



FASTENERS FOR

USE WITH

PC BOARDS

BULLETIN



PERFORMANCE DATA FOR BROACHING FASTENERS ⁽¹⁾ (Continued)

| 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 KFS2 KFE KFSE | M3 | (3) | 1.5 mm FR-4 Fiberglass | 2.2 | 290 | 1.7 |
| | | M4 | (3) | 1.5 mm FR-4 Fiberglass | 2.2 | 420 | 3.4 |
| | | M5 | (3) | 1.5 mm FR-4 Fiberglass | 2.9 | 440 | 4.5 |
| | KFB3 | M3 | (3) | 1.5 mm FR-4 Fiberglass | 4.4 | 560 | 2.03 |
| | | M4 | (3) | 1.5 mm FR-4 Fiberglass | 6 | 680 | 3.2 |
| | KFH | M3 | 0.45 | 1.5 mm FR-4 Fiberglass | 1.8 | 285 | 0.79 |
| | | M4 | 1.6 | 1.5 mm FR-4 Fiberglass | 1.8 | 355 | 1.8 |
| | | M5 | 2.1 | 1.5 mm FR-4 Fiberglass | 1.8 | 400 | 1.92 |
| | PKF | M3 | (3) | 1.5 mm FR-4 Fiberglass | 1.1 | 245 | (3) |
| KPS6 | M3 | (3) | 1.5 mm FR-4 Fiberglass (5) | 9.8 | 178 | .56 | |
| | M4 | (3) | 1.5 mm FR-4 Fiberglass (5) | 22.2 | 312 | 1.36 | |
| | M5 | (3) | 1.5 mm FR-4 Fiberglass (5) | 26.7 | 356 | 1.7 | |

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

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

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

(3) Not applicable.

(4) See Application Data drawing on page K-6.

(5) 1 Mil Cu, .5 Mil Sn/Pb plated thru-hole.

PEMSERTER® PRESSES

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

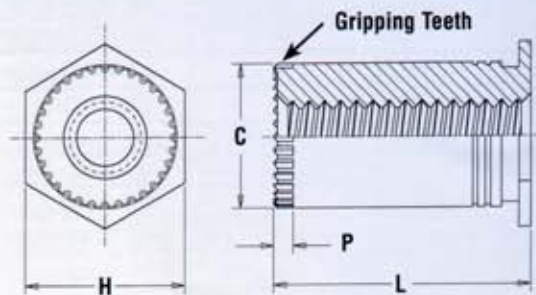
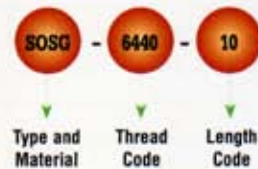
GROUNDING STANDOFFS

TYPES SOSG AND SOAG

(For installation in metal sheets)



Part Number Designation



All dimensions are in inches.

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

All dimensions are in millimeters.

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

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

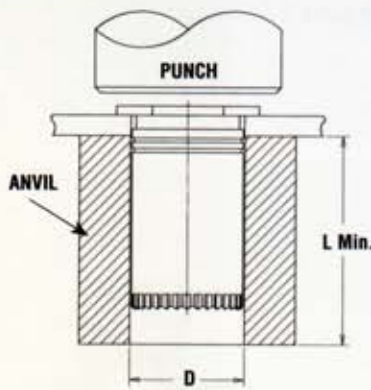
MATERIAL & FINISH SPECIFICATIONS FOR GROUNDING FASTENERS

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

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

(2) Aluminum parts have no finish suffix.

INSTALLATION FOR GROUNDING STANDOFFS



Types SOAG and SOSG

For Types SOAG and SOSG

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

PERFORMANCE DATA FOR GROUNDING STANDOFFS (1)

| 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.) |
|---------|-----------|-------------|---------------------------------------|--|-------------------------|--------------------|-----------------------|
| | SOAG/SOSG | | 6440 | (3) | .064" 5052-H34 Aluminum | 1700 | 300 |
| | | 8632 | (3) | .064" 5052-H34 Aluminum | 1700 | 400 | 45 |

| 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) |
|--------|-----------|-------------|----------------------------------|--|--------------------------|-----------------|------------------|
| | SOAG/SOSG | | 3.5M3 | (3) | 1.6 mm 5052-H34 Aluminum | 7.6 | 1330 |

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

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

(3) Not applicable.

