

PennEngineering®

**FASTENERS FOR
USE WITH PC BOARDS**



BULLETIN K



712
REV 1012

FASTENERS FOR USE WITH PC BOARDS

NUTS AND SPACERS/STANDOFFS



Type SMTSO - ReelFast® surface mount nuts and standoffs are available threaded and unthreaded - [PAGE 4](#)



Type KF2 and KFS2 - Broaching nuts, internally threaded for mounting on PC boards - [PAGE 5](#)



Type KFE and KFSE - Broaching standoffs, threaded or unthreaded for stacking or spacing - [PAGE 6](#)



Type KFB3 - Broach/flare-mount standoffs with greater pullout performance - [PAGE 6](#)



Type KSSB - Broaching, SNAP-TOP® standoffs feature a spring action to hold PC board securely without screws or threaded hardware - [PAGE 7](#)

CAPTIVE PANEL SCREWS



ReelFast® surface mount captive panel screws - [PAGE 8](#)



Type PFK - Broaching panel fastener assemblies for mounting on PC boards - [PAGE 9](#)

STUDS



Type KFH - Threaded broaching studs for use as solderable connectors or as permanently mounted studs on PC boards - [PAGE 10](#)

RIGHT ANGLE FASTENERS



Type SMTRA - ReelFast® R'ANGLE® surface mount fasteners provide strong re-usable threads at right angles to PC boards - [PAGE 11](#)

SHEET JOINING FASTENERS



Type SFK - SpotFast® clinch/broach mount fasteners for joining metal to PCB/plastic panels - [PAGE 12](#)

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NOTE ABOUT PLATED THRU-HOLES

Broaching and broach/flare types are designed for unplated thru-hole applications. If used in plated thru-hole applications, 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. Increasing the mounting hole size $+0.005$ " to $+0.008$ " / $+0.13$ to $+0.2$ may relieve these conditions. In non-plated thru-holes this will also help when delamination, measeling or crazing is evident after installation. When none of the above can be tolerated, we recommend Type SMTSO (surface-mount) type fasteners.

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.

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.

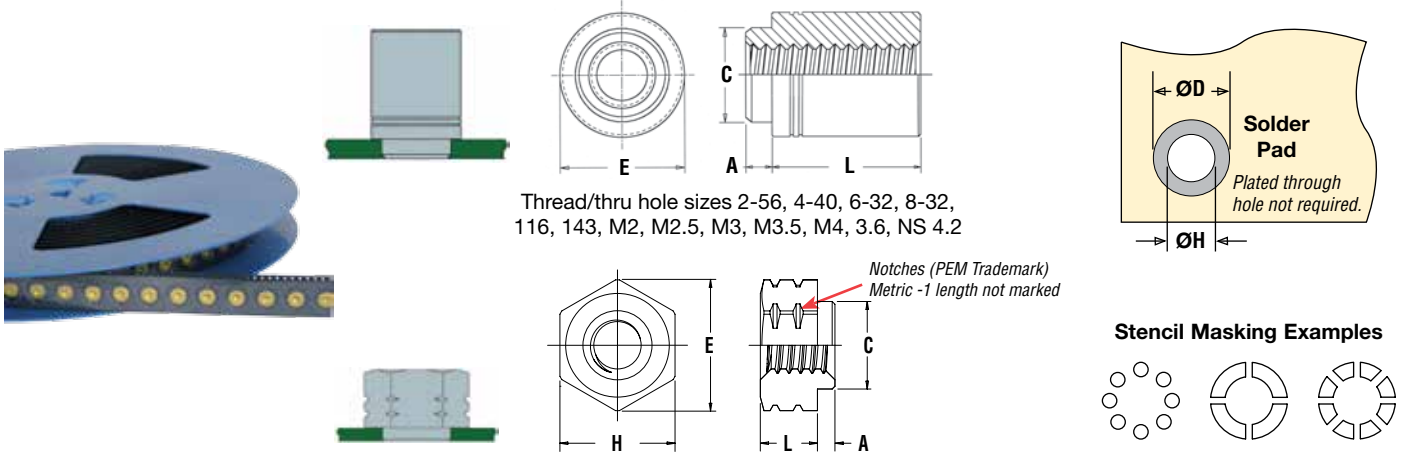
Broach/flare-mount standoffs (Type KFB3) offer a combined broach/flare feature for even greater pullout performance in PC board materials.

QUICK REFERENCE CHART

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

FASTENERS FOR USE WITH PC BOARDS

TYPE SMTSO ReelFast® SURFACE MOUNT NUTS AND SPACERS/STANDOFFS



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

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

All dimensions are in inches.

| UNIFIED | 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 | H Nom. | ØH Hole Size In Sheet +.003 -.000 | ØD Min. Solder Pad |
|-----------------|-------------|--------------------------|------|--------------------------|--|------|-------|------|----------------------|--------|--------|---------|--------|--------------------------------------|--------------------|
| | | | | | .062 | .125 | .250 | .375 | | | | | | | |
| | | | | | .060-80 (#0-80) | — | SMTSO | 080 | | | | | | | |
| .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 | — | .250 | .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.

| METRIC | 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 | H Nom. | ØH Hole Size In Sheet +0.08 | ØD Min. Solder Pad |
|-------------|---------------------|--------------------------|------|--------------------------|---|---|-------|----|----|----|------|------|----------------------|--------|--------|---------|--------|--------------------------------|--------------------|
| | | | | | 1 | 2 | 3 | NA | NA | NA | NA | NA | | | | | | | |
| | | | | | S1 | — | SMTSO | M1 | 1 | 2 | 3 | NA | | | | | | | |
| S1.2 | — | SMTSO | M1.2 | 1 | 2 | 3 | NA | NA | NA | NA | 0.5 | 0.48 | 2.41 | 3.66 | 3.18 | 2.5 | 4.19 | | |
| S1.4 | — | SMTSO | M1.4 | 1 | 2 | 3 | NA | NA | NA | NA | 0.5 | 0.48 | 2.41 | 3.66 | 3.18 | 2.5 | 4.19 | | |
| M1.6 x 0.35 | — | SMTSO | M1.6 | 1 | 2 | 3 | NA | NA | NA | NA | 0.5 | 0.48 | 2.41 | 3.66 | 3.18 | 2.5 | 4.19 | | |
| M2 x 0.4 | — | SMTSO | M2 | NA | 2 | 3 | 4 | 6 | 8 | 10 | 1.53 | 1.53 | 3.6 | 5.56 | — | 3.73 | 6.2 | | |
| M2.5 x 0.45 | — | SMTSO | M2.5 | NA | 2 | 3 | 4 | 6 | 8 | 10 | 1.53 | 1.53 | 4.09 | 5.56 | — | 4.22 | 6.2 | | |
| M3 x 0.5 | — | SMTSO | M3 | NA | 2 | 3 | 4 | 6 | 8 | 10 | 1.53 | 1.53 | 4.09 | 5.56 | — | 4.22 | 6.2 | | |
| M3.5 x 0.6 | — | SMTSO | M3.5 | NA | 2 | 3 | 4 | 6 | 8 | 10 | 1.53 | 1.53 | 5.28 | 7.14 | — | 5.41 | 7.77 | | |
| M4 x 0.7 | — | SMTSO | M4 | NA | 2 | 3 | 4 | 6 | 8 | 10 | 1.53 | 1.53 | 6.22 | 8.74 | — | 6.35 | 9.37 | | |
| — | 3.6 | SMTSO | 3.6 | NA | 2 | 3 | 4 | 6 | 8 | 10 | 1.53 | 1.53 | 5.28 | 7.14 | — | 5.41 | 7.77 | | |
| — | 4.2 | SMTSO | 4.2 | NA | 2 | 3 | 4 | 6 | 8 | 10 | 1.53 | 1.53 | 6.22 | 8.74 | — | 6.35 | 9.37 | | |

