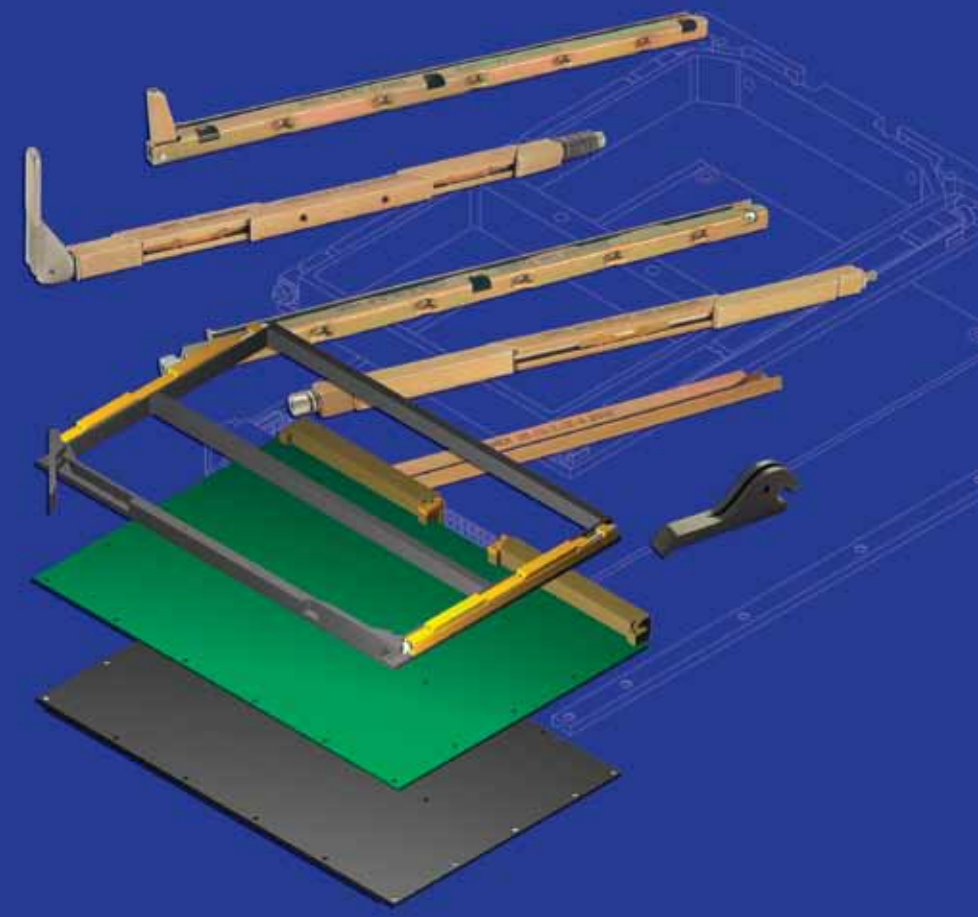
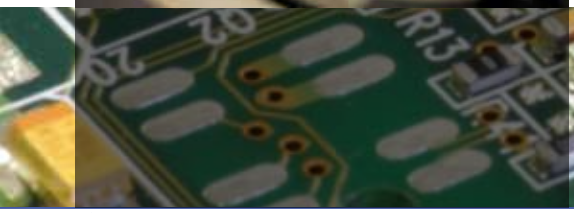
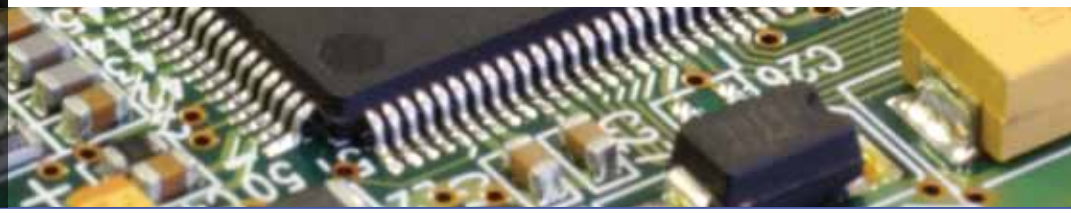
Birtcher®

Rugged Printed Circuit Board Hardware



2010 Edition, Vol. 2





Pentair
Technical Products

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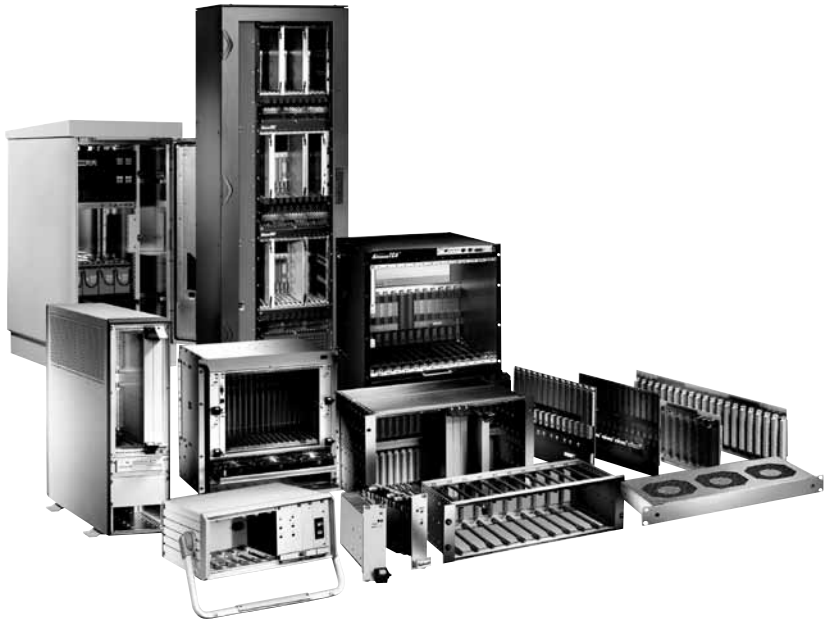
The Birtcher® brand, home of the original WEDGE-LOK®, also provides rugged printed circuit board card guides, conduction cooled frames for VME, CompactPCI®, PMC applications and extractors for use in non-benign airborne, ship-borne and rugged land transportation environments. In addition to our broad range of standard products, modifications can be made to meet customer-specific requirements.

Pentair Technical Products, a Pentair global business unit, is the leading provider of worldwide product and service solutions for enclosing, protecting and cooling electrical and electronic systems. Its industry-leading brands—Hoffman®, Schroff®, McLean® Cooling Technology, Calmark®, Birtcher®, Aspen Motion Technologies™ and Taunus™—provide a broad variety of standard, modified and engineered solutions to the commercial, communications, energy, general electronics, industrial, infrastructure, medical, and security and defense markets.



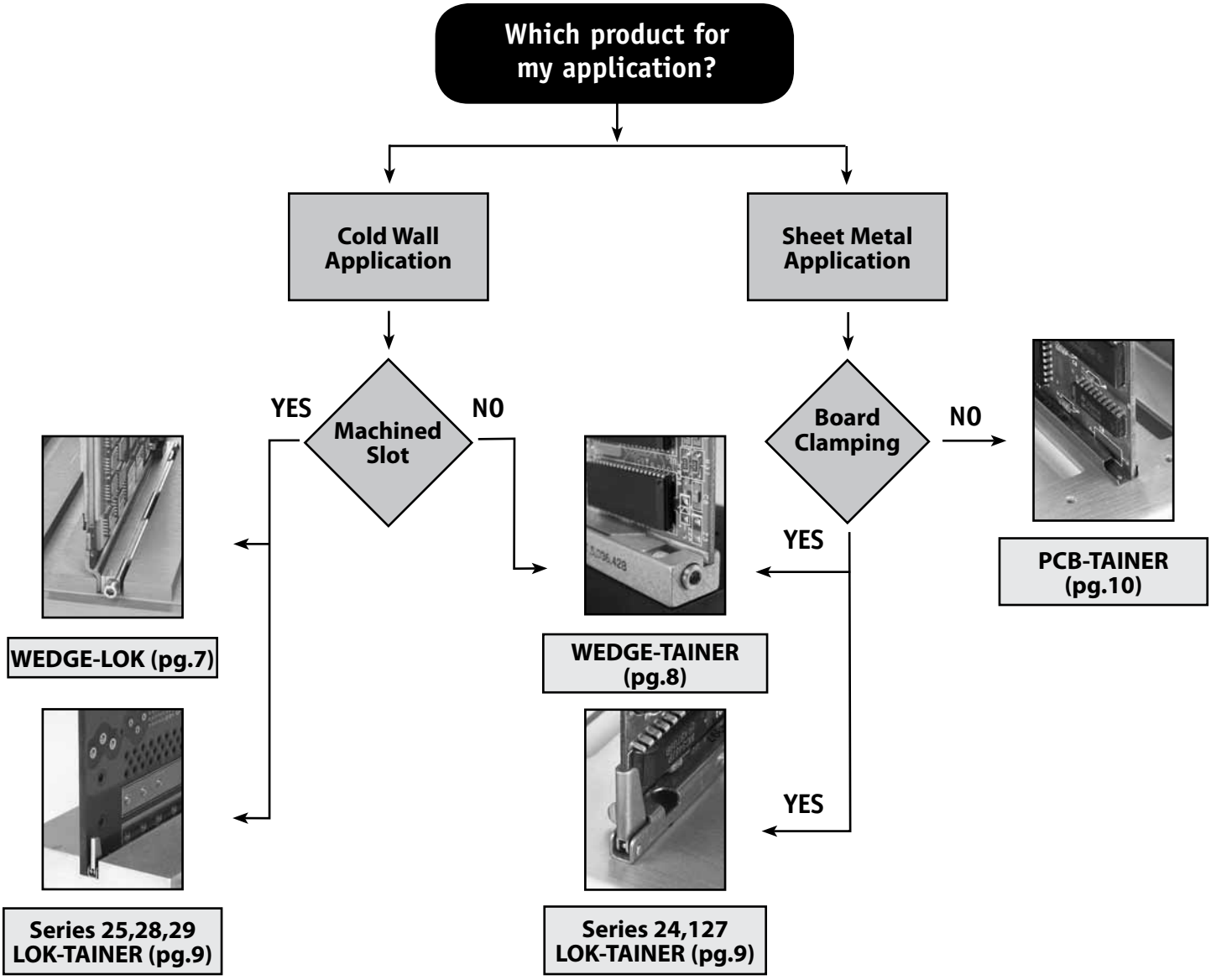
Global Capabilities

Fabrication Capabilities									
	Steel	Aluminum	Stainless Steel	Stamping	Chassis Assembly	Testing	Finishing	System Integration	Capacity
AMERICAS									
Anoka, MN USA	•	•	•		•	•	•	Level 1-4	720,000 sq. ft. (66,890 sq. m)
Mt. Sterling, KY USA	•		•				•	Level 1-2	310,000 sq. ft. (29,000 sq. m)
Warwick, RI USA	•	•	•		•	•	•	Level 1-5	170,000 sq. ft. (15,794 sq. m)
San Diego, CA USA		•		•	•	•		Level 1-5	60,000 sq. ft. (5,574 sq. m)
Reynosa, Mexico	•	•	•	•			•	Level 1-2	325,000 sq. ft. (30,193 sq. m)
Boituva, Brazil SA	•	•	•		•	•	•	Level 1-4	170,000 sq. ft. (15,794 sq. m)
ASIA / NEAR EAST									
Qingdao, China	•	•	•	•	•	•	•	Level 1-3	60,000 sq. ft. (5,574 sq. m)
Meiwa, Japan	•				•	•		Level 1-3	40,000 sq. ft. (3,716 sq. m)
Bangalore, India	•						•	Level 1-3	75,000 sq. ft. (6,968 sq. m)
EUROPE									
Straubenhardt, Germany	•	•	•	•	•	•	•	Level 1-3	577,000 sq. ft. (53,605 sq. m)
Dzierzoniow, Poland	•	•		•	•	•	•	Level 1-3	110,000 sq. ft. (10,219 sq. m)
Betschdorf, France	•	•	•		•	•	•	Level 1-3	205,000 sq. ft. (19,045 sq. m)

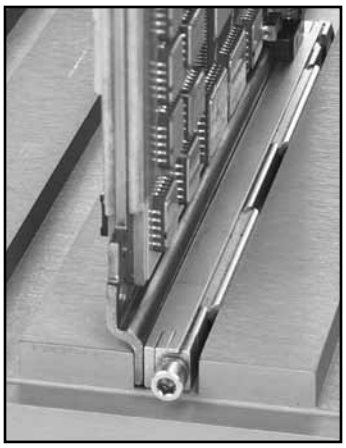
Birtcher® rugged card guides are available in four different product families:

- **WEDGE-LOK®**
- **WEDGE-TAINER™**
- **LOK-TAINER®**
- **PCB-TAINER™**

This product family selection chart will assist you in choosing the product family best suited for your application.



Once you have selected a product family, pages 7 through 10 will facilitate the selection of the correct product for your application based upon key performance criteria and product features.



The WEDGE-LOK® series of retainers offers the highest locking force available for cold wall applications. They mount to PC board assemblies using screws, rivets or adhesive bonding and are then inserted into machined channels of cold plates or heat exchangers. The wedge design holds the PC board firmly in place, providing high resistance to shock and vibration while producing maximum thermal transfer.

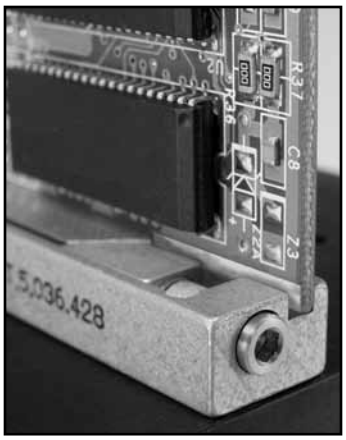
WEDGE-LOK

Product Series	3 or 5 Wedges	Actuation	Profile Width x Height in. (mm)	Length* Min to Max in. (mm)	Relative Clamping Force	Relative Retention Force	Relative Thermal Resistance	DSCC** Spec	DSCC CID	Relative Cost
40 (pg. 16)	3 pc.	Screw	.225 x .260 (5.72 x 6.60)	2.00 to 12.00 (50.8 to 304.8)	◑	◕	◔	84103	59590	◔
40-5 (pg. 18)	5 pc.	Screw	.225 x .260 (5.72 x 6.60)	5.00 to 12.00 (127.0 to 304.8)	◕	◕	◕	89064	59789	◑
41 (pg. 20)	3 pc.	Screw	.240 x .180 (6.10 x 4.57)	2.00 to 12.00 (50.8 to 304.8)	◔	◔	◔	84103	--	◔
42 (pg. 16)	3 pc.	Screw	.225 x .225 (5.72 x 5.72)	2.00 to 12.00 (50.8 to 304.8)	◔	◑	◔	84103	59590	◔
42-5 (pg. 18)	5 pc.	Screw	.225 x .225 (5.72 x 5.72)	5.00 to 12.00 (127.0 to 304.8)	◑	◕	◑	89064	59789	◑
44 (pg. 28)	3 pc.	Screw	.375 x .375 (9.53 x 9.53)	3.00 to 12.00 (76.2 to 304.8)	◑	◕	◑	--	--	◔
44-5 (pg. 30)	5 pc.	Screw	.375 x .375 (9.53 x 9.53)	5.00 to 12.00 (127.0 to 304.8)	●	●	●	--	59789	◕
45 (pg. 32)	3 pc.	Screw	.225 x .260 (5.72 x 6.60)	2.00 to 12.00 (50.8 to 304.8)	◔	◔	◔	--	--	◑
146CR (pg. 34)	3 pc.	Lever	.225 x .270 (5.72 x 6.90)	3.00 to 9.00 (76.2 to 228.6)	◔	◔	◔	--	--	◕
146CR-5 (pg. 36)	5 pc.	Lever	.225 x .270 (5.72 x 6.90)	5.00 to 12.00 (127.0 to 304.8)	◔	◔	◔	--	--	◕
48SL (pg. 38)	5 pc.	Screw	.250 x .260 (6.35 x 6.60)	4.80 to 12.00 (121.9 to 304.8)	◑	◑	◕	--	--	◕
48-5 (pg. 40)	5 pc.	Screw	.300 x .250 (7.62 x 6.35)	3.00 to 11.00 (76.2 to 279.4)	◔	◑	●	--	--	◕

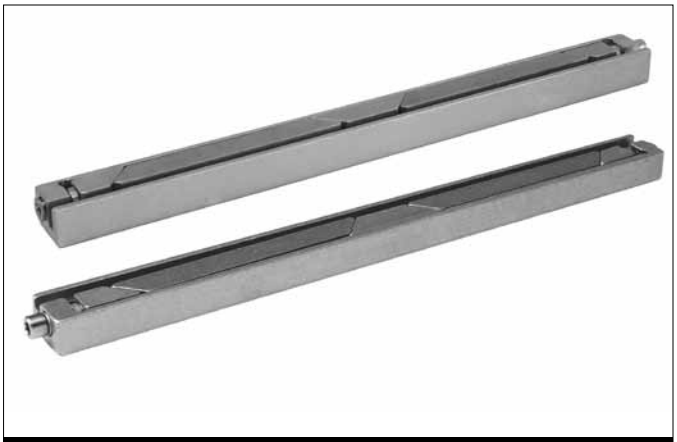
* for other lengths please consult factory ** Defense Supply Center, Columbus

• Relative performance data is based upon a 6.00-in. (152.4-mm) length part with Chem Film finish

700-lb. (3114-N) Clamping Force ● 750-lb. (3336-N) Retention Force ● 0.8 C/W/in. Thermal Resistance ●



The WEDGE-TAINER™ series of locking retainers is designed for heavy shock and vibration, and for effective heat dissipation in sheet metal chassis/heat sink applications. The design combines chassis mounted housings with WEDGE-LOK® retainers.



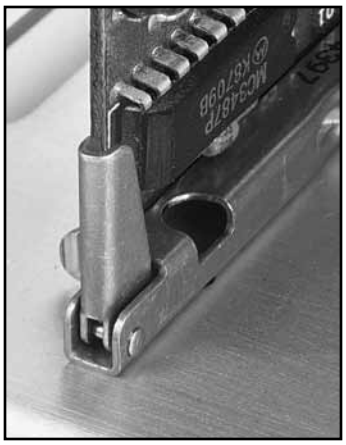
WEDGE-TAINER

Product Series	Actuation	Insertion Depth in. (mm)	Length* Min to Max in. (mm)	Relative Clamping Force	Relative Retention Force	Relative Thermal Resistance
340 **(pg. 42)**	Screw	.230 (5.84)	3.00 to 5.50 (76.2 to 139.7) 3 pc. 6.00 -12.50 (152.4 to 317.5) 5 pc.	◔	◑	◑
V340 **(pg. 42)**	Screw	.090 (2.29) (VME & cPCI)	3.00 to 5.50 (76.2 to 139.7) 3 pc. 6.00 -12.50 (152.4 to 317.5) 5 pc.	◔	◔	○

* for other lengths please consult factory

• Relative performance data is based upon a 6.00-in. (152.4-mm) length part with Chem Film finish

700-lb. (3114-N) Clamping Force ● 500-lb. (2224-N) Retention Force ● 0.8 C/W/in. Thermal Resistance ●



The LOK-TAINER® series of retainers are cam and lobe designs featuring lever or screw action for board retention. They are typically screw or rivet mounted to a sheet metal chassis, achieving a zero insertion force configuration as well as high resistance to shock and vibration. LOK-TAINERS also provide outstanding grounding characteristics.

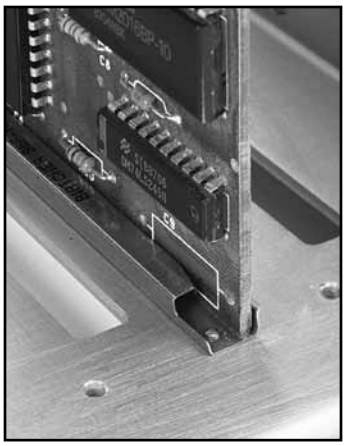
LOK-TAINER

Product Series	Cold Wall Application	Actuation	Length* Min to Max in. (mm)	Relative Clamping Force	Relative Retention Force	Relative Thermal Resistance	DSCC** Spec	Relative Cost
24 **(pg. 44)**	Yes	Lever	3.00 to 12.00 (76.2 to 304.8)	◔	◕	N/A	84168	◕
25 **(pg. 46)**	Yes	Lever	3.00 to 12.00 (76.2 to 304.8)	◔	◕	◑	86092	●
127 **(pg. 48)**	No	Screw	3.00 to 12.00 (76.2 to 304.8)	◕	●	N/A	88052	●
28/29 **(pg. 50)**	Yes	Screw	3.00 to 12.00 (76.2 to 304.8)	◕	◕	◕	--	●

* for other lengths please consult factory ** Defense Supply Center, Columbus

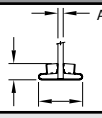
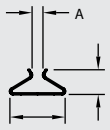
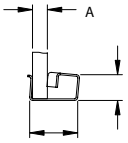
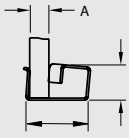
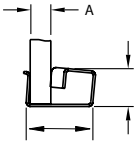
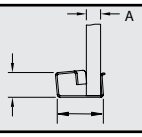
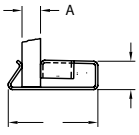
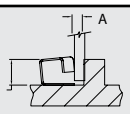
• Relative performance data is based upon a 6.00-in. (152.4-mm) length part with Cadmium Yellow finish

70-lb. (311-N) Clamping Force ● 50-lb. (222-N) Retention Force ● 1.5 C/W/in. Thermal Resistance ●



The PCB-TAINER™ series of retainers features a low-cost spring-action card retention design. They attach to the chassis using screws, rivets or adhesives and are designed primarily for use in sheet metal applications. The PCB-TAINER provides protection against shock and vibration and offers excellent grounding characteristics.

PCB-TAINER

Product Series		Board Thickness "A" in. (mm)	Height in. (mm)	Width in. (mm)	Length* Min to Max in. (mm)	Retention Force	DSCC** Spec	DSCC CID	Relative Cost
15 (pg. 52)*		.063 (1.59)	.190 (4.83)	.500 (12.7)	2.00 to 10.00 (50.8 to 254.0)	◔	--	--	●
21 (pg. 54)		.031 (.79) .063 (1.59) .094 (2.38) .125 (3.18)	.125 (3.18) .125 (3.18) .130 (3.30) .130 (3.30)	.190 (4.83) .190 (4.83) .200 (5.08) .210 (5.33)	1.00 to 6.00 (25.4 to 152.4)	◑	--	--	◑
35-1 (pg. 56)		.031 (.79) .063 (1.59) .094 (2.38) .125 (3.18)	.180 (4.57) .180 (4.57) .180 (4.57) .180 (4.57)	.360 (9.14) .360 (9.14) .360 (9.14) .400 (10.16)	2.00 to 6.00 (50.8 to 152.4)	◑	85020 85021	55563	◕
35-2 (pg. 58)		.031 (.79) .063 (1.59) .094 (2.38) .125 (3.18)	.130 (3.30) .130 (3.30) .130 (3.30) .130 (3.30)	.320 (8.13) .320 (8.13) .360 (9.14) .370 (9.39)	2.00 to 6.00 (50.8 to 152.4)	◑	--	--	◕
35-5 & 35-6 (pg. 60)		.031 (.79) .063 (1.59) .094 (2.38) .125 (3.18)	.180 (4.57) .180 (4.57) .180 (4.57) .180 (4.57)	.130 (3.30) .130 (3.30) .130 (3.30) .370 (9.39)	35-5: 1.37 (34.79) only 35-6: 1.00 to 6.00 (25.4 to 152.4)	◔	85020 85021	55563	35-5 ◑ 35-6 ◕
35-7 (pg. 62)		.031 (.79) .063 (1.59) .094 (2.38)	.125 (3.18) .125 (3.18) .125 (3.18)	.250 (6.35) .250 (6.35) .250 (6.35)	25.4 to 152.4 (1.00 to 6.00)	◔	85020 85021	55563	◕
35-8 (pg. 64)*		.031 (.79) .063 (1.59) .094 (2.38) .125 (3.18)	.130 (3.30) .130 (3.30) .130 (3.30) .130 (3.30)	.320 (8.13) .320 (8.13) .360 (9.14) .370 (9.39)	50.8 to 152.4 (2.00 to 6.00)	●	--	--	◕
37-1 37-6 (pg. 66)		N/A	.180 (4.57)	N/A	25.4 to 152.4 (1.00 to 6.00)	◔	--	--	◕

50-lb. (222-N) retention force ●

• Relative performance data is based upon a 6.00-in. (152.4-mm) length part with Cadmium Yellow finish

* Additional board thicknesses available. See individual product pages

Finish & Plating

The Birtcher product line is available in a wide variety of standard finishes. Most of the components are made of aluminum, stainless steel, beryllium copper or plastic. The standard finishes are:

For aluminum, standard finishes include:
- Chemical Film per Mil-C-5541 Class 1A or 3, Gold
- Chemical Film per Mil-DTL-5541 Class 3, Type II, Clear
- Black Anodize per Mil-A-8625 Type II, Class 2
- Hard Black Anodize per Mil-A-8625 Type III, Class 2
- Electroless Nickel per Mil-C-26074 Class 4, Grade B, Bright

For stainless steel, standard finish is:
- Passivation per Mil-S-5002

For BeCu, standard finishes include:
- Tin Plate per Mil-T-10727 Type I, Bright
- Nickel Plate per QQ-N-290 Class I, Grade F
- Electroless Nickel per Mil-C-26074 Class 4, Grade B, Bright
- Zinc Plate per ASTM-B633 Type III (Clear), SC1

For plastic card guides and extractors:
- Color coding is available for natural/white card guides and extractors
- Standard colors are BLK, BRN, RED, ORG, YEL, GRN, BLU, VIO and GRY

RoHS - Restriction of Hazardous Substances

The Birtcher product line offers several product configurations to meet the requirements of the European Directive 2002/95/EC for Restriction of Hazardous Substances. This European Directive affects primarily the aluminum components that are finished with a gold chemical film process. This process uses a hexavalent chromium (Cr+6). A clear chemical film process using a trivalent chromium (Cr+3) option has been added for customers who need to meet this requirement. Contact our applications engineers for more details regarding the RoHS requirements of specific items.

