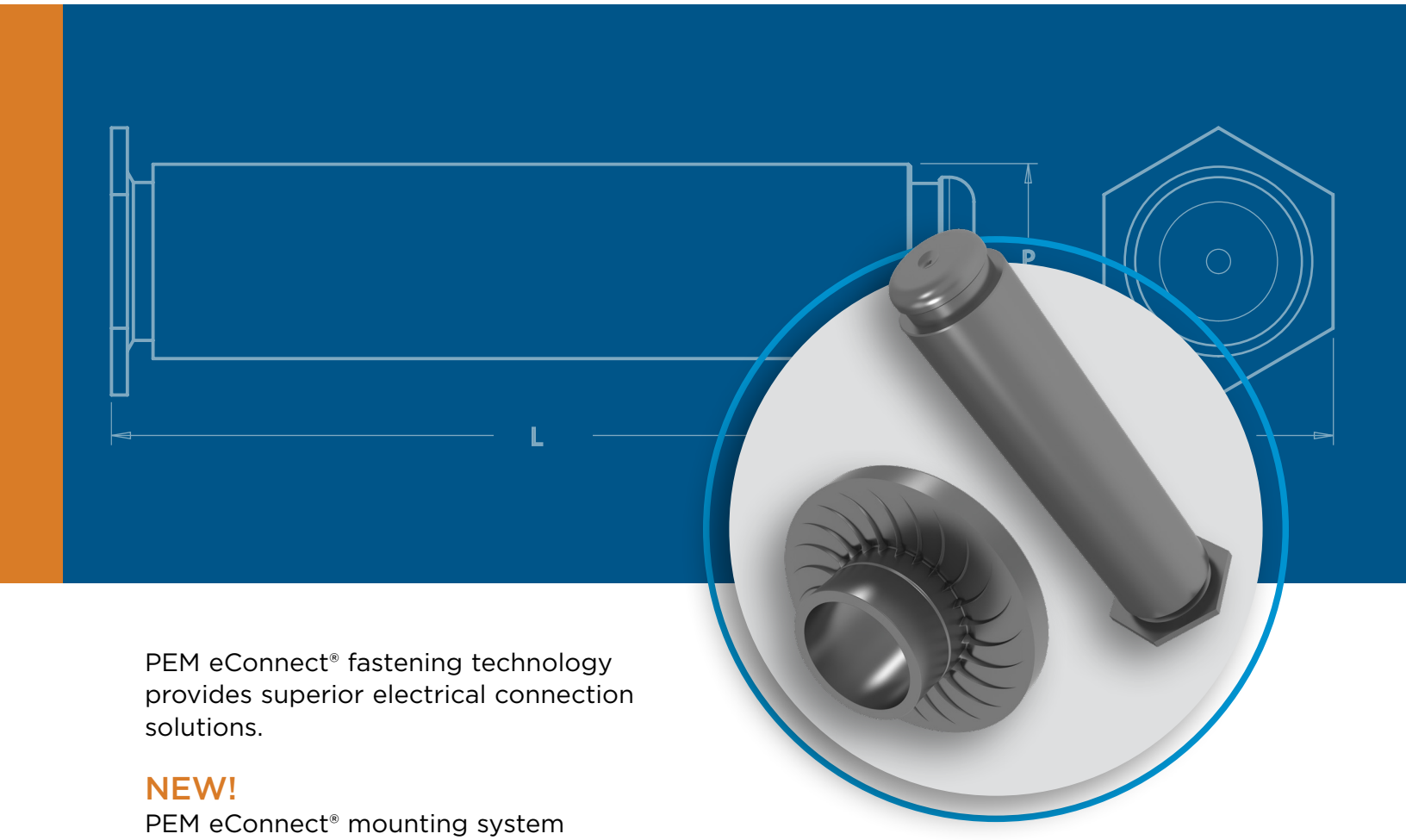
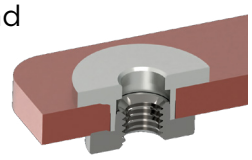
EC™
PEM eConnect® FASTENERS



PEM eConnect® fastening technology provides superior electrical connection solutions.

NEW!
PEM eConnect® mounting system for use in aluminum and copper busbars.

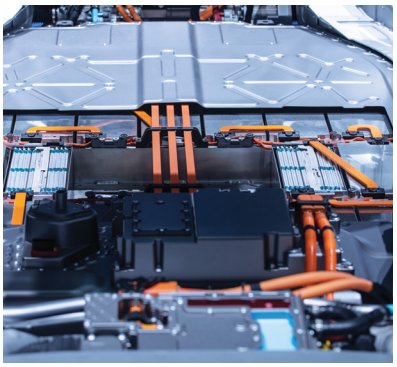


PEM eConnect® fastening technology provides repeatable, consistent electrical joints and superior installation in applications that demand superior performance from internal components.

- No hot spots or poor conductivity
- Joint has an electrical resistance of less than 100 μΩ
- Range of captivation options
- Quick, secure automated installation
- Proven, application-tested performance
- Unmatched PEM® quality

Your Go-To Choice for Superior Electrical Connection in Busbar and PCB Applications

Busbar



- Power Distribution Systems
- Power Distribution Headers
- Battery Management Systems
- Battery Pack
- Battery Disconnect Units
- EV Drivetrains
- EV Motor
- On Board Charger

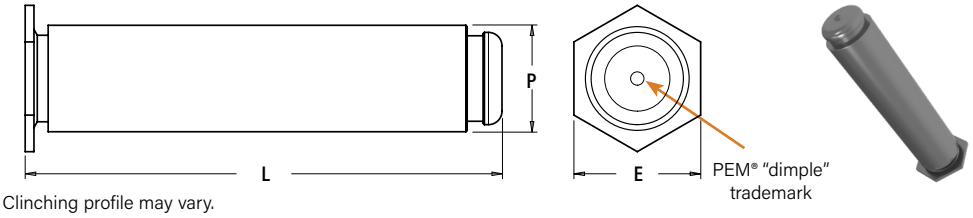
PCB

- Connectivity Systems
- Infotainment Systems
- Safety & Driver Assistance
- ADAS
- Body Electronics
- Engine Control Units
- Heads Up Displays
- EV Powertrain Electronic Control

Fastener drawings and models are available at www.pemnet.com.
Custom sizes are available on special order. Contact us for more information.

Custom sizes are available on special order. Contact us for more information.

EPCRB™ PEM eConnect® Self-Clinching Pin



Clinching profile may vary.

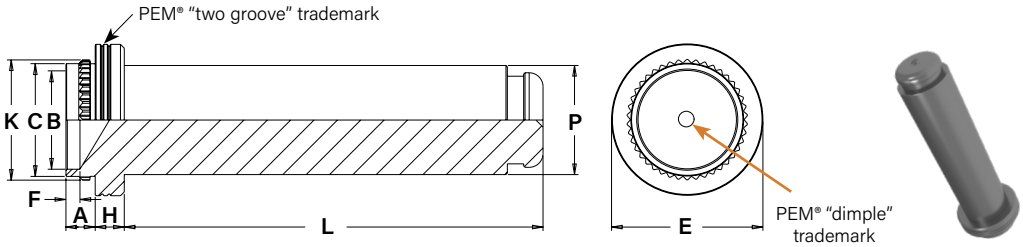
Part Number Designation

EPCR B - 8 - 35.6 AG

Type | Material Code | Pin Diameter | Pin Length | Finish

Type	Pin Dia. Code	Pin Length Code	Sheet Thickness		Hole Size in Sheet +.002" / +0.05mm		E Nom.		L ±.012" / ± 0.3mm		P ±.002" / ±0.05mm		Min. Dist. Hole C/L to Edge [1]	
			in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
EPCRB	8	35.6	.079 - .158	2 - 4	.319	8.1	.375	9.53	1.402	35.6	.315	8	.374	9.5

EPFRB™ PEM eConnect® Broaching Pin



Part Number Designation

EPFR B - 8 - 30.8 AG

Type | Material Code | Pin Diameter | Pin Length | Finish

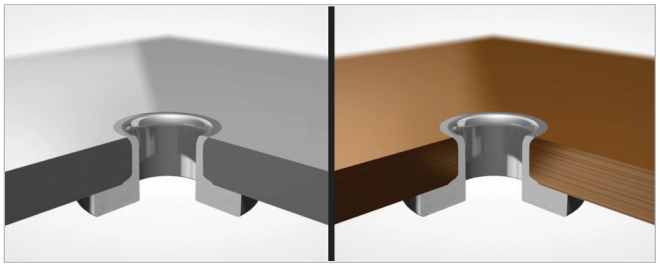
Type	Pin Dia. Code	Pin Length Code	Sheet Thickness		Hole Size in Sheet +.002" / +0.05mm		A Max.		B ±.003" / ±0.08mm		C Max.		E ±.005" / ±0.13mm		F ±.010" / ±0.25mm		H ±.0029" / ±0.07mm		K ±.003" / ±0.08mm		L ±.007" / ±0.18mm		P ±.002" / ±0.05mm		Min. Dist. Hole C/L to Edge [1] +.005"/-.001" +0.13/-0.03mm	
			in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
EPFRB	8	30.8	.049-.065	1.24-1.65	.335	8.5	.058	2.18	.284	7.21	.329	8.35	.437	11.09	.037	0.93	.084	2.13	.350	8.89	1.209	30.8	.315	8	.346	8.8

(1) For more information on proximity to bends and distance to other clinch hardware, see PEM® Tech Sheet C/L To Edge.