OTHER FASTENERS FOR USE WITH PC BOARDS

SURFACE MOUNT FASTENERS

(See PEM® Bulletin SMT)

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

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



TYPE PFF™ HYBRID™ FLOATING PANEL FASTENER

(See PEM® Bulletin PF)

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

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



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

RoHS compliance information can be found on our website.

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

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CAGE-46384

FASTENERS FOR USE WITH PC BOARDS

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

BROACHING FASTENERS

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

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

GROUNDING STANDOFFS

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

TYPE KF2 AND KFS2
Broaching Nuts Page 3

TYPE KFE AND KFSE
Broaching Standoffs Page 4

TYPE KFB3
Flare-mounted Standoffs Page 4

TYPE KFH
Broaching Studs Page 5

TYPE PFK
Board-mount Panel Fastener Assemblies Page 5

TYPE KSSB
Broaching, SNAP-TOP® Standoffs Page 6

TYPE KPS6
Self-expanding FOILGARD® Fasteners Page 7

TYPE SOSG AND SOAG
Self-clinching Grounding Standoffs Page 10

Other Fasteners For Use With PC Boards Page 12



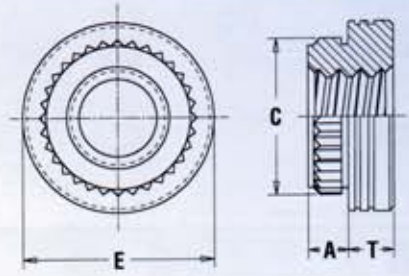
To be sure that you are getting genuine PEM® brand fasteners, look for our "dimple", or "two groove" registered trademarks.

BROACHING FASTENERS

TYPES KF2 AND KFS2 BROACHING NUTS



Part Number Designation



All dimensions are in inches.

| UNIFIED | Thread Size | Type | | Thread Code | A (Shank) Max. | Min. Sheet Thickness | Hole Size In Sheet +.003 - .000 (1) | C ±.003 | E ±.005 | T ±.005 | Min. Dist. Hole C/L To Edge |
|---------|------------------|--------------|-----------------|-------------|----------------|----------------------|-------------------------------------|---------|---------|---------|-----------------------------|
| | | Carbon Steel | Stainless Steel | | | | | | | | |
| | .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.

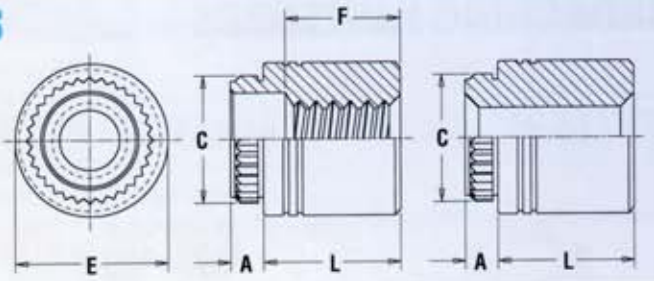
| METRIC | Thread Size x Pitch | Type | | Thread Code | A (Shank) Max. | Min. Sheet Thickness | Hole Size In Sheet +0.08 (1) | C ±0.08 | E ±0.13 | T ±0.13 | Min. Dist. Hole C/L To Edge |
|--------|---------------------|--------------|-----------------|-------------|----------------|----------------------|------------------------------|---------|---------|---------|-----------------------------|
| | | 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 | 6.86 | 8.74 | 2 | 6.4 |
| | M5 x 0.8 | KF2 | KFS2 | M5 | 1.53 | 1.53 | 6.9 | 7.37 | 9.53 | 3 | 7.1 |