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, M2.5, M3, M3.5, 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

↓ ↓ ↓ ↓

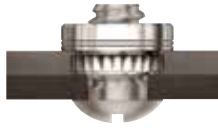
Type Thread or Thru Hole Code Length Code Finish Code

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



FASTENERS FOR USE WITH PC BOARDS

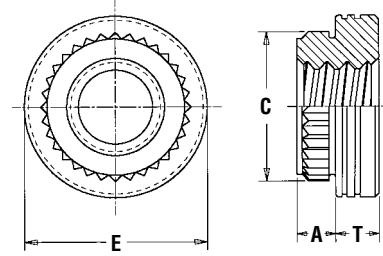
TYPES KF2 AND KFS2 BROACHING NUTS



PART NUMBER DESIGNATION

KFS2 - 832
KF2 - 832 - ET

↓ ↓ ↓
 Type and Thread Finish
 Material Code Code
 KF2 = carbon steel
 KFS2 = stainless steel



All dimensions are in inches.

| UNIFIED | 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 ϕ To Edge |
|---------|------------------|--------------|-----------------|-------------|----------------|----------------------|---------------------------------|---------|---------|---------|--------------------------------|
| | | Carbon Steel | Stainless Steel | | | | | | | | |
| | .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.

| METRIC | 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 ϕ To Edge |
|--------|---------------------|--------------|-----------------|-------------|----------------|----------------------|--------------------------|---------|---------|---------|--------------------------------|
| | | Carbon Steel | Stainless Steel | | | | | | | | |
| | 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 |

FASTENERS FOR USE WITH PC BOARDS

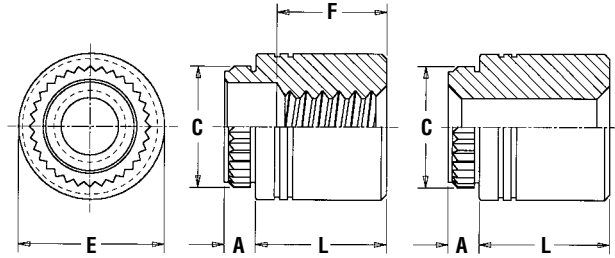
TYPES KFE AND KFSE BROACHING STANDOFFS



PART NUMBER DESIGNATION

KFSE - 632 - 12
KFE - 632 - 12 **ET**

↓ Type and Material ↓ Thread or Thru Hole Code ↓ Length Code ↓ Finish Code
 KFE = carbon steel
 KFSE = stainless steel



All dimensions are in inches.

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

| METRIC | Thread Size x Pitch | Thru Hole +0.10 -0.08 | Type | | Thread or Thru Hole Code | Length "L" ±0.13 (Length Code is in millimeters) | | | | | | | | A (Shank) Max. | Min. Sheet Thickness | Hole Size In Sheet +0.08 | C ±0.08 | E ±0.13 | Min. Dist. Hole ϕ To Edge |
|--|---------------------|-----------------------------|--------------|-----------------|--------------------------|---|-----|-----|-----------|-----|-----|-----|-----|----------------|----------------------|-----------------------------|---------|---------|--------------------------------|
| | | | Carbon Steel | Stainless Steel | | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | | | | | | |
| | | | (2) | (2) | | (2) | (2) | (2) | (2) | (2) | (2) | (2) | (2) | | | | | | |
| M3 x 0.5 | (2) | | KFE | KFSE | M3 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 1.53 | 1.53 | 4.22 | 4.68 | 5.56 | 4.4 |
| | (2) | 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 |
| | (2) | 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 | | | | | | | | | | |

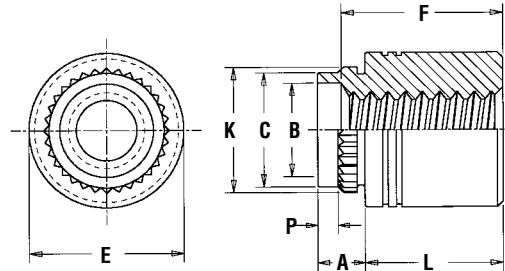
TYPE KFB3 BROACH/FLARE-MOUNT STANDOFFS



PART NUMBER DESIGNATION

KFB3 - 632 - 12 **ET**

↓ Type and Material ↓ Thread Code ↓ Length Code ↓ Finish Code



All dimensions are in inches.

| UNIFIED | Thread Size | Type | Thread Code | Length "L" ±.005 (Length Code is in 32nds of an inch) | | | | | | | | A (Shank) Max. | Sheet Thickness | Hole Size in Sheet +.005 -.001 | B ±.003 | C Max. | E ±.005 | K ±.003 | P ±.010 | Min. Dist. Hole ϕ To Edge | | |
|---|-------------|------|-------------|--|------|------|------------|------|------|------|------|----------------|-----------------|--------------------------------------|---------|--------|---------|---------|---------|--------------------------------|-------------|-------------|
| | | | | .062 | .125 | .187 | .250 | .312 | .375 | .500 | .625 | | | | | | | | | | (1) .750 | (1) 1.00 |
| | | | | (2) | (2) | (2) | (2) | (2) | (2) | (2) | (2) | | | | | | | | | | (2) | (2) |
| .112-40 (#4-40) | KFB3 | 440 | 2 | 4 | 6 | 8 | 10 | 12 | 16 | 20 | NA | NA | .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.

| METRIC | Thread Size x Pitch | Type | Thread Code | Length "L" ±0.13 (Length Code is in millimeters) | | | | | | | | 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 ϕ To Edge | |
|---|---------------------|------|-------------|---|-----|-----|-----------|-----|-----|-----|-----|----------------|-----------------|--------------------------------------|---------|--------|---------|---------|---------|--------------------------------|-----|
| | | | | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | | | | | | | | | | 16 |
| | | | | (2) | (2) | (2) | (2) | (2) | (2) | (2) | (2) | | | | | | | | | | (2) |
| 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.