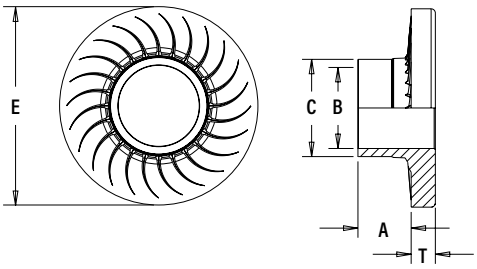
ECCB™ PEM eConnect® Contact Bushing

NEW - ECCB™ PEM eConnect® Contact Bushing:

- Designed for installation into straight punched holes without additional surface preparation
- Breaks aluminum and copper oxide layers on busbars for low resistance connections
- Combined broach and flare install ensures consistent mechanical and electrical connections
- For use in panels with sheet hardness HRB 50 / HB 82 or less



ECCB™ contact bushing is suitable for aluminum and copper busbars



Patent pending

Part Number Designation

ECCB - 6.7 - 440 AG

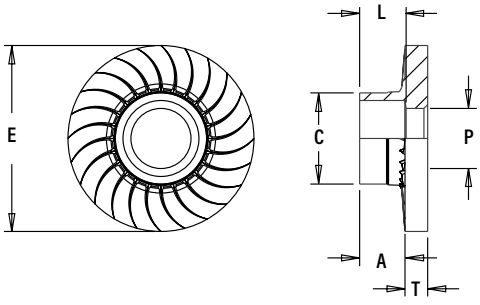
- ECCB: Type
- 6.7: Thru-Hole Code
- 440: Length
- AG: Finish

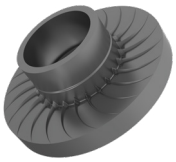
Type / Fastener Material / Copper	Thru-Hole Code	L Length Code	A (Shank) ±.004"/±0.1mm		B Thru-Hole Dia. ± .004"/±0.1mm		Rec. Sheet Thickness +.003"/ +0.08mm (2)		Hole Size In Sheet +.003"/ +0.08mm		Pilot C Max.		E ±.010"/ ±0.25mm		T ±.010"/ ±0.25mm		Min. Dist. Hole C/L to Edge (1)	
			in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
ECCB	6.7	380	.150	3.8	.265	6.7	.134	3.4	.325	8.25	.319	8.1	.646	16.4	.079	2	.325	8.25
ECCB	6.7	440	.173	4.4	.265	6.7	.158	4	.325	8.25	.319	8.1	.646	16.4	.079	2	.325	8.25

ECCBF™ PEM eConnect® Contact Bushing

NEW - ECCBF™ PEM eConnect® Contact Bushing:

- Designed for installation into eConnect nut to offer superior electric performance
- Bushing Breaks aluminum and copper oxide layers on busbars for low resistance connections
- Combined nut and bushing install ensures consistent mechanical and electrical connections
- For use in panels with hardness HRB 50 / HB 82 or less





Part Number Designation

ECCBF - 5.3 - 380 AG

- ECCBF: Type
- 5.3: Thru-hole Code
- 380: Length Code
- AG: Finish

Type / Fastener Material / Copper	Thru-hole Code	L Length Code	A (Shank) ±.004" / ±0.1mm		Rec. Sheet Thickness +.003" / +0.08mm (2)		Hole Size in Sheet +.003" / +0.08		Pilot C Max.		E ±.010" / ±0.25mm		T ±.010" / ±0.25mm		Min. Dist. Hole C/L to Edge (1)		L (Counterbore Depth) ±.010" / ±0.25mm		P ±.004" / ±0.1mm	
			in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
ECCBF	5.3	380	.150	3.8	.134	3.4	.325	8.25	.319	8.1	.646	16.4	.079	2	.325	8.25	.138	3.5	.213	5.4

(1) For more information on proximity to bends and distance to other clinch hardware, see PEM® Tech Sheet C/L To Edge.
(2) Recommended sheet thicknesses are for use when bushing is flared directly into busbar. For use with captive nut or stud, see recommendations on page 5.

PEM eConnect® Busbar Connection System

The PEM eConnect® busbar connection system is a two-piece fastening solution sold individually, which combines features optimized to provide ideal mechanical and electrical performance in a simple to install reliable system. The highly conductive, low resistance bushing creates a consistent electrical terminal for busbar connections without the need for plating, while the high strength steel fastener adds secure heat-treated threads that can create the clamp load required for electrical joints in critical applications.

- Both components install in a single press stroke making assembly easy and quick
- Under head bushing features break busbar oxidation layers without surface preparation.

How to Select the Correct Part Numbers

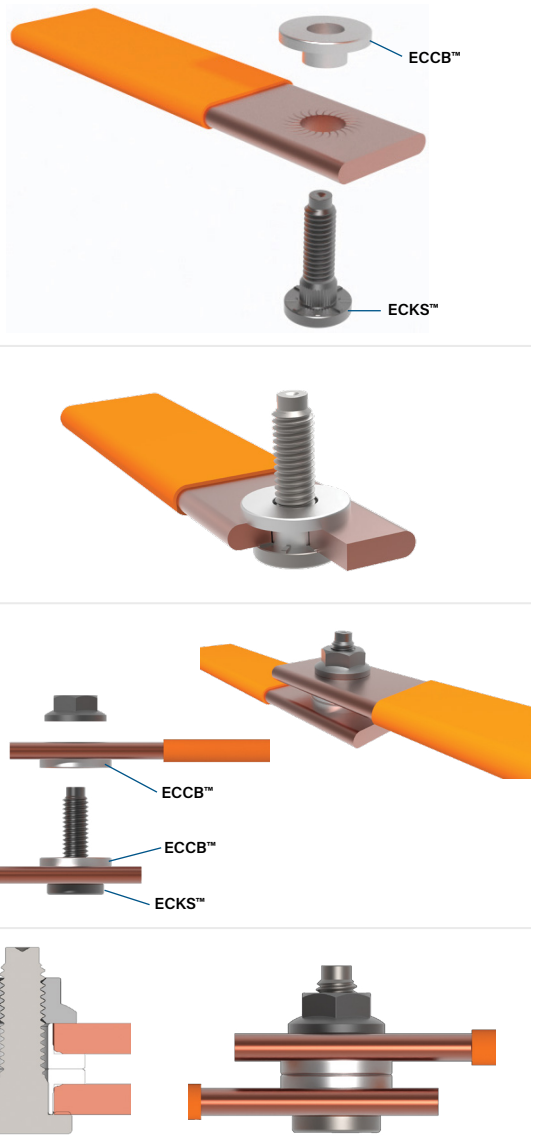
1. Determine the correct part families
   a) For studs, use ECCB combined with ECKS.
   b) For nuts, use ECCBF combined with ECKN.
2. Determine the correct shank and knurl length for both components.
   a) For the bushing component, take the panel thickness and subtract .008"/0.2mm to find the shank length A.
   b) ECKN Nuts, take the busbar thickness and subtract .053"/1.35mm to find the knurled length A.
   c) For ECKS Studs, take the busbar thickness and subtract .006"/0.15mm to from the knurled length S.

NOTE: Using too large of A or S dimensions will cause tight threads. Too small of an A or S dimension will cause reduced performance.

If you can't find a match, please contact techsupport. We are happy to provide a custom quote.

ECCBF™ Bushing combined with ECKN™ nut

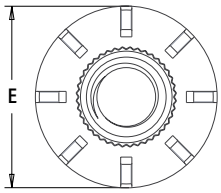
ECCB™ Bushing combined with ECKS™ stud

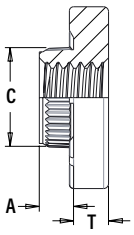


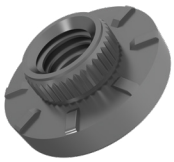
ECKN™ PEM eConnect® Nut

NEW - ECKN™ PEM eConnect® Nut:

- For use in Aluminum and Copper busbars
- Designed for installation into eConnect bushing to offer superior mechanical and electric performance
- Bushing Breaks aluminum and copper oxide layers on busbars for low resistance connections
- Combined nut and bushing install ensures consistent mechanical and electrical connections
- For use in panels with hardness HRB 50 / HB 82 or less







Part Number Designation

ECKN - M5 - 245 ZN

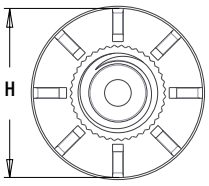
- ECKN: Type
- M5: Thread Code
- 245: Length Code
- ZN: Finish