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

TYPES KFE AND KFSE BROACHING STANDOFFS



Part Number Designation



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 (1) | C ±.003 | E ±.005 | Min. Dist. Hole C/L To Edge |
|--|-----------------|-----------------------------|--------------|-----------------|--------------------------|--|------|------|-------------|------|------------------|------------------|------------------|----------------|----------------------|---|---------|---------|-----------------------------|
| | | | Carbon Steel | Stainless Steel | | .125 | .250 | .375 | .500 | .625 | .750 | .875 | 1.00 | | | | | | |
| | | | (2) | (2) | | (2) | (2) | (2) | (2) | (2) | (2) | | | | | | | | |
| | .112-40 (#4-40) | (3) | KFE | KFSE | 440 | 4 | 8 | 12 | 16 | 20 | 24 ^{NS} | NA | NA | .060 | .060 | .166 | .184 | .219 | .17 |
| | .138-32 (#6-32) | (3) | KFE | KFSE | 632 | 4 | 8 | 12 | 16 | 20 | 24 ^{NS} | 28 ^{NS} | 32 ^{NS} | .060 | .060 | .213 | .231 | .281 | .22 |
| | (3) | .116 | KFE | KFSE | 116 | 4 | 8 | 12 | 16 | 20 | 24 ^{NS} | NA | NA | .060 | .060 | .166 | .184 | .219 | .17 |
| | (3) | .143 | KFE | KFSE | 143 | 4 | 8 | 12 | 16 | 20 | 24 ^{NS} | 28 ^{NS} | 32 ^{NS} | .060 | .060 | .213 | .231 | .281 | .22 |
| "F" Minimum Thread Length (Where Applicable) | | | | | | Full | | | .375 ± .016 | | | .375 Blind | | | | | | | |

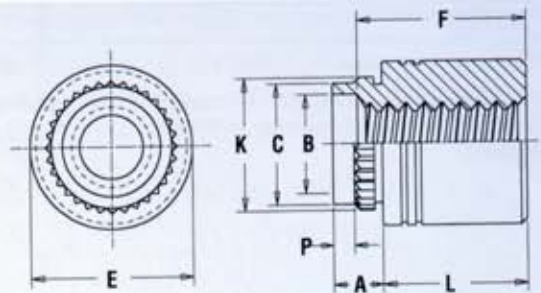
All dimensions are in millimeters.

| 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 (1) | C ±0.08 | E ±0.13 | Min. Dist. Hole C/L To Edge |
|--|---------------------|-----------------------------|--------------|-----------------|--------------------------|---|---|-----------------|-----------------|------------------|------------------|------------------|------------------|----------------|----------------------|------------------------------------|---------|---------|-----------------------------|
| | | | Carbon Steel | Stainless Steel | | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 ^{NS} | | | | | | |
| | | | M3 | M3 | | 3 | 4 | 6 ^{NS} | 8 ^{NS} | 10 ^{NS} | 12 ^{NS} | 14 ^{NS} | 16 ^{NS} | | | | | | |
| | M3 x 0.5 | (3) | KFE | KFSE | M3 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 ^{NS} | 1.53 | 1.53 | 4.22 | 4.68 | 5.56 | 4.4 |
| | (3) | 3.6 | KFE | KFSE | 3.6 | 3 | 4 | 6 ^{NS} | 8 ^{NS} | 10 ^{NS} | 12 ^{NS} | 14 ^{NS} | 16 ^{NS} | 1.53 | 1.53 | 5.41 | 5.87 | 7.14 | 5.5 |
| | (3) | 4.2 | KFE | KFSE | 4.2 ^{NS} | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 1.53 | 1.53 | 6.4 | 6.86 | 8.74 | 7.1 |
| "F" Minimum Thread Length (Where Applicable) | | | | | | Full | | | 9.5 ± 0.4 | | | | | | | | | | |