(2) Not applicable. NA - Not Available.



FASTENERS FOR USE WITH PC BOARDS

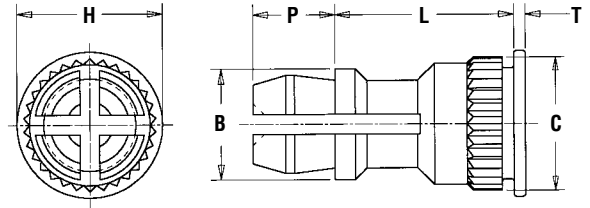
TYPE KSSB BROACHING SNAP-TOP® STANDOFFS



PART NUMBER DESIGNATION

KSSB - 156 - 12

↓ ↓ ↓
 Type and Material Top Board Mounting Hole Diameter Code Length Code



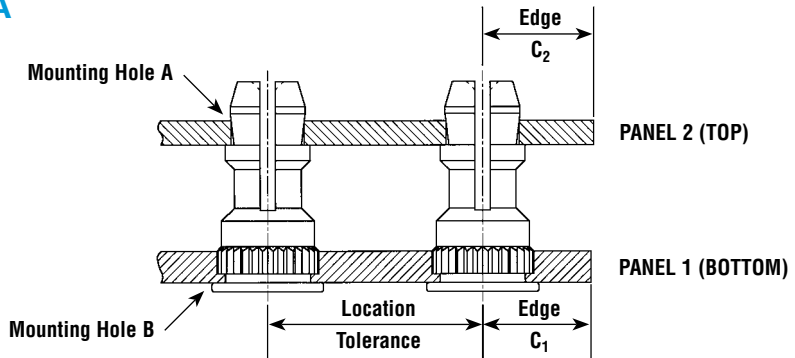
All dimensions are in inches.

| UNIFIED | 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 | | | | | |
| KSSB | 156 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 | 28 | 32 | .188 | .226 | .250 | .141 | .020 | |

All dimensions are in millimeters.

| METRIC | 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 | | | | | | |
| KSSB | 4MM | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 25 | 4.8 | 5.74 | 6.35 | 3.58 | 0.51 | | |

TYPE KSSB APPLICATION DATA



All dimensions are in inches.

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

All dimensions are in millimeters.

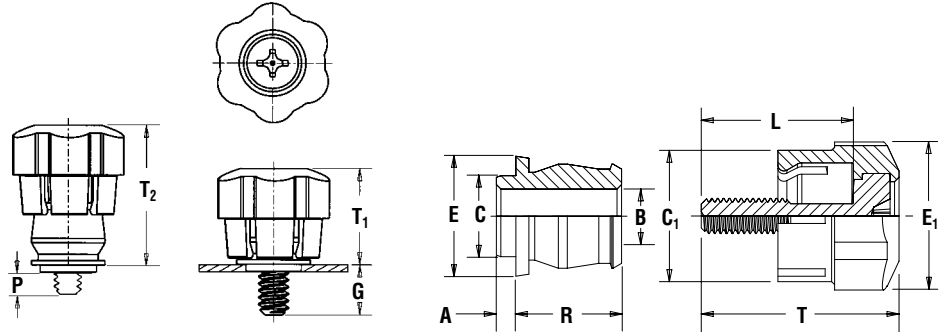
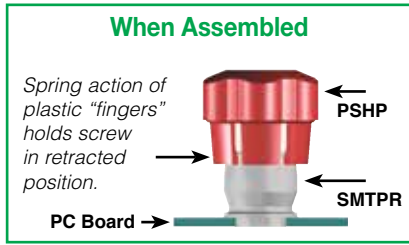
| METRIC | Type | PANEL 1 (Bottom) | | | | | PANEL 2 (Top) | | | | | |
|--------|------|------------------------------|----------|---------------|----------------|-----------------------------------|-------------------------|---------------------------|-------------------|---------------|-----------------|-----------------------------------|
| | | 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. |
| 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 |



FASTENERS FOR USE WITH PC BOARDS

ReelFast® SURFACE MOUNT CAPTIVE PANEL SCREWS

Patented.



All dimensions are in inches.

| UNIFIED | Screw Part Number | | | | Assembly Dimensions | | | | | Screw Dimensions | | | | Retainer Dimensions | | | | | | |
|--------------------|--------------------|------|-------------|-------------------|----------------------|--------------|--------------|------------------------|------------------------|--------------------|-------------------------|-------------------------|--------------|---------------------|----------------------|-------------------|------------|-----------|-----------|------------|
| | Thread Size | Type | Thread Code | Screw Length Code | Retainer Part Number | G ±.025 | P ±.025 | T ₁ Nom. | T ₂ Nom. | Total Radial Float | C ₁ ±.010 | E ₁ ±.010 | L ±.015 | T Nom. | A (Shank) Max. | Min. Sheet Thick. | B ±.003 | C Max. | E Nom. | R ±.005 |
| | .112-40 (#4-40) | PSHP | 440 | 0 1 | SMTPR-6-1 | .188 .248 | .000 .026 | .478 | .646 | .015 | .440 | .542 | .510 .570 | .663 .723 | .060 | .060 | .167 | .249 | .375 | .325 |
| .138-32 (#6-32) | PSHP | 632 | 0 1 | SMTPR-6-1 | .188 .248 | .000 .026 | .478 | .646 | .020 | .440 | .542 | .510 .570 | .663 .723 | .060 | .060 | .167 | .249 | .375 | .325 | |

All dimensions are in millimeters.

| METRIC | Screw Part Number | | | | Assembly Dimensions | | | | | Screw Dimensions | | | | Retainer Dimensions | | | | | | |
|------------|---------------------|------|-------------|-------------------|----------------------|-------------|------------|------------------------|------------------------|--------------------|-------------------------|-------------------------|----------------|---------------------|----------------------|-------------------|------------|-----------|-----------|------------|
| | Thread Size x Pitch | Type | Thread Code | Screw Length Code | Retainer Part Number | G ±0.64 | P ±0.64 | T ₁ Nom. | T ₂ Nom. | Total Radial Float | C ₁ ±0.25 | E ₁ ±0.25 | L ±0.38 | T Nom. | A (Shank) Max. | Min. Sheet Thick. | B ±0.08 | C Max. | E Nom. | R ±0.13 |
| | M3 x 0.5 | PSHP | M3 | 0 1 | SMTPR-6-1 | 4.78 6.3 | 0 .66 | 12.14 | 16.41 | .38 | 11.18 | 13.77 | 12.95 14.48 | 16.84 18.36 | 1.53 | 1.53 | 4.24 | 6.33 | 9.53 | 8.26 |
| M3.5 x 0.6 | PSHP | M3.5 | 0 1 | SMTPR-6-1 | 4.78 6.3 | 0 .66 | 12.14 | 16.41 | .51 | 11.18 | 13.77 | 12.95 14.48 | 16.84 18.36 | 1.53 | 1.53 | 4.24 | 6.33 | 9.53 | 8.26 | |