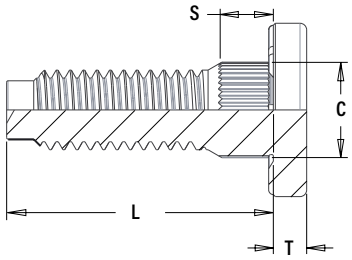
Type	Thread Code	L Length Code	A (Shank) ±.004" / ±0.1mm		Rec. Sheet Thickness +.003" -.000" / +0.08mm		Hole Size in Sheet +.003" -.000" / +0.08mm		Knurl C Max.		E ±.010" / ±0.25mm		T ±.010" / ±0.25mm		Min. Dist. Hole C/L to Edge [1]	
			in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
ECKN	M5	245	.097	2.45	.158	4	.327	8.3	.288	7.32	.512	13	.098	2.5	.325	8.25

ECKS™ PEM eConnect® Stud

NEW - ECKS™ PEM eConnect® Stud:

- For use in Aluminum and Copper busbars
- Designed for installation into eConnect bushing to offer superior mechanical and electric performance
- Bushing Breaks aluminum and copper oxide layers on busbars for low resistance connections
- Combined nut and bushing install ensures consistent mechanical and electrical connections
- For use in panels with hardness HRB 50 / HB 82 or less





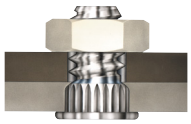
Part Number Designation

ECKS - M6 - 20 ZN

- ECKS: Type
- M6: Thread Code
- 20: Length Code
- ZN: Finish

Type	Thread Code	L Length Code	S (Shank) ±.004" / ±0.1mm		Rec. Sheet Thickness +.003" -.000" / +0.08mm		Hole Size in Sheet +.003" -.000" / +0.08mm		Knurl C Max.		H ±.010" / ±0.25mm		T ±.010" / ±0.25mm		Min. Dist. Hole C/L to Edge [1]	
			in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
ECKS	M6	20	.152	3.85	.158	4	.327	8.3	.288	7.32	.512	13	.098	2.5	.325	8.25

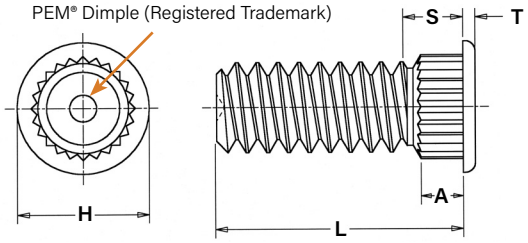
KFH™ Broaching Studs



Part Number Designation

KFH – 632 – 8 ET

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



All dimensions are in inches.

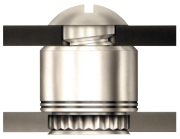
	Thread Size	Type	Thread Code	Length Code "L" ±.010 (Length code in 16ths of an inch)						A (Shank) Max.	Min. Sheet Thickness	Hole Size in Sheet +.003 -.000	Max. Hole Size in Attached Parts	H ±.010	S Max. (1)	T ±.005	Min. Dist. Hole C/L to Edge (2)
				.250	.312	.375	.500	.625	.750								
Unified	.112-40 (#4-40)	KFH	440	4	5	6	8	10	12	.065	.060	.120	.145	.180	.09	.020	.15
	.138-32 (#6-32)	KFH	632	4	5	6	8	10	12	.065	.060	.140	.170	.200	.09	.020	.19
	.164-32 (#8-32)	KFH	832	4	5	6	8	10	12	.065	.060	.166	.195	.225	.09	.020	.20
	.190-32 (#10-32)	KFH	032	4	5	6	8	10	12	.065	.060	.189	.220	.250	.09	.020	.20

All dimensions are in millimeters.

	Thread Size x Pitch	Type	Thread Code	Length Code "L" ±0.25 (Length code 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 C/L to Edge (2)
Metric	M3 x 0.5	KFH	M3	6	8	10	12	15	18	1.65	1.53	3	3.7	4.58	2.3	0.51	3.8
	M4 x 0.7	KFH	M4	6	8	10	12	15	18	1.65	1.53	4.2	4.8	5.74	2.3	0.51	5.1
	M5 x 0.8	KFH	M5	6	8	10	12	15	18	1.65	1.53	1.53	5.8	6.6	2.3	0.51	5.3

(1) Threads are gaugeable to within 2 pitches of the "S" Max. dimension. A class 3B/5H maximum material commercial nut shall pass up to the "S" Max. dimension.
(2) For more information on proximity to bends and distance to other clinch hardware, see PEM® Tech Sheet C/L To Edge.

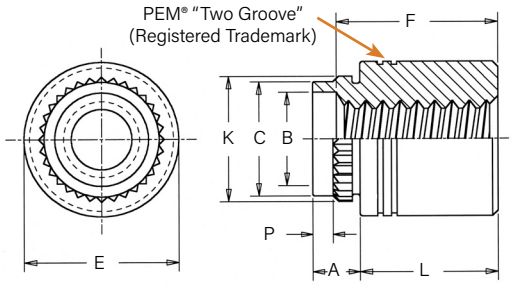
KFB3™ Broach/Flare-Mount Standoffs



Part Number Designation

KFB3 – 632 – 12 ET

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



All dimensions are in inches.

	Thread Size	Type	Thread Code	Length Code "L" ±.005 (Length code 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 C/L to Edge (2)
				.062	.125	.187	.250	.312	.375	.500	.625	.750 (1)	1.00 (1)									
Unified	.112-40 (#4-40)	KFB3	440	2	4	6	8	10	12	16	20	—	—	.09	.050-.065	.166	.122	.165	.219	.179	.040	.17
	.138-32 (#6-32)	KFB3	632	2	4	6	8	10	12	16	20	24	32	.09	.050-.065	.213	.171	.212	.280	.226	.040	.22
	.190-32 (#10-32)	KFB3	032	2	4	6	8	10	12	16	20	24	32	.09	.050-.065	.272	.128	.271	.375	.285	.040	.275
	.250-32 (1/4-20)	KFB3	0420	2	4	6	8	10	12	16	20	24	32	.09	.050-.065	.335	.183	.331	.437	.348	.040	.335
	"F" Min. Thread Length (Where Applicable)			Full								.375 Blind										

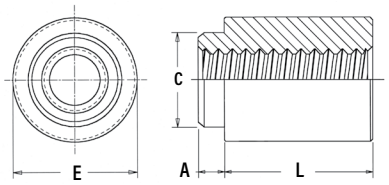
All dimensions are in millimeters.

	Thread Size x Pitch	Type	Thread Code	Length Code "L" ±0.13 (Length code 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 C/L to Edge (2)
Metric	M3 x 0.5	KFB3	M3	2	3	4	6	8	10	12	14	16	2.29	1.27-1.65	4.22	3.23	4.2	5.56	4.55	1	4.33
	M4 x 0.7	KFB3	M4	2	3	4	6	8	10	12	14	16	2.29	1.27-1.65	6.4	5.23	6.33	8.74	6.68	1	6.36
	M5 x 0.8	KFB3	M5	2	3	4	6	8	10	12	14	16	2.29	1.27-1.65	6.9	5.8	6.86	9.53	7.23	1	7
	M6 x 1	KFB3	M6	2	3	4	6	8	10	12	14	16	2.29	1.27-1.65	8.5	7.2	8.4	11.1	8.83	1	8.5
	"F" Minimum Thread Length (Where Applicable)			Full						9.5											

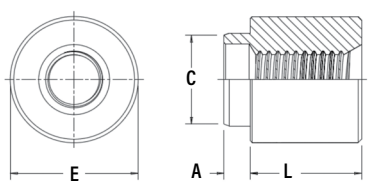
(1) Blind at shank end with .375" minimum thread length from head end.
(2) For more information on proximity to bends and distance to other clinch hardware, see PEM® Tech Sheet C/L To Edge.

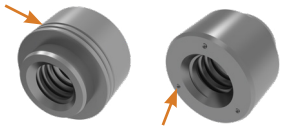
SMTSOB™ Reelfast® Surface Mount Nuts And Spacers/Standoffs

SMTSOB



SMTSOB(1)





PEM® SMTSOB standoffs may be marked with either our "Two Groove" or "3 Dimple" registered trademarks.

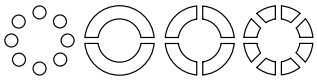
Thread/thru hole sizes 2-56, 4-40, 6-32, 8-32, 116, 143, M2, M2.5, M3, M3.5, M4, 3.1, 3.6, and 4.2

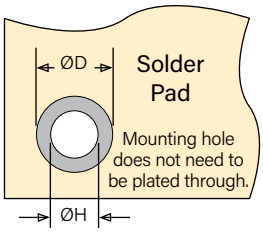
Part Number Designation

SMTSOB – 440 – 8 ET

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

Stencil Masking Examples





NOTE: Standoffs are available on special order without a pilot that do not require a thru hole for installation. Contact techsupport@pemnet.com for more information.

All dimensions are in inches.

