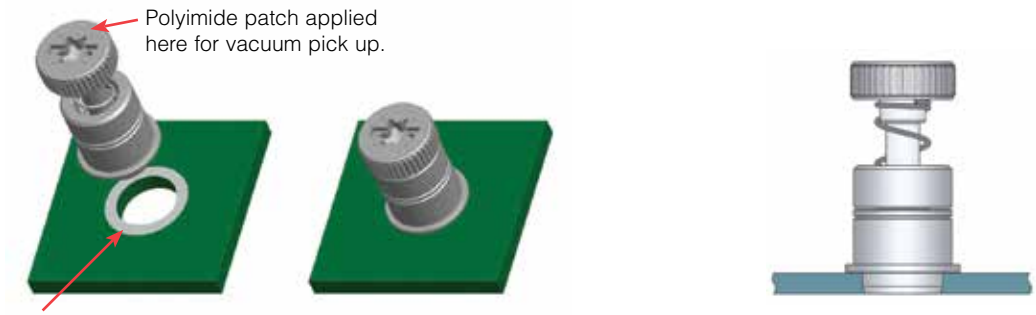
For SMT R'ANGLE® Fasteners



For SMT Captive Panel Screws



For SMTPFLSM Captive Panel Screws



PERFORMANCE DATA[1]

TYPES KF2/KFS2/KFE/KFSE/KFB3/KFH/PFK BROACHING AND BROACH/FLARE MOUNT FASTENERS

	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 Panel	400	60	6
		440	(3)	.060" FR-4 Panel	400	65	15
		632	(3)	.060" FR-4 Panel	500	80	30
		832	(3)	.060" FR-4 Panel	700	95	35
		032	(3)	.060" FR-4 Panel	700	100	40
	KFB3	440	(3)	.060" FR-4 Panel	1,000	140	18
		632	(3)	.060" FR-4 Panel	1,500	170	28
	KFH	440	4	.060" FR-4 Panel	400	65	7
		632	8	.060" FR-4 Panel	400	70	11
		832	15	.060" FR-4 Panel	400	80	16
		032	18	.060" FR-4 Panel	400	90	17
	PFK	440	(3)	.060" FR-4 Panel	250	55	(3)
		632	(3)	.060" FR-4 Panel	400	60	(3)

	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 Panel	2.2	290	1.7
		M4	(3)	1.5 mm FR-4 Panel	2.2	420	3.4
		M5	(3)	1.5 mm FR-4 Panel	2.9	440	4.5
	KFB3	M3	(3)	1.5 mm FR-4 Panel	4.4	560	2.03
		M4	(3)	1.5 mm FR-4 Panel	6	680	3.2
	KFH	M3	0.45	1.5 mm FR-4 Panel	1.8	285	0.79
		M4	1.6	1.5 mm FR-4 Panel	1.8	355	1.8
		M5	2.1	1.5 mm FR-4 Panel	1.8	400	1.92
	PFK	M3	(3)	1.5 mm FR-4 Panel	1.1	245	(3)

TYPE KSSB BROACHING SNAP-TOP® STANDOFFS

	Type	Panel 1 (.060" FR-4 Panel) (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

	Type	Panel 1 (1.5 mm FR-4 Panel) (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) Published installation forces are for general reference. Actual set-up and confirmation of complete installation should be made by observing proper seating of fastener as described in the installation steps. Other performance values reported are averages when all proper installation parameters and procedures are followed. Variations in mounting hole size, sheet material, and installation procedure may affect performance. Performance testing this product in your application is recommended. We will be happy to provide technical assistance and/or 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 7.

PEMSERTER® PRESSES

For best results we recommend using a PEMSERTER® press for installation of PEM broaching fasteners. For more information on our line of presses check our web site.

TYPE SFK SpotFast® CLINCH/BROACH MOUNT FASTENERS

Type and Size	Thickness Code	Installation into Panel 1 Cold-rolled Steel		Installation into Panel 2 FR-4 Fiberglass		Pushout of Panel 2 (3)	
		kN	lbs.	kN	lbs.	N	lbs.
SFK-3	0.8	6.2	1400	1.8	400	200	45
SFK-3	1.0	8	1800	1.8	400	200	45
SFK-3	1.2	8.9	2000	1.8	400	200	45
SFK-3	1.6	10.2	2300	1.8	400	200	45
SFK-5	0.8	11.1	2500	1.8	400	400	90
SFK-5	1.0	13.5	3000	1.8	400	400	90
SFK-5	1.2	15.6	3500	1.8	400	400	90
SFK-5	1.6	17.8	4000	1.8	400	400	90

TYPE SMTSO NUTS AND SPACERS/STANDOFFS(1)(2)

Type and Size	Test Sheet Material .062" Single Layer FR-4			
	Pushout (lbs.)	Pushout (N)	Torque-out (in. lbs.)	Torque-out (N•m)
SMTSO-440	56.5	251	8.56	1
SMTSO-632	93.5	416	13.83	1.6
SMTSO-832	151.1	672	26.96	3
SMTSO-M3	56.5	251	8.56	1
SMTSO-M3.5	93.5	416	13.83	1.6
SMTSO-M4	151.1	672	26.96	3

TYPE SMTSO microPEM® FASTENERS(1)(2)