RETAINER - Packaged on 13" recyclable reels of 465 pieces. Tape width is 24mm. 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

Type Thread Code Length Code Cap Style Color Code
(Lobed) (Standard Black)

PART NUMBER DESIGNATION FOR RETAINER

SMTPR - 6 - 1 ET

Type Retainer Size Shank Code Finish Code

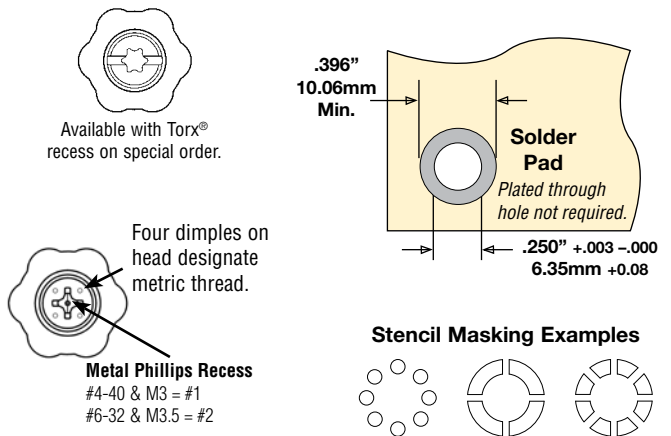
COLOR CAPABILITIES FOR TYPE PSHP SCREW

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



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



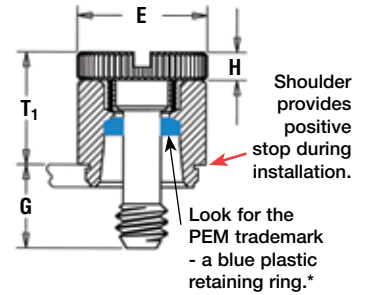
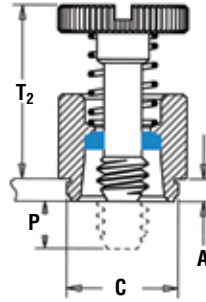
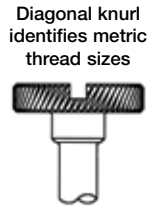
FASTENERS FOR USE WITH PC BOARDS

TYPE PFK BROACHING CAPTIVE PANEL SCREWS



PART NUMBER DESIGNATION

PFK - **632** - **62**
 ↓ ↓ ↓
 Type Thread Size Code Screw Length Code



All dimensions are in inches.

| UNIFIED | 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 (1) | T ₁ Max. | T ₂ Nom. | Min. Dist. Hole \varnothing To Edge |
|-----------------|-----------------|------|-------------|-------------------|----------------|----------------------|---------------------------------|---------|---------|---------|---------|-------------|---------------------|---------------------|---------------------------------------|
| | .112-40 (#4-40) | PFK | 440 | 40 | .060 | .060 | .265 | .283 | .312 | .072 | .250 | .000 | .36 | .54 | .20 |
| 62 | | | | .375 | | | | | | | | | | | |
| 84 | | | | .500 | | | | | | | | | | | |
| .138-32 (#6-32) | PFK | 632 | 40 | .060 | .060 | .281 | .299 | .344 | .072 | .250 | .000 | .36 | .54 | .26 | |
| | | | 62 | | | | | | | .375 | | | | | |
| | | | 84 | | | | | | | .500 | | | | | |

All dimensions are in millimeters.

| METRIC | 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 (1) | T ₁ Max. | T ₂ Nom. | Min. Dist. Hole \varnothing To Edge |
|--------|---------------------|------|-------------|-------------------|----------------|----------------------|--------------------------|---------|---------|--------|---------|-------------|---------------------|---------------------|---------------------------------------|
| | M3 x 0.5 | PFK | M3 | 40 | 1.53 | 1.53 | 6.73 | 7.19 | 7.92 | 1.83 | 6.4 | 0 | 9.14 | 13.72 | 5.08 |
| 62 | | | | 9.5 | | | | | | | | | | | |
| 84 | | | | 12.7 | | | | | | | | | | | |

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

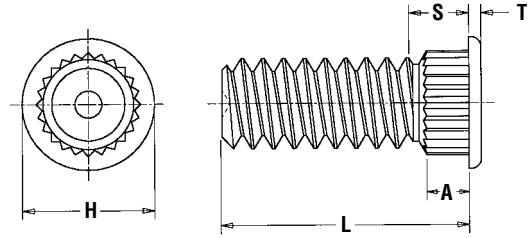
FASTENERS FOR USE WITH PC BOARDS

TYPE KFH BROACHING STUDS



PART NUMBER DESIGNATION

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



All dimensions are in inches.

| UNIFIED | 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 \varnothing To Edge | |
|---------|---------------------|------|-------------|--|------|------|------|------|----------------------|----------------------------|--|--|------------|------------------|------------|---|------|
| | | | | .250 | .312 | .375 | .500 | .625 | | | | | | | | | .750 |
| | .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.

| METRIC | 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 \varnothing To Edge | |
|--------|---------------------|------|-------------|---|---|----|----|----|----------------------|----------------------------|-----------------------------------|--|------------|------------------|------------|---|-----|
| | | | | 6 | 8 | 10 | 12 | 15 | | | | | | | | | 18 |
| | 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 gageable 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.

FASTENERS FOR USE WITH PC BOARDS

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



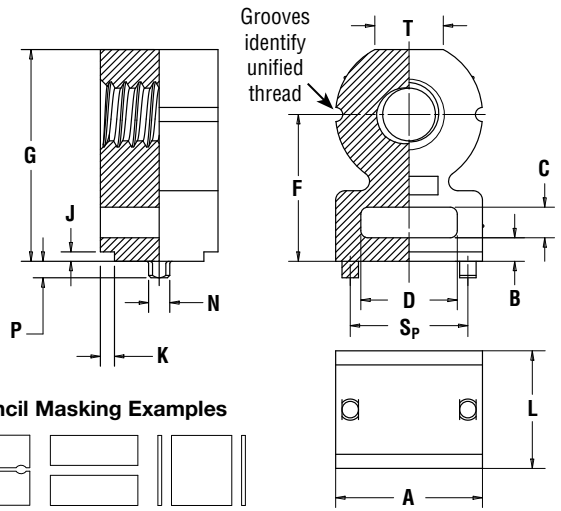
PART NUMBER DESIGNATION

SMTRA - 256 - 8 - 6 - ET

Type Thread Code Height Code Length Code Finish Code



Patented.