	Thread Size	Thru Hole +.004 -.003	Type	Thread or Thru Hole Code	Length Code "L" ±.005 (Length code in 32nds of an inch)				Min. sheet Thickness	A Max.	C Max.	E		H Nom.	ØH Hole Size in Sheet +.003 -.000	ØD Min. Solder Pad
					.062	.125	.250	.375				Ref.	±.005			
Unified	.060-80 (#0-80)	–	SMTSOB	080	2	4	–	–	.020	.019	.095	.144	–	.125	.098	.165
	.086-56 (#2-56)	–	SMTSOB	256	2	4	8 (1)	12 (1)	.060	.060	.142	–	.219	–	.147	.244
	.112-40 (#4-40)	–	SMTSOB	440	2	4	8 (1)	12 (1)	.060	.060	.161	–	.219	–	.166	.244
	.1387-32 (#6-21)	–	SMTSOB	632	2	4	8 (1)	12 (1)	.060	.060	.208	–	.281	–	.213	.306
	.164-32 (#8-32)	–	SMTSOB	832	2	4	8 (1)	12 (1)	.060	.060	.245	–	.344	–	.250	.369
	–	.116	SMTSOB	116	2	4	8	12	.060	.060	.161	–	.219	–	.166	.244
	–	.143	SMTSOB	143	2	4	8	12	.060	.060	.208	–	.281	–	.213	.306

All dimensions are in millimeters.

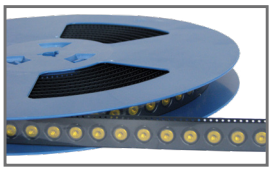
	Thread Size	Thru Hole +0.10 -0.08	Type	Thread or Thru Hole Code	Length Code "L" ±0.13 (Length code in millimeters)							Min. sheet Thickness	A Max.	C Max.	E		H Nom.	ØH Hole Size in Sheet +0.08	ØD Min. Solder Pad
					1	2	3	4	6	8	10				Ref.	±0.13			
Metric	S1	–	SMTSOB	M1	1	2	3	–	–	–	–	0.5	0.48	2.41	3.66	–	3.18	2.5	4.19
	S1.2	–	SMTSOB	M1.2	1	2	3	–	–	–	–	0.5	0.48	2.41	3.66	–	3.18	2.5	4.19
	S1.4	–	SMTSOB	M1.4	1	2	3	–	–	–	–	0.5	0.48	2.41	3.66	–	3.18	2.5	4.19
	M1.6 x 0.35	–	SMTSOB	M1.6	1	2	3	–	–	–	–	0.5	0.48	2.41	3.66	–	3.18	2.5	4.19
	M2 x 0.4	–	SMTSOB	M2	–	2	3	4 (1)	6 (1)	8 (1)	10 (1)	1.53	1.53	3.6	–	5.56	–	3.73	6.2
	M2.5 x 0.45	–	SMTSOB	M25	–	2	3	4 (1)	6 (1)	8 (1)	10 (1)	1.53	1.53	4.09	–	5.56	–	4.22	6.2
	M3 x 0.5	–	SMTSOB	M3	–	2	3	4 (1)	6 (1)	8 (1)	10 (1)	1.53	1.53	4.09	–	5.56	–	4.22	6.2
	M3.5 x 0.6	–	SMTSOB	M35	–	2	3	4 (1)	6 (1)	8 (1)	10 (1)	1.53	1.53	5.28	–	7.14	–	5.41	7.77
	M4 x 0.7	–	SMTSOB	M4	–	2	3	4	6 (1)	8 (1)	10 (1)	1.53	1.53	6.22	–	8.74	–	6.35	9.37
	–	3.1	SMTSOB	3.1	–	2	3	4	6	8	10	1.53	1.53	4.09	–	5.56	–	4.22	6.2
	–	3.6	SMTSOB	3.6	–	2	3	4	6	8	10	1.53	1.53	5.28	–	7.14	–	5.41	7.77
	–	4.2	SMTSOB	4.2	–	2	3	4	6	8	10	1.53	1.53	6.22	–	8.74	–	6.35	9.37

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

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

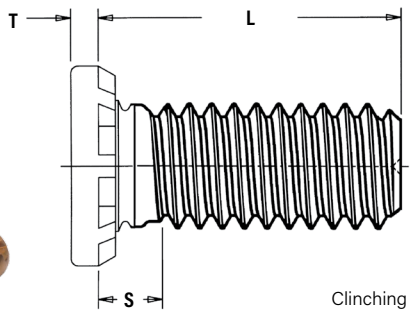
Thread/ Thru-Hole Size	Length Code							
	1	2	3	4	6	8	10	12
080	–	3500 / 8	–	2000 / 8	–	–	–	–
256, 440, 632, 116, 143	–	1500 / 12	–	1000 / 12	–	650 / 12	–	300 / 16
832	–	1100 / 16	–	800 / 16	–	500 / 16	–	300 / 16
M1, M1.2, M1.4, M1.6	3500 / 8	2500 / 8	2000 / 8	–	–	–	–	–
M2, M25, M3, M35, 3.1, 3.6	–	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	–

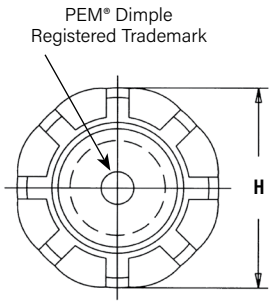
Packaged on 330 mm recyclable reels. Tape width is 24 mm. Reels conform to EIA-481.



A polyimide patch is supplied to allow for reliable vacuum pickup. Fasteners are also available without a patch which may provide a lower cost alternative, depending on your installation methods/requirements.

HFHB™ Heavy-Duty Studs





Clinching profile may vary.

Part Number Designation

HFH	B	–	032	–	12	X
Type	Material Code		Thread Code		Length Code	Finish Code

All dimensions are in inches.

	Thread Size	Type	Thread Code	Length Code "L" ±.015 (Length code in 16ths of an inch)							Min. Sheet Thickness (2)	Hole Size in Sheet +.005 -.000	H ±.010	S Max. (3)	T Max.	Max. Hole in Attached Parts	Min. Dist. Hole C/L to Edge (4)
				.500	.750	1.00	1.25	.150	.175	2.00							
Unified	.190-32 (#10-32)	HFHB	032	8	12	16	20	24	28	32	.050	.190	.300	.105	.040	.252	.415
	.250-32 (1/4-20)	HFHB	0420	8	12	16	20	24	28	32	.060	.250	.380	.125	.050	.312	.460
	.313-18 (5/16-18)	HFHB	0518	8	12	16	20	24	28	32	.075	.312	.480	.140	.070	.374	.500
	.375-16 (3/8-16)	HFHB	0616	–	12	16	20	24	28	32	.090	.375	.580	.155	.085	.437	.530

Tensile strength: HFH - 120 ksi / HFHS - 75 ksi / HFHB - 60 ksi.

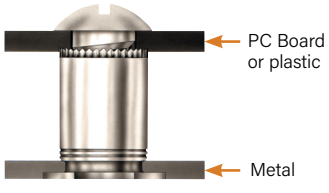
All dimensions are in millimeters.

	Thread Size x Pitch	Type	Thread Code	Length Code "L" ±0.4 (Length code in millimeters							Min. Sheet Thickness (2)	Hole Size in Sheet +0.13	H ±0.25	S Max. (3)	T Max.	Max. Hole in Attached Parts	Min. Dist. Hole C/L to Edge (4)
Metric	M5 x 0.8	HFHB	M5	15	20	25	30	35	40	50	1.3	5	7.8	2.7	10.14	6.4	10.7
	M6 x 1	HFHB	M6	15	20	25	30	35	40	50	1.5	6	9.4	2.8	1.27	7.5	11.5
	M8 x 1.25	HFHB	M8	15	20	25	30	35	40	50	2	8	12.5	3.5	1.78	9.5	12.7
	M10 x 1.5	HFHB	M10	15	20	25	30	35	40	50	2.3	10	15.7	4.1	2.29	11.5	13.7

Tensile strength: HFH - 900 MPa / HFHS - 515 MPa / HFHB - 415 MPa.

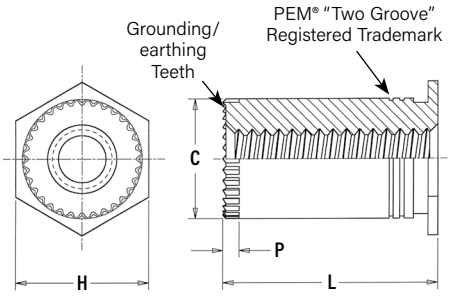
(1) The electrical resistance (tested at 10 amps DC) between phosphor bronze studs and copper busbars is below 104μ ohms and 62μ ohms for the #10-32 / M5 and 3/8-16 / M10 thread sizes respectively, after repeated thermal and mechanical cycling. For complete electrical resistance test data for type HFHB studs installed in copper, see bulletin entitled "Electrical Resistance of HFHB Studs Installed in Copper" on our website.
(2) See page 20 for installation tool requirements.
(3) Threads are gaugeable to within 2 pitches of the "S" Max. dimension. A class 3B/5H maximum material commercial nut shall pass up to the "S" Max. dimension.
(4) For more information on proximity to bends and distance to other clinch hardware, see PEM® Tech Sheet C/L To Edge.

SOAG™ Grounding/Earthing Standoffs



Part Number Designation

SO	A	G	-	6440	-	10
Type	Material Code	Grounding/ Earthing		Thread Code		Length Code



All dimensions are in inches.