Type and Size	Test Sheet Material .062" Single Layer FR-4			
	Pushout (lbs.)	Pushout (N)	Torque-out (in. lbs.)	Torque-out (N•m)
SMTSO-080	85.1	378.7	4.94	0.56
SMTSO-M1				
SMTSO-M1.2				
SMTSO-M1.4				
SMTSO-M1.6				

TYPE SMTRA R'ANGLE® FASTENERS(1)(2)

	Part Number	Test Sheet Material .062" Single Layer FR-4 Pushout (lbs.)	Side Load (lbs.)
UNIFIED	SMTRA256-8-6	51.7	7.1
	SMTRA440-9-6	89.5	10.8
	SMTRA632-10-8	110.3	8.4
	SMTRA832-12-9	137.2	21.2

	Part Number	Test Sheet Material 1.58mm Single Layer FR-4 Pushout (N)	Side Load (N)
METRIC	SMTRAM2-6-5	418.2	56.8
	SMTRAM25-6-5	216.5	36.9
	SMTRAM3-7-5	257.6	41.3
	SMTRAM4-9-7	369.3	73.3

TYPE SMTPR RETAINERS(1)

Part Number	Test Sheet Material .062" Single Layer FR-4	
	Pushout (lbs.)	Pushout (N)
SMTPR-6-1ET	161.4	718

TYPE SMTPFLSM FASTENERS(1)

	Type and Thread Size	Min. Tensile Strength (lbs.)	Rec. Tightening Torque (in. lbs.) (4)	Test Sheet Material .060" P.C. Board Pull-off (lbs.) (5)
UNIFIED	SMTPFLSM-440	556	4.4	100
	SMTPFLSM-632	724	7.0	105

	Type and Thread Size	Min. Tensile Strength (N)	Rec. Tightening Torque (N•m) (4)	Test Sheet Material 1.5 mm P.C. Board Pull-off (N) (5)
METRIC	SMTPFLSM-M3	2900	0.61	445
	SMTPFLSM-M3.5	3269	0.8	465

TESTING CONDITIONS

Oven Quad ZCR convection oven w/ 4 zones
High Temp 473˚F / 245˚C
Board Finish 62% Sn, 38% Pb
Screen Printer Ragin Manual Printer
Vias None

Spokes 2 Spoke Pattern
Paste Amtech NC559LF Sn96.5/3.0Ag/0.5Cu (SAC305) **(Types SMTSO, SMTRA, SMTPR)**
Alpha CVP-390 Sn96.5/3.0Ag/0.5Cu (SAC305) **(Type SMTPFLSM)**
Stencil .0067" / 0.17 mm thick **(Types SMTSO, SMTRA, SMTPR)**
.005" / 0.13 mm thick **(Type SMTPFLSM)**

(1) With lead-free paste. Average values of 30 test points. The data presented here is for general comparison purposes only. Actual 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 the performance data specific to your application.
(2) Further testing details can be found in our website's literature section.
(3) In most applications, pullout strength of the SFK fastener in Panel 1 exceeds pushout strength of Panel 2.
(4) Torque values shown will produce a preload of 70% minimum tensile with a nut factor "k" equal to .1.
(5) Failure occurred at the solder joint. Screw retention strength is greater than the retainer.

OTHER FASTENERS FOR CONSIDERATION TO USE WITH PC BOARDS

TYPE PF11MW™ FLOATING CAPTIVE PANEL SCREWS
(See PEM® Bulletin PF)

Unique flare mount feature allow fasteners to "float" in mounting hole.
- Compensates for mating thread misalignment.
- Installs into any panel material.
- Appropriate for close center-line-to-edge applications.
- Color coded knobs available.

TYPE PF11MF™ FLARE-MOUNTED CAPTIVE PANEL SCREWS
(See PEM® Bulletin PF)
- Appropriate for close centerline-to-edge applications.
- Doesn't require high installation force.
- Installs into any panel material.
- Installs flush on back side of panel.
- Color coded knobs available.

TYPE SGPC™ SWAGING COLLAR STUDS
(See PEM® Bulletin FH)
- Can be installed into most materials, including stainless steel and rigid non-metallic panels.
- Can be used to attach dissimilar materials.
- Can accommodate multiple panels as long as the total thickness does not exceed the maximum sheet thickness.
- Appropriate for close center-line-to-edge applications.

TYPE SOAG/SOSG GROUNDING STANDOFFS
(See PEM® Bulletin SO)
- Designed for clinching into steel or aluminum chassis.
- "Gripping teeth" on opposite side of standoff makes firm electrical contact with mating PC Board.

TYPE SKC KEYHOLE® STANDOFFS
(See PEM® Bulletin SK)
- Clinch feature mounts fastener permanently into metal sheet.
- Allows for quick attachment and detachment of PC Board.
- Head is flush or sub-flush in metal sheet.
- Makes horizontal or vertical component mounting possible.

TYPE SSA/SSC/SSS SNAP-TOP® STANDOFFS
(See PEM® Bulletin SSA)
- Spring action holds PC Boards and subassemblies securely, while allowing for quick removal.
- Screws and other threaded hardware are eliminated.

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

Regulatory compliance information is available in Technical Support section of our website.

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

PennEngineering®

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