Stencil Masking Examples



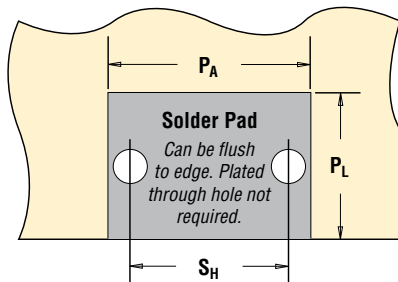
All dimensions are in inches.

| UNIFIED | 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. | Sp ±.003 | T Nom. |
|---------|-----------------|-------|-------------|-------------|-------------|-------------------|----------------------|-----------------------------------|------------|------------|------------|------------|-------------------|------------|-----------|-----------|-----------|-----------|-------------|-----------|
| | .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.

| METRIC | 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. | Sp ±0.08 | T Nom. |
|--------|---------------------|-------|-------------|-------------|-------------|-------------------|----------------------|-----------------------------|------------|------------|------------|------------|-------------------|------------|-----------|-----------|-----------|-----------|-------------|-----------|
| | 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 |

| UNIFIED | Thread Code | Pad Width PA Min. | Pad Length PL Min. | Hole Spacing SH ±.002 | Hole Size In Sheet +.003 -.000 |
|---------|-------------|----------------------|-----------------------|--------------------------|-----------------------------------|
| | 256 | .262 | .171 | .157 | .053 |
| | 440 | .294 | .171 | .188 | .053 |
| | 632 | .356 | .233 | .250 | .053 |
| | 832 | .419 | .264 | .312 | .053 |



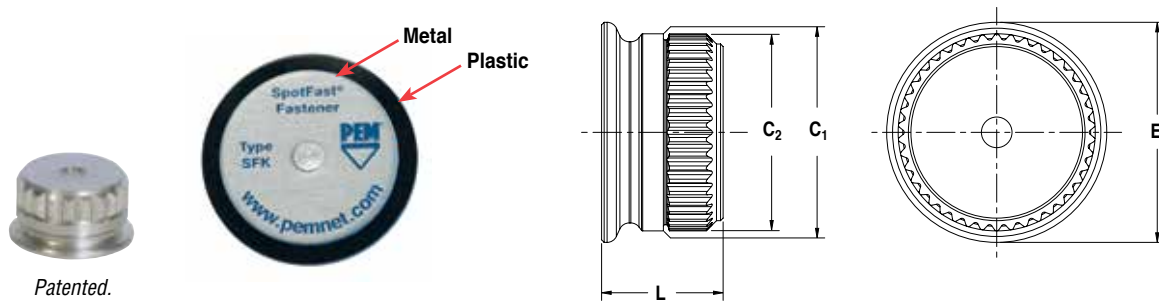
| METRIC | Thread Code | Pad Width PA Min. | Pad Length PL Min. | Hole Spacing SH ±0.05 | Hole Size In Sheet +0.08 |
|--------|-------------|----------------------|-----------------------|--------------------------|-----------------------------|
| | M2 | 6.62 | 4.57 | 4 | 1.35 |
| | M25 | 6.62 | 4.57 | 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 |



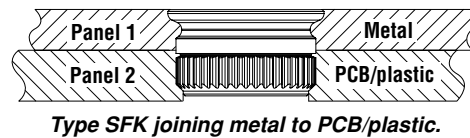
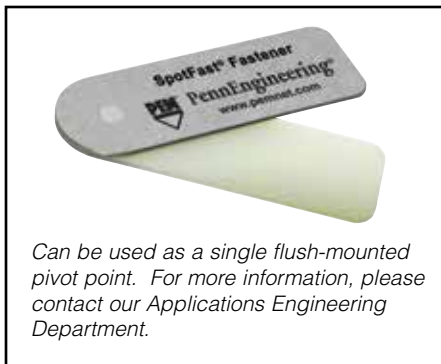
FASTENERS FOR USE WITH PC BOARDS

TYPE SFK SpotFast® CLINCH/BROACH MOUNT FASTENERS



| Type and Size | Thickness Code | Panel 1 | | | | Panel 2 | | | | C ₁ Max. | | C ₂ ±0.08mm / ±.003" | | E Max. | | L Max. | | Min. Dist Hole To Edge | |
|---------------|----------------|----------------------------|------|--|------|--------------------|------|--|------|---------------------|------|---------------------------------|------|--------|------|--------|------|------------------------|------|
| | | Thickness ±0.08mm / ±.003" | | Mounting Hole +0.08mm / +.003" - .000" | | Thickness Min. (1) | | Mounting Hole +0.08mm / +.003" - .000" | | | | | | | | | | | |
| | | 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.



PART NUMBER DESIGNATION

SFK - 3 - 0.8 - ZI

↓ ↓ ↓ ↓

Type Panel 1 Thickness Finish

 Mounting Code Code

 Hole Code

FASTENERS FOR USE WITH PC BOARDS

MATERIAL AND FINISH SPECIFICATIONS

| Type | Threads (1) | | Fastener Materials | | | | | Standard Finishes | | | Optional Finishes | | For Use in Sheet Hardness: (3) | | | | |
|--------------------------------|--|--|--------------------|----------------------------|-------------------------|---------------|----------------------------------|--|---|-----------|--|---------------|--------------------------------|-------------------------|-------------------------|------------------------|----------|
| | 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 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 | 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 | DT | BN | | | | | | |

| Type | Threads (1) | | Fastener Materials | | | | Standard Finishes (2) | | | Optional Finish (2) | For Use In Sheet Hardness: (3) | |
|--------------------------------|-------------------------|--|--|--------------|-------------------------------|--------------|----------------------------|---|---------------------------------|--|--------------------------------|----------|
| | Miniature ISO 1501, 4H6 | Internal, ASME B1.1 2B/ ASME B1.13M 6H | External, ASME B1.1 2A/ ASME B1.13M 6g | Carbon Steel | ABS Temp. Limit 200° F/ 93° C | Zinc Diecast | Zinc Plated 5µm, Colorless | Electro-Plated Bright Tin ASTM B 545, Class A With Clear Preservative Coating | Bright Nickel Over Copper Flash | Electro-Plated Matte Tin ASTM B 545, Class A With Clear Preservative Coating, Annealed | HRB 80 / HB 150 or less | PC Board |
| SMTSO | • S1 to S1.4 | • 0-80 to 8-32 M1.6 to M4 | | • | | | | • | | • | | • |
| SMTRA | | • | | | | • | | • (4) | | • (4) | | • |
| SMTPR | | | | • | | | | • | | • | | • |
| PSHP Cap | | | | | • | | | | | | | |
| Screw | | | • | • | | | | • | | | | |
| SFK | | | | • | | | • | | | | • | • |
| Part Number Codes For Finishes | | | | | | | ZI | ET | CN | 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/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.