Clinching profile may vary.

	Thread Size	Type	Thread Code	Length Code "L" +.010 -.000 (Length code 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 (2)
				.125	.187	.250	.312	.375	.437	.500						
Unified	.112-40 (#4-40)	SOAG	6440	4	6	8	10	12	14	16	.040	.213	.212	.250	.030	.27
	.138-32 (#6-32)	SOAG	8632	4	6	8	10	12	14	16	.050	.281	.280	.312	.030	.31

All dimensions are in millimeters.

	Thread Size x Pitch	Type	Thread Code	Length Code "L" ±0.25 (Length code in millimeters)						Min. Sheet Thickness	Hole Size in Sheet +0.08	C -0.13	H ±0.25	P Nom.	Min. Dist. Hole C/L to Edge (2)
Metric	M3 x 0.5	SOAG	3.5M3	3	4	6	8	10	12	1	5.4	5.39	6.4	0.76	6.8

(2) For more information on proximity to bends and distance to other clinch hardware, see PEM® Tech Sheet C/L To Edge.

Material And Finish Specifications

	Threads [1]		Fastener Material						Standard Finishes				
Type	Internal, ASME B1.12B/ ASME B1.13M 6H	External, ASME B1.12A/ ASME B1.13M 6g	Free Machining Brass	C14415 (K81) Copper	CDA-510 Phosphor Bronze	Brass	Carbon Steel	Aluminum	Matte Electroplated Silver per ASTM B700, Type II, Grade A [1]	Electro-Plated Tin ASTM B545, Class A with Clear Preservative Coating, Annealed [2]	Zinc Nickel plated per ISO 19598	No Finish [3]	No Finish
ECKN	▪						▪				▪		
ECKS		▪					▪				▪		
ECCBF				▪					▪	▪			
EPCRB			▪						▪				
EPFRB			▪						▪				
ECCB				▪					▪	▪			
KFH		▪			▪					▪			
KFB3	▪					▪				▪			
SMTSOB	▪						▪			▪			
HFHB		▪			▪							▪	
SOAG	▪							▪					▪
Part Number Code for Finishes									Ag	ET	ZN	X	None

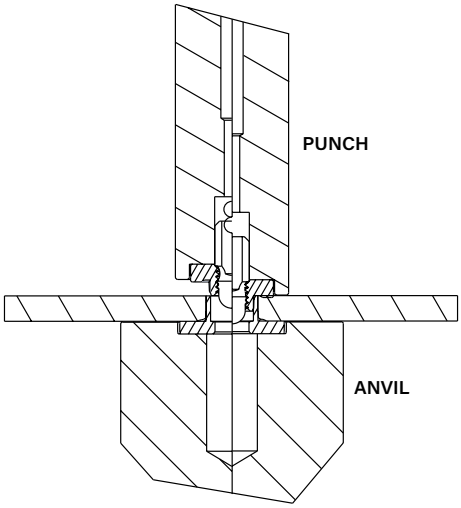
	For Use In						
Type	Sheet Hardness HRB 44 / HB 80 or less [4]	Sheet Hardness HRB 50 / HB 82 or less [4]	Sheet Hardness HRB 55 / HB 96 or less [4]	Sheet Hardness HRB 65 / HB 116 or less [4]	Sheet Hardness HRB 70 / HB 125 or less [3]	Aluminum, Acrylic, Castings, Polycarbonate, and PC Board	PC Board
ECKN		▪					
ECKS		▪					
ECCBF		▪					
EPCRB	▪						
EPFRB							▪
ECCB		▪					
KFH			▪			▪	
KFB3				▪		▪	
SMTSOB							▪
HFHB			▪				
SOAG					▪		

(1) See PEM Technical Support section of our website for related plating standards and specifications.
(2) Optimal solderability life noted on packaging.
(3) "X" suffix studs may have pitch diameters and major diameters below 2A/6g minimum size, per ANSI B1.1, Section 7, and B1.13M, Section 8 to allow for minimum of 0.0002" / 0.0051 mm of plating.
(4) HRB - Hardness Rockwell "B" Scale. HB - Hardness Brinell.

Installation

ECKN™ PEM eConnect® Nut

1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Insert nut into the nested section on the punch , this will be centred using a locating pin built into the punch.
3. Insert Bushing into the nested section on the anvil.
4. With punch and anvil surfaces parallel, apply squeezing force until the shoulder of the nut contacts the sheet.

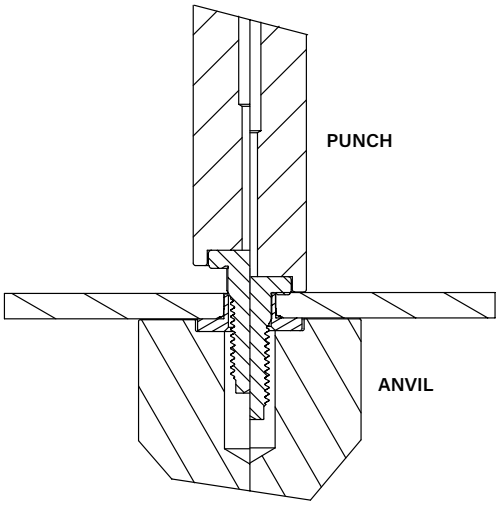


Installation Tooling

Type	HAEGER® Part Number		PEMSERTER® Part Number	
	Anvil	Punch	Anvil	Punch
ECKN	H192	H-598-ECKN-M5	8026985	8026986

ECKS™ PEM eConnect® Stud

1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Insert stud into the nested section on the punch.
3. Insert Bushing into the nested section on the anvil.
4. With punch and anvil surfaces parallel, apply squeezing force until the shoulder of the stud contacts the sheet.

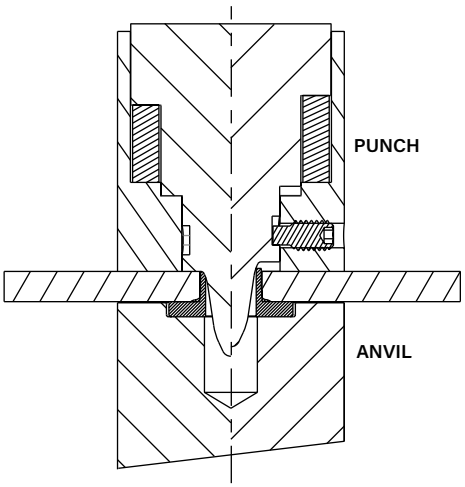


Installation Tooling

Type	HAEGER® Part Number		PEMSERTER® Part Number	
	Anvil	Punch	Anvil	Punch
ECKS	H192	H-598-ECKS	8026985	8026987

ECCB™ and ECCBF™ Contact Bushings

1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Place the shank of the fastener into the mounting hole.
3. With punch and anvil surfaces parallel, apply squeezing force to flare the shank of the fastener.



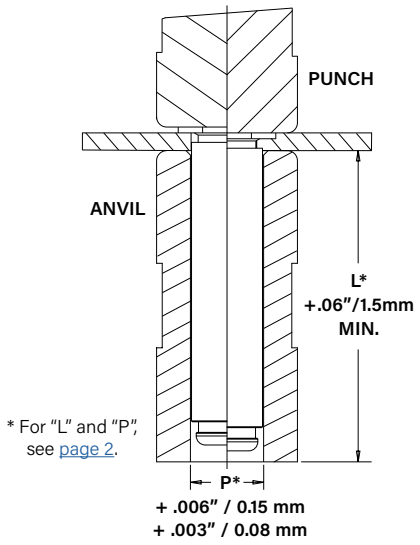
Installation Tooling

Type	HAEGER® Part Number		PEMSERTER® Part Number	
	Anvil	Punch	Anvil	Punch
ECCB	H-192	H-191	8026985	8026982

Installation

EPCRB™ Self-clinching Pins

1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Insert pin through mounting hole (punch side) of sheet and into anvil hole.
3. With punch and anvil surfaces parallel, apply squeezing force to embed the head of the pin flush in the sheet.

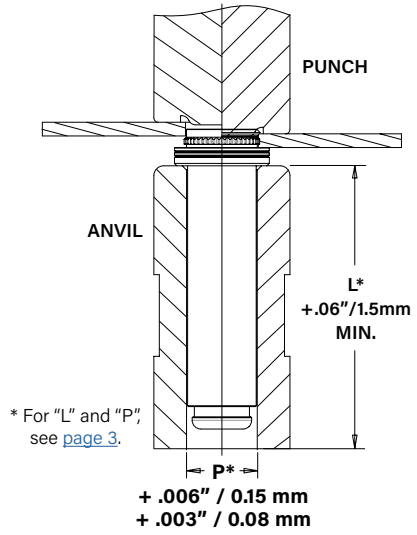


Installation Tooling

Type	HAEGER® Part Number		PEMSERTER® Part Number	
	Anvil	Punch	Anvil	Punch
EPCRB	15875-1	H-108-0020L	8026712	975200048

EPFRB™ Broaching Pins

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.
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.