DFARS 252.225-7014 & Alt 1. Preference for Domestic Specialty Metals Clause

Birtcher products can support the needs of Prime Contractors and Subcontractors supplying product to the DOD, particularly the Preference for Domestic Specialty Metals Clause. This clause is applicable to DOD Prime Contract Awards exceeding the simplified acquistion threshold of products, components and assemblies for use in aircraft, missile and space systems, ships, tank and automotive items, weapon systems or ammunition.

For the Birtcher product line, this affects the hardware, components and materials that are made of stainless steel. At the time of this writing all COTS items, which include all part numbers configurable in this catalog, are exempt from the Preference for Domestic Specialty Metals Clause for Prime Contract Awards after October 25, 2007. Fastener DNAD waivers are also available for Prime Contract Awards between April 10, 2007 and July 26, 2008. There are many other exemptions available.

We recognize that our customers have different processes for handling this requirement, so we have implemented a process that we feel will accommodate the great majority of our customers' requirements. Because Class Deviations are not retro-active at this time, we do require that all quotations and purchase orders note this requirement along with the Prime Contract Number. We do charge for a signed DFARS 252.225-7014 & Alt 1. Statement Sheet that must accompany your order. For customers who can use the COTS exemption, we provide downloadable documents on our Web site. The product sheets will indicate from the Statement Sheet which statement applies to your product of interest. If these documents meet your needs, please indicate this in your quotation or P. O. Requests for a signed Statement Sheet can be accommodated for an additional fee.

DSCC - Defense Supply Center - Columbus

Birtcher standard products meet many of the specifications defined by Defense Supply Center – Columbus. The DSCC part numbers are incorporated into our standard product offering. To obtain the proper specification requirements, add a "BR-" prefix to our DSCC part configuration number. The DSCC part number will be included in the description. All part numbers defined in the DSCC specifications are considered Birtcher COTS items.

Design Flexibility – Common Modifications

The Birtcher product line offers an extremely broad range of configurations, not all of which are detailed in this catalog. Contact one of our applications engineers and a unique part number will be assigned for a product that meets your specification. Some of the available modifications include:

- 7 and 9 or more wedge segments
- Lengths
- Relocation or addition of mounting holes
- Tapped holes
- Screw head activation
- Specific individual wedge dimensions
- Replacement of split washers with Belleville washers
- Materials with different alloys
- Finish
- Lever lengths
- Hardware, including screw threads, thread-locking mechanism and bonded washers
- Secured wedges
- Modification of PCB-TAINERS™ and LOK-TAINERS™ to accommodate non-standard PCB thicknesses
- Plastic parts hot stamping
- Silkscreen or inkstamp

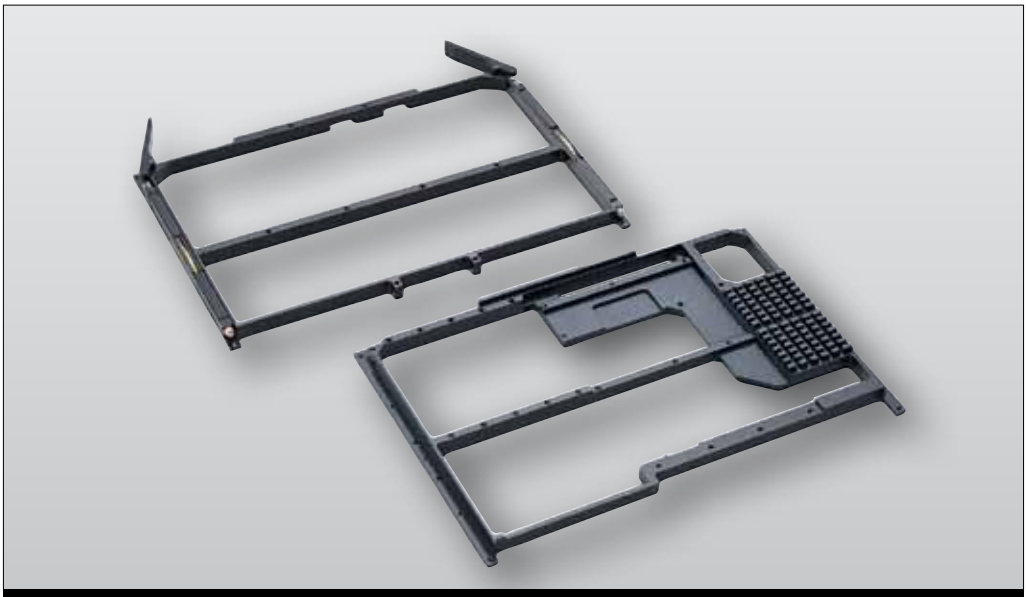
Our applications engineers can help you specify a cost-effective design for your application. This catalog offers the configurations that meet most applications, but if you don't see what you're looking for, please call us. Odds are, we've already created something very similar.

Warranty

Pentair Technical Products' Warranty guarantees product from defects for 1 (one) year after shipment.

Conduction Cooled Assemblies consist of a conduction cooled frame, backing plate or backing strips, extractors and wedge clamps. They are designed for circuit boards requiring cooling in severe environments where convection cooling is not practical. The assembly also provides needed structural support of the plug-in module during extremely high shock and vibration applications. Optional configuration for compliance to IEEE 1101.2 and VITA 30.1.

Birtcher offers a standard design that takes the guesswork out of the perimeter of the assembly. The component area can be customized to match your board and application.



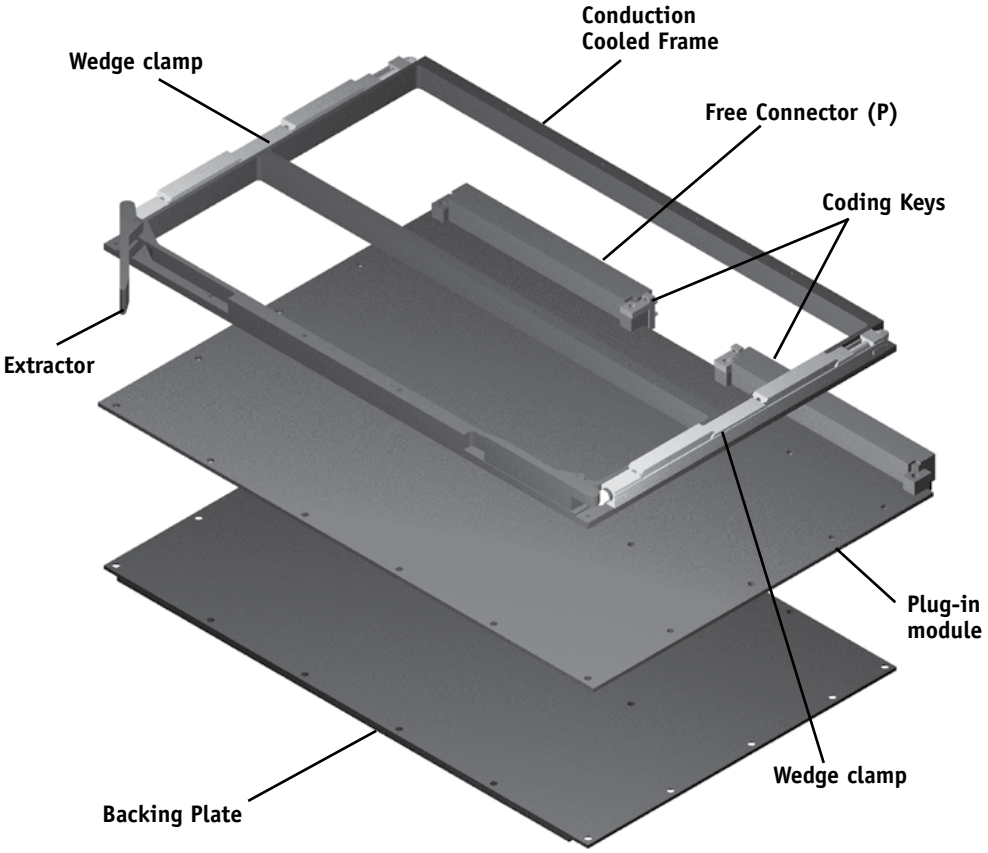
Custom Conduction Cooled Frames

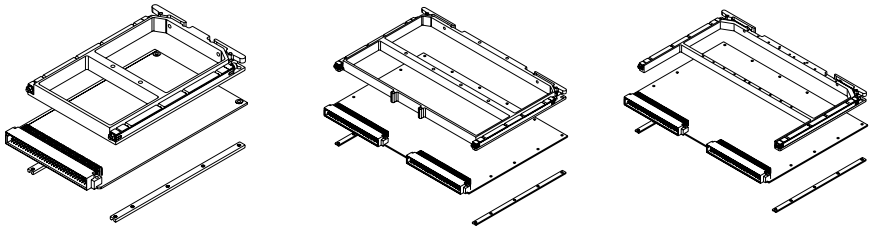
FEATURES

- Conduction frames available in 3U or 6U, VME/VME64x (IEEE 1101.2) or cPCI (VITA 30.1) based designs
- Can accommodate ccPMC (per VITA 20) or XMCs
- Extractors provide ample force to disengage board connectors
- Available in Black Anodize, Chem film or Electroless Nickel plating for excellent corrosion resistance
- 6061-T6 aluminum provides high thermal conductivity as well as lightweight support
- Locking Helicoils secure board fasteners in extreme vibration environments
- High-performance five-piece wedge clamp provides high clamping force with even pressure distribution for low thermal resistance
- Frame and backing plate are each machined from a solid piece to assure high heat transfer and structural integrity
- Custom silkscreen available

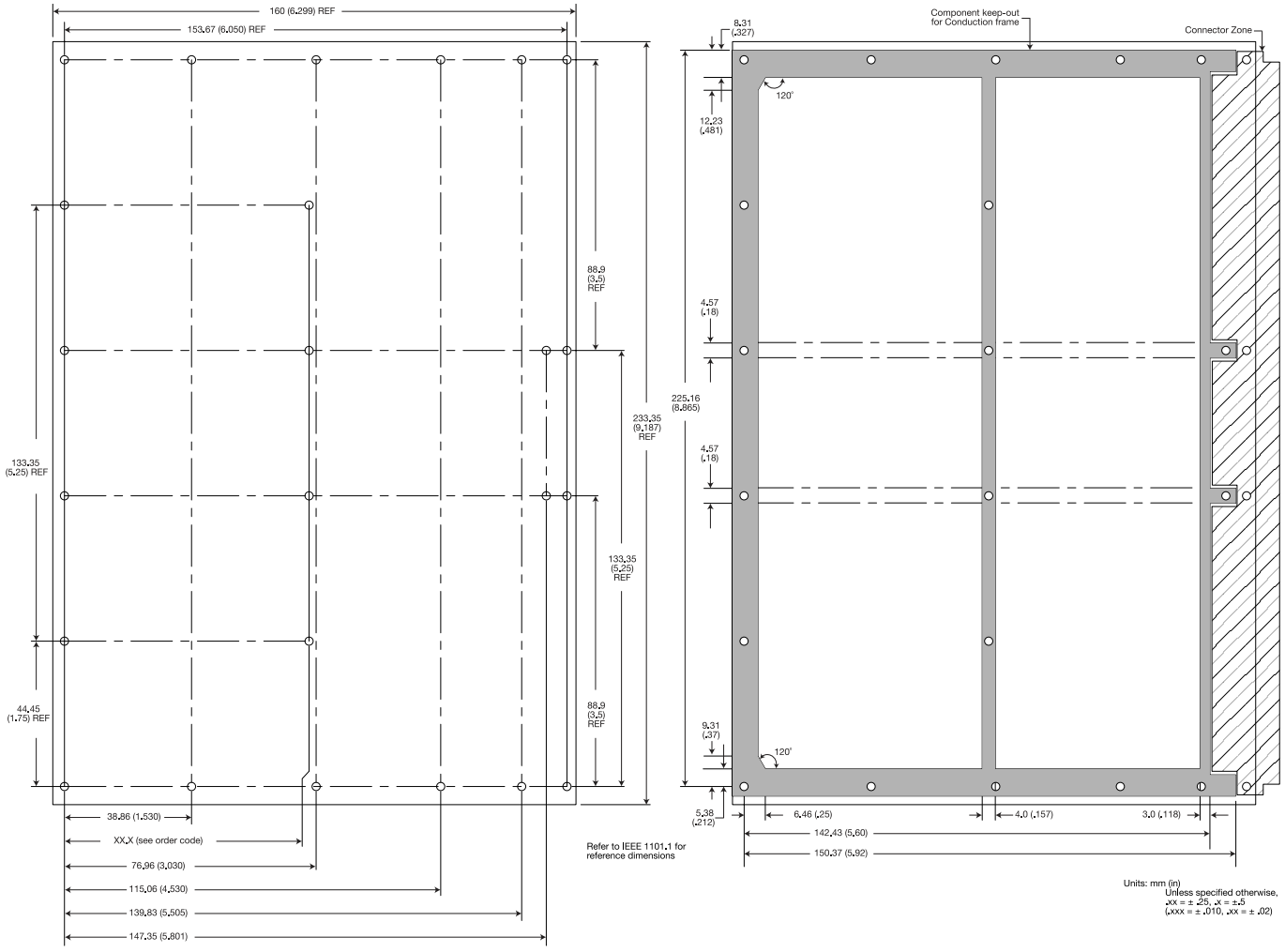
ACCESSORY

- Code Keys prevents VME64x Conduction Cooled Assemblies from inadvertent insertion into the wrong slot





- 3U and 6U designs are available with compliance to IEEE 1101.2 and VITA 30.1 specifications.
- Conduction Cooled PMC modules can be incorporated per VITA 20.



Part Number Code

Conduction Cooled Assemblies

	CC	3	V	XXX	G	B16	L
3U		**3**					
6U		**6**					
VME (1101.2)			**V**				
cPCI (VITA 30.1)			**C**				
Center rib location (mm.m)				**XXX**			
PMC for ccPMC mounting				**PMC**			
Gold Chemical Film Finish					**G**		
or choose from Finish Table [1]							
Backing Thermal strip 1.6 mm (for V option)						**B16**	
Backing Thermal strip 2.4 mm (for C option)						**B24**	
Backing Plate 1.6 mm (for V option)						**P16**	
Backing Plate 2.4 mm (for C option)						**P24**	
Latching Extractor handle							**L**
no latching							**[blank]**

Part Number Code example: CC3VPMCBP16L

Conduction Cooled Assembly 3U IEEE 1101.2 designed with ccPMC (VITA 20) mounting, black anodized, with 1.6-mm backing plate and latching extractors

[1] FINISH TABLE

Code Letter	Finish
"G"	Gold Chemical Film per Mil-C-5541 Class 1A
"C"	Clear Chemical Film per Mil-DTL-5541 Class 3, Type II
"B"	Black Anodize per Mil-A-8625 Type II, Class 2
"N"	Electroless Nickel per Mil-C-26074 Class 4, Grade B, Bright

Birtcher has the answer for those IEEE 1101.10 applications with keying requirements, but do not have front panels.

IEEE 1101.10 specifications provides a method for keying slots using programming keys inserted into the front panel assembly and card guide. Unfortunately, many military and ruggedized systems do not use this front panel system. VITA 1.6 standard provides a method of keying for these types of systems.

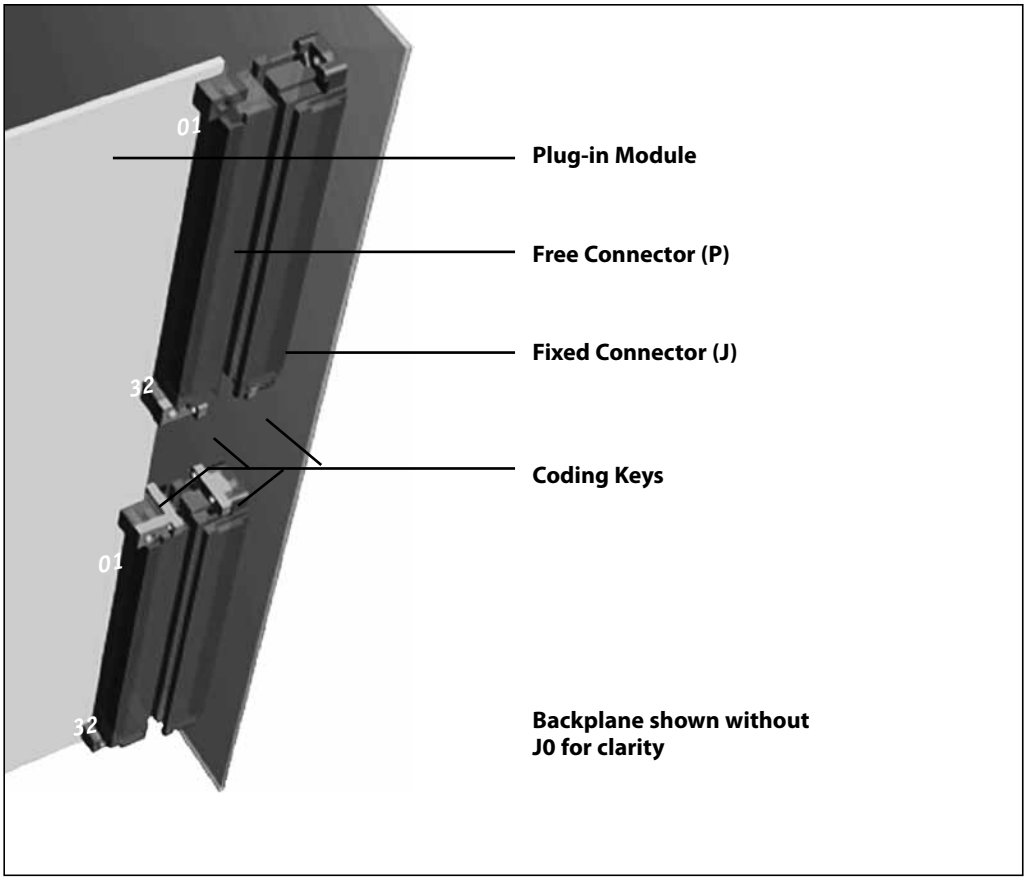
FEATURES

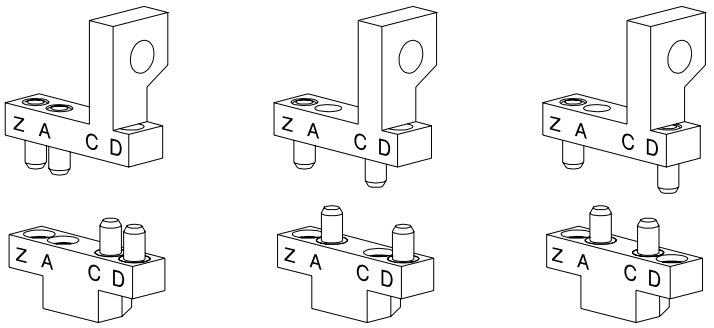
- Complies with VITA 1.6 standard
- Gold Chem Film aluminum bracket
- 6 configurations per coding bracket set
- 36 configurations in a 6U conduction cooled application
- Up to 1296 Keying combinations in a 6U non-conduction cooled application
- Includes complimentary mounting hardware

WEIGHT

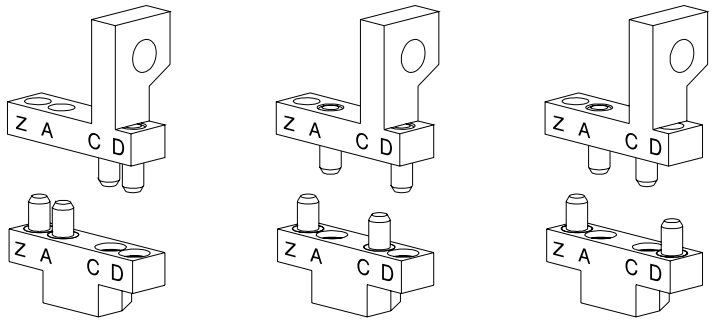
- 100 pcs. = 0.32 lb. (145 g)

Coding Keys





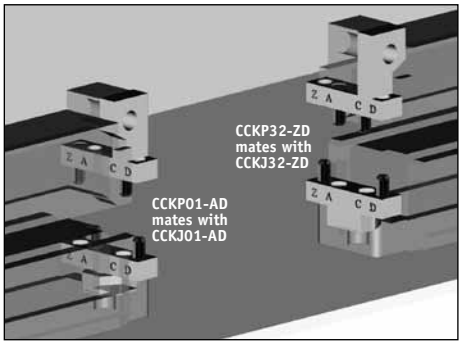
CD key pair | AD key pair | AC key pair

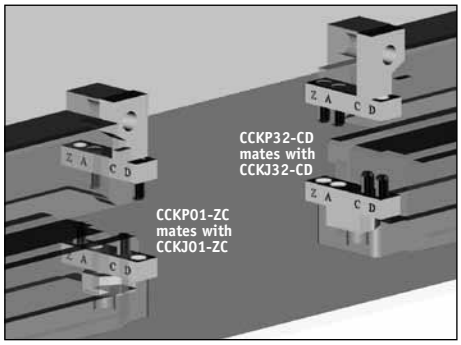


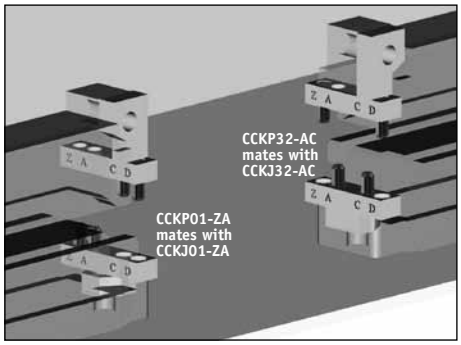
ZA key pair | ZC key pair | ZD key pair

For interface dimensions, refer to ANSI/VITA 1.6

*The drawings above are representative of the J32 and P32. J01 and P01 are mirror images.







Samples of coding device usage - notations on brackets are for reference only

Part Number Code

Conduction Cooled Keying **CCK x x - x -x -x**

Board or Backplane

Free Connector:	**P**
Fixed Connector:	**J**

Connector End

01	**01**
32	**32**

Keying Configuration

ZA	**ZA**
ZC	**ZC**
ZD	**ZD**
AC	**AC**
AD	**AD**
CD	**CD**

Thread Type

Metric 2.5-mm x .45 thread:	**[Blank]**
Imperial 2-56 thread:	**1**
Imperial 2-56 locking helicoil:	**2**
Metric 2.5-mm x .45 locking helicoil:	**3**

Finish Type

Chem Film Gold	**[Blank]**
Chem Film Clear	**CC**

Also available in Kit Form (see contents example, below)

CCK-KIT -x -x

Keying Configuration

ZA	**ZA**
ZC	**ZC**
ZD	**ZD**
AC	**AC**
AD	**AD**
CD	**CD**

Thread Type

Metric 2.5-mm x .45 thread:	**[blank]**
Imperial 2-56 thread:	**-1**
Imperial 2-56 thread helicoil:	**-2**
Metric 2.5-mm x .45 locking helicoil:	**-3**

Example of Kit Contents:

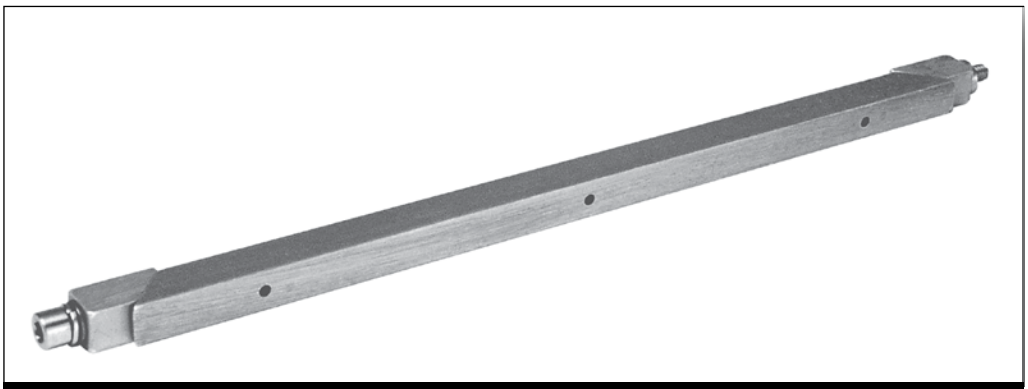
CCK-KIT-ZA

Qty	Item
1	CCKP01-ZA
1	CCKJ01-ZA
1	CCKP32-ZA
1	CCKJ32-ZA
4	Mounting Screws (complimentary)
4	Washers

FEATURES

Relative Clamping Force*	◑
Relative Retention Force*	◕
Relative Thermal Resistance*	◔
Relative Price	◔

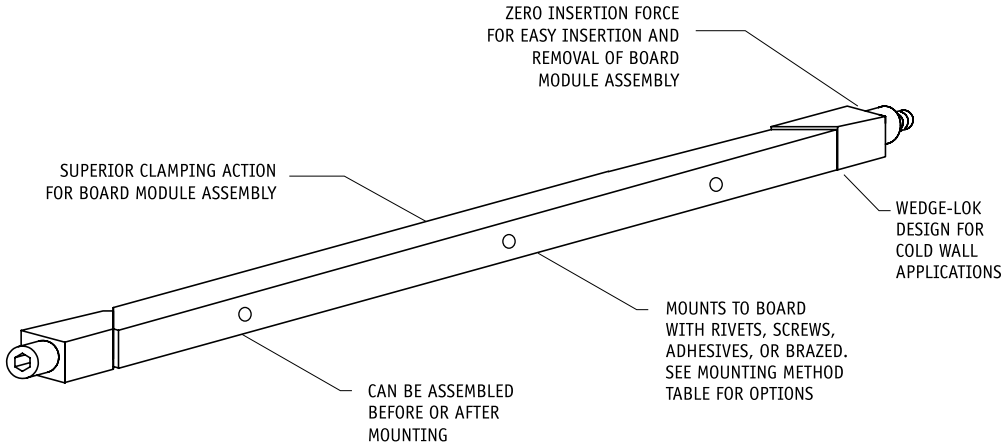
**For mechanical and thermal peformance data see the Technical Applications section pages 74-92*



Series 40 WEDGE-LOK *DSCC 84103 & CID 59590*

DESIGNED FOR HEAVY SHOCK, VIBRATION, AND HEAT DISSIPATION

5.72 (.225) X 6.60 (.260) PROFILE



WEDGES

Material:
Aluminum Alloy 6061-T6 per QQ-A-200/8

Finish:
See finish table on opposite page

SCREW

.09-in. or 2.5-mm hex. socket-head cap screw, depending on mounting configuration