FASTENERS FOR USE WITH PC BOARDS

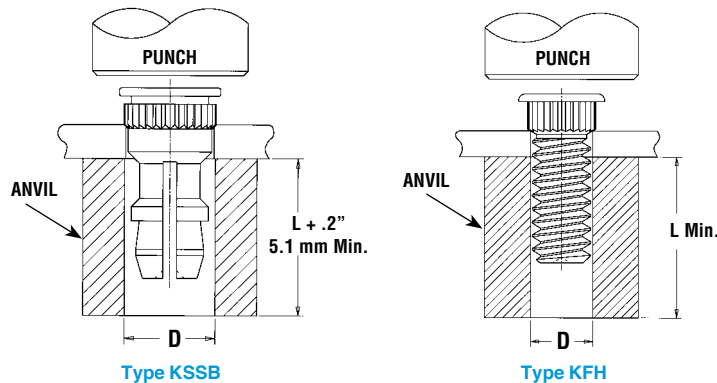
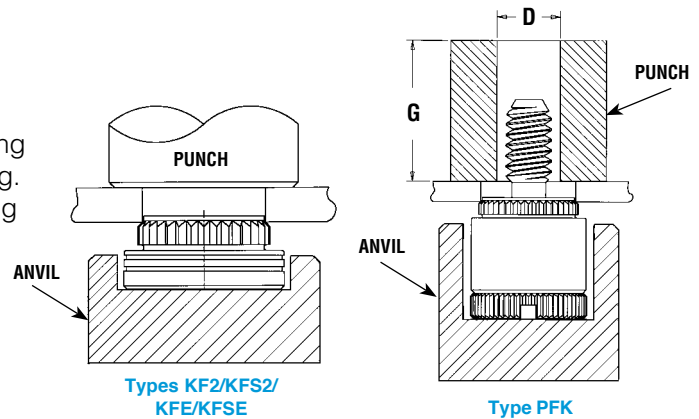
INSTALLATION

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 punch and anvil surfaces parallel, apply squeezing force until shoulder contacts the board.

| Part Number | D +.003" -.000" | G Min. |
|-------------|--------------------|-----------|
| PFK-440-40 | .173" | .250" |
| PFK-440-62 | .173" | .375" |
| PFK-440-84 | .173" | .500" |
| PFK-632-40 | .190" | .250" |
| PFK-632-62 | .190" | .375" |
| PFK-632-84 | .190" | .500" |

| Part Number | D +0.08mm | G Min. |
|-------------|--------------|-----------|
| PFK-M3-40 | 4.5mm | 6.4mm |
| PFK-M3-62 | 4.5mm | 9.5mm |
| PFK-M3-84 | 4.5mm | 12.7mm |



For Types KSSB/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.

| 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 |

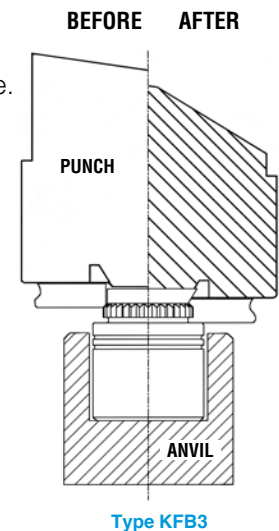
For Type KFB3⁽¹⁾

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.

(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 | |



FASTENERS FOR USE WITH PC BOARDS

INSTALLATION

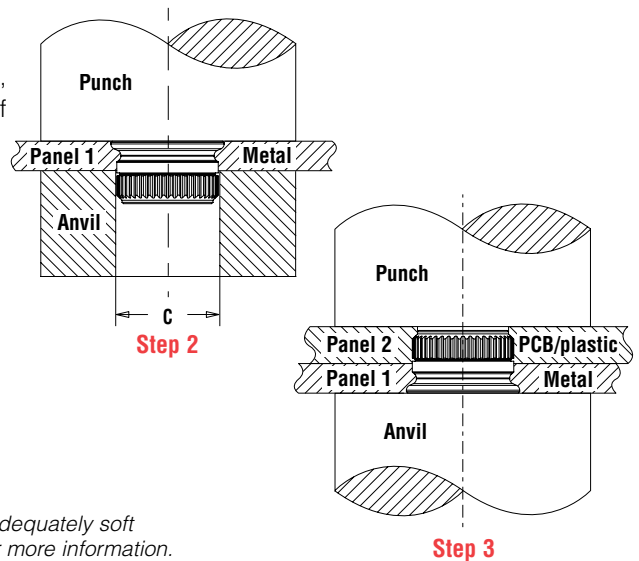
For Type SFK

- 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

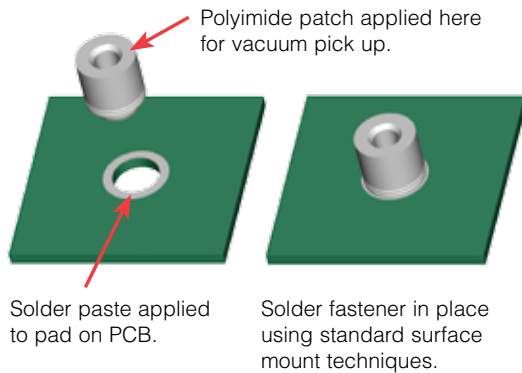
| Size | C ±0.13/±.003 (mm) / (in.) | Punch Part No. | Anvil Part No.* |
|-------|----------------------------------|-------------------|--------------------|
| SFK-3 | 3.05 / .120 | 975200048 | 970200229300 |
| SFK-5 | 5.05 / .199 | 975200048 | 970200020300 |

* Part number for anvil used in Step 2

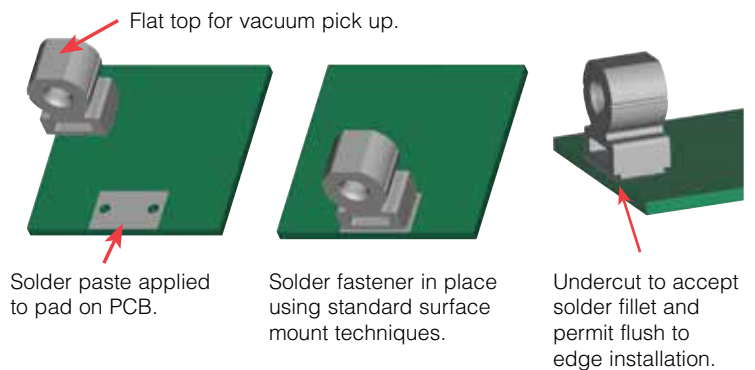


NOTE: Fastener can be installed in both sheets at once when metal panel is adequately soft compared to the non-metal panel. E-mail techsupport@pemnet.com for more information.