Installation Tooling

Type	HAEGER® Part Number		PEMSERTER® Part Number	
	Anvil	Punch	Anvil	Punch
EPFRB	15875-1	15875-2	8026712	8026681

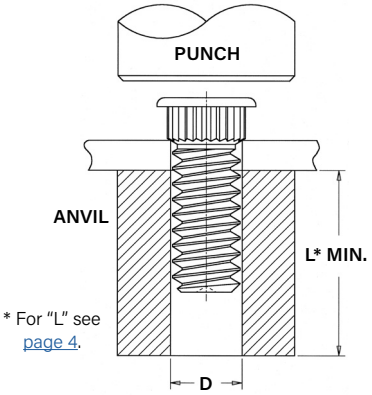
KFH™ Studs

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

PEMSERTER® Installation Tooling (1)

Part Number	Anvil Dimensions	PEMSERTER® Part Number	
	D +.003" -.000"	Anvil	Punch
KFH-440-L	.113"	970200006300	975200048
KFH-632-L	.140"	970200007300	975200048
KFH-832-L	.166"	970200008300	975200048
KFH-032-L	.191"	970200009300	975200048

Part Number	Anvil Dimensions	PEMSERTER® Part Number	
	D +.003" -.000"	Anvil	Punch
KFH-M3-L	3.1mm	970200229300	975200048
KFH-M4-L	4.1mm	970200019300	975200048
KFH-M5-L	5.1mm	970200008300	975200048



* For "L" see page 4.

(1) Click here for a quote on Haeger® custom installation tooling.

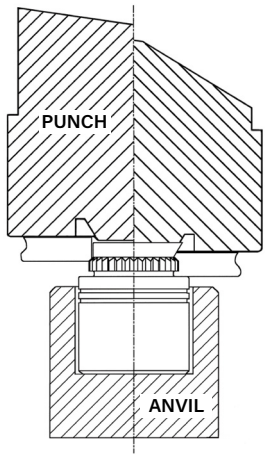
KFB3™ Nuts and Standoffs

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 diagram.
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.

PEMSERTER® Installation Tooling (1)

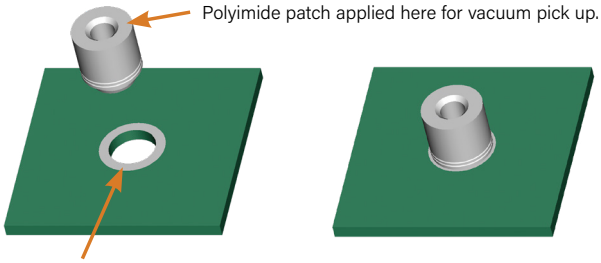
Thread Size	Length Code	PEMSERTER® Part Number	
		Anvil	Punch (Flaring Tool)
#4-40	-2	975201213300	975201231400
#4-40	-4 to -8	975200846300	
#4-40	-10 to -12	975200847300	
#4-40	-16 to -20	975200848300	
#4-40	-20 to -24	975200882300	
#6-32	-2	975201215300	975201232400
#6-32	-4 to -8	975200849300	
#6-32	-10 to -12	975200850300	
#6-32	-16 to -20	975200851300	
#6-32	-22 to -24	975200883300	
#6-32	-28 to -32	975200884300	
#10-32	-2	8026682	8026680
#10-32	-4 to -8	8026683	
#10-32	-10 to -12	8026684	
#10-32	-16 to -20	8026685	
#10-32	-20 to -24	8026686	
#10-32	-28 to -32	8026687	
1/4-20	-2	8026688	8026681
1/4-20	-4 to -8	8026689	
1/4-20	-10 to -12	8026690	
1/4-20	-16 to -20	8026691	
1/4-20	-20 to -24	8026692	
1/4-20	-28 to -32	8026693	

Thread Size	Length Code	PEMSERTER® Part Number	
		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	
M5	-2	8026670	8026680
M5	-3 to -6	8026671	
M5	-8 to -10	8026672	
M5	-12 to -14	8026673	
M5	-14 to -16	8026674	
M6	-2	8026675	8026681
M6	-3 to -6	8026676	
M6	-8 to -10	8026677	
M6	-12 to -14	8026678	
M6	-14 to -16	8026679	



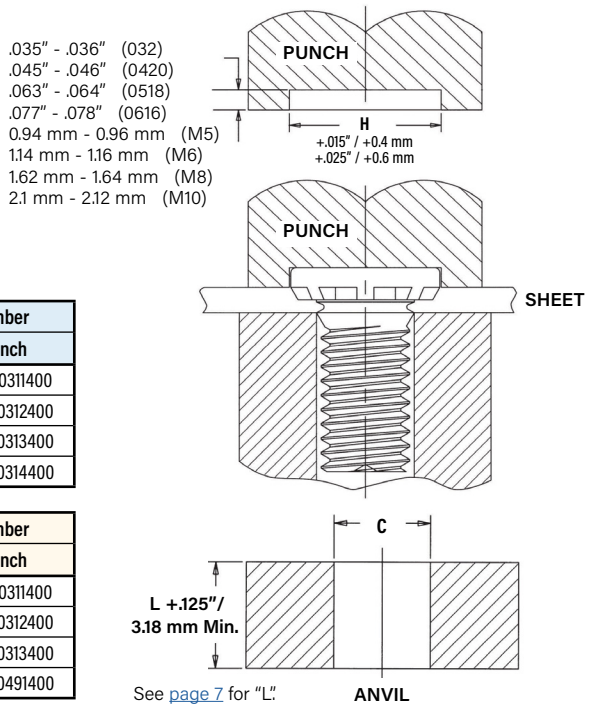
(1) Click here for a quote on Haeger® custom installation tooling.

SMTSOB™ Nuts and Standoffs



HFHB™ Studs

1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Insert stud through mounting hole (punch side) of sheet and into anvil hole.
3. With punch and anvil surfaces parallel, apply squeezing force on the punch sufficient only to embed the ribs on the head of the stud into the sheet. The standard punch design provides clearance for the stud head and reduces chances of over squeezing.



See page 7 for "L".

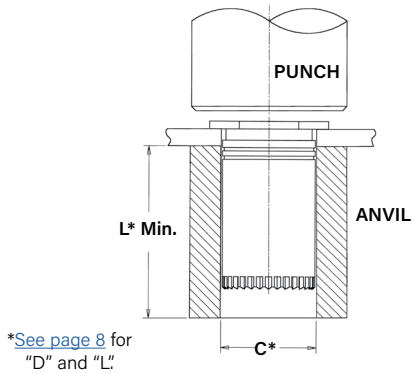
Installation Tooling

	Thread Code	Anvil Dimensions (in.)	HAEGER® Part Number		PEMSERTER® Part Number	
		C	Anvil	Punch	Anvil	Punch
Unified	032	.191 - .194	H-103-10L	H-184-10L	970200009300	970200311400
	0420	.250 - .253	H-103-04L	H-184-04L	970200010300	970200312400
	0518	.3125 - .3155	H-103-05L	H-184-05L	970200011300	970200313400
	0616	.375 - .378	H-103-06L	H-184-06L	970200004300	970200314400

	Thread Code	Anvil Dimensions (mm)	HAEGER® Part Number		PEMSERTER® Part Number	
		C +0.08	Anvil	Punch	Anvil	Punch
Metric	M5	5.03	H-103-M5L	H-184-10L	970200020300	970200311400
	M6	6.03	H-103M6L	H-184-04L	970200230300	970200312400
	M8	8.03	H-103-M8L	H-184-05L	970200231300	970200313400
	M10	10.03	H-103-M10L	H-184-06L	970200402300	970200491400

SOAG™ Standoffs

1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Insert fastener through mounting hole (preferably the punch side) and into anvil as shown in drawing.
3. With installation punch and anvil surfaces parallel, apply only enough squeezing force to embed the standoff's head flush in the sheet.



*See page 8 for "D" and "L".

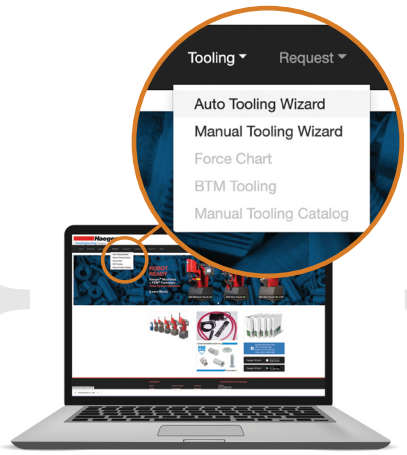
PEMSERTER® Installation Tooling

Thread Code	HAEGER® Part Number		PEMSERTER® Part Number	
	Anvil	Punch	Anvil	Punch
440/M3	H-109-4/M3L	H-108-0020L	970200487300	975200048
6440/3.5M3	H-109-6/M3.5L	H-108-0020L	970200012300	975200048
8632	H-109-8-10/M5L	H-108-0020L	970200013300	975200048

Installation Notes

- For best results we recommend using a HAEGER® or PEMSERTER® machine for installation of PEM® self-clinching fasteners. See our website for more information.
- Visit the Animation Library on our website to view the installation process.