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

OPTION LOCK & FLAT WASHER

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

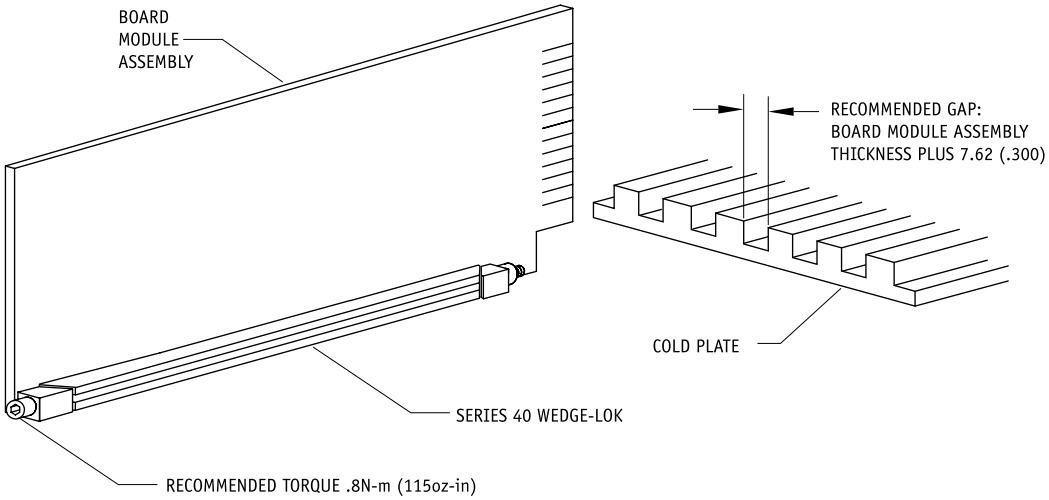
LOCKNUT

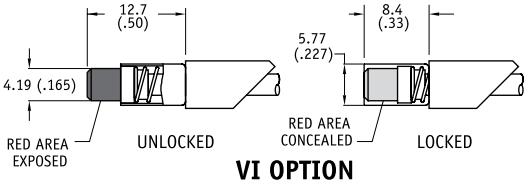
Material:
Type A286 stainless steel per ASTM AMS 5525 (or similar)

Finish:
Silver plate per AMS 2410

WEIGHT

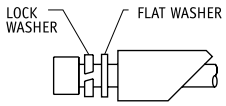
.096 oz./in. (1.07 g/cm)





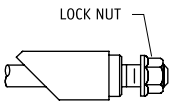
VI OPTION

Indicates assembly is unlocked (adds 5.1 (.20) to screw length)



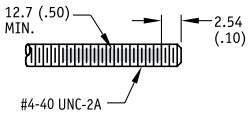
LF OPTION

Provides additional resistance to shock and vibration (adds 2.5 (.10) to screw length)



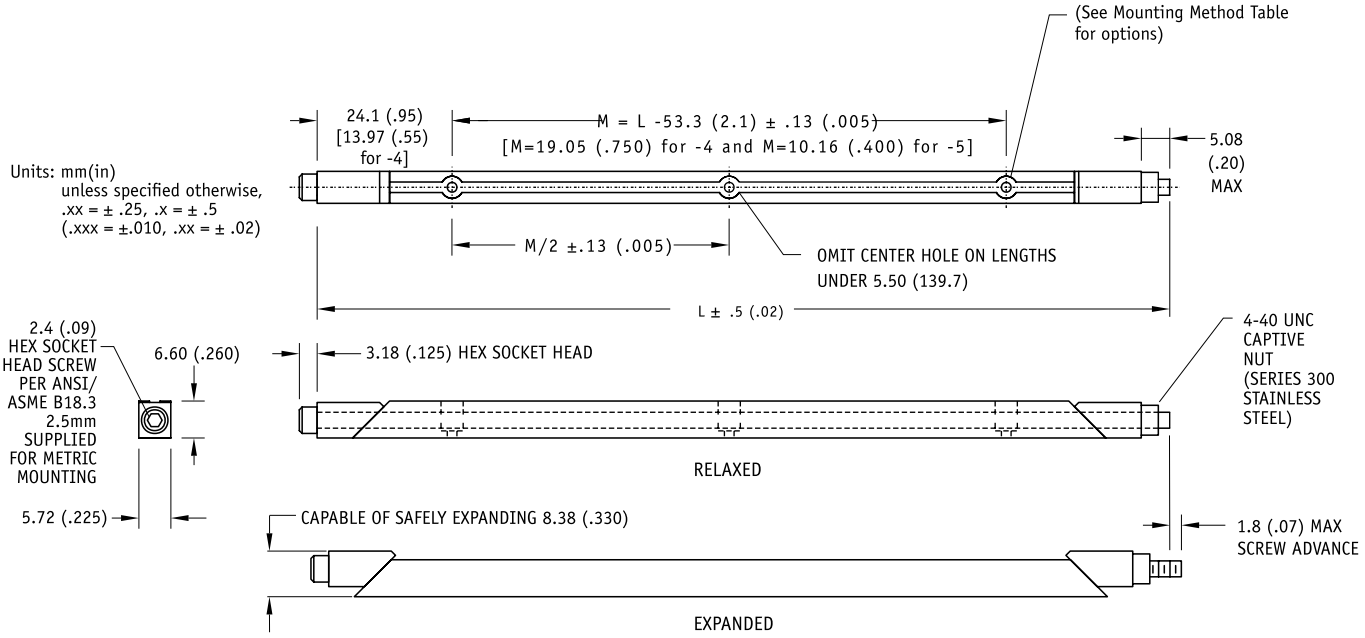
LN OPTION

Captivates rear wedge when untorqued (adds 2.5 (.10) to screw length)



L OPTION

Provides additional resistance to shock and vibration



Part Number Code (See example at right)

Series 40 WEDGE-LOK Three-piece **40** **x** **-x** **-x** **-x** **-x** **-x** **-x** **-x**

Optional Visual Indicator
Visual Indicator _____ **VI**
None _____ **[Blank]**

Length
Length in .500 (12.7) increments ____ 4 [2.00 (50.8)]
_____ to 24 [12.00 (304.8)]

Finish
Chem Film _____ **[Blank]**
or select code letter from Finish Table _____ 1

Lock/Flat Washers and Locknut
Lock Washer and Flat Washer _____ **LF**
None _____ **[Blank]**

Lock Nut _____ **LN**
None _____ **[Blank]**

Mounting
Standard Rivet Holes _____ **[Blank]**
or select code letter from Mounting Method Table _____ 2

Lock Patch
Lock Patch _____ **L**
None _____ **[Blank]**

Part Number Code example: 40VI-12-LF

Series 40 WEDGE-LOK Three-piece, 6.00 (152.4) long, with Visual Indicator option, Chem Film finish, standard rivet hole mounting, and Lock and Flat Washer option.

❶ FINISH TABLE

Code Letter	Finish (see pg.11 for RoHS Compliance)
[blank]	Chemical Film per MIL-C-5541, Class 1A, Gold, non RoHS compliant
CC	Chemical Film per MIL-C-5541, Class 1A, Clear
EN	Electroless Nickel per MIL-C-26074, Class 4, Grade B, Bright
N	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright (.0002")
B	Black Anodize per MIL-A-8625, Type II, Class 2, (.00005" - .0003")
B3	Hard Black Anodize per MIL-A-8625, Type III, Class 2 (.002")
B3D	Hard Black Anodize with Dry Film Lube per MIL-L46010

❷ MOUNTING METHOD TABLE

Code Letter	Method
NONE	Rivet Mount (Ø 1.70 +.10/-.03 (.067 +.004/.001) THRU ⌴ Ø 3.96 (.156) ▽ 3.30 (.200) ⌵ Ø 3.56 (.140) x 100°)
A	No mounting holes
S	2-56 UNC-2B tapped hole
T	0-80 UNF-2B tapped hole
M2	M2 x .40 tapped hole
M	M2.5 x .45 tapped hole
P	Indexing Pins Ø.062 x .040" (two pins only)

Indexing pins (-P) and rivet (blank) parts are shipped unassembled.
Center wedge is unplated and unmarked for Indexing pins (-P) method.

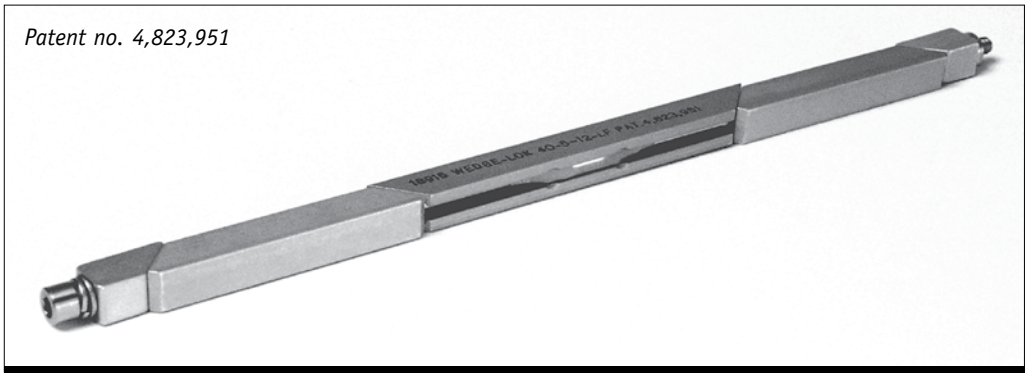
FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

Relative Clamping Force*	◕
Relative Retention Force*	◕
Relative Thermal Resistance*	◕
Relative Price	◑

*For mechanical and thermal peformance data see the Technical Applications section pages 74-92

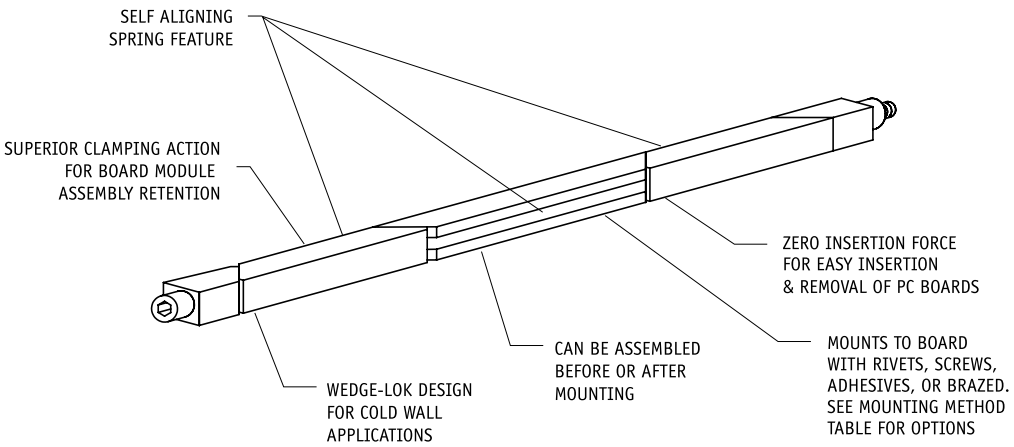
Patent no. 4,823,951



Series 40-5 WEDGE-LOK ***DSCC 89064 & CID 59789***

DESIGNED FOR HEAVY SHOCK, VIBRATION, AND HEAT DISSIPATION

5.72 (.225) X 6.60 (.260) PROFILE



WEDGES

Material:
Aluminum Alloy 6061-T6 per QQ-A-200/8

Finish:
See Finish table on opposite page

SCREW

.09-in. or 2.5-mm. socket head cap screw, depending on mounting configuration

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

ALIGNMENT SPRINGS

Material:
Beryllium Copper QQ-C-533

Finish:
Nickel QQ-N-290 Class I, Grade G, Bright

OPTION
LOCK & FLAT WASHER

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

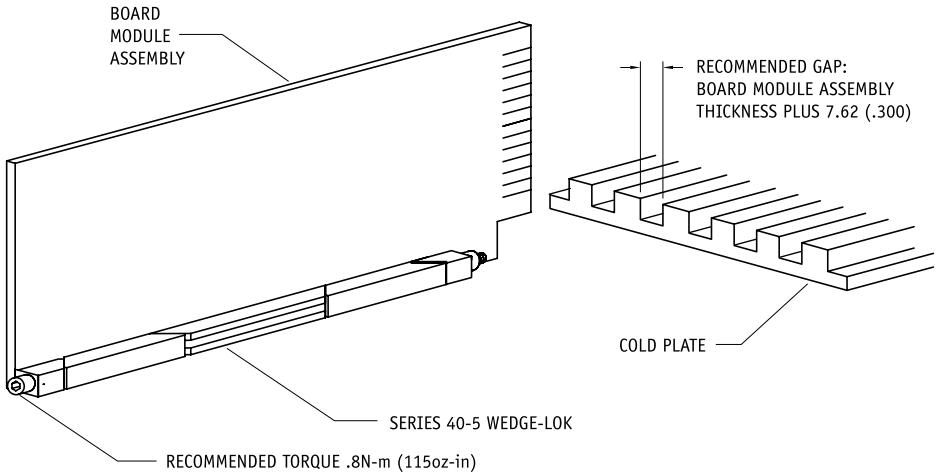
LOCKNUT

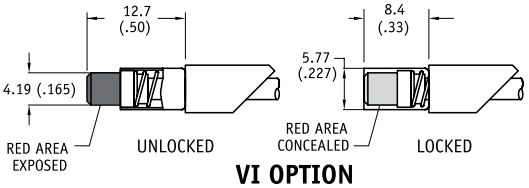
Material:
Type A286 stainless steel per ASTM AMS 5525 (or similar)

Finish:
Silver plate per AMS 2410

WEIGHT

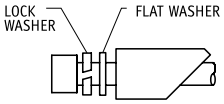
1.04 oz./in. (1.16 g/cm)





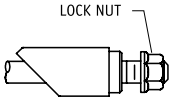
VI OPTION

Indicates assembly is unlocked
(adds 5.1 (.20) to screw length)



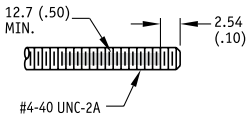
LF OPTION

Provides additional resistance to shock and vibration (adds 2.5 (.10) to screw length)



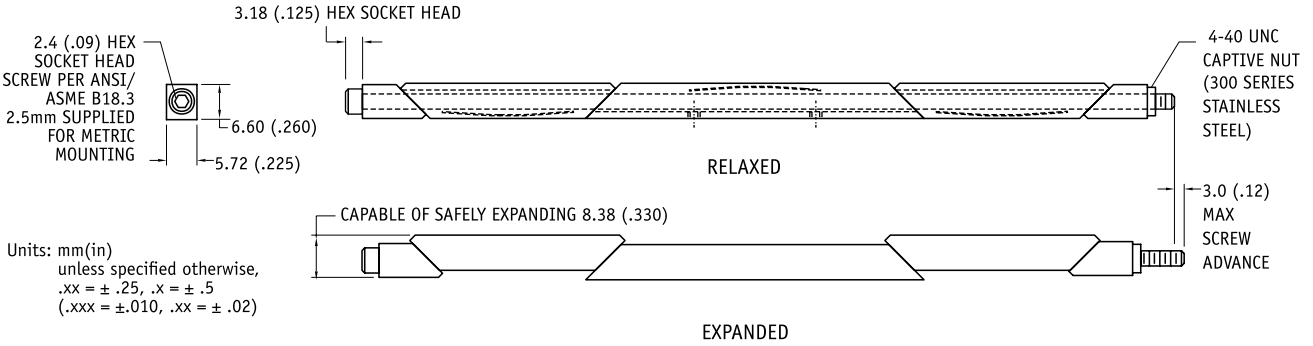
LN OPTION

Captivates rear wedge when untorqued (adds 2.5 (.10) to screw length)



L OPTION

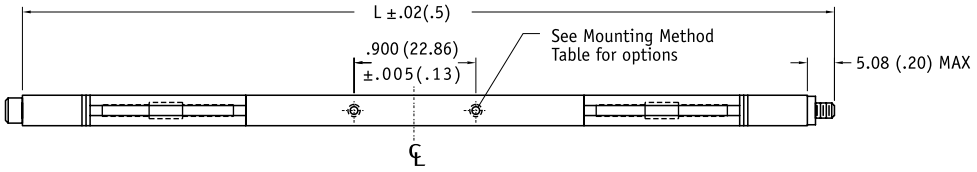
Provides additional resistance to shock and vibration



Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)

MOUNTING HOLE LOCATION

22.86 (.900) hole spacing centered on mounting body
-10 thru -13 2 holes
-14 thru -24 4 holes



Part Number Code (See example below)

Series 40-5 WEDGE-LOK Five-piece **40-5** **x -x -x -x -x -x -x**

Optional Visual Indicator
Visual Indicator _____ **VI**
None _____ **[Blank]**

Length
Length in .500 (12.7) increments _10 [5.00 (127.0)]
_____ to 24 [12.00 (304.8)]

Finish
Chem Film _____ **[Blank]**
or select code letter from Finish Table _____ 1

Lock/Flat Washers and Locknut
Lock Washer and Flat Washer _____ **LF**
None _____ **[Blank]**

Lock Nut _____ **LN**
None _____ **[Blank]**

Mounting
Standard 2-56 thread _____ **[Blank]**
or select code letter from Mounting Method Table _____ 2

Lock Patch
Lock Patch _____ **L**
None _____ **[Blank]**

Part Number Code example: 40-5-20-LF-LN-M

Series 40-5 WEDGE-LOK Five-piece, 10.00-in. (254.0-mm) long, chem film finish, with Lock Washer and Flat Washer option and Lock Nut option, Screw M2.5 x .45 metric mounting.

❶ FINISH TABLE

Code Letter	Finish (see pg.11 for RoHS Compliance)
[blank]	Chemical Film per MIL-C-5541, Class 1A, Gold, non RoHS compliant
A	No Mounting Holes
CC	Chemical Film per MIL-C-5541, Class 1A, Clear
EN	Electroless Nickel per MIL-C-26074, Class 4, Grade B, Bright
N	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright (.0002")
B	Black Anodize per MIL-A-8625, Type II, Class 2, (.00005" - .0003")
B3	Hard Black Anodize per MIL-A-8625, Type III, Class 2 (.002")
B3D	Hard Black Anodize with Dry Film Lube per MIL-L46010

❷ MOUNTING METHOD TABLE

Code Letter	Method
NONE	2-56 UNC-2B tapped hole
R	Rivet Mount (Ø 1.70 +.10/-.03 (.067 +.004/.001) THRU ⌴ Ø 3.96 (.156) ⌵ 3.30 (.200) ⌵ Ø 3.56 (.140) x 100°)
A	No Mounting Holes
T	0-80 UNF-2B tapped hole
M2	M2 x .40 tapped hole
M	M2.5 x .45 tapped hole
P	Indexing Pins Ø.062 x .040" (two pins only)

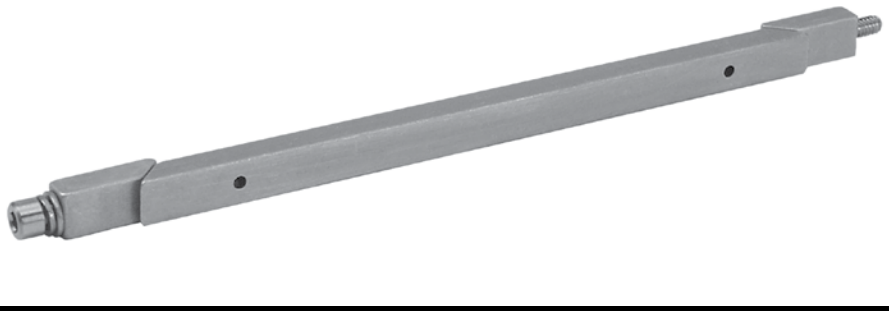
Indexing pins (-P) and rivet (-R) parts are shipped in un-snapped configuration. Center wedge is unplated and unmarked for Indexing pins (-P) method.

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

Relative Clamping Force*	◔
Relative Retention Force*	◔
Relative Thermal Resistance*	◔
Relative Price	◔

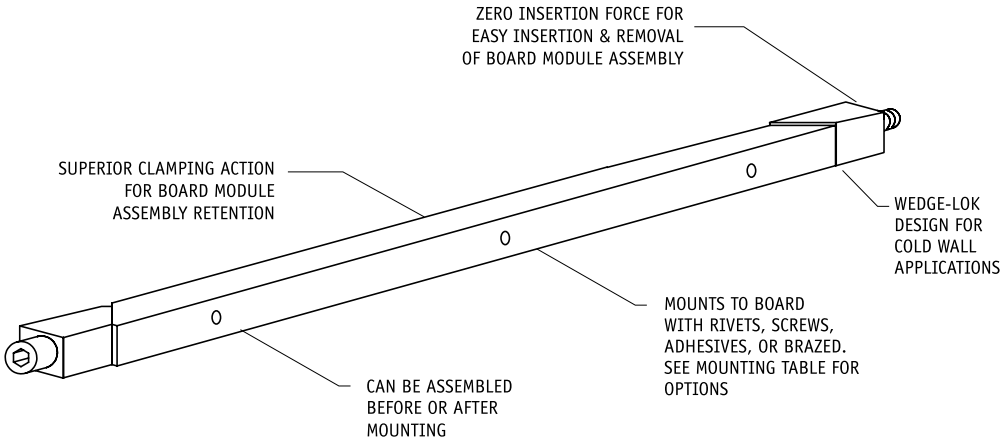
For mechanical and thermal peformance data see the Technical Applications section pages 74-92



Series 41 WEDGE-LOK *DSCC 84103*

DESIGNED FOR HEAVY SHOCK, VIBRATION & HEAT DISSIPATION

6.10 (.240) X 4.57 (.180) PROFILE



WEDGES

Material:
Aluminum Alloy 6061-T6 per QQ-A-200/8

Finish:
See finish table on opposite page

SCREW

.09-in. or 2.5-mm hex. socket head cap screw, depending on mounting configuration

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

OPTION
LOCK & FLAT WASHER

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

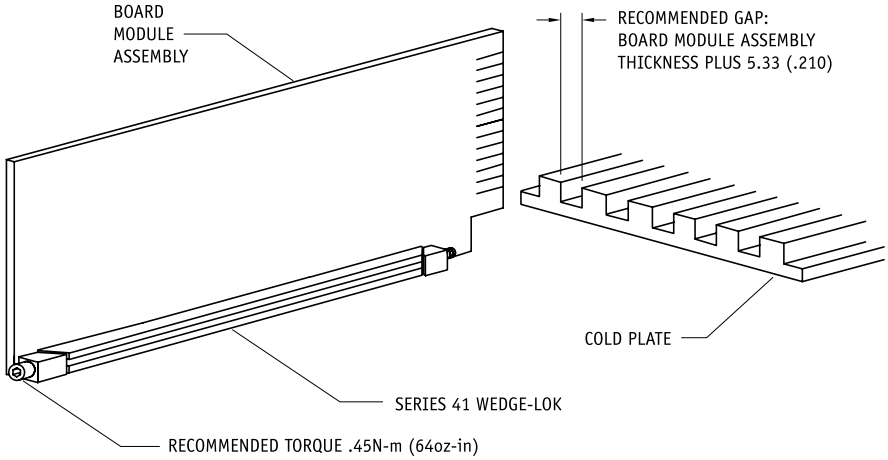
LOCKNUT

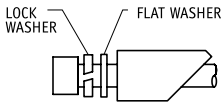
Material:
Type A286 stainless steel per ASTM AMS 5525 (or similar)

Finish:
Silver plate per AMS 2410

WEIGHT

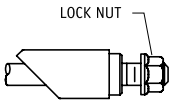
.083 oz./in. (.93 g/cm)





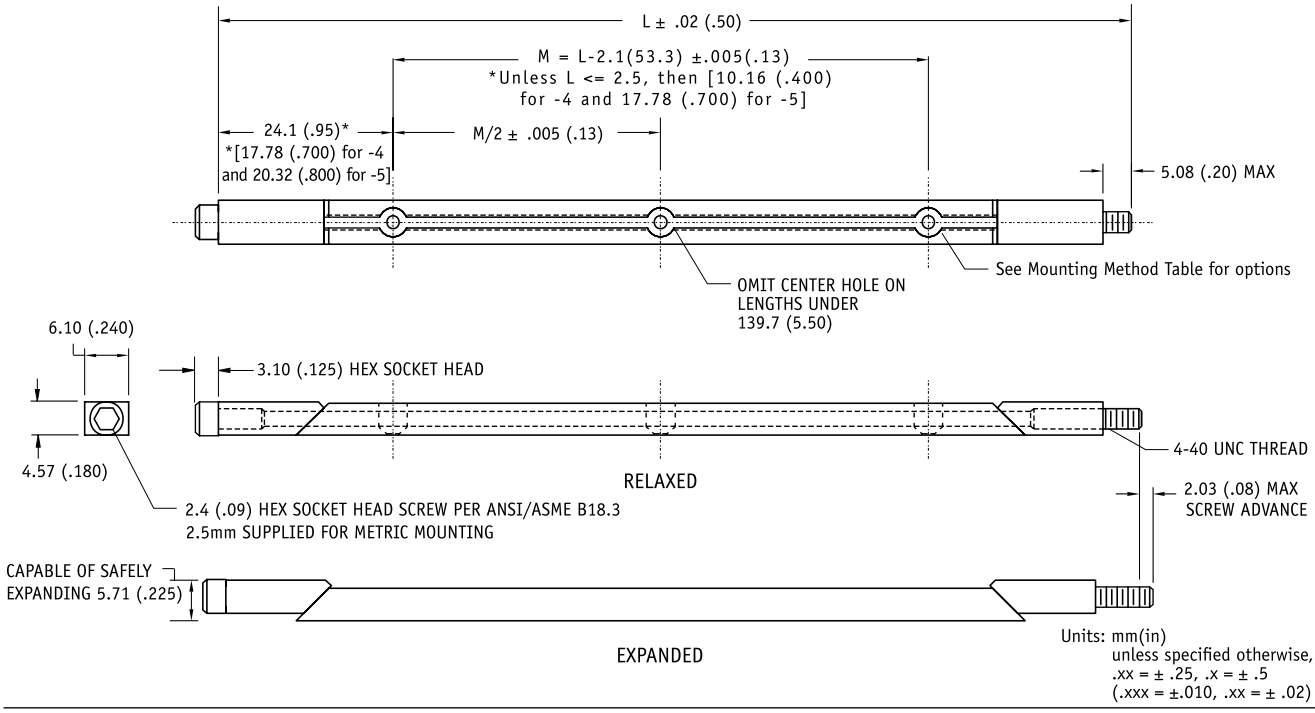
LF OPTION

Provides additional resistance to shock and vibration (adds 5.1 (.20) to screw length)



LN OPTION

Captivates rear wedge when untorqued (adds 2.5 (.10) to screw length)



Part Number Code (See example below)

Series 41 WEDGE-LOK Three-piece **41** -x -x -x -x -x -x

Length
Length in .500 (12.7) increments__4 [2.00 (50.8)]
_____to 24 [12.00 (304.8)]

Finish
Chem Film_____ **[Blank]**
or select code letter from Finish Table _____ 1

Lock/Flat Washers and Locknut
Lock Washer and Flat Washer _____ **LF**
None _____ **[Blank]**

Lock Nut _____**LN**
None _____**[Blank]**

Mounting
Standard Rivet Holes _____**[Blank]**
or select code letter from Mounting Method Table_____ 2

Lock Patch
Lock Patch_____ **L**
None _____ **[Blank]**

Part Number Code example: 41-8-LF

Series 41 WEDGE-LOK Three-piece, 4.00-in. (101.6-mm) long, chem film finish, with Lock Washer and Flat Washer option, and standard rivet hole mounting.