TYPE KFB3 FLARE-MOUNTED STANDOFFS



Part Number Designation



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 (1) | B ±.003 | C Max. | E ±.005 | K ±.003 | P ±.010 | Min. Dist. Hole C/L To Edge | | |
|------------------------|-----------------|------|-------------|--|------|------|------------|------|------|------|------------------|----------------|-----------------|---|-----------|--------|---------|---------|---------|-----------------------------|------|------|
| | | | | .062 | .125 | .187 | .250 | .312 | .375 | .500 | .625 | | | | | | | | | | .750 | 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 ^{NS} | NA | NA | .09 | .050-.065 | .166 | .122 | .165 | .220 | .179 | .040 | .17 |
| | .138-32 (#6-32) | KFB3 | 632 | 2 | 4 | 6 | 8 | 10 | 12 | 16 | 20 ^{NS} | 24 | 32 | .09 | .050-.065 | .213 | .171 | .212 | .280 | .226 | .040 | .22 |
| "F" Min. Thread Length | | | | Full | | | .375 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 (1) | B ±0.08 | C Max. | E ±0.13 | K ±0.08 | P ±0.25 | Min. Dist. Hole C/L To Edge | |
|------------------------|---------------------|------|-------------|---|----|---|-----------|---|----|----|----|----------------|-----------------|---|---------|--------|---------|---------|---------|-----------------------------|------|
| | | | | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | | | | | | | | | | 16 |
| | | | | M3 | M3 | 2 | 3 | 4 | 6 | 8 | 10 | | | | | | | | | | 12 |
| | M3 x 0.5 | KFB3 | M3 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 2.29 | 1.27-1.65 | 4.22 | 3.23 | 4.2 | 5.56 | 4.55 | 1 | 4.33 |
| | M4 x 0.7 | KFB3 | M4 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 2.29 | 1.27-1.65 | 6.4 | 5.23 | 6.33 | 8.74 | 6.68 | 1 | 6.36 |
| "F" Min. Thread Length | | | | Full | | | 9.5 ± 0.4 | | | | | | | | | | | | | | |

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

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

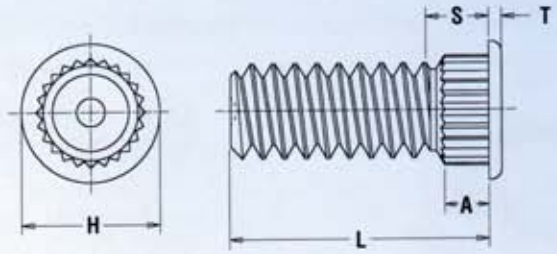
(3) Not applicable. NA - Not Available.

NS - Not Stocked. Available on special order.

TYPE KFH BROACHING STUDS



Part Number Designation



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 (1) | Max. Hole Size in Attached Parts | H ±.010 | S Max. | T ±.005 | Min. Dist. Hole C/L To Edge | D Anvil Hole +.003 - .000 | |
|---------|------------------|------|-------------|--|-----------------|------|------|------|----------------|----------------------|-------------------------------------|----------------------------------|---------|--------|---------|-----------------------------|---------------------------|------|
| | | | | .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 | .113 |
| | .138-32 (#6-32) | KFH | 632 | 4 | 5 | 6 | 8 | 10 | 12 | .065 | .060 | .140 | 170 | .200 | .09 | .020 | .19 | .140 |
| | .164-32 (#8-32) | KFH | 832 | 4 ^{NS} | 5 ^{NS} | 6 | 8 | 10 | 12 | .065 | .060 | .166 | 195 | .225 | .09 | .020 | .20 | .166 |
| | .190-32 (#10-32) | KFH | 032 | 4 ^{NS} | 5 ^{NS} | 6 | 8 | 10 | 12 | .065 | .060 | .189 | 220 | .250 | .09 | .020 | .20 | .191 |

All dimensions are in millimeters.