For Additional HAEGER® and PEMSERTER® Tooling Information / Part Numbers



Go to haeger.com to access
the Auto and Manual Tooling Wizards

HAEGER® MANUAL TOOLING CATALOG

HAEGER® AUTO TOOLING CATALOG

Or download the
HAEGER WIZZARD Phone App

PEMSERTER® MANUAL TOOLING CATALOG

PEMSERTER® AUTO TOOLING CATALOG

Performance Data(1)

ECCB™ PEM eConnect™ Contact Bushing

Type	Test Sheet Material			
	C110 Copper CuETP Rm240		Aluminum (1000 Series) 1050-H14	
	Installation		Installation	
	(lbs.)	(kN)	(lbs.)	(kN)
ECCB	7194	32	6744	30

ECCBF™ PEM eConnect™ Contact Bushing

Type	Test Sheet Material			
	C110 Copper CuETP Rm240		Aluminum (1000 Series) 1050-H14	
	Installation		Installation	
	(lbs.)	(kN)	(lbs.)	(kN)
ECCBF	7194	32	6744	30

ECKN™ PEM eConnect™ Nuts

Type	Test Sheet Material											
	C110 Copper CuETP Rm240						Aluminum (1000 Series) 1050-H14					
	Installation		Pullout		Torque-out		Installation		Pullout		Torque-out	
	(lbs.)	(kN)	(lbs.)	(N)	(in. lbs.)	(N•m)	(lbs.)	(kN)	(lbs.)	(N)	(in. lbs.)	(N•m)
ECKN	7644	34	146	649	124	14	6744	30	146	649	124	14

ECKS™ PEM eConnect™ Studs

Type	Test Sheet Material											
	C110 Copper CuETP Rm240						Aluminum (1000 Series) 1050-H14					
	Installation		Pullout		Torque-out		Installation		Pullout		Torque-out	
	(lbs.)	(kN)	(lbs.)	(N)	(in. lbs.)	(N•m)	(lbs.)	(kN)	(lbs.)	(N)	(in. lbs.)	(N•m)
ECKS	9442	42	360	1600	124	14	7194	32	154	686	124	14

PEM eConnect™ Pins

Type	Test Sheet Material							
	C110 Copper HRB 44				FR-4 Fiberglass			
	Installation		Pushout		Installation		Pushout	
	(lbs.)	(kN)	(lbs.)	(kN)	(lbs.)	(kN)	(lbs.)	(N)
EPCRB	5845	26	900	4	—	—	—	—
EPFRB	—	—	—	—	1710	7.6	169	750

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

Performance Data(1)

KFH™ Studs and KFB3 Nuts and Standoffs

	Type	Thread Code	Max. Nut Tightening Torque (in. lbs.)	Test Sheet Material .060" FR-4 Panel			
				Installation (lbs.)	Pushout (2) (lbs.)	Torque-out (in. lbs.)	Rated Current Amps (3)
Unified	KFH	440	4	400	65	7	14
		632	8	400	70	11	19
		832	15	400	80	16	24
		032	18	400	90	17	30
	KFB3	440	4	1000	140	18	42
		632	8	1500	170	28	88
		032	15	1600	180	30	100
		0420	18	1700	188	42	150

	Type	Thread Code	Max. Nut Tightening Torque (N·m)	Test Sheet Material 1.5mm FR-4 Panel			
				Installation (kN)	Pushout (2) (N)	Torque-out (N·m)	Rated Current Amps (3)
Metric	KFH	M3	0.45	1.8	285	0.79	15
		M4	1.6	1.8	355	1.8	23
		M5	2.1	1.8	400	1.92	32
	KFB3	M3	N/A	4.4	560	2.03	42
		M4	N/A	6	680	3.2	88
		M5	N/A	7.1	800	3.5	100
		M6	N/A	7.6	835	4.8	150

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

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

(3) The maximum carrying current for each of the above fasteners is calculated based on a heat transfer coefficient of 20 W/m^2 °K and a maximum temperature rise of 15°C / 27˚F above ambient.

SMTSOB™ Nuts and Standoffs

Type	Thread/ Thru-Hole Code	Test Sheet Material .062" Single Layer FR-4 Pushout (lbs.)	Pushout (N)	Torque-out (in. lbs.)	Torque-out (N•m)	Rated Current Amps (1)
SMTSOB	080	85.1	378.7	4.94	0.56	—
	256	56.5				40
	440	56.5				36
	632	93.5				55
	832	151.1				76
	116	—	—	—	—	37
	143	—	—	—	—	55
	M1	85.1	378.7	4.94	0.56	—
	M1.2	85.1	378.7	4.94	0.56	—
	M1.4	85.1	378.7	4.94	0.56	—
	M1.6	85.1	378.7	4.94	0.56	—
	M3	56.5	251	8.56	1	36
	M3.5	93.5	416	13.83	1.6	55
	M4	151.1	672	26.96	3	76
	3.1	—	—	—	—	36
	3.6	—	—	—	—	55
	4.2	—	—	—	—	75

SOAG™ Standoffs

	Type	Thread Code	Test Sheet Material .064" 5052-H34 Aluminum Installation (lbs.)	Pushout (lbs.)	Torque-out (2) (in. lbs.)	Pull-Thru (2) (lbs.)
Unified	SOAG	6440	1700	300	25	186
		8632	1700	400	45	248

	Type	Thread Code	Test Sheet Material 1.6mm 5052-H34 Aluminum Installation (kN)	Pushout (N)	Torque-out (2) (N•m)	Pull-Thru (2) (N)
Metric	SOAG	3.5M3	7.6	1330	2.82	825

HFHB™ Studs

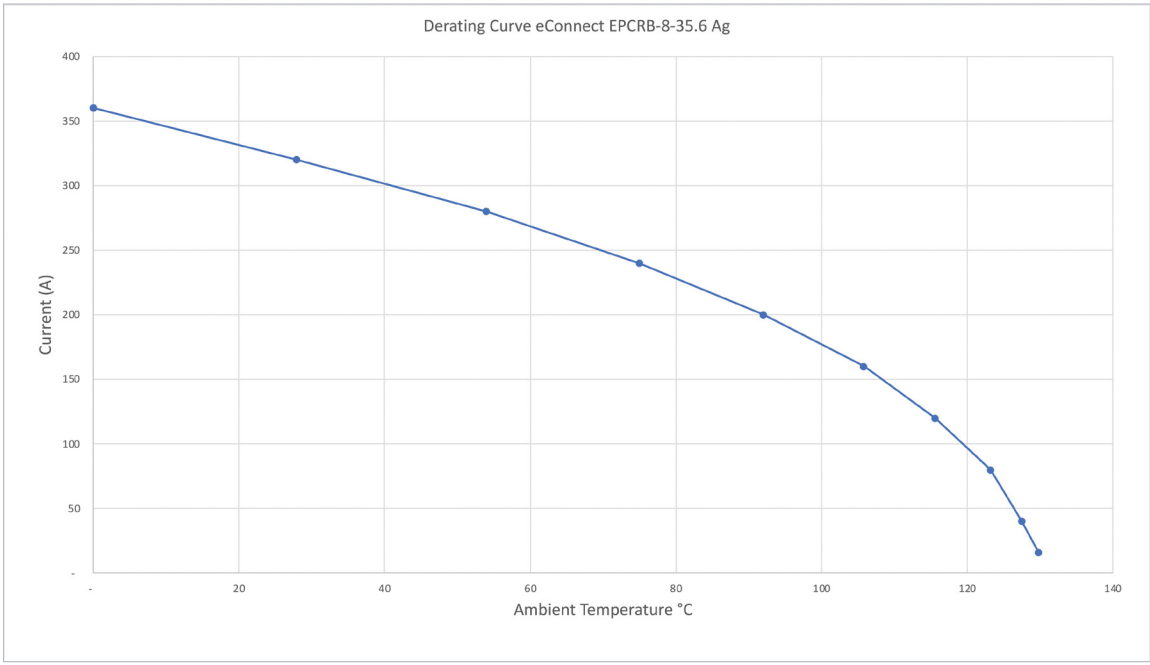
	Type	Thread Code	Rec. Nut Tightening Torque (ft. lbs.) (3)	Test Sheet Thickness and Material	Installation (4) (lbs.)	Pushout (lbs.)	Torque-out (ft. lbs.)	Tensile Strength (lbs.)
Unified	HFHB	032	1.7	.061" Copper CDA-110 HRB 28	3400	150	2.9	1200
		0420	3.6	.061" Copper CDA-110 HRB 28	6000	380	5	1908
		0518	7	.126" Copper CDA-110 HRB 32	7500	500	11	3140
		0616	13	.126" Copper CDA-110 HRB 32	12000	560	18	4650

	Type	Thread Code	Rec. Nut Tightening Torque (N•m) (3)	Test Sheet Thickness and Material	Installation (4) (kN)	Pushout (N)	Torque-out (N•m)	Tensile Strength (kN)
Metric	HFHB	M5	2.7	1.5mm Copper CDA-110 HRB 28	15.6	1115	3.4	5.9
		M6	4.5	1.5mm Copper CDA-110 HRB 28	25.3	1600	6.7	8.3
		M8	11	3.2mm Copper CDA-110 HRB 32	33	2250	15.3	15.1
		M10	22	3.2mm Copper CDA-110 HRB 32	53.3	2500	25	24