❶ FINISH TABLE

Code Letter	Finish (see pg.11 for RoHS Compliance)
[blank]	Chemical Film per MIL-C-5541, Class 1A, Gold, non RoHS compliant
CC	Chemical Film per MIL-C-5541, Class 1A, Clear
EN	Electroless Nickel per MIL-C-26074, Class 4, Grade B, Bright
N	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright (.0002")
B	Black Anodize per MIL-A-8625, Type II, Class 2, (.00005" - .0003")
B3	Hard Black Anodize per MIL-A-8625, Type III, Class 2 (.002")
B3D	Hard Black Anodize with Dry Film Lube per MIL-L46010

❷ MOUNTING METHOD TABLE

Code Letter	Method
NONE	Rivet Mount (Ø 1.70 +.10/-.03 (.067 +.004/.001) THRU ⌴ Ø 3.96 (.156) ▽ 3.30 (.200) ⌵ Ø 3.56 (.140) x 100°)
A	No mounting holes
S	2-56 UNC-2B tapped hole
T	0-80 UNF-2B tapped hole
M2	M2 x .40 tapped hole
M	M2.5 x .45 tapped hole
P	Indexing Pins Ø.062 x .040" (two pins only)

Indexing pins (-P) and rivet (NONE) parts are shipped unassembled.
Center wedge is unplated and unmarked for Indexing pins (-P) method.

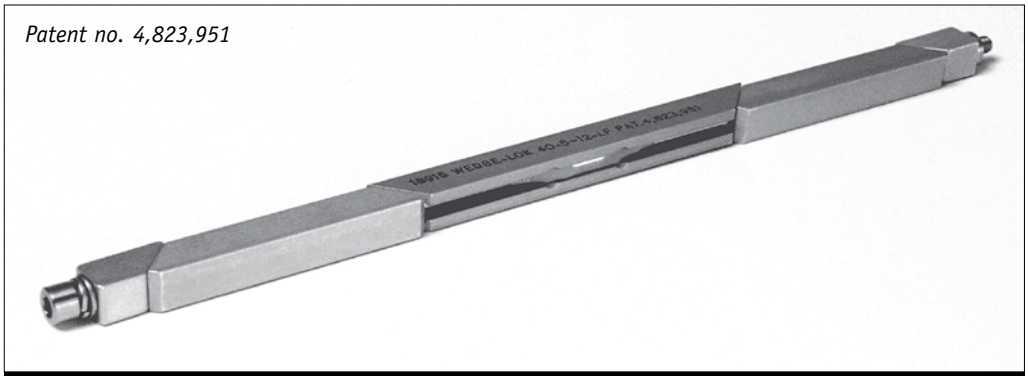
FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

Relative Clamping Force*	◔
Relative Retention Force*	◔
Relative Thermal Resistance*	◔
Relative Price	◔

**For mechanical and thermal peformance data see the Technical Applications section pages 74-92*

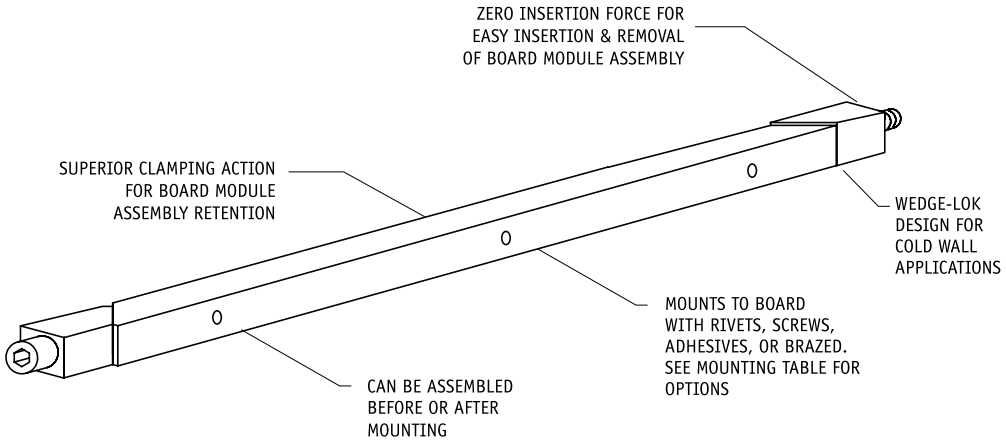
Patent no. 4,823,951



Series 41-5 WEDGE-LOK

DESIGNED FOR HEAVY SHOCK, VIBRATION, AND HEAT DISSIPATION

6.10 (.240) X 4.57 (.180) PROFILE



WEDGES

Material:
Aluminum Alloy 6061-T6 per QQ-A-200/8

Finish:
See finish table on opposite page

SCREW

.09-in. or 2.5-mm hex. socket head cap screw, depending on mounting configuration

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

OPTION
LOCK & FLAT WASHER

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

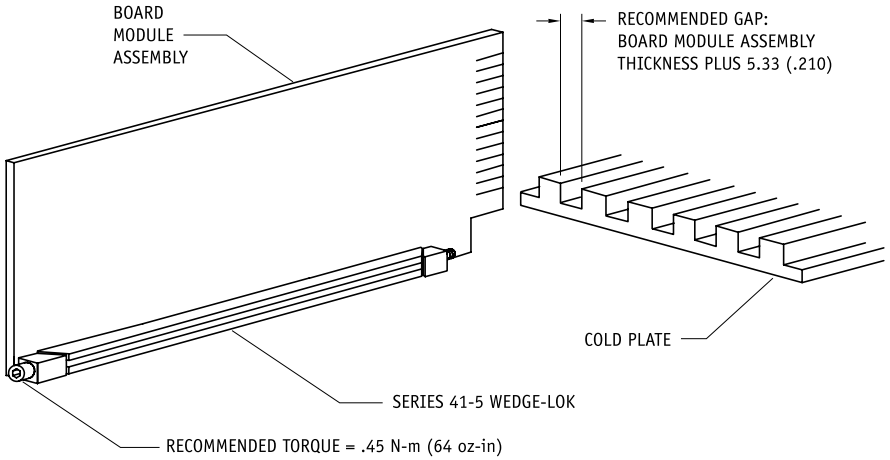
LOCKNUT

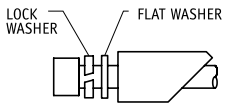
Material:
Type A286 stainless steel per ASTM AMS 5525 (or similar)

Finish:
Silver plate per AMS 2410

WEIGHT

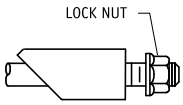
.083 oz./in. (0.93 g/cm)





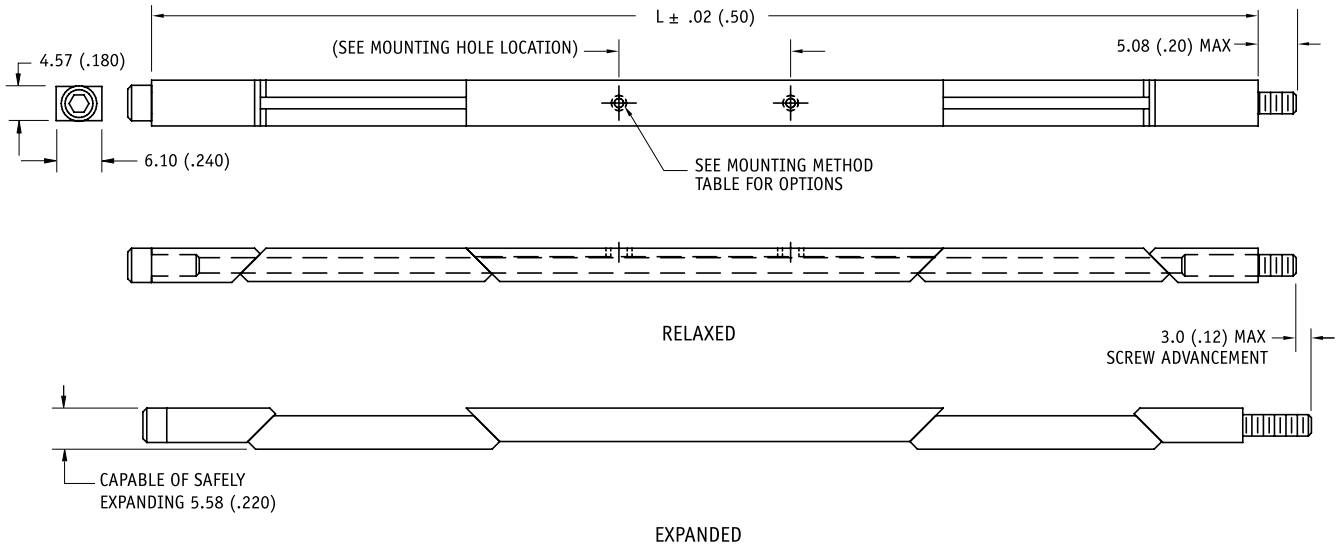
LF OPTION

Provides additional resistance to shock and vibration (adds 5.1 (.20) to screw length)



LN OPTION

Captivates rear wedge when untorqued (adds 2.5 (.10) to screw length)



Part Number Code (See example below)

Series 41-5 WEDGE-LOK Five-piece **41-5** **-x** **-x** **-x** **-x** **-x** **-x**

Length
Length in .500 (12.7) increments_10 [5.00 (127.0)]
_____to 24 [12.00 (304.8)]

Finish
Chem Film_____ **[Blank]**
or select code letter from Finish Table _____ 1

Lock/Flat Washers and Locknut
Lock Washer and Flat Washer _____ **LF**
None _____ **[Blank]**

Lock Nut _____**LN**
None _____**[Blank]**

Mounting
Standard Rivet Holes _____ **[Blank]**
or select code letter from Mounting Method Table _____ 2

Lock Patch
Lock Patch_____ **L**
None _____ **[Blank]**

Part Number Code example: 41-5-8-LF

Series 41-5 WEDGE-LOK 5-piece, 4.00-in. (101.6-mm) long, chem film finish, with Lock Washer and Flat Washer option, and standard rivet hole mounting.

❶ FINISH TABLE

Code Letter	Finish (see pg.11 for RoHS Compliance)
[blank]	Chemical Film per MIL-C-5541, Class 1A, Gold, non RoHS compliant
CC	Chemical Film per MIL-C-5541, Class 1A, Clear
EN	Electroless Nickel per MIL-C-26074, Class 4, Grade B, Bright
N	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright (.0002")
B	Black Anodize per MIL-A-8625, Type II, Class 2, (.00005" - .0003")
B3	Hard Black Anodize per MIL-A-8625, Type III, Class 2 (.002")
B3D	Hard Black Anodize with Dry Film Lube per MIL-L46010

❷ MOUNTING METHOD TABLE

Code Letter	Method
NONE	2-56 UNC-2B tapped hole
R	Rivet Mount (Ø 1.70 +.10/-.03 (.067 +.004/.001) THRU ⌴ Ø 3.96 (.156) ⌵ 3.30 (.200) ⌵ Ø 3.56 (.140) x 100°)
A	No Mounting Holes
T	0-80 UNF-2B tapped hole
M2	M2 x .40 tapped hole
M	M2.5 x .45 tapped hole
P	Indexing Pins Ø.062 x .040" (two pins only)

Indexing pins (-P) and rivet (-R) parts are shipped in un-snapped configuration. Center wedge is unplated and unmarked for Indexing pins (-P) method.

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

Relative Clamping Force*	
Relative Retention Force*	
Relative Thermal Resistance*	
Relative Price	

**For mechanical and thermal peformance data see the Technical Applications section pages 74-92*

WEDGES

Material:
Aluminum Alloy
6061-T6 per QQ-A-200/8

Finish:
See finish table on opposite page

SCREW

.09-in. or 2.5-mm hex. socket head cap screw, depending on mounting configuration

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

OPTION
LOCK & FLAT WASHER

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

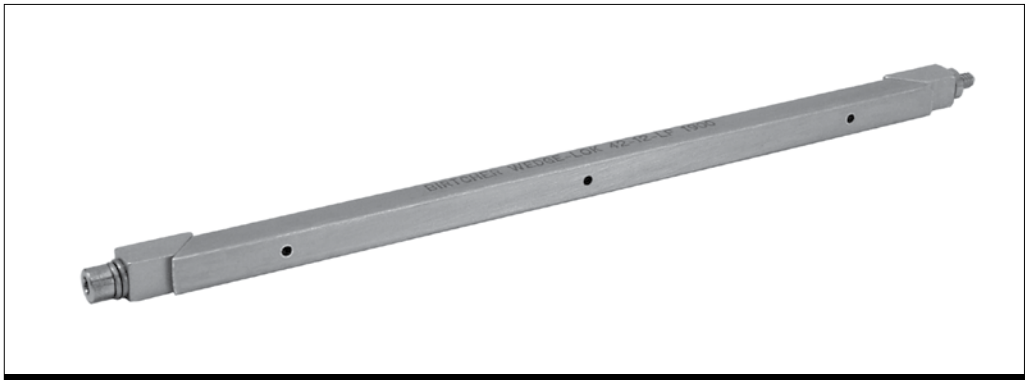
LOCKNUT

Material:
Type A286 stainless steel per ASTM AMS 5525 (or similar)

Finish:
Silver plate per AMS 2410

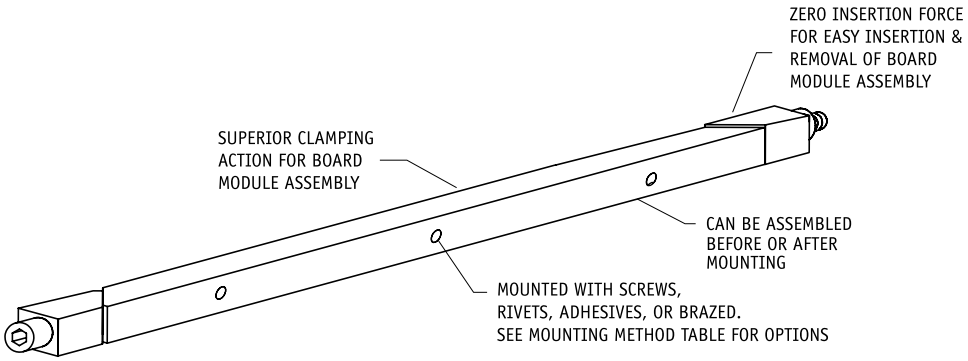
WEIGHT

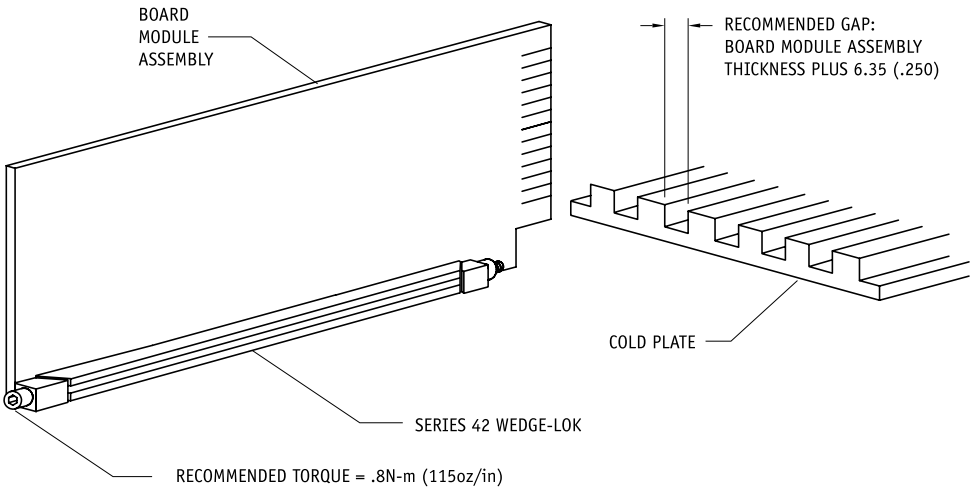
.080 oz./in. (0.89 g/cm)

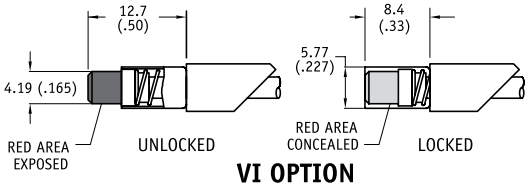


Series 42 WEDGE-LOK ***DSCC 84103 & CID 59590***

DESIGNED FOR HEAVY SHOCK,
VIBRATION, & HEAT DISSIPATION
5.72 (.225) X 5.72 (.225) PROFILE

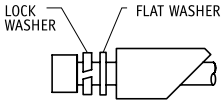






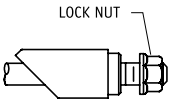
VI OPTION

Indicates assembly is unlocked (adds 5.1 (.20) to screw length)



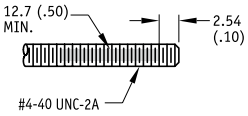
LF OPTION

Provides additional resistance to shock and vibration (adds 2.5 (.10) to screw length)



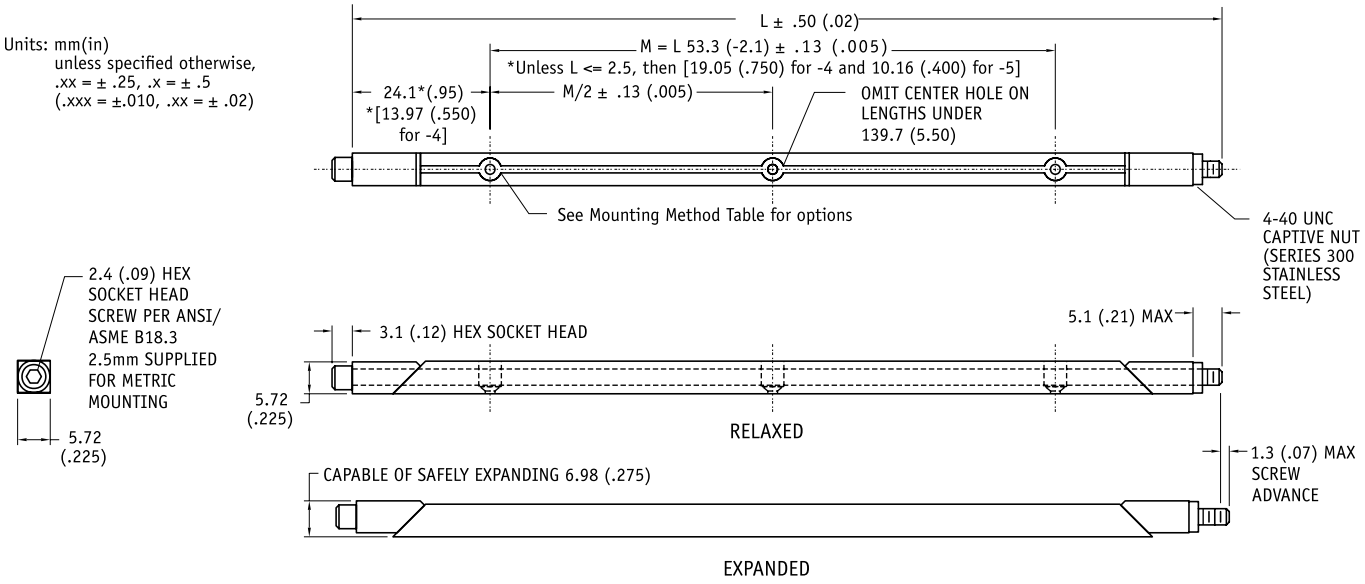
LN OPTION

Captivates rear wedge when untorqued (adds 2.5 (.10) to screw length)



L OPTION

Provides additional resistance to shock and vibration



Part Number Code (See example below)

Series 42 WEDGE-LOK Three-piece **42** x -x -x -x -x -x -x

Optional Visual Indicator
Visual Indicator _____ **VI**
None _____ **[Blank]**

Length
Length in .500 (12.7) increments ____ 4 [2.00 (50.8)]
_____ to 24 [12.00 (304.8)]

Finish
Chem Film _____ **[Blank]**
or select code letter from Finish Table _____ 1

Lock/Flat Washers and Locknut
Lock Washer and Flat Washer _____ **LF**
None _____ **[Blank]**

Lock Nut _____ **LN**
None _____ **[Blank]**

Mounting
Standard Rivet Holes _____ **[Blank]**
or select code letter from Mounting Method Table _____ 2

Lock Patch
Lock Patch _____ **L**
None _____ **[Blank]**

Part Number Code example: 42VI-10-B3D-LF

Series 42 WEDGE-LOK Three-piece, 5.00-in. (127.0-mm) long, hard black anodize finish with dry film lube, with Lock Washer and Flat Washer option, standard rivet hole mounting.

❶ FINISH TABLE

Code Letter	Finish (see pg.11 for RoHS Compliance)
[blank]	Chemical Film per MIL-C-5541, Class 1A, Gold, non RoHS compliant
CC	Chemical Film per MIL-C-5541, Class 1A, Clear
EN	Electroless Nickel per MIL-C-26074, Class 4, Grade B, Bright
N	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright (.0002")
B	Black Anodize per MIL-A-8625, Type II, Class 2, (.00005" - .0003")
B3	Hard Black Anodize per MIL-A-8625, Type III, Class 2 (.002")
B3D	Hard Black Anodize with Dry Film Lube per MIL-L46010

❷ MOUNTING METHOD TABLE

Code Letter	Method
NONE	Rivet Mount (Ø 1.70 +.10/-.03 (.067 +.004/.001) THRU ⌴ Ø 3.96 (.156) ⌵ 3.30 (.200) ⌵ Ø 3.56 (.140) x 100°)
A	No mounting holes
S	2-56 UNC-2B tapped hole
T	0-80 UNF-2B tapped hole
M2	M2 x .40 tapped hole
M	M2.5 x .45 tapped hole
P	Indexing Pins Ø.062 x .040" (two pins only)

Indexing pins (-P) and rivet (NONE) parts are shipped unassembled.
Center wedge is unplated and unmarked for Indexing pins (-P) method.