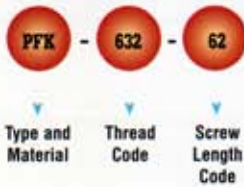
| METRIC | Thread Size x Pitch | Type | Thread Code | Length "L" ±0.25 (Length Code is in millimeters) | | | | | A (Shank) Max. | Min. Sheet Thickness | Hole Size in Sheet +0.08 (1) | Max. Hole Size in Attached Parts | H ±0.25 | S Max. | T ±0.13 | Min. Dist. Hole C/L To Edge | D Anvil Hole +0.08 | |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

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

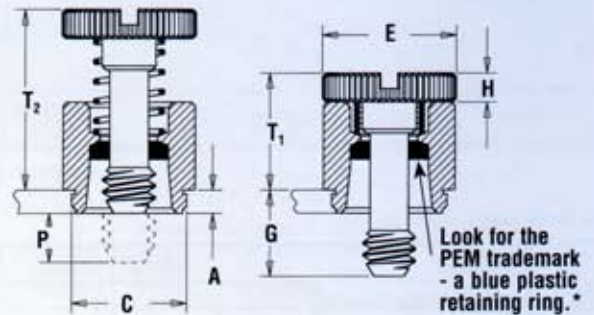
TYPE PFK BOARD-MOUNT PANEL FASTENER ASSEMBLIES



Part Number Designation



Diagonal knurl identifies metric thread sizes



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

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 +.015 - .005 | G ±.016 | H ±.005 | P Nom. (1) | T ₁ Max. | T ₂ Nom. | Min. Dist. Hole C/L To Edge | D Anvil Hole +.003 - .000 |
|---------|-----------------|------|-------------|-------------------|----------------|----------------------|---------------------------------|---------|----------------|---------|---------|------------|---------------------|---------------------|-----------------------------|---------------------------|
| | | | | | | | | | | | | | | | | |
| | .112-40 (#4-40) | PFK | 440 | 40 | .060 | .060 | .265 | .283 | .310 | 250 | .072 | .000 | .36 | .54 | .20 | .173 |
| | .138-32 (#6-32) | PFK | 632 | 40 | .060 | .060 | .281 | .299 | .340 | 250 | .072 | .000 | .36 | .54 | .26 | .190 |
| | | | | 62 | | | | | | 375 | | .125 | | | | |
| | | | | 84 ^{NS} | | | | | | 500 | | .250 | | | | |

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 +0.4 -0.13 | G ±0.4 | H ±0.13 | P Nom. (1) | T ₁ Max. | T ₂ Nom. | Min. Dist. Hole C/L To Edge | D Anvil Hole +0.08 |
|--------|---------------------|------|-------------|-------------------|----------------|----------------------|--------------------------|---------|--------------|--------|---------|------------|---------------------|---------------------|-----------------------------|--------------------|
| | | | | | | | | | | | | | | | | |
| | M3 x 0.5 | PFK | M3 | 40 | 1.53 | 1.53 | 6.75 | 7.19 | 7.87 | 6.4 | 1.83 | 0 | 9.15 | 13.72 | 5.1 | 4.5 |
| | | | | 62 ^{NS} | | | | | | 9.5 | | 3.2 | | | | |
| | | | | 84 ^{NS} | | | | | | 12.7 | | 6.4 | | | | |

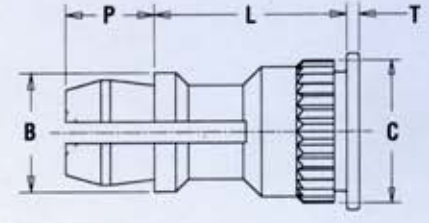
*Retaining rings are plastic with normal 250°F / 120°C temperature limit.

(1) Screw may protrude .005" beyond nominal dimensions.