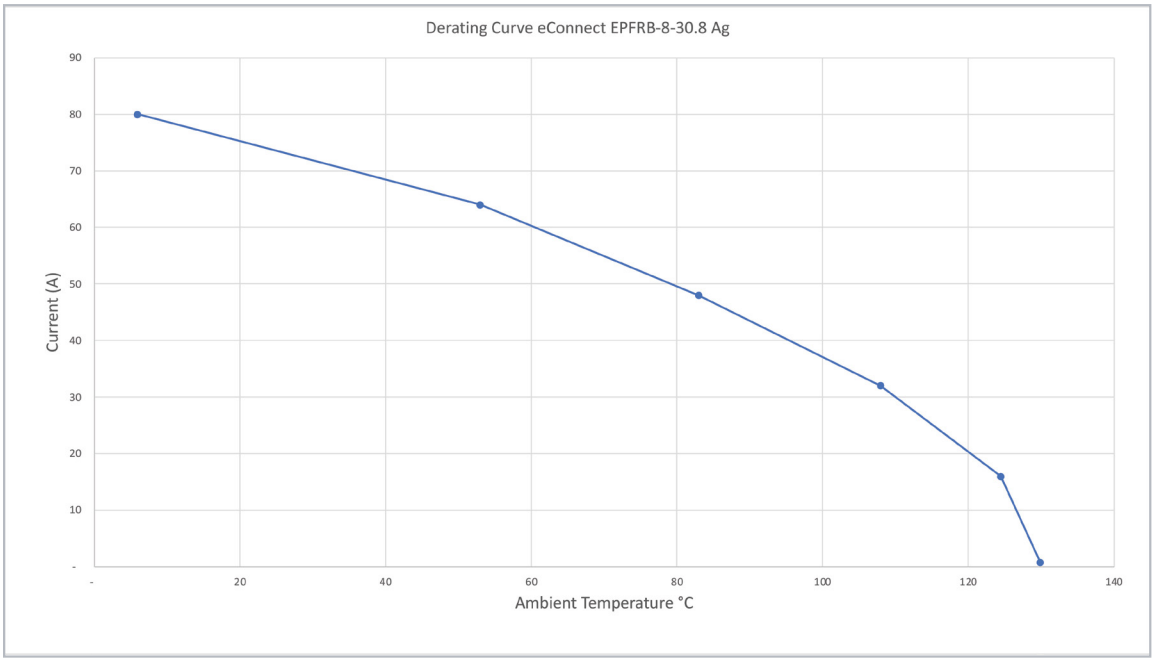
(1) The maximum carrying current for each of the above fasteners is calculated based on a heat transfer coefficient of 20 W/m^2 °K and a maximum temperature rise of 15°C / 27°F above ambient.
(2) Joint failure in torque-out and pull-thru will depend on the strength and type of screw being used. In some cases the failure will be in the screw and not in the self-clinching standoff. Please contact our Applications Engineering group with any questions.
(3) Tightening torque shown is a theoretical value calculated to induce a load of 75% of minimum axial yield strength of the stud with an assumed K value or nut factor equal to 0.20. In some applications tightening torque may need to be adjusted based on the actual K value.
(4) Installation controlled by proper cavity depth in punch.

Derating Curves

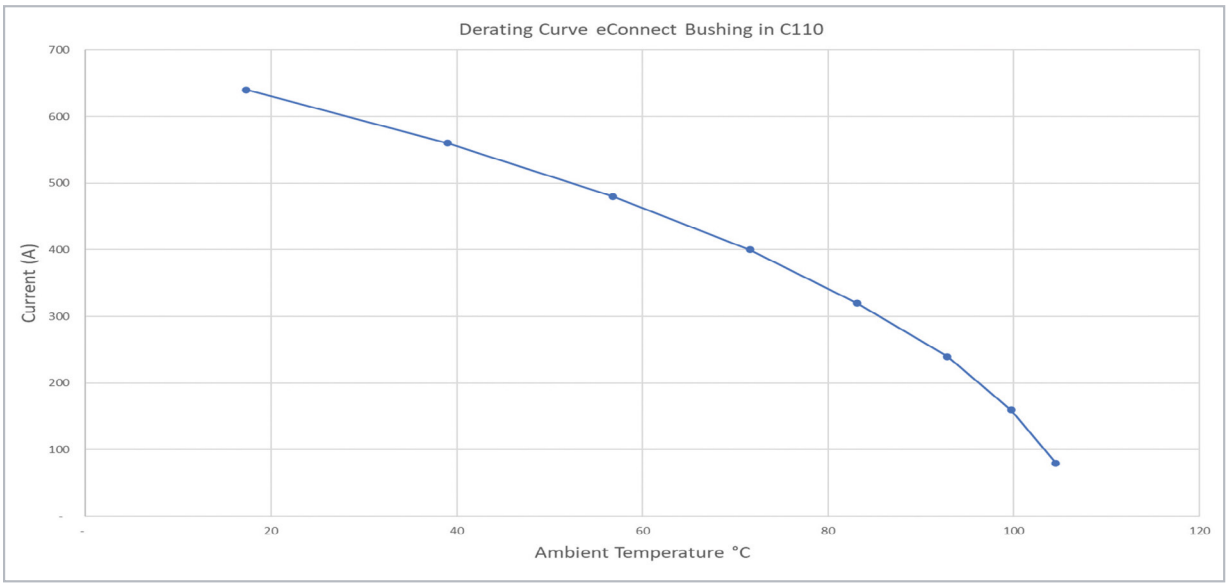
EPCRB™ Self Clinching Pin

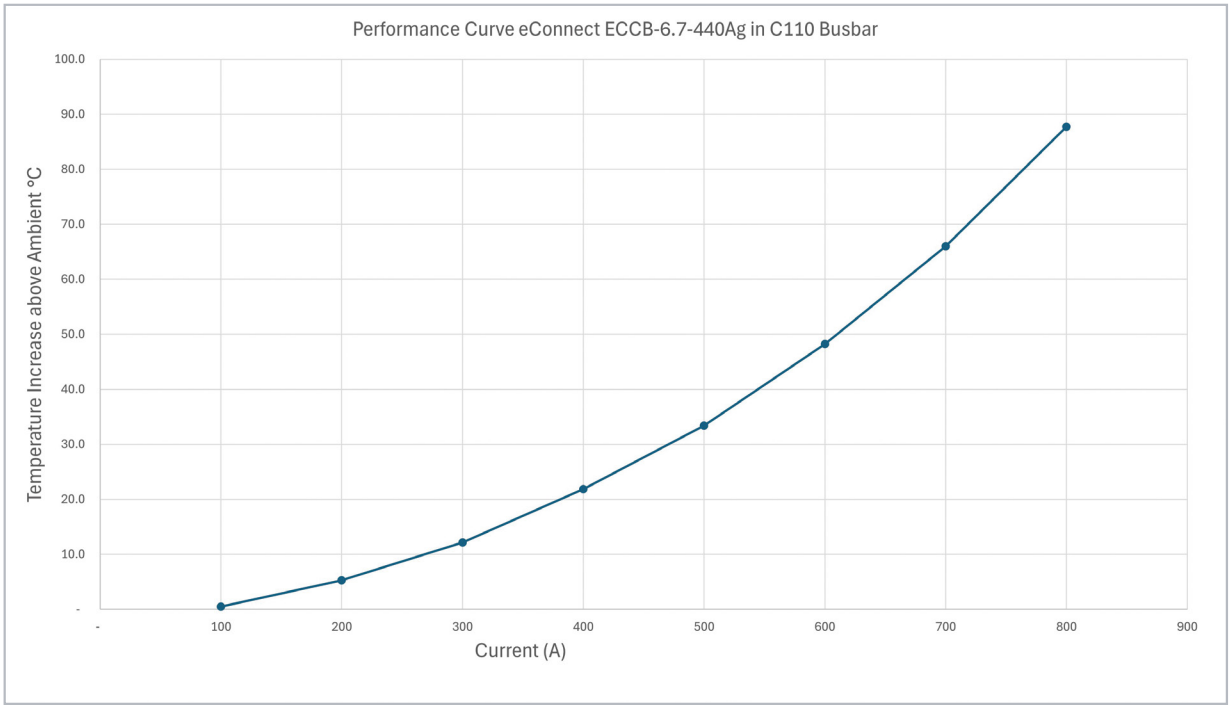


EPFRB™ Broaching Pin



ECCB™ Contact Bushing





The performance curve for the ECCB shows the Temperature vs. Current response, when installed in to CU ETP Busbar.
This was achieved by allowing the temperature increase to stabilise for each Ampere setting.
The test equipment used is in accordance with IEC 60512-5-2.

All PEM® products meet our stringent quality standards. If you require additional industry or other specific quality certifications, special procedures and/or part numbers are required. Please contact your local sales office or representative for further information.

Regulatory compliance information is available in Technical Support section of our website. Specifications subject to change without notice. See our website for the most current version of this bulletin.

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