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

Relative Clamping Force*	◑
Relative Retention Force*	◕
Relative Thermal Resistance*	◑
Relative Price	◑

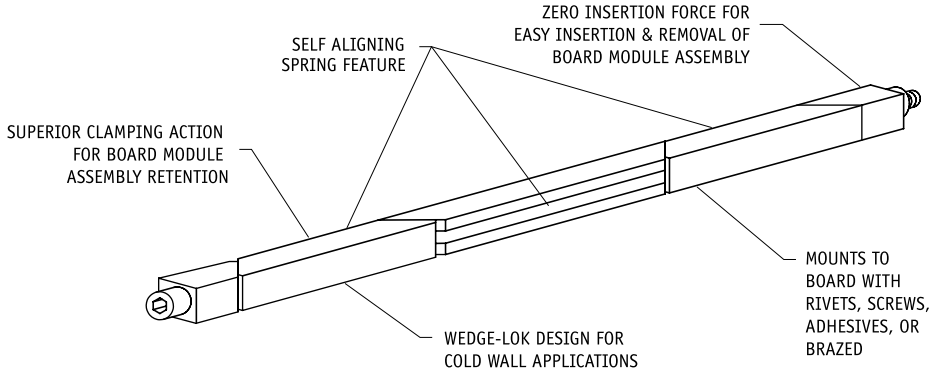
*For mechanical and thermal peformance data see the Technical Applications section pages 74-92

Patent no. 4,823,951

Series 42-5 WEDGE-LOK ***DSCC 89064 & CID 59789***

DESIGNED FOR HEAVY SHOCK, VIBRATION, AND HEAT DISSIPATION

5.72 (.225) X 5.72 (.225) PROFILE



WEDGES

Material:
Aluminum Alloy 6061-T6 per QQ-A-200/8

Finish:
See finish table on opposite page

SCREW

.09-in. or 2.5-mm hex. socket head cap screw, depending on mounting configuration

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

ALIGNMENT SPRINGS

Material:
Beryllium Copper QQ-C-533

Finish:
Nickel QQ-N-290 Class I, Grade G, Bright

OPTION
LOCK & FLAT WASHER

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

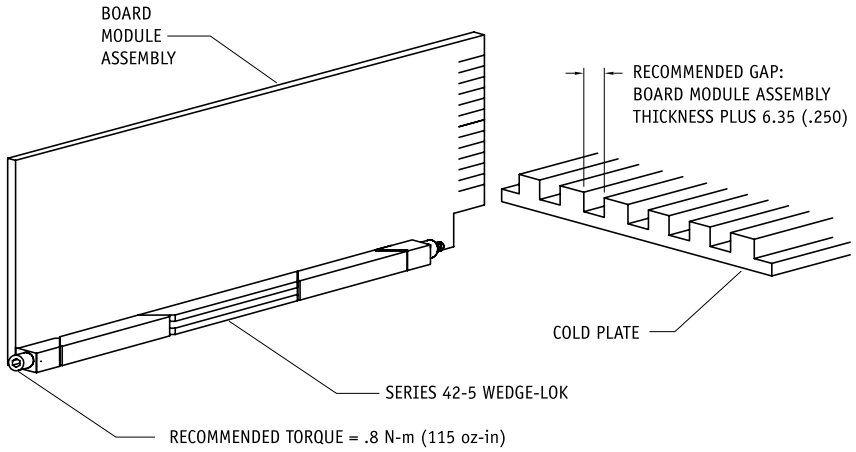
LOCKNUT

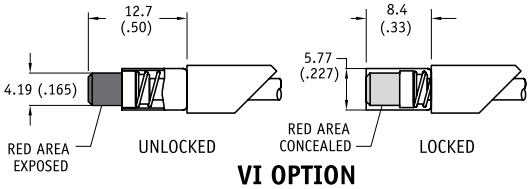
Material:
Type A286 stainless steel per ASTM AMS 5525 (or similar)

Finish:
Silver plate per AMS 2410

WEIGHT

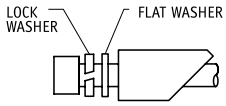
.088 oz./in. (.98 g/cm)





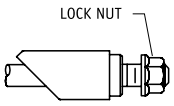
VI OPTION

Indicates assembly is unlocked
(adds 4.8 (SB .20) to screw length)



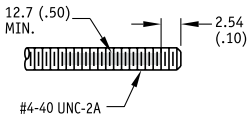
LF OPTION

Provides additional resistance to shock and vibration (adds 1.5 (SB .10) to screw length)



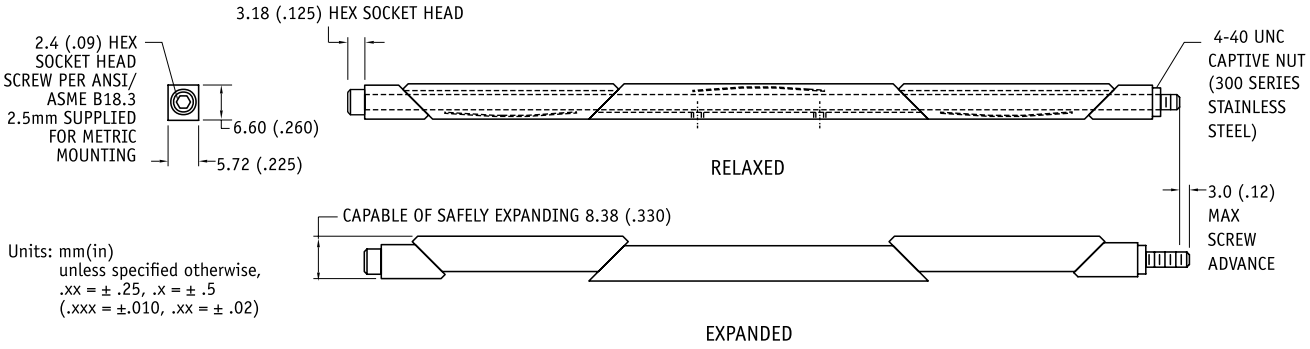
LN OPTION

Captivates rear wedge when untorqued (adds 2.5 (.10) to screw length)



L OPTION

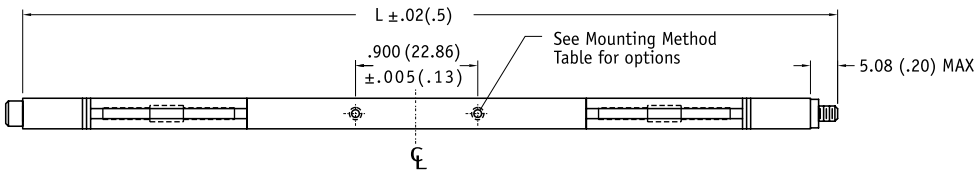
Provides additional resistance to shock and vibration



Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)

MOUNTING HOLE LOCATION

22.86 (.900) hole spacing centered on mounting body
-10 thru -13 2 holes
-14 thru -24 4 holes



Part Number Code (See example below)

Series 42-5 WEDGE-LOK Five-piece **42-5** **x** **-x** **-x** **-x** **-x** **-x** **-x**

Optional Visual Indicator
Visual Indicator _____ **VI**
None _____ **[Blank]**

Length
Length in .500 (12.7) increments __ 10 [5.00 (127.0)]
_____ to 24 [12.00 (304.8)]

Finish
Chem Film _____ **[Blank]**
or select code letter from Finish Table _____ 1

Lock/Flat Washers and Locknut
Lock Washer and Flat Washer _____ **LF**
None _____ **[Blank]**

Lock Nut _____ **LN**
None _____ **[Blank]**

Mounting
Standard 2-56 screws _____ **[Blank]**
or select code letter from Mounting Method Table _____ 2

Lock Patch
Lock Patch _____ **L**
None _____ **[Blank]**

Part Number Code example: 42-5-18-LN-R

Series 42-5 WEDGE-LOK Five-piece, 9.00-in. (228.6-mm) long, chem film finish, with Lock Nut option, rivet mount.

❶ FINISH TABLE

Code Letter	Finish (see pg.11 for RoHS Compliance)
[blank]	Chemical Film per MIL-C-5541, Class 1A, Gold, non RoHS compliant
A	No Mounting Holes
CC	Chemical Film per MIL-C-5541, Class 1A, Clear
EN	Electroless Nickel per MIL-C-26074, Class 4, Grade B, Bright
N	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright (.0002")
B	Black Anodize per MIL-A-8625, Type II, Class 2, (.00005" - .0003")
B3	Hard Black Anodize per MIL-A-8625, Type III, Class 2 (.002")
B3D	Hard Black Anodize with Dry Film Lube per MIL-L46010

❷ MOUNTING METHOD TABLE

Code Letter	Method
NONE	Rivet Mount (Ø 1.70 +.10/-.03 (.067 +.004/.001) THRU ⌴ Ø 3.96 (.156) ⌵ 3.30 (.200) ⌵ Ø 3.56 (.140) x 100°)
A	No mounting holes
S	2-56 UNC-2B tapped hole
T	0-80 UNF-2B tapped hole
M2	M2 x .40 tapped hole
M	M2.5 x .45 tapped hole
P	Indexing Pins Ø.062 x .040" (two pins only)

Indexing pins (-P) and rivet (-R) parts are shipped unassembled.
Center wedge is unplated and unmarked for Indexing pins (-P) method.

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

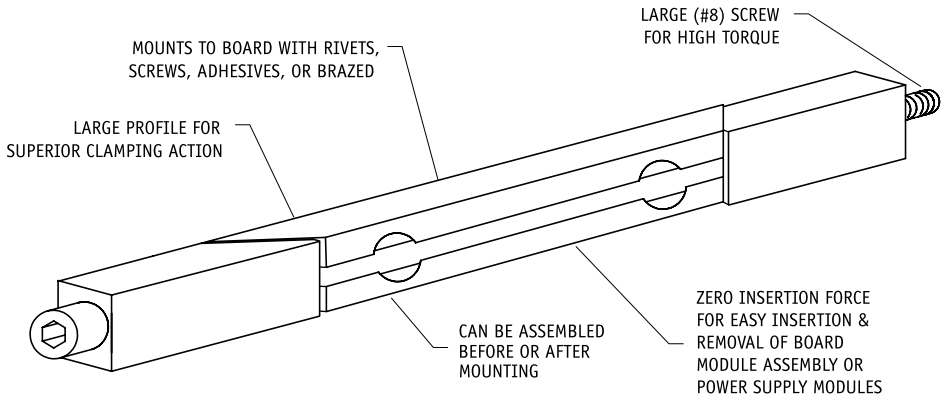
Relative Clamping Force*	◑
Relative Retention Force*	◕
Relative Thermal Resistance*	◑
Relative Price	◔

**For mechanical and thermal peformance data see the Technical Applications section pages 74-92*

Series 44 WEDGE-LOK

DESIGNED FOR HEAVY SHOCK, VIBRATION, AND HEAT DISSIPATION POWER SUPPLY MOUNTING

9.53 (.375) X 9.78 (.385) PROFILE



WEDGES

Material:
Aluminum Alloy 6061-T6 per QQ-A-200/8

Finish:
See finish table on opposite page

SCREW

.14-in. (3.6-mm) hex. socket head cap screw

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

OPTION LOCK & FLAT WASHER

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

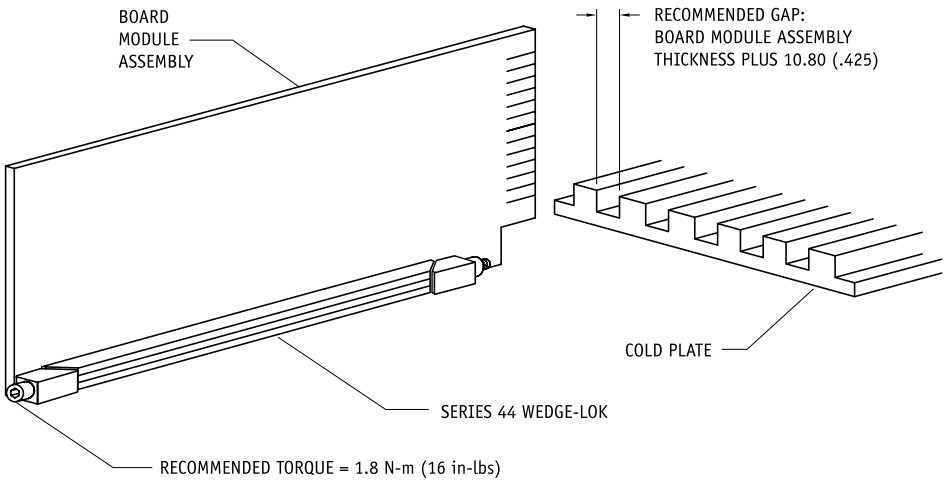
LOCKNUT

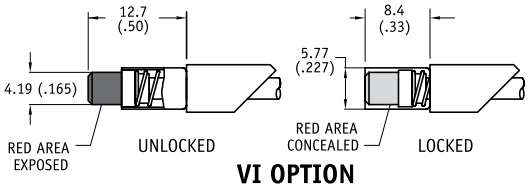
Material:
Type A286 stainless steel per ASTM AMS 5525 (or similar)

Finish:
Silver plate per AMS 2410

WEIGHT

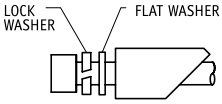
.250 oz./in. (2.79 g/cm)





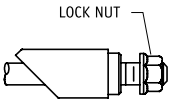
VI OPTION

Indicates assembly is unlocked (adds 4.8 (.19) to screw length)



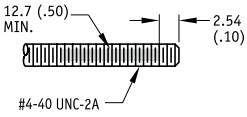
LF OPTION

Provides additional resistance to shock and vibration (adds 1.5 (.06) to screw length)



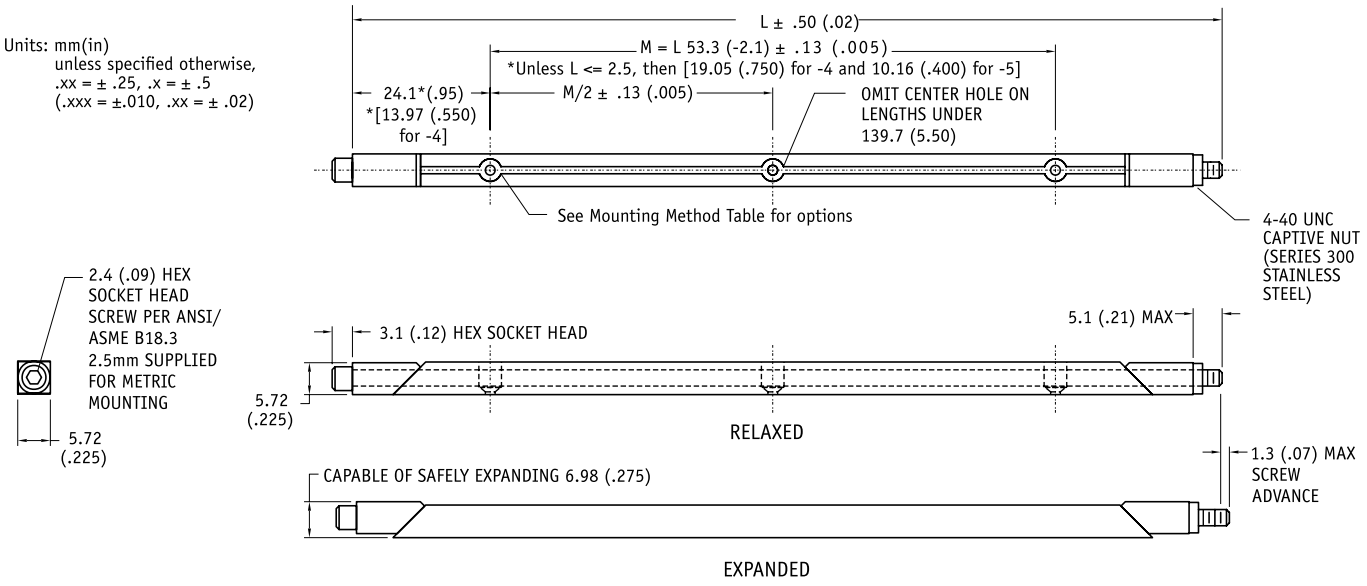
LN OPTION

Captivates rear wedge when untorqued (adds 2.5 (.10) to screw length)



L OPTION

Provides additional resistance to shock and vibration



Part Number Code (See example at right)

Series 44 WEDGE-LOK Three-piece Heavy Duty

44 x -x -x -x -x -x -x

Optional Visual Indicator
Visual Indicator _____ **VI**
None _____ **[Blank]**

Length
Length in .500 (12.7) increments ____ 6 [3.00 (76.2)]
_____ to 24 [12.00 (304.8)]

Finish
Chem Film _____ **[Blank]**
or select code letter from Finish Table _____ 1

Lock/Flat Washers and Locknut
Lock Washer and Flat Washer _____ **LF**
None _____ **[Blank]**

Lock Nut _____ **LN**
None _____ **[Blank]**

Mounting
Standard Rivet Holes _____ **[Blank]**
or select code letter from Mounting Method Table _____ 2

Lock Patch
Lock Patch _____ **L**
None _____ **[Blank]**

Part Number Code example: 44-12-LF

Series 44 WEDGE-LOK Three-piece Heavy Duty, 6.00-in. (152.4-mm) long, chem film finish, with Lock Washer and Flat Washer option.

❶ FINISH TABLE

Code Letter	Finish (see pg.11 for RoHS Compliance)
[blank]	Chemical Film per MIL-C-5541, Class 1A, Gold, non RoHS compliant
CC	Chemical Film per MIL-C-5541, Class 1A, Clear
EN	Electroless Nickel per MIL-C-26074, Class 4, Grade B, Bright
N	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright (.0002")
B	Black Anodize per MIL-A-8625, Type II, Class 2, (.00005" - .0003")
B3	Hard Black Anodize per MIL-A-8625, Type III, Class 2 (.002")
B3D	Hard Black Anodize with Dry Film Lube per MIL-L46010

❷ MOUNTING METHOD TABLE

Code Letter	Method
[blank]	Rivet Mount (Ø 3.45 +.10/-.03 (.136 +.004/.001) THRU ⌴ Ø 4.95 (.195) ⌵ 7.65 (.305) ⌵ Ø 4.95 (.195) x 100°)
A	No mounting holes
F	4-40 UNC-2B tapped hole
M	M2.5 x .45 tapped hole
M2	M2 x .40 tapped hole
M3	M3 x .50 tapped hole
P	Indexing Pins Ø.062 x .040" (two pins only)
S	2-56 UNC-2B tapped hole
T	0-80 UNF-2B tapped hole

Indexing pins (-P) and rivet (-R) parts are shipped unassembled.
Center wedge is unplated and unmarked for Indexing pins (-P) method.

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

Relative Clamping Force*	●
Relative Retention Force*	●
Relative Thermal Resistance*	●
Relative Price	◕

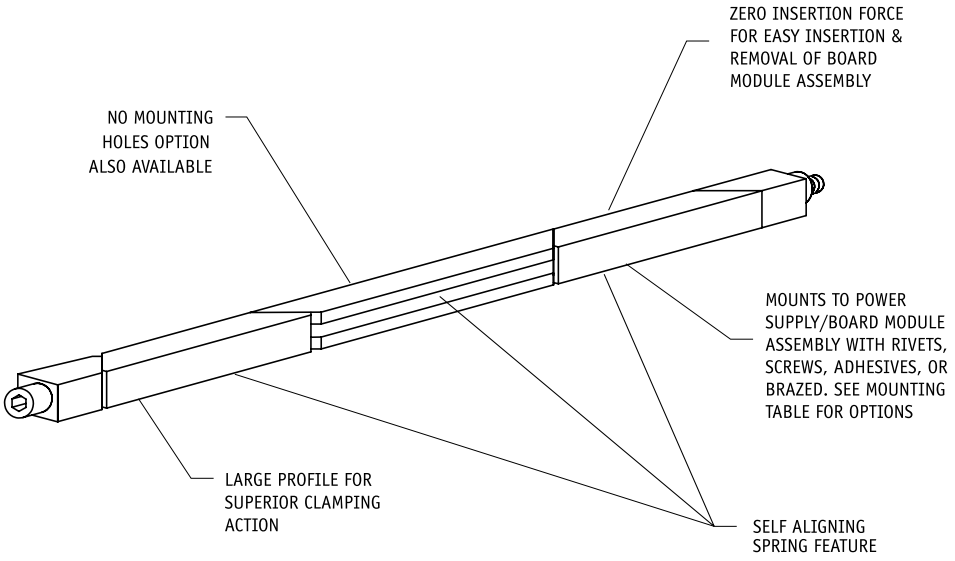
*For mechanical and thermal peformance data see the Technical Applications section pages 74-92

Patent no. 4,823,951

Series 44-5 WEDGE-LOK ***CID 59789***

DESIGNED FOR HEAVY SHOCK, VIBRATION, AND HEAT DISSIPATION POWER SUPPLY MOUNTING

9.53 (.375) X 9.53 (.375) PROFILE



WEDGES

Material:
Aluminum Alloy 6061-T6 per QQ-A-200/8

Finish:
See finish table on opposite page

SCREW

.14-in. (3.6-mm) hex. socket head cap screw

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

ALIGNMENT SPRINGS

Material:
Beryllium Copper QQ-C-533

Finish:
Nickel per QQ-N-290, Class 1, grade G, Bright

OPTION LOCK & FLAT WASHER

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

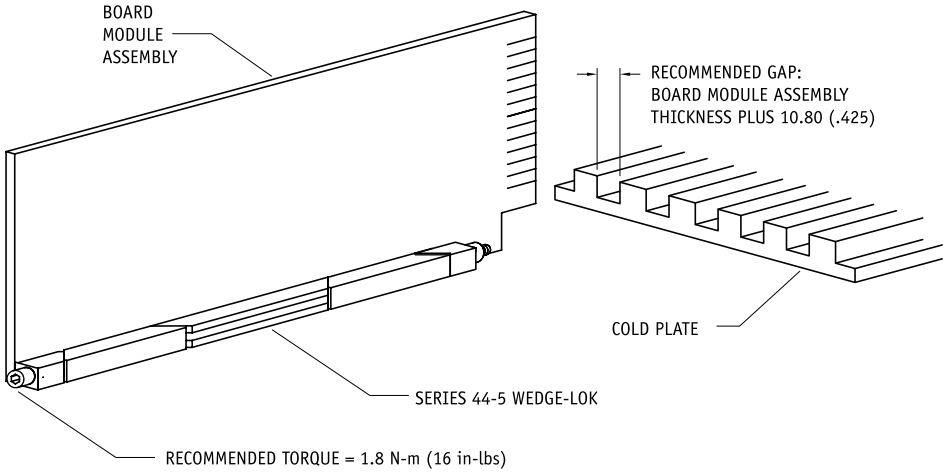
LOCKNUT

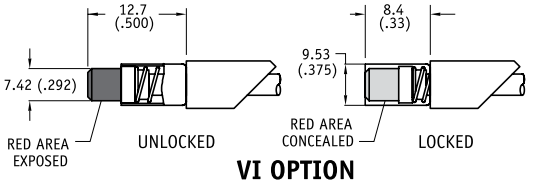
Material:
Type A286 stainless steel per ASTM AMS 5525 (or similar)

Finish:
Silver plate per AMS 2410

WEIGHT

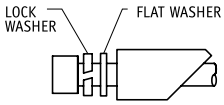
.250 oz./in. (2.79 g/cm)





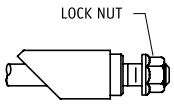
VI OPTION

Indicates assembly is unlocked
(adds 5.1 (.20) to screw length)



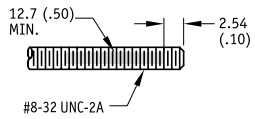
LF OPTION

Provides additional resistance to shock and vibration (adds 2.5 (.10) to screw length)



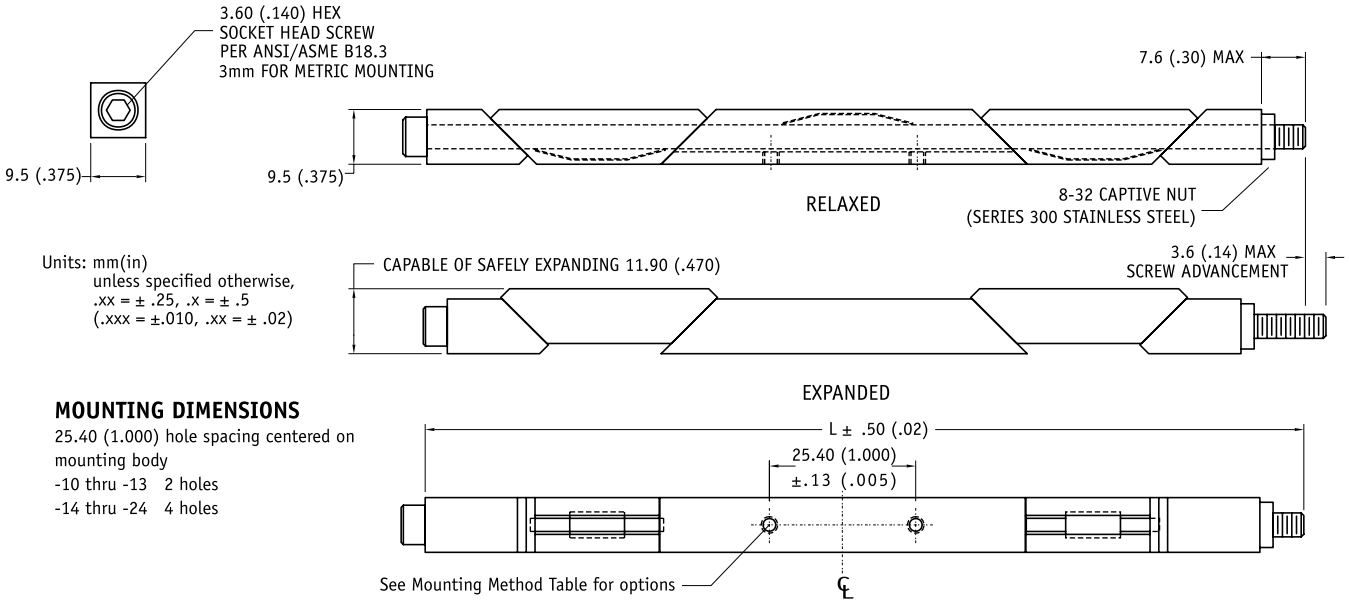
LN OPTION

Captivates rear wedge when untorqued
(adds 2.5 (.10)
to screw length)



L OPTION

Provides additional resistance to shock and vibration



MOUNTING DIMENSIONS

25.40 (1.000) hole spacing centered on mounting body
-10 thru -13 2 holes
-14 thru -24 4 holes

Part Number Code (See example below)

Series 44-5 WEDGE-LOK Five-piece Heavy Duty

44-5 x -x -x -x -x -x -x

Optional Visual Indicator
Visual Indicator _____ **VI**
None _____ **[Blank]**

Length
Length in .500 (12.7) increments __ 10 [5.00 (127.5)]
_____ to 24 [12.00 (304.8)]

Finish
Chem Film _____ **[Blank]**
or select code letter from Finish Table _____ 1

Lock/Flat Washers and Locknut
Lock Washer and Flat Washer _____ **LF**
None _____ **[Blank]**

Lock Nut _____ **LN**
None _____ **[Blank]**

Mounting
Standard 4-40 threaded holes _____ **[Blank]**
or select code letter from Mounting Method Table _____ 2

Lock Patch
Lock Patch _____ **L**
None _____ **[Blank]**

Part Number Code example: 44-5-15-LN-L

Series 44-5 WEDGE-LOK Five-piece Heavy Duty , 7.50-in. (190.5-mm) long, chem film finish, with Lock Nut option, standard 4-40 threaded hole mounting, and Lock Patch option.

❶ FINISH TABLE

Code Letter	Finish (see pg.11 for RoHS Compliance)
[blank]	Chemical Film per MIL-C-5541, Class 1A, Gold, non RoHS compliant
CC	Chemical Film per MIL-C-5541, Class 1A, Clear
EN	Electroless Nickel per MIL-C-26074, Class 4, Grade B, Bright
N	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright (.0002")
B	Black Anodize per MIL-A-8625, Type II, Class 2, (.00005" - .0003")
B3	Hard Black Anodize per MIL-A-8625, Type III, Class 2 (.002")
B3D	Hard Black Anodize with Dry Film Lube per MIL-L46010

❷ MOUNTING METHOD TABLE

Code Letter	Method
NONE	4-40 UNC-2B tapped hole
A	No Mounting Holes
M	Metric M2.5 x .45
M2	Metric M2 x .40
M3	Metric M3 x .50
P	Indexing Pins Ø.062 x .040" (two pins only)
R	Rivet Mount (Ø 3.45 +.10/-.03 (.136 +.004/.001) THRU ⌴ Ø 4.95 (.195) ⌵ 7.65 (.305) ⌵ Ø 4.95 (.195) x 100°)
S	2-56 UNC-2B tapped hole
T	0-80 UNF-2B tapped hole

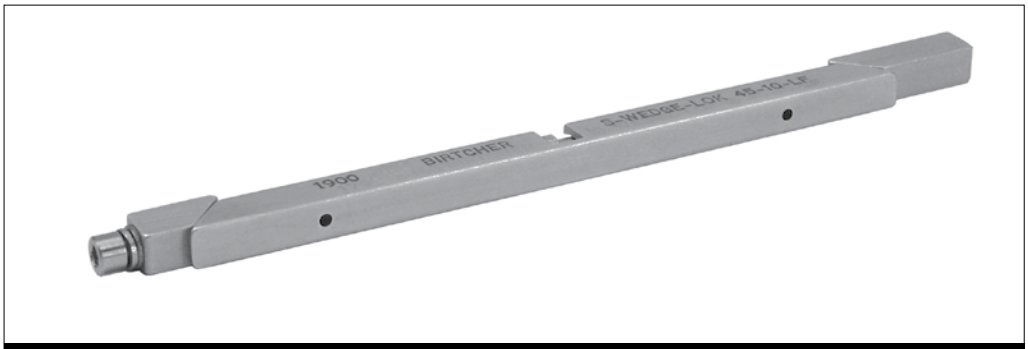
Indexing pins (-P) and rivet (-R) parts are shipped unassembled.
Center wedge is unplated and unmarked for Indexing pins (-P) method.