TYPE KSSB™ BROACHING, SNAP-TOP® STANDOFFS



Part Number Designation



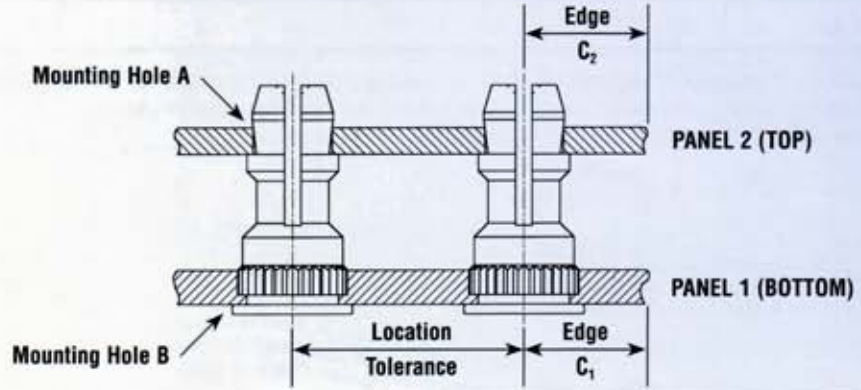
All dimensions are in inches.

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

All dimensions are in millimeters.

| METRIC | Type | Top Board Mounting Hole Diameter Code | Length "L" ±0.13 (Length Code is in millimeters) | | | | | | | | | | B ±0.13 | C ±0.08 | E ±0.13 | P ±0.13 | T ±0.13 | D Anvil Hole +0.08 |
|--------|------|---------------------------------------|---|----|----|----|----|----|----|----|----|-----|------------|------------|------------|------------|------------|--------------------------|
| | | | 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 | 5.49 | |

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.

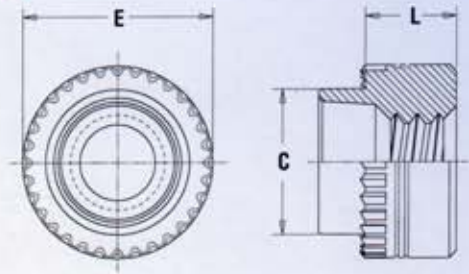
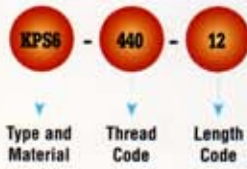
| METRIC | Type | PANEL 1 (Bottom) | | | | | PANEL 2 (Top) | | | | | |
|--------|------|---------------------------------|----------|---------------|----------------|-----------------------------------|-------------------------|------------------------------|-------------------|---------------|-----------------|-----------------------------------|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

TYPE KPS6 SELF-EXPANDING, FOILGARD® FASTENERS

(For plated thru-holes)



Part Number Designation



All dimensions are in inches.

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

All dimensions are in millimeters.

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

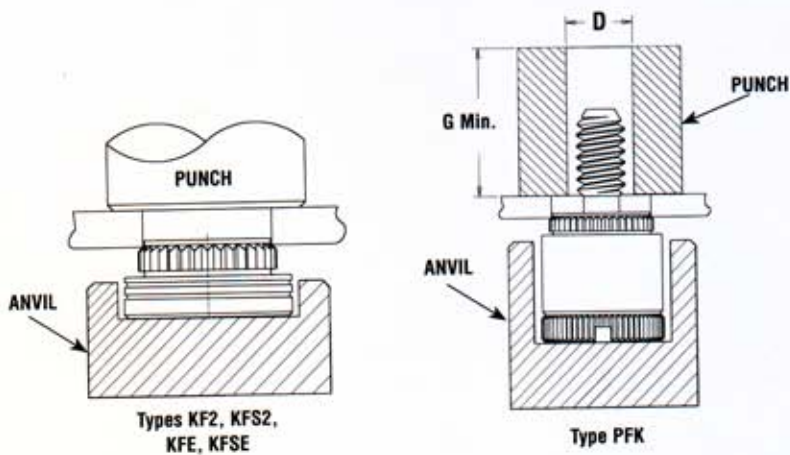
(1) Fasteners for other board thicknesses available on special order.