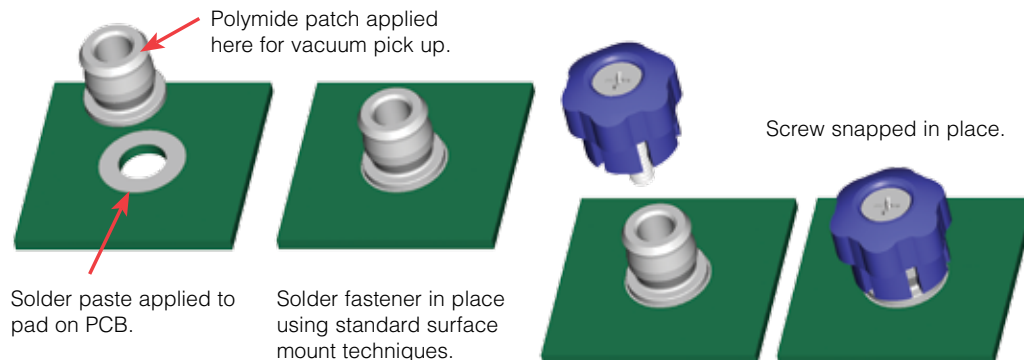
For SMT Nuts and Standoffs



For SMT R'ANGLE® Fasteners



For SMT Captive Panel Screws



FASTENERS FOR USE WITH PC BOARDS

PERFORMANCE DATA⁽¹⁾

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

| UNIFIED | Type | Thread Code | Max. Nut Tightening Torque (in. lbs.) | Test Sheet Thickness & Test Sheet Material | Installation (lbs.) | Pushout (lbs.) (2) | Torque-out (in. lbs.) |
|---------|------|-------------|---------------------------------------|--|---------------------|--------------------|-----------------------|
| | KF2 | 256 | (3) | .060" FR-4 Panel | 400 | 60 | 6 |
| | | 440 | (3) | .060" FR-4 Panel | 400 | 65 | 15 |
| | KFS2 | 632 | (3) | .060" FR-4 Panel | 500 | 80 | 30 |
| | | 832 | (3) | .060" FR-4 Panel | 700 | 95 | 35 |
| | KFE | 032 | (3) | .060" FR-4 Panel | 700 | 100 | 40 |
| | | 440 | (3) | .060" FR-4 Panel | 1,000 | 140 | 18 |
| | KFB3 | 632 | (3) | .060" FR-4 Panel | 1,500 | 170 | 28 |
| | | KFH | 440 | 4 | .060" FR-4 Panel | 400 | 65 |
| | 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) | |

| METRIC | Type | Thread Code | Max. Nut Tightening Torque (N•m) | Test Sheet Thickness & Test Sheet Material | Installation (kN) | Pushout (N) (2) | Torque-out (N•m) |
|--------|------|-------------|----------------------------------|--|-------------------|-----------------|------------------|
| | KF2 | M3 | (3) | 1.5 mm FR-4 Panel | 2.2 | 290 | 1.7 |
| | | KFS2 | M4 | (3) | 1.5 mm FR-4 Panel | 2.2 | 420 |
| | KFE | M5 | (3) | 1.5 mm FR-4 Panel | 2.9 | 440 | 4.5 |
| | | KFSE | M3 | (3) | 1.5 mm FR-4 Panel | 4.4 | 560 |
| | KFB3 | | M4 | (3) | 1.5 mm FR-4 Panel | 6 | 680 |
| | | KFH | M3 | 0.45 | 1.5 mm FR-4 Panel | 1.8 | 285 |
| | 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

| UNIFIED | 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.) |
| | KSSB | 500 | 110 | 13 | 3.0 | 1.0 |

| METRIC | 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) |
| | KSSB | 2.2 | 484 | 57.7 | 13.3 | 4.4 |

(1) The values reported are averages when all installation specifications and procedures are followed. Variations in mounting hole size, sheet material, and installation procedure will affect results. Performance testing of this product in your application is recommended. We will be happy to provide samples for this purpose or perform the installation for you.

(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.

FASTENERS FOR USE WITH PC BOARDS

PERFORMANCE DATA⁽¹⁾

TYPE SFK SpotFast® CLINCH/BROACH MOUNT FASTENERS

| Type and Size | Thickness Code | Installation into Panel 1 | | Installation into Panel 2 | | Pushout of Panel 2 ⁽²⁾ | |
|---------------|----------------|---------------------------|------|---------------------------|------|-----------------------------------|------|
| | | Cold-rolled Steel | | FR-4 Fiberglass | | | |
| | | 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 |

(1) The values reported are averages when all installation specifications and procedures are followed. Variations in mounting hole size, sheet material, and installation procedure will affect results. Performance testing of this product in your application is recommended. We will be happy to provide samples for this purpose or perform the installation for you.

(2) In most applications, pullout strength of the SFK fastener in Panel 1 exceeds pushout strength of Panel 2.

TYPE SMTSO NUTS AND SPACERS/STANDOFFS⁽³⁾⁽⁴⁾

| Pushout | | | | | | Torque-out | | | | | |
|-----------------------|-----|-------------------------|-----|-----------------------|-----|-----------------------|-----|-------------------------|-----|-----------------------|-----|
| SMTSO-440 SMTSO-M3 | | SMTSO-632 SMTSO-M3.5 | | SMTSO-832 SMTSO-M4 | | SMTSO-440 SMTSO-M3 | | SMTSO-632 SMTSO-M3.5 | | SMTSO-832 SMTSO-M4 | |
| lbs. | N | lbs. | N | lbs. | N | in-lbs. | N-m | in-lbs. | N-m | in-lbs. | N-m |
| 56.5 | 251 | 93.5 | 416 | 151.1 | 672 | 8.56 | 1.0 | 13.83 | 1.6 | 26.96 | 3.0 |

TYPE SMTSO microPEM™ FASTENERS⁽³⁾⁽⁴⁾

| Pushout | | | Torque-out | | |
|---|-------|--|---|------|--|
| SMTSO-080, SMTSO-M1, SMTSO-M1.2 SMTSO-M1.4, SMTSO-M1.6 | | | SMTSO-080, SMTSO-M1, SMTSO-M1.2 SMTSO-M1.4, SMTSO-M1.6 | | |
| lbs. | N | | in-oz | N-cm | |
| 85.1 | 378.7 | | 79 | 56 | |

TYPE SMTPR RETAINERS⁽³⁾

| Pushout | |
|-------------|-----|
| SMTPR-6-1ET | |
| lbs. | N |
| 161.4 | 718 |