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

Relative Clamping Force*	◔
Relative Retention Force*	◔
Relative Thermal Resistance*	◔
Relative Price	◑

For mechanical and thermal peformance data see the Technical Applications section pages 74-92



Series 45 WEDGE-LOK

WEDGES

Material:
Aluminum Alloy 6061-T6 per QQ-A-200/8

Finish:
See finish table on opposite page

SCREW

.09-in. or 2.5-mm hex socket head cap screw, depending on mounting configuration

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

WASHERS & RING

Material
Stainless Steel per QQ-S-763, ASTM-A-582

Finish:
Passivate per Mil-S-5002

OPTION
LOCK & FLAT WASHER

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

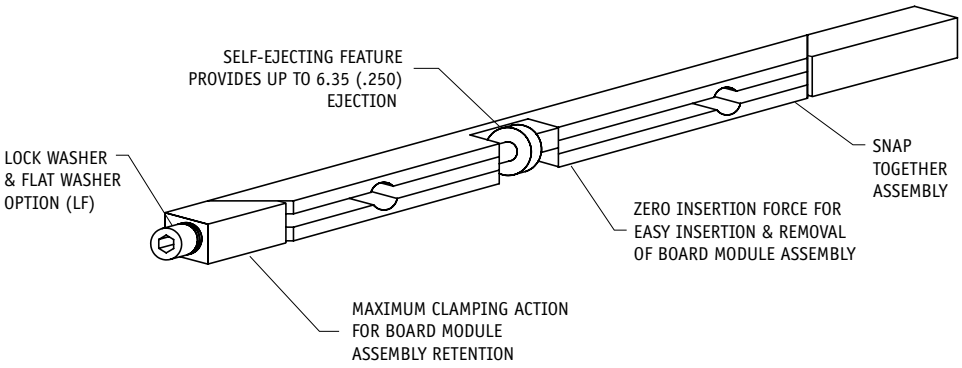
Finish:
Passivate per Mil-S-5002

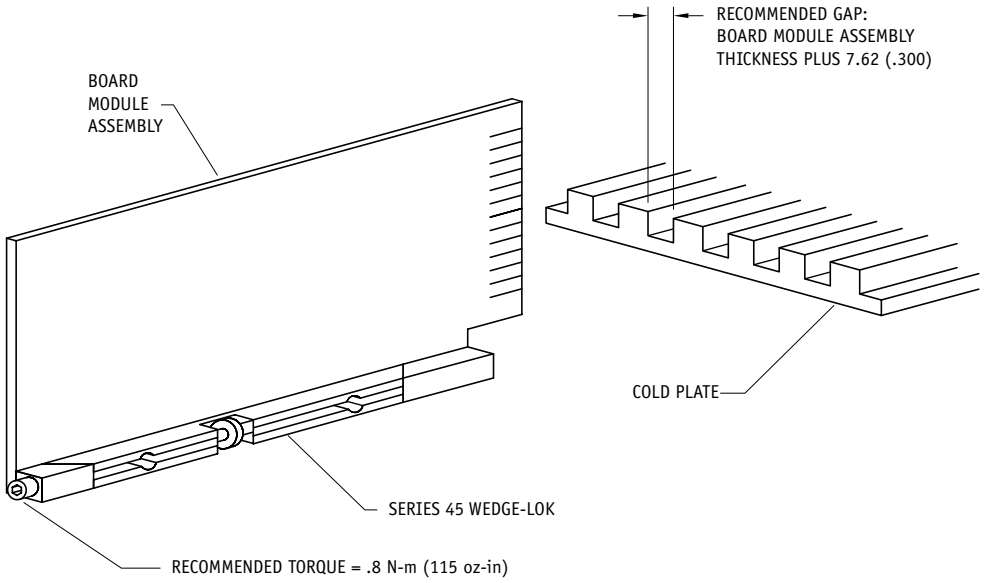
WEIGHT

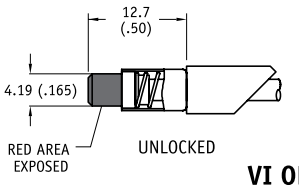
.091 oz./in. (1.07 g/cm)

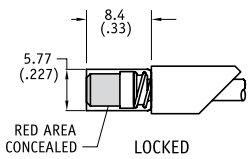
DESIGNED FOR HEAVY SHOCK, VIBRATION, HEAT DISSIPATION, & INITIAL EJECTION

5.72 (.225) X 6.60 (.260) PROFILE



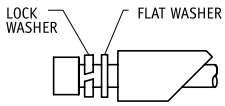






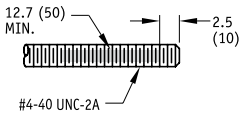
VI OPTION

Indicates assembly is unlocked
(adds 5.1 (.20) to screw length & -L length)



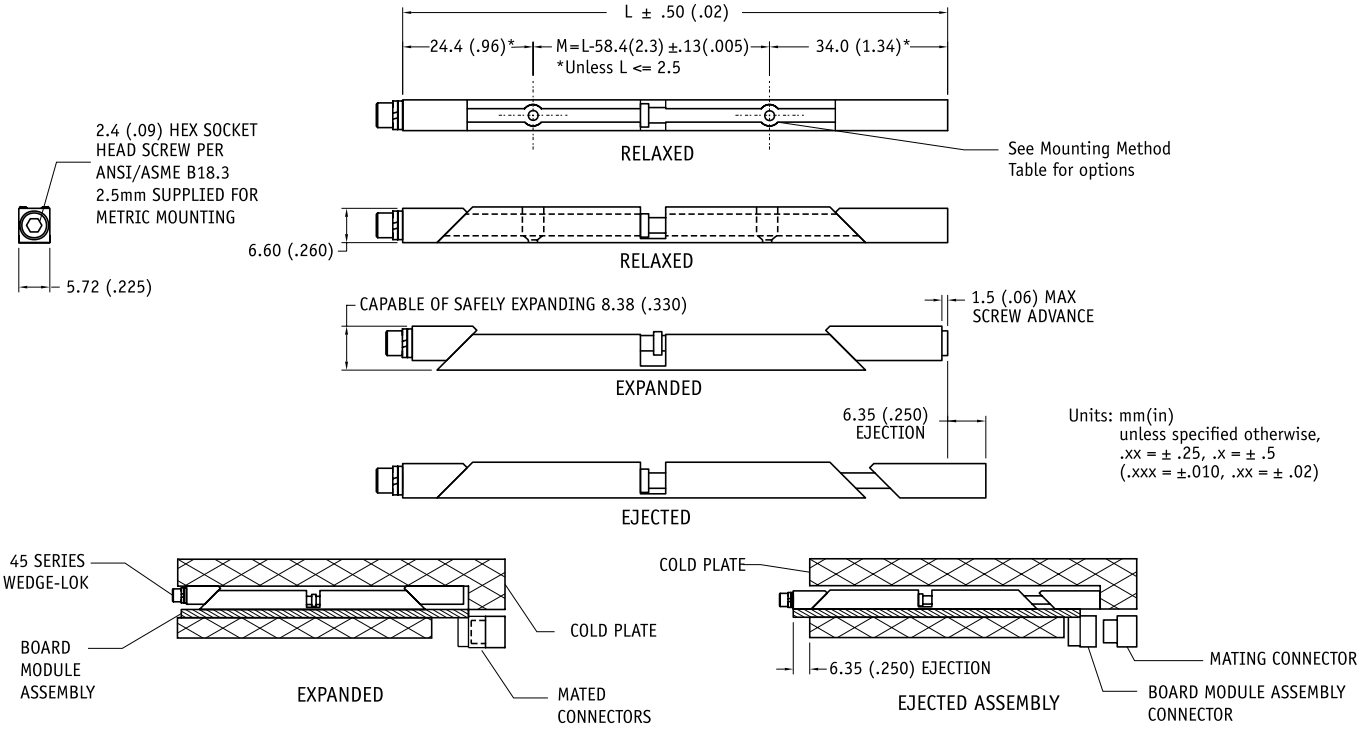
LF OPTION

Provides additional resistance to shock
and vibration (adds 2.5 (.10) to screw length)



L OPTION

Provides additional resistance
to shock and vibration



Part Number Code (See example below)

Series 45 WEDGE-LOK Three-piece Ejector **45** **x** **-x** **-x** **-x** **-x** **-x**

Optional Visual Indicator
Visual Indicator _____ **VI**
None _____ **[Blank]**

Length
Length in .500 (12.7) increments _____ 4 [2.00 (50.8)]
_____ to 24 [12.00 (304.8)]

Finish
Chem Film _____ **[Blank]**
or select code letter from Finish Table _____ 1

Washers
Lock Washer and Flat Washer _____ **LF**
None _____ **[Blank]**

Mounting
Standard rivet holes _____ **[Blank]**
or select code letter from Mounting Method Table _____ 2

Lock Patch
Lock Patch _____ **L**
None _____ **[Blank]**

Part Number Code example: 45VI-10-B3-S

Series 45 WEDGE-LOK Three-piece Ejector, 5.00-in. (127.0-mm) long with visual indicator, hard black anodize finish, 2-56 UNC screw mounted

❶ FINISH TABLE

Code Letter	Finish (see pg.11 for RoHS Compliance)
[blank]	Chemical Film per MIL-C-5541, Class 1A, Gold, non RoHS compliant
CC	Chemical Film per MIL-C-5541, Class 1A, Clear
EN	Electroless Nickel per MIL-C-26074, Class 4, Grade B, Bright
N	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright (.0002")
B	Black Anodize per MIL-A-8625, Type II, Class 2, (.00005" - .0003")
B3	Hard Black Anodize per MIL-A-8625, Type III, Class 2 (.002")
B3D	Hard Black Anodize with Dry Film Lube per MIL-L46010

❷ MOUNTING METHOD TABLE

Code Letter	Method
NONE	Rivet Mount (Ø 1.70 +.10/-.03 (.067 +.004/.001) THRU ⌴ Ø 3.96 (.156) ⌵ 3.30 (.200) ⌵ Ø 3.56 (.140) x 100°)
A	No Mounting Holes
S	2-56 UNC-2B tapped hole
T	0-80 UNF-2B tapped hole
M	M2.5 x .45 tapped hole
P	Indexing Pins Ø.062 x .040" (two pins only)

Indexing pins (-P) and rivet (NONE) parts are shipped in un-snapped configuration. Center wedge is unplated and unmarked for Indexing pins (-P) method.

**FOR MECHANICAL AND THERMAL PERFORMANCE
SEE THE TECHNICAL REFERENCE SECTION Pages 74-92**

FEATURES

Relative Clamping Force*	◔
Relative Retention Force*	◔
Relative Thermal Resistance*	◔
Relative Price	◕

*For mechanical and thermal peformance data see the Technical Applications section pages 74-92

Series 146CR WEDGE-LOK

WEDGES

Material:
Aluminum Alloy
6061-T6 per QQ-A-200/8

Finish:
See finish table on opposite page

LEVER

Material:
Series 300 stainless steel per Mil-S-5059

Finish:
Passivate per Mil-S-5002

SCREW

Material:
Series 300 stainless steel per QQ-S-763 ASTM A-582

Finish:
Passivate per Mil-S-5002

WASHERS AND SPRING WASHERS

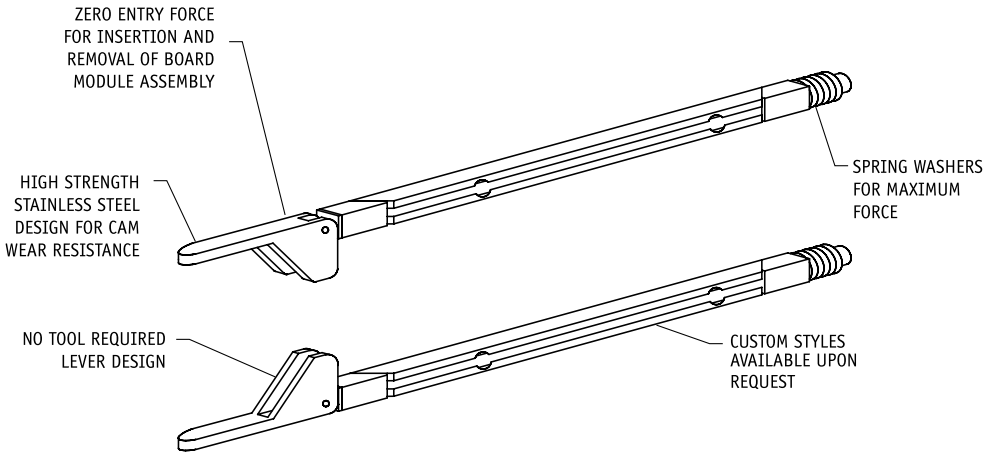
Material:
Series 300 stainless steel per QQ-S-763 ASTM A-582

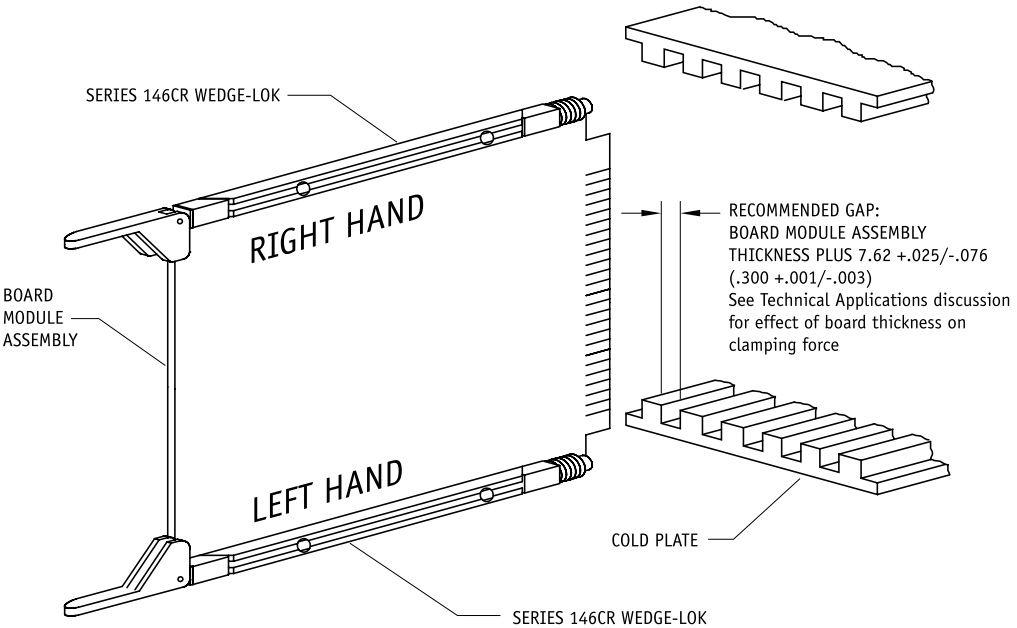
Finish:
Passivate per Mil-S-5002

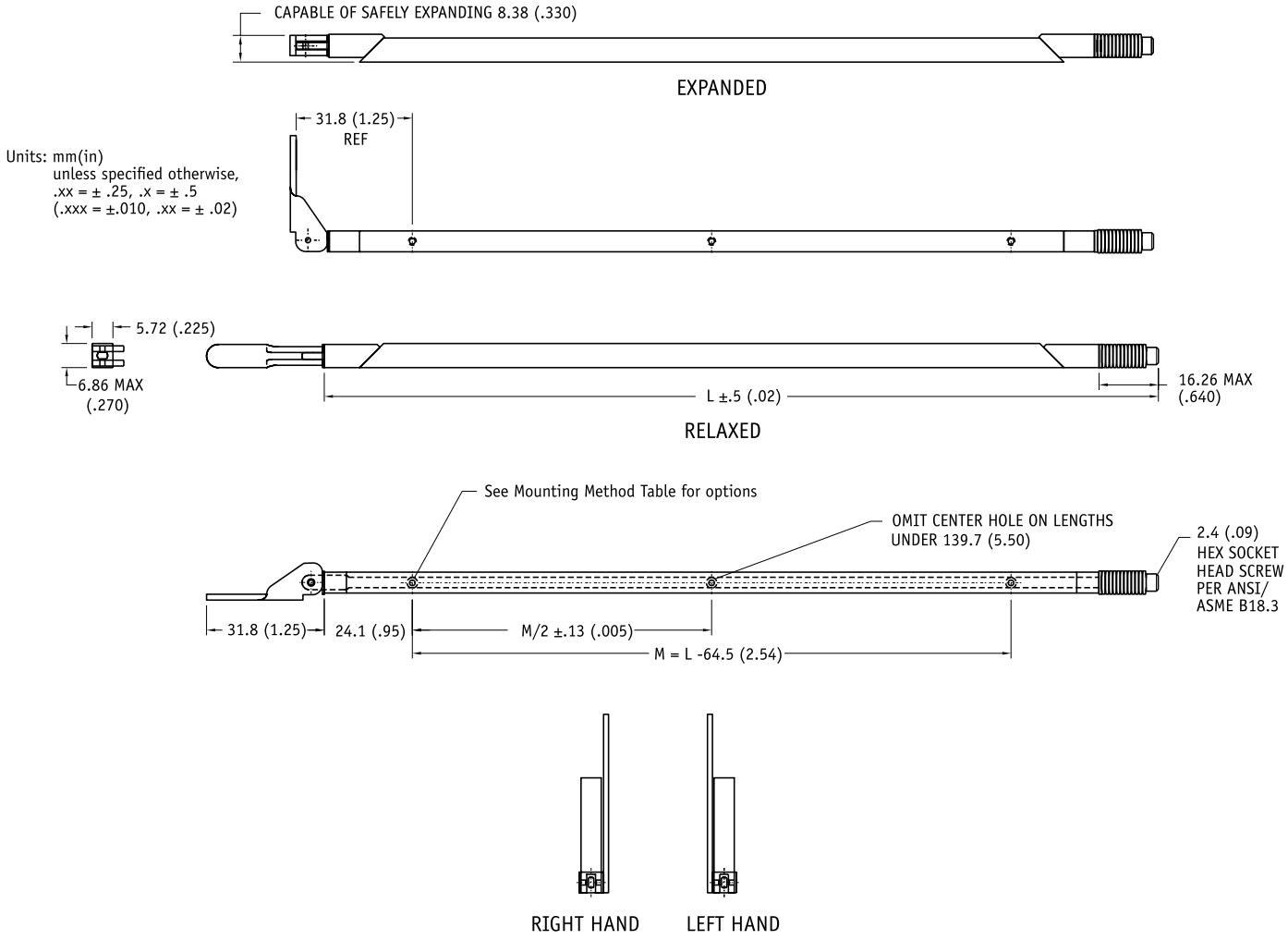
WEIGHT

.103 oz./in. (1.22 g/cm)

DESIGNED FOR HEAVY SHOCK, VIBRATION, & HEAT DISSIPATION
6.60 (.260) X 6.48 (.255) PROFILE







Part Number Code (See example below)

Series 146CR WEDGE-LOK Three-piece Lever-actuated

146CR -x -x -x -x

Mounting
Select code letter from Mounting Method Table _____ 1

Length
Length in .500 (12.7) increments _____ 6 [3.00 (76.2)]
_____ to 18 [9.00 (228.6)]

Finish
Select code letter from Finish Table _____ 2

Lever Action
Left hand _____ **L**
Right hand _____ **R**

Part Number Code example: 146CR-S-12-N-L

Series 146CR WEDGE-LOK Three-piece Lever actuated, 6.00-in. (152.4-mm) long, Nickel plated, #2-56 UNC screw mounted, left hand

❶ MOUNTING METHOD

Code Letter	Method
R	Rivet Mount (Ø 1.70 +.10/-.03 (.067 +.004/.001) THRU ⌴Ø 3.96 (.156) ⌵3.30 (.200) ⌵Ø 3.56 (.140) x 100°)
A	No Mounting Holes
S	2-56 UNC-2B tapped hole
M	M2.5 X .45 tapped hole
M2	M2 X .40 tapped hole
T	0-80 UNF-2B tapped hole

❷ FINISH TABLE

Code Letter	Finish (see pg.11 for RoHS Compliance)
[blank]	Chemical Film per MIL-C-5541, Class 1A, Gold, non RoHS compliant
CC	Chemical Film per MIL-C-5541, Class 1A, Clear
EN	Electroless Nickel per MIL-C-26074, Class 4, Grade B, Bright
N	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright (.0002")
B	Black Anodize per MIL-A-8625, Type II, Class 2, (.00005" - .0003")
B3	Hard Black Anodize per MIL-A-8625, Type III, Class 2 (.002")
B3D	Hard Black Anodize with Dry Film Lube per MIL-L46010

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

Relative Clamping Force*	◔
Relative Retention Force*	◔
Relative Thermal Resistance*	◔
Relative Price	◕

For mechanical and thermal peformance data see the Technical Applications section pages 74-92

Series 146CR-5 WEDGE-LOK

WEDGES

Material:
Aluminum Alloy
6061-T6 per QQ-A-200/8

Finish:
Chemical Film per
Mil-C-5541 Class 1A

LEVER

Material:
Series 300 stainless steel
per Mil-S-5059

Finish:
Passivate per Mil-S-5002

SCREW

Material:
Series 300 stainless steel per
QQ-S-763 ASTM A-582

Finish:
Passivate per Mil-S-5002

ALIGNMENT SPRINGS

Material:
Beryllium Copper per QQ-C-
533

Finish:
Nickel per QQ-N-290, Class
1, Grade G, Bright

WASHERS AND SPRING WASHERS

Material:
Series 300 stainless steel per
QQ-S-763 ASTM A-582

Finish:
Passivate per Mil-S-5002

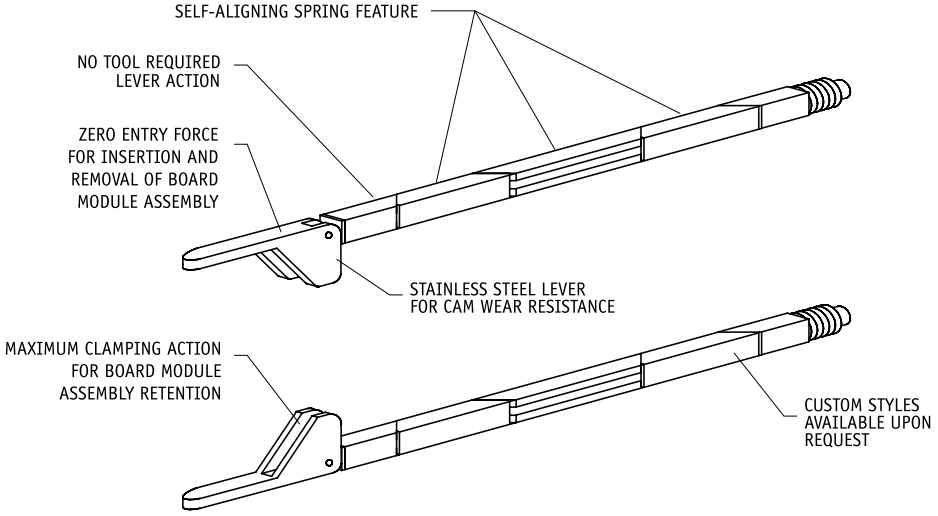
WEIGHT

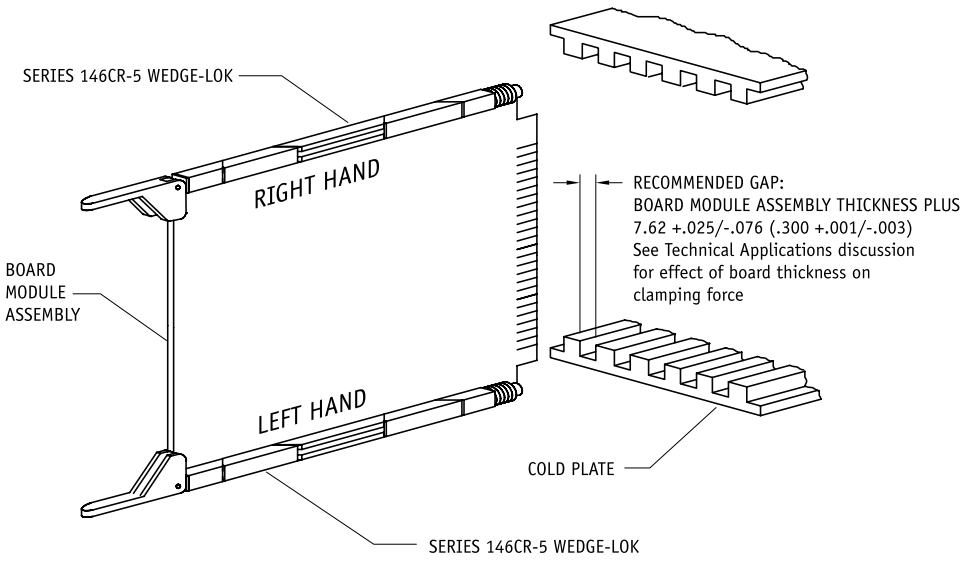
.103 oz./in. (1.22 g/cm)

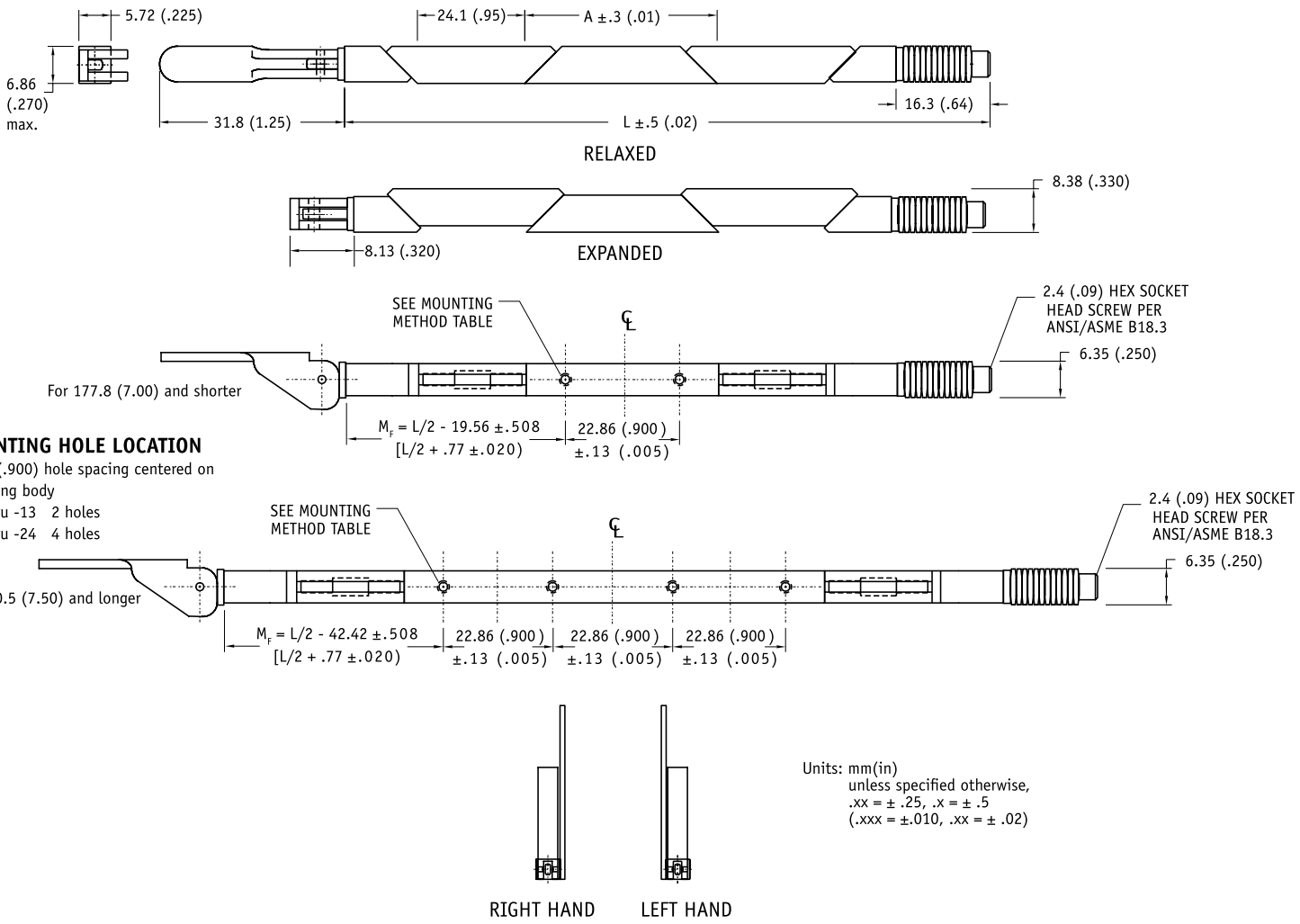
DESIGNED FOR HEAVY SHOCK, VIBRATION, & HEAT DISSIPATION

6.60 (.260) X 6.48 (.255) PROFILE

ALSO AVAILABLE IN 7-PIECE CONFIGURATION







Part Number Code (See example below)

Series 146CR-5 WEDGE-LOK Five-piece Lever-actuated

146CR-5 x -x -x -x

Mounting
Select code letter from Mounting Method Table _____ 1

Length
Length in .500 (12.7) increments _____ 10 [5.00 (127.0)]
_____ to 24 [12.00 (304.8)]

Finish
Select code letter from Finish Table _____ 2

Lever Action
Left hand _____ **L**
Right hand _____ **R**

Part Number Code example: 146CR-5M-12-C-R

Series 146CR WEDGE-LOK Five piece Lever actuated 6.00-in. (152.4-mm) long, Chem Film, M2.5 screw mounted, right hand.