MATERIAL & FINISH SPECIFICATIONS FOR BROACHING FASTENERS

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

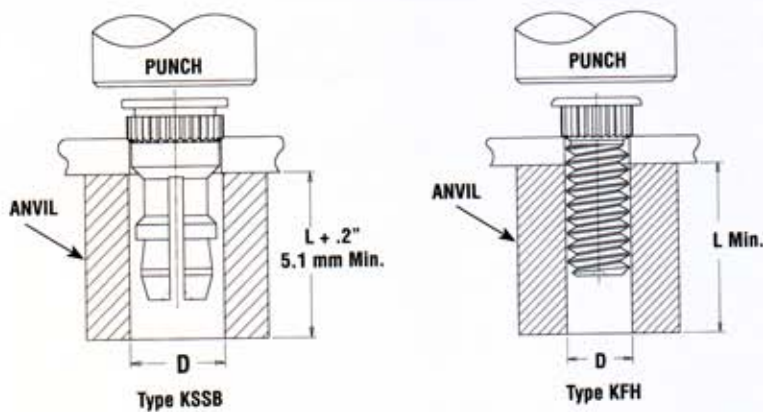
(1) For plated studs, Class 2A/6g, the maximum major and pitch diameter, after plating, may equal basic sizes and can be gauged to Class 3A/4h, per ANSI B1.1, Section 8, Table 3A and ANSI B1.13M, Section 8, Paragraph 8.2.

INSTALLATION FOR BROACHING FASTENERS



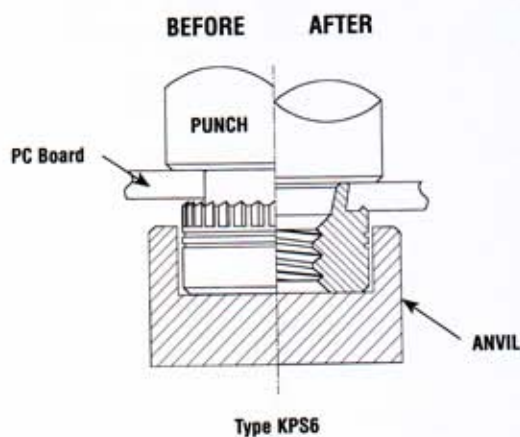
For Types KF2, KFS2, KFE, KFSE, and PFK

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



For Types KSSB and KFH

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



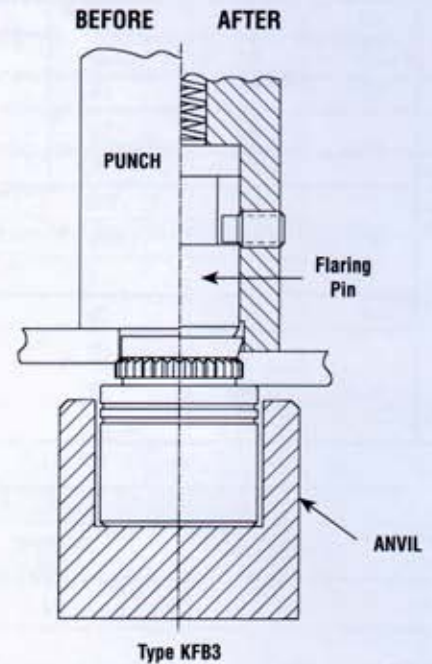
For Type KPS6

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

For Type KFB3⁽¹⁾

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

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



Unified.

| Thread Code | Length Code | Anvil | Punch (Flaring Tool) |
|-------------|-------------|--------------|----------------------|
| #4-40 | -2 | 975201213300 | 975200791400 |
| #4-40 | -4 to -8 | 975200846300 | |
| #4-40 | -10 to -12 | 975200847300 | |
| #4-40 | -16 to -20 | 975200848300 | |
| #4-40 | -20 to -24 | 975200882300 | 975200790400 |
| #6-32 | -2 | 975201215300 | |
| #6-32 | -4 to -8 | 975200849300 | |
| #6-32 | -10 to -12 | 975200850300 | |
| #6-32 | -16 to -20 | 975200851300 | 975201221400 |
| #6-32 | -22 to -24 | 975200883300 | |
| #6-32 | -28 to -32 | 975200884300 | |

Metric.

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

PERFORMANCE DATA FOR BROACHING FASTENERS ⁽¹⁾

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

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

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

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

(3) Not applicable.

(4) See Application Data drawing on page K-6.

(5) 1 Mil Cu, .5 Mil Sn/Pb plated thru-hole.