TYPE SMTRA R'ANGLE® FASTENERS WITH ET FINISH⁽³⁾⁽⁴⁾

| SMTRA256-8-6 | | SMTRA440-9-6 | | SMTRA632-10-8 | | SMTRA832-12-9 | | SMTRAM2-6-5 | | SMTRAM25-6-5 | | SMTRAM3-7-5 | | SMTRAM4-9-7 | |
|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|-------------|---------------|--------------|---------------|-------------|---------------|-------------|---------------|
| Pushout (lbs.) | Side Load (lbs.) | Pushout (lbs.) | Side Load (lbs.) | Pushout (lbs.) | Side Load (lbs.) | Pushout (lbs.) | Side Load (lbs.) | Pushout (N) | Side Load (N) | Pushout (N) | Side Load (N) | Pushout (N) | Side Load (N) | Pushout (N) | Side Load (N) |
| 51.7 | 7.1 | 89.5 | 10.8 | 110.3 | 8.4 | 137.2 | 21.2 | 418.2 | 56.8 | 216.5 | 36.9 | 257.6 | 41.3 | 369.3 | 73.3 |

TESTING CONDITIONS

| | | | |
|-----------------------|---------------------------------------|----------------|--|
| Oven | Quad ZCR convection oven with 4 zones | Vias | None |
| High Temp | 518°F / 270°C | Spokes | 2 Spoke Pattern |
| Board Finish | 62% Sn, 38% Pb | Paste | Amtech NC559LF Sn96.5/3.0Ag/0.5Cu (SAC305) - Lead-free |
| Board | .062" thick, Single Layer FR-4 | Stencil | .0067" / 0.17 mm thick |
| Screen Printer | Ragin Manual Printer | | |

(3) 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.

(4) Further testing details can be found in our website's literature section.



FASTENERS FOR USE WITH PC BOARDS

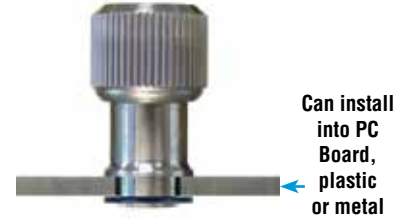
OTHER FASTENERS FOR CONSIDERATION TO USE WITH PC BOARDS

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)

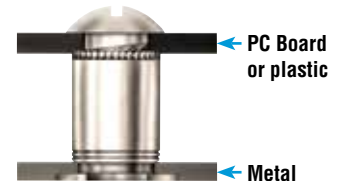
- Appropriate for close centerline-to-edge applications.
- Doesn't require high installation force.
- Installs into any panel material.
- Installs flush on back side of panel.
- Color coded knobs available.



TYPE SOAG/SOSG GROUNDING STANDOFFS

(See PEM® Bulletin SO)

- Designed for clinching into steel or aluminum chassis.
- “Gripping teeth” on opposite side of standoff firmly contact mating PC Board.



TYPE SKC KEYHOLE® STANDOFFS

(See PEM® Bulletin SK)

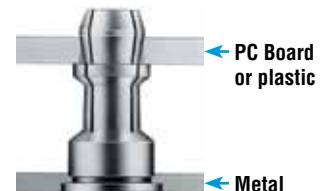
- Clinch feature mounts fastener permanently into metal sheet.
- Allows for quick attachment and detachment of PC Board.
- Head is flush or sub-flush in metal sheet.
- Makes horizontal or vertical component mounting possible.



TYPE SSA/SSC/SSS SNAP-TOP® STANDOFFS

(See PEM® Bulletin SSA)

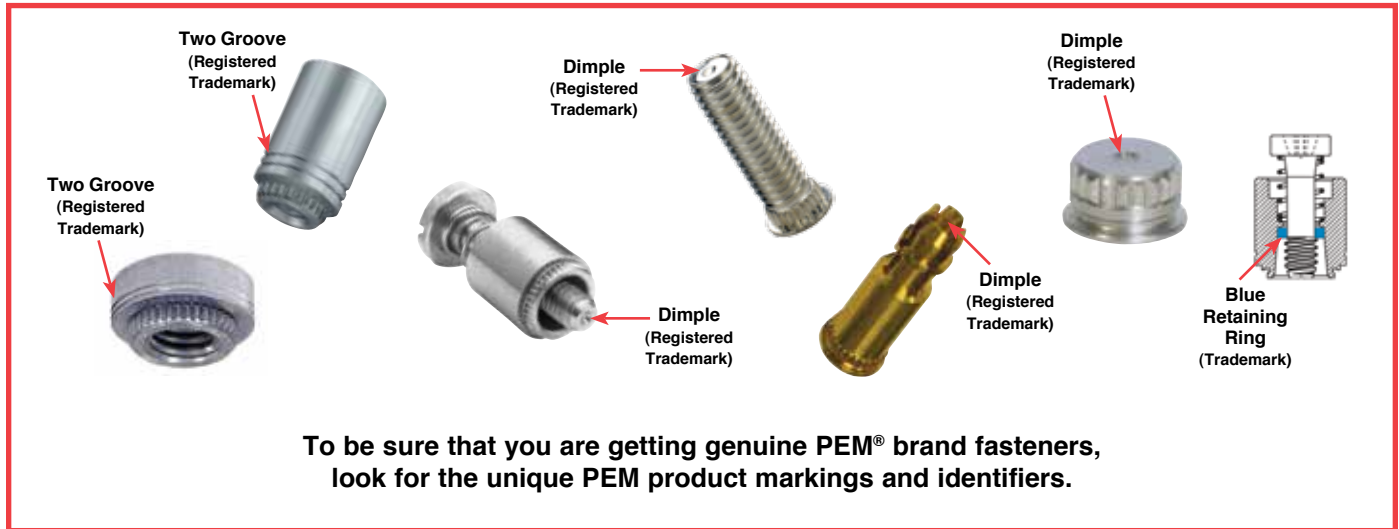
- Spring action holds PC Boards and subassemblies securely, while allowing for quick removal.
- Screws and other threaded hardware are eliminated.



FASTENERS FOR USE WITH PC BOARDS

PEM® TRADEMARKS

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



FASTENERS FOR USE WITH PC BOARDS

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North America: Danboro, PA USA • E-mail: info@pemnet.com • Tel: +1-215-766-8853 • Fax: +1-215-766-0143 • 800-237-4736 (USA Only)
Europe: Galway, Ireland • E-mail: europe@pemnet.com • Tel: +353-91-751714 • Fax: +353-91-753541
Asia/Pacific: Singapore • E-mail: singapore@pemnet.com • Tel: +65-6-745-0660 • Fax: +65-6-745-2400
Shanghai, China • E-mail: china@pemnet.com • Tel: +86-21-5868-3688 • Fax: +86-21-5868-3988

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