❶ MOUNTING METHOD

Code Letter	Method
R	Rivet Mount (Ø 1.70 +.10/-.03 (.067 +.004/.001) THRU ⌴Ø 3.96 (.156) ⌵3.30 (.200) ⌵Ø 3.56 (.140) x 100°)
A	No Mounting Holes
S	2-56 UNC-2B tapped hole
M	M2.5 X .45 tapped hole
M2	M2 X .40 tapped hole

❷ FINISH TABLE

Code Letter	Finish (see pg.11 for RoHS Compliance)
[blank]	Chemical Film per MIL-C-5541, Class 1A, Gold, non RoHS compliant
CC	Chemical Film per MIL-C-5541, Class 1A, Clear
EN	Electroless Nickel per MIL-C-26074, Class 4, Grade B, Bright
N	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright (.0002")
B	Black Anodize per MIL-A-8625, Type II, Class 2, (.00005" - .0003")
B3	Hard Black Anodize per MIL-A-8625, Type III, Class 2 (.002")
B3D	Hard Black Anodize with Dry Film Lube per MIL-L46010

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

Relative Clamping Force*	◑
Relative Retention Force*	◑
Relative Thermal Resistance*	◕
Relative Price	◕

**For mechanical and thermal peformance data see the Technical Applications section pages 74-92*

Patent no. 4,823,951

Series 48SL WEDGE-LOK

- Also 47SL version available 5.72 (.225) x 5.72 (.225) call factory for details

DESIGNED FOR HEAVY SHOCK, VIBRATION, AND HEAT DISSIPATION

6.35 (.250) X 6.60 (.260) PROFILE

CHANNEL, WEDGES AND END PIECES

Material:
Aluminum Alloy 6061-T6 per ASTM-B-221

Finish:
See finish table on opposite page

SCREW & WASHERS

.09-in. or 2.5-mm hex. socket head cap screw, depending on mounting configuration

Material:
Series 300 stainless steel per QQ-S-763 ASTM A-582

Finish:
Passivate per Mil-S-5002 Type II

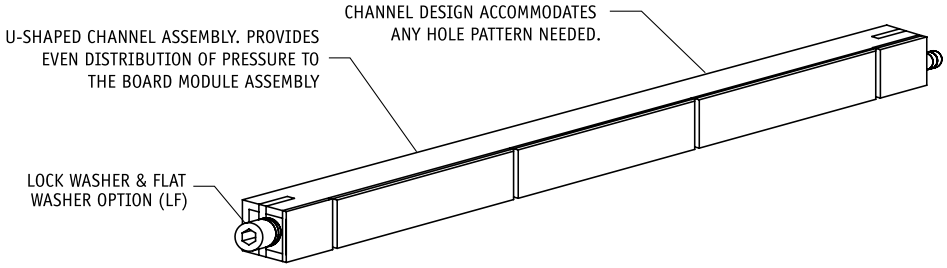
OPTIONAL LOCK & FLAT WASHER

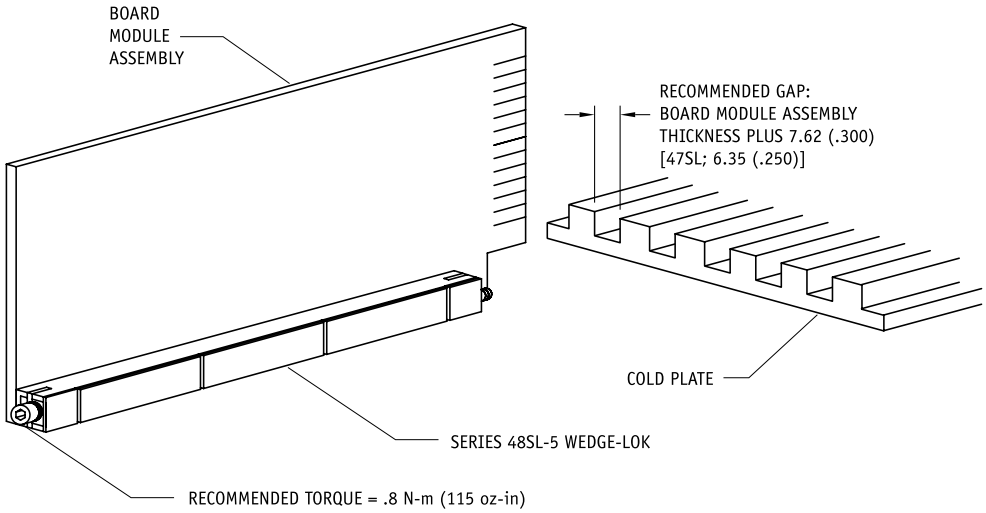
Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

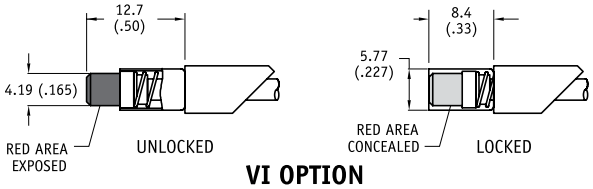
Finish:
Passivate per Mil-S-5002

WEIGHT

.115 oz./in. (1.28 g/cm)

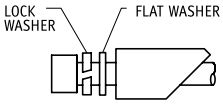






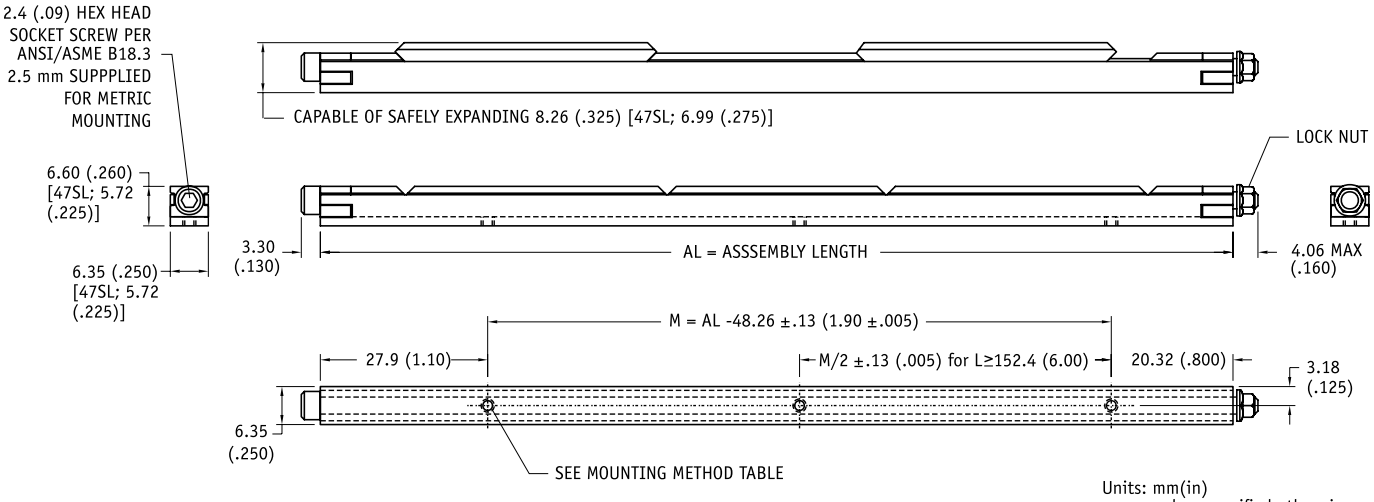
VI OPTION

Indicates assembly is unlocked
(adds 5.1 (.20) to screw length)



LF OPTION

Provides additional resistance to shock and vibration (adds 2.5 (.10) to screw length)



Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)

Part Number Code (See example below)

Series 48SL-5 WEDGE-LOK Five-piece	**48SL-5**	**x**	**x**	**-x**	**-x**	**-x**

Optional Visual Indicator
Visual Indicator _____ **VI**
None _____ **[Blank]**

Mounting
Select code letter from Mounting Method Table _____ 1

Length
Length in .100 (2.54) increments _____ 48 [4.80 (121.9)]
_____ to 120 [12.00 (304.8)]

Finish
Select code letter from Finish Table _____ 2

Washers
Lock Washer and Flat Washer _____ **LF**
None _____ **[Blank]**

Part Number Code example: 48SL-5S-48-C-LF

Series 48SL-5 WEDGE-LOK Five-piece High Thermal Transfer, 2-56 screw mount, 4.80-in. (121.9-mm) long, chem film, with lock washer and flat washer

❶ MOUNTING METHOD TABLE

DASH #	METHOD
A	No Mounting Holes
S	2-56 UNC-2B
T	0-80 UNF-2B
M	M2.5 X .45 tapped hole
M2	M2 X .40 tapped hole

❷ FINISH TABLE

Code Letter	Finish (see pg.11 for RoHS Compliance)
[blank]	Chemical Film per MIL-C-5541, Class 1a, Gold, non RoHS compliant
CC	Chemical Film per MIL-C-5541, Class 1A, Clear
EN	Electroless Nickel per MIL-C-26074, Class 4, Grade B, Bright
N	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright (.0002")
B	Black Anodize per MIL-A-8625, Type II, Class 2, (.00005" - .0003")
B3	Hard Black Anodize per MIL-A-8625, Type III, Class 2 (.002")
B3D	Hard Black Anodize with Dry Film Lube per MIL-L46010

**FOR MECHANICAL AND THERMAL PERFORMANCE
SEE THE TECHNICAL REFERENCE SECTION Pages 74-92**

FEATURES

Relative Clamping Force*	◔
Relative Retention Force*	◑
Relative Thermal Resistance*	●
Relative Price	◕

**For mechanical and thermal peformance data see the Technical Applications section pages 74-92*

Patent no. 4,823,951

Series 48-5 WEDGE-LOK

HOUSING AND WEDGE

Material:
Aluminum Alloy 6061-T6 per QQ-A-200/8

Finish:
Chemical Film per Mil-C-5541, Class 1A

WEDGES

Material:
Aluminum Alloy 6061-T6 per QQ-A-200/8

Finish:
Black Anodize per Mil-A-8625, Type II

SCREW

.09-in. or 2.5-mm hex socket Head cap screw, depending on mounting configuration

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

ALIGNMENT SPRINGS

Material:
Beryllium Copper per QQ-C-533

Finish:
Nickel per QQ-N-290, Class 1, Grade G, Bright

FLAT WASHER

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

OPTIONAL LOCK WASHER

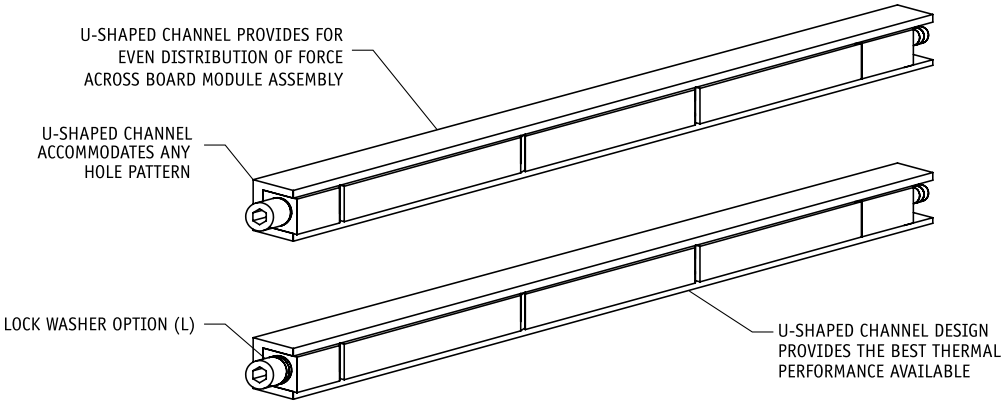
Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

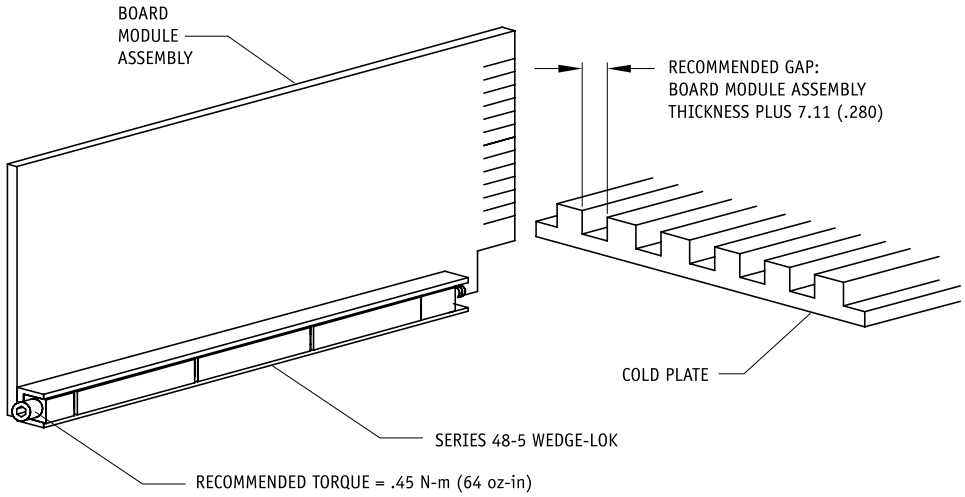
Finish:
Passivate per Mil-S-5002

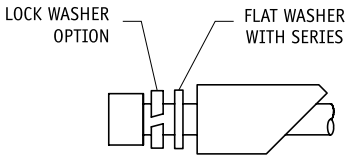
WEIGHT

.120 oz./in. (1.42 g/cm)

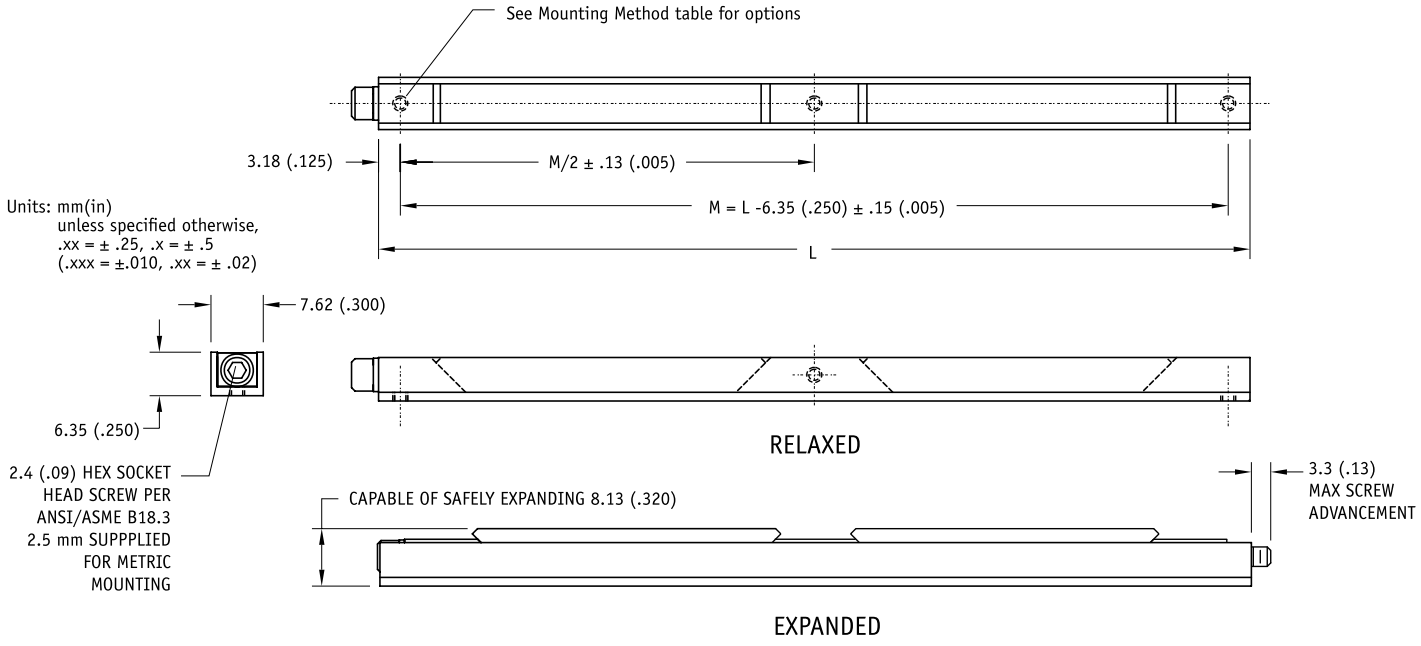
DESIGNED FOR HEAVY SHOCK, VIBRATION, AND HEAT DISSIPATION







L OPTION



Part Number Code (See examples below)

Series 48-5 WEDGE-LOK High Thermal Transfer **48-5** **-x** **-x** **-x** **-x**

Mounting
Select Code Letter from Mounting Table _____ 1

Length
Length in .500 (12.7) increments _____ 6 [3.00 (76.2)]
_____ to 24 [12.00 (304.8)]

Finish
Select code letter from Finish Table _____ 2

Lock Washer
Lock Washer _____ **L**
None _____ **[Blank]**

Part Number Code example: 48-5S-12-L

Series 48-5 WEDGE-LOK Five-piece High Thermal Transfer 6.00-in. (152.4-mm) long, with Lock Washer option, 2-56 mounting screws

❶ MOUNTING METHOD TABLE

Code Letter	METHOD
A	No Mounting Holes
S	2-56 UNC-2B tapped hole
T	0-80 UNF-2B tapped hole
M	M2.5 X .45 tapped hole
M2	M2 X .40 tapped hole
P	Indexing pins Ø1.57 (.062) x 1.02 (.040) (two pins only)

❷ FINISH TABLE

Code Letter	Finish (see pg.11 for RoHS Compliance)
[blank]	Housing-Chem Film Gold; Wedges-Black Anodize
C	Chemical Film per MIL-C-5541, Class 1A, Gold, non RoHS compliant
CC	Chemical Film per MIL-C-5541, Class 1A, Clear
EN	Electroless Nickel per MIL-C-26074, Class 4, Grade B, Bright
N	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright (.0002")
B	Black Anodize per MIL-A-8625, Type II, Class 2, (.00005" - .0003")
B3	Hard Black Anodize per MIL-A-8625, Type III, Class 2 (.002")
B3D	Hard Black Anodize with Dry Film Lube per MIL-L46010

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

APPLICATIONS

For military and commercial applications where harsh environments exist and where retainers are not mounted to the PCB modules. Ideal for conduction cooled chassis cold wall that do not provide a precision machined slot. There is a version "V" for use with VME64x or cPCI boards not designed with conduction frame or wedge clamps.

FEATURES

WEDGES & HOUSING

Material:
Aluminum Alloy 6061-T6 per QQ-A-200/8

Finish:
See finish table on opposite page

SCREW

.09-in. or 2.5-mm hex. socket head cap screw, depending on mounting configuration

Material:
Series 300 stainless steel per QQ-S-763 and ASTM A-582

Finish:
Passivate per Mil-S-5002

ALIGNMENT SPRINGS

Material:
Beryllium Copper QQ-C-533

Finish:
Nickel QQ-N-290 Class I, Grade G, Bright

WEIGHT

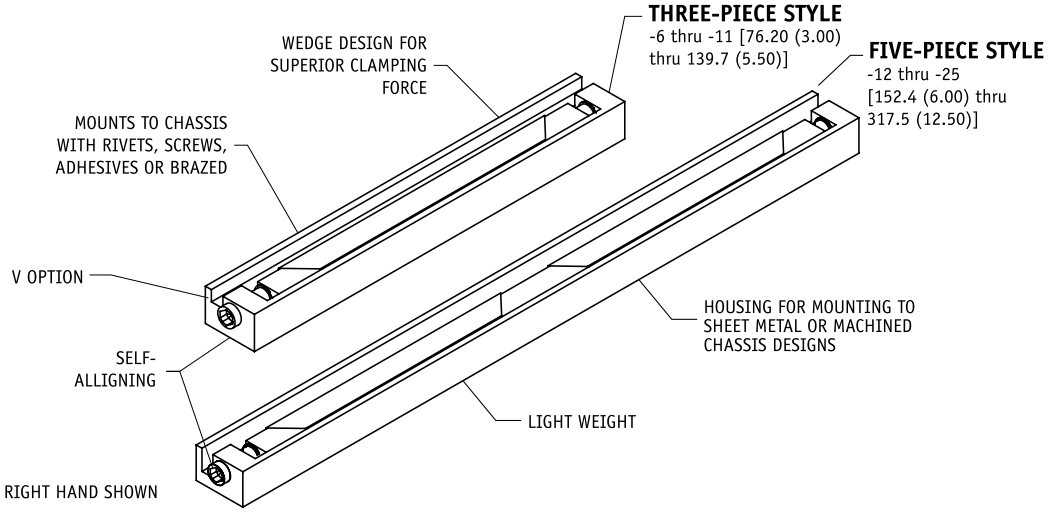
.224 oz./in. (2.65 g/cm)

Patent no. 4,823,951

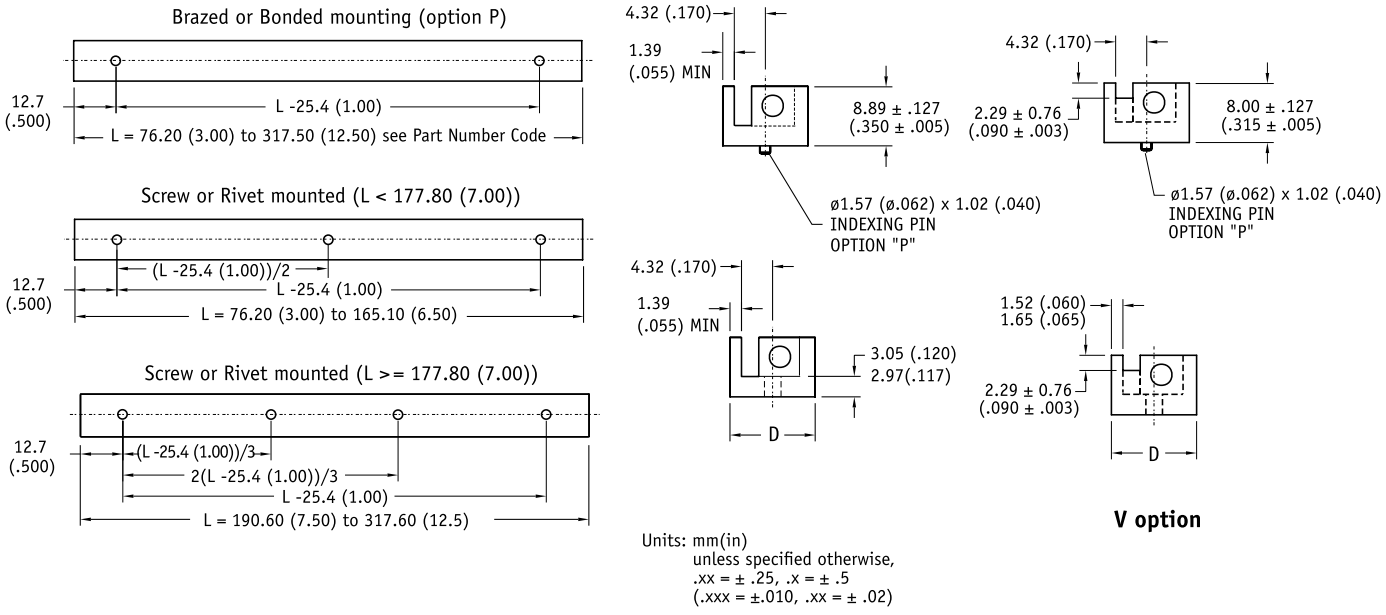
Series 340 WEDGE-TAINER

Series V340 WEDGE-TAINER

DESIGNED FOR HEAVY SHOCK, VIBRATION, AND HEAT DISSIPATION



Recommended torque .8N-m (115oz-in)



Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)

Part Number Code (See example below)

Series 340 & Series V340 WEDGE-TAINER

x 340 x -x -x -xx -x

V for eurocard style board like VME or cPCI _____ **V**
or not _____ **[Blank]**

Screw Action
Left hand _____ **L**
Right hand _____ **R**

Board Thickness
Select a dash number from Board Thickness Table _____ 1

Mounting Method
Select code letter from Mounting Method Table _____ 2

Length
Length in .500 (12.7) increments _____ 06 [3.00 (76.2)]
_____ to 25 [12.50 (317.5)]

Finish
Select code letter from Finish Table _____ 3

Part Number Code example: 340L-100M-12N

Series 340 WEDGE-TAINER, left handed, for .060-.094-in. (1.52-2.39 mm) thick board, M3 metric screw mounting, 6.00-in. (152.4-mm) long, nickel plate finish.

Part Number Code example: V340R-175P-10C

Series V340 WEDGE-TAINER VME/cPCI, right handed, for .130-.165-in. (3.30-4.19-mm) thick board, indexing pin mounting, 5.00-in. (127.0) long, Chem Film Gold finish.

❶ BOARD THICKNESS TABLE

DASH #	THICKNESS ±.127 (.005)	D ±.127 (.005)
-100	1.52 (.060)-2.39 (.094)	12.19 (.480)
-150	2.79 (.95)-3.68 (.145)	13.46 (.530)
-175	3.30 (.130)-4.19 (.165)	13.46 (.530)

❷ MOUNTING METHOD TABLE

Code Letter	Method
R	Rivet Holes (Ø2.48 (.098) THRU ⌵ Ø4.55 (.179) x 100°)
A	No Mounting Holes
P	Indexing Pins Ø1.57 (.062) X 1.02 (.040) (Two pins only) Indexing pins (-P) and rivet (-R) parts are shipped unassembled. Housing is unplated and unmarked for Indexing Pins (-P) method.
S	4-40 UNC-2B tapped holes
M	M3 X .50 tapped holes

❸ FINISH TABLE

Code Letter	Finish (see pg.11 for RoHS Compliance)
[blank]	Chemical Film per MIL-C-5541, Class 1A, Gold, non RoHS compliant
CC	Chemical Film per MIL-C-5541, Class 1A, Clear
EN	Electroless Nickel per MIL-C-26074, Class 4, Grade B, Bright
N	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright (.0002")
B	Black Anodize per MIL-A-8625, Type II, Class 2, (.00005" - .0003")
B3	Hard Black Anodize per MIL-A-8625, Type III, Class 2 (.002")
B3D	Hard Black Anodize with Dry Film Lube per MIL-L46010

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

Relative Clamping Force*	◔
Relative Retention Force*	◕
Relative Thermal Resistance*	--
Relative Price	◕

For mechanical and thermal peformance data see the Technical Applications section pages 74-92

Series 24 LOK-TAINER *DSCC 84168*

MATERIAL

HOUSING
.025-in. (.64-mm) thick Beryllium Copper per QQ-C-533 or
.024-in. (.61-mm) thick Cold Rolled Steel per ASTM A-366

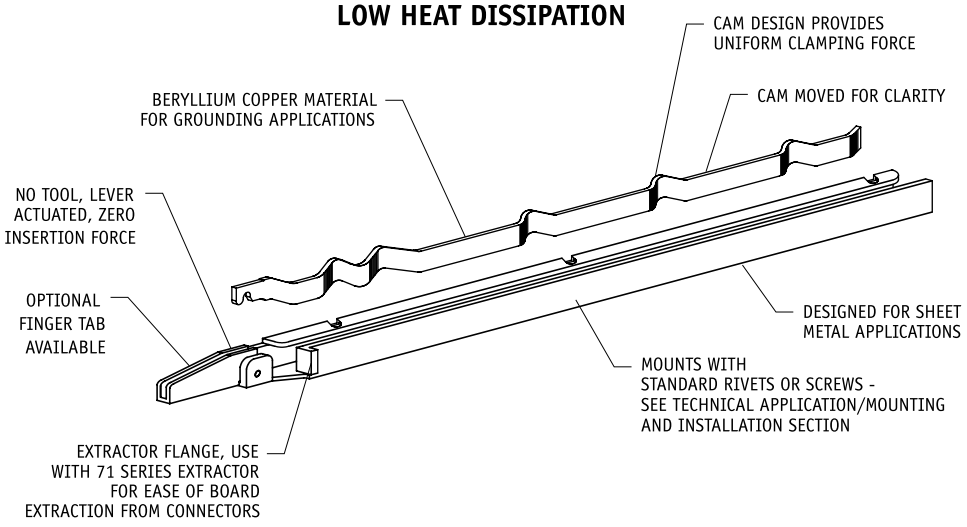
CAM
Beryllium Copper per QQ-C-533

LEVER
Cold Rolled Steel per ASTM A-366
Note: Beryllium Copper lever furnished when housing is unplated

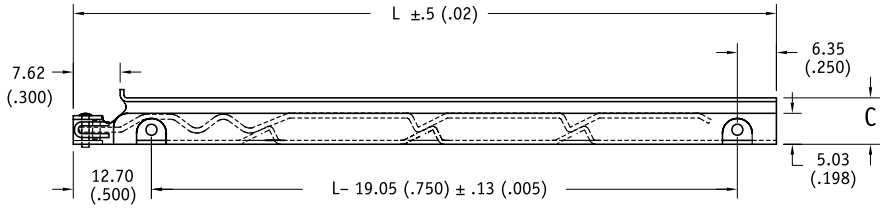
FINISH
See finish table on opposite page

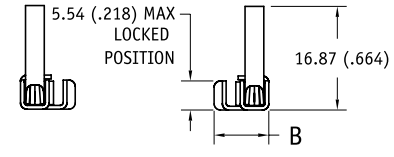
WEIGHT
.087 oz./in.. (97 g/cm)

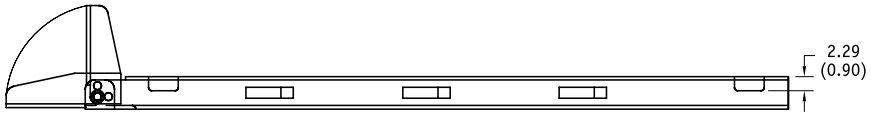
MODERATE SHOCK & VIBRATION APPLICATIONS
LOW HEAT DISSIPATION

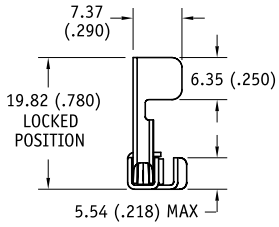


Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)

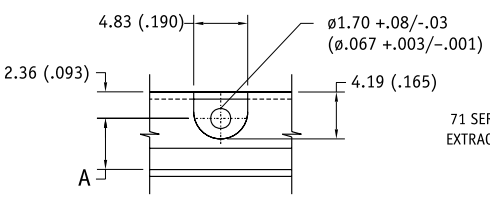




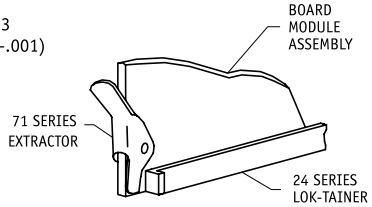




FINGER TAB OPTION
NOT TO SCALE - LEFT HAND SHOWN

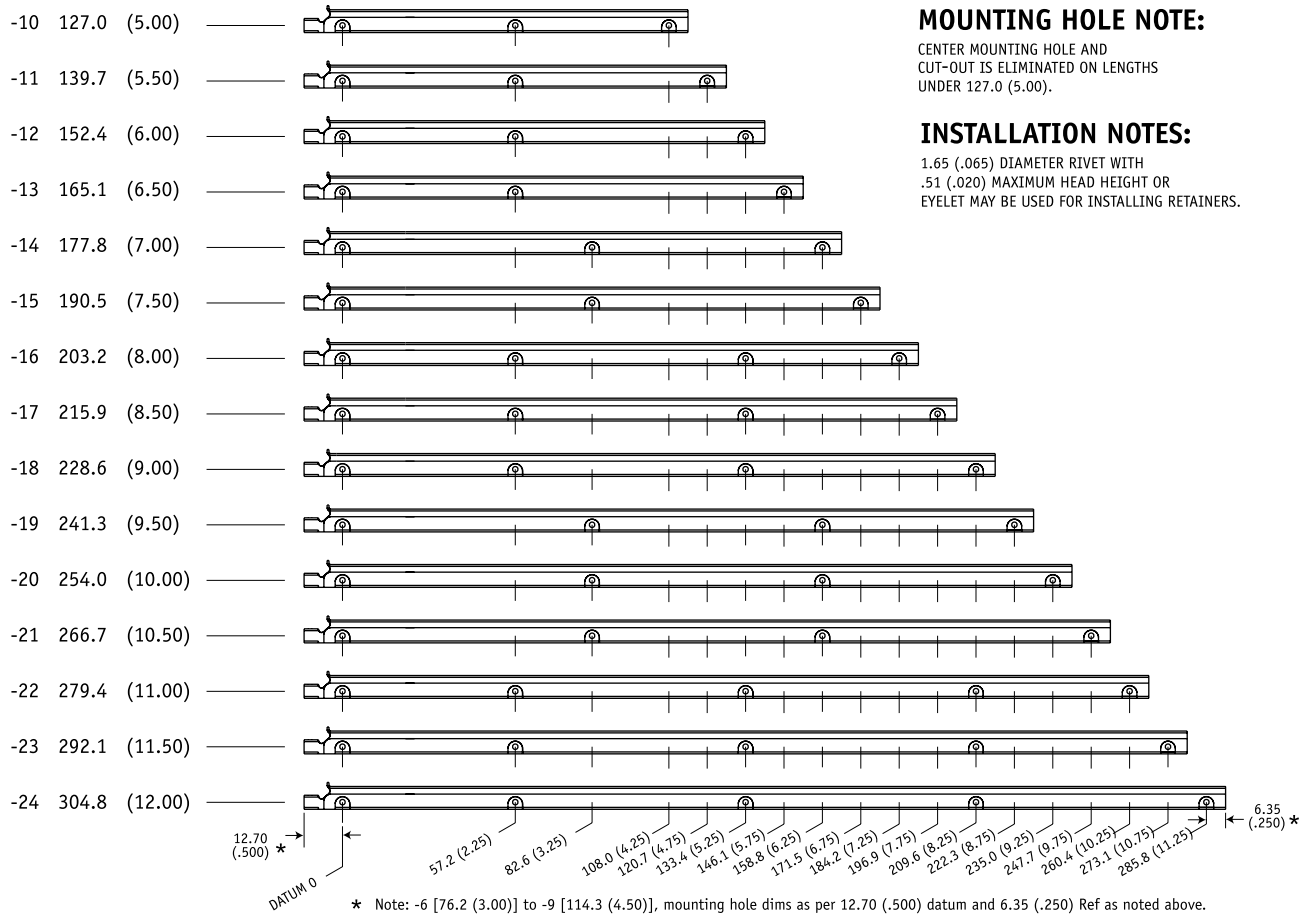


MOUNTING HOLE DETAIL
NOT TO SCALE



71 SERIES EXTRACTOR
OPTIONAL/NOT TO SCALE

MOUNTING HOLE DIMENSIONS
24 SERIES



MOUNTING HOLE NOTE:
CENTER MOUNTING HOLE AND CUT-OUT IS ELIMINATED ON LENGTHS UNDER 127.0 (5.00).

INSTALLATION NOTES:
1.65 (.065) DIAMETER RIVET WITH .51 (.020) MAXIMUM HEAD HEIGHT OR EYELET MAY BE USED FOR INSTALLING RETAINERS.

* Note: -6 [76.2 (3.00)] to -9 [114.3 (4.50)], mounting hole dims as per 12.70 (.500) datum and 6.35 (.250) Ref as noted above.

Part Number Code

Series 24 LOK-TAINER Lever Actuated — x 24 x x -x -x -x -x

Finger Tab
Finger tab _____ **T**
None _____ **[Blank]**

Housing Material
Select from Materials Table _____ 1

Extractor Flange
(Standard) _____ **X**
None _____ **[Blank]**

Board Thickness
Select dash number from Board Thickness Table _____ 2

Length
Length in .500 (12.7) increments _____ 6 [3.00 (76.2)]
_____ to 24 [12.00 (304.8)]

Finish
Select dash number from Finish Table _____ 3

Lever Action
Left hand _____ **L**
Right hand _____ **R**

Part Number Code example: 24BX-3-10-6-L

Series 24 Lever-actuated LOK-TAINER, Beryllium Copper housing with flange, .094-in. (2.39-mm) thick board, 5.00-in. (127.2-mm) long, Nickel plate finish and left hand lever action

❶ MATERIALS TABLE

Code Letter	Material
B	Beryllium Copper, 1/4H per, ASTM-B-194
S	Steel per, ASTM-A-366

❷ BOARD THICKNESS TABLE

DASH #	THICKNESS +.127/-.000 +.005/-.000	A	B	C
-1	0.79 (.031)	4.58 (.180)	8.89 (.350)	7.55 (.297)
-2	1.60 (.063)	4.58 (.180)	8.89 (.350)	7.55 (.297)
-3	2.39 (.094)	5.34 (.210)	9.66 (.380)	8.31 (.327)

❸ FINISH TABLE

Contact Factory for other finishes

Dash #	Finish (see pg.11 for RoHS Compliance)
[blank]	Silver Plate per QQ-S-365, Type III, Grade A
-1	None
-2	Ebanol per MIL-F-495 for Beryllium Copper per MIL-C-13924 for Steel
-4	Copper Plate per MIL-C 14550, Class 2
-5	Gold Plate per MIL-G-45204, Type 1, Class 1
-6	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright
-7	Zinc Plate Clear Chromate, per ASTM-B-633, Fe/Zn 8
-8	Zinc Plate Yellow Chromate, per ASTM-B-633, Fe/Zn 8

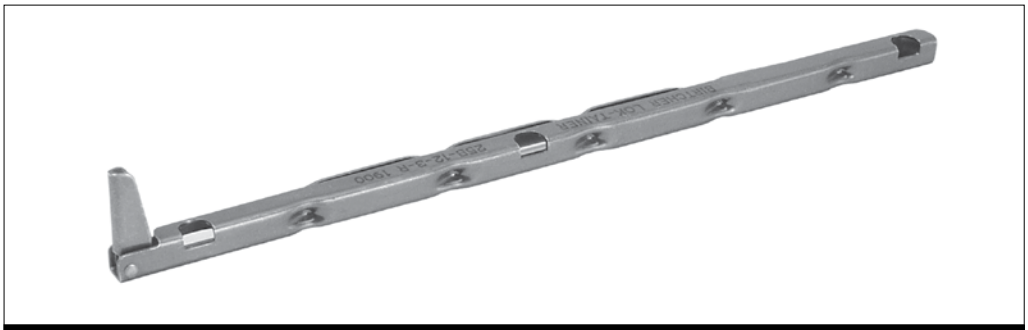
NOTE: No finish (-1) not available with "S" Steel material

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

Relative Clamping Force*	◔
Relative Retention Force*	◕
Relative Thermal Resistance*	◑
Relative Price	●

*For mechanical and thermal peformance data see the Technical Applications section pages 74-92



Series 25 LOK-TAINER *DSCC 86092*

MATERIAL

HOUSING
.025-in. (.64-mm) thick Beryllium Copper per QQ-C-533 or
.024-in. (.61-mm) thick Cold Rolled Steel per ASTM A-366

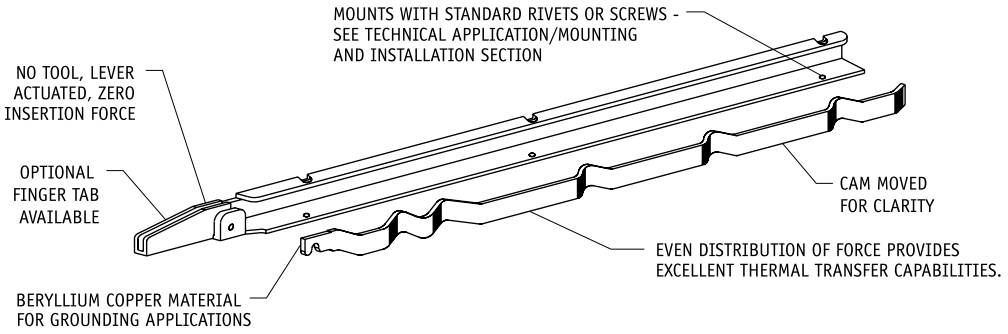
CAM
Beryllium Copper per QQ-C-533

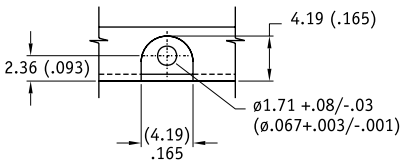
LEVER
Cold Rolled Steel per ASTM A-366
Note: Beryllium Copper lever furnished when housing is unplated.

FINISH
See finish table on opposite page

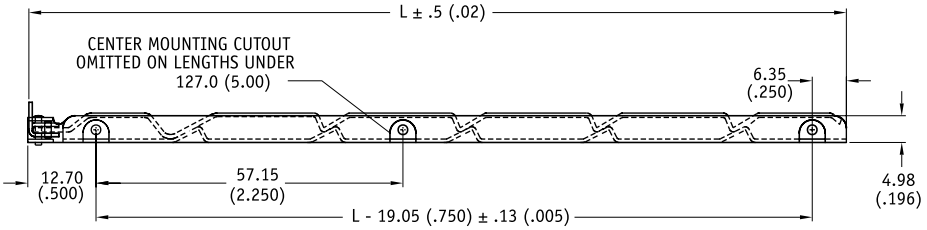
WEIGHT
.087 oz./in. (.97 g/cm)

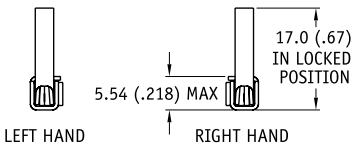
COLD WALL APPLICATIONS
MODERATE THERMAL, SHOCK & VIBRATION APPLICATIONS

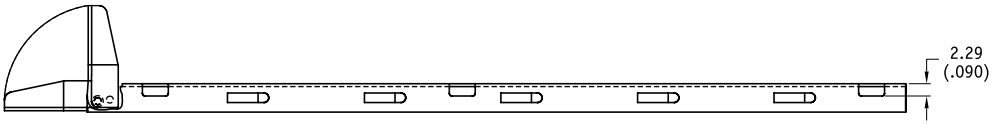


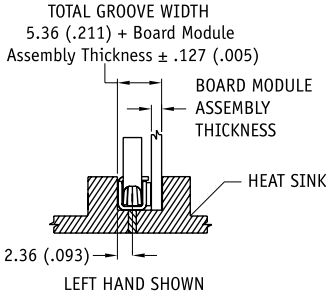


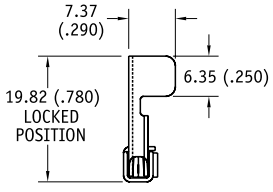
MOUNTING HOLE DETAIL
NOT TO SCALE









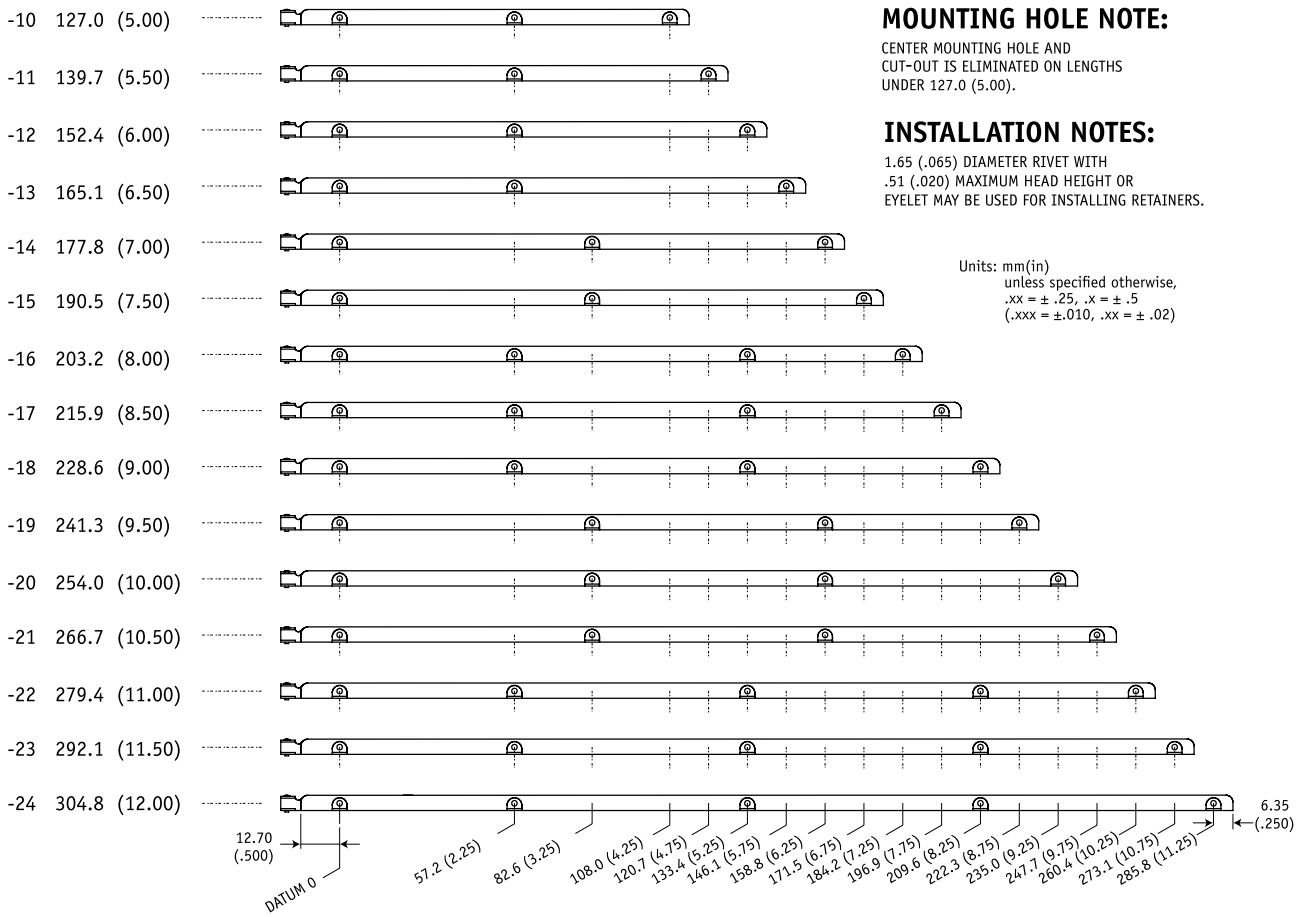


FINGER TAB OPTION
NOT TO SCALE - LEFT HAND SHOWN

Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)

MOUNTING HOLE DIMENSIONS

25 SERIES



MOUNTING HOLE NOTE:

CENTER MOUNTING HOLE AND CUT-OUT IS ELIMINATED ON LENGTHS UNDER 127.0 (5.00).

INSTALLATION NOTES:

1.65 (.065) DIAMETER RIVET WITH .51 (.020) MAXIMUM HEAD HEIGHT OR EYELET MAY BE USED FOR INSTALLING RETAINERS.

Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)

Note: -6 [76.2 (3.00)] to -9 [114.3 (4.50)], mounting hole dims as per 12.70 (.500) datum and 6.35 (.250) Ref as noted above.

Part Number Code

Series 25 LOK-TAINER Lever Actuated — **x 25 x -x -x -x**

Finger Tab
Finger tab _____ **T**
None _____ **[Blank]**

Housing Material
Select from Materials Table _____ 1

Length
Length in .500 (12.7) increments _____ 6 [3.00 (76.2)]
_____ to 24 [12.00 (304.8)]

Finish
Select dash number from Finish Table _____ 2

Lever Action
Left hand _____ **L**
Right hand _____ **R**

Part Number Code example: T25B-12-4-L

Series 25 Lever Actuated LOK-TAINER, with Finger Tab option, Beryllium Copper housing, 6.00-in. (152.4-mm) long, copper plate finish, and left hand lever action.

❶ MATERIALS TABLE

Code Letter	Material
B	Beryllium Copper, 1/4H per, ASTM-B-194
S	Steel per, ASTM-A-366

❷ FINISH TABLE

Contact Factory for other finishes

Dash #	Finish (see pg.11 for RoHS Compliance)
[blank]	Silver Plate per QQ-S-365, Type III, Grade A
-1	None
-2	Ebanol per MIL-F-495 for Beryllium Copper per MIL-C-13924 for Steel
-4	Copper Plate per MIL-C 14550, Class 2
-5	Gold Plate per MIL-G-45204, Type 1, Class 1
-6	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright
-7	Zinc Plate Clear Chromate, per ASTM-B-633, Fe/Zn 8
-8	Zinc Plate Yellow Chromate, per ASTM-B-633, Fe/Zn 8

NOTE: No finish (-1) not available with "S" Steel material

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

Relative Clamping Force*	◕
Relative Retention Force*	●
Relative Thermal Resistance*	--
Relative Price	●

For mechanical and thermal peformance data see the Technical Applications section pages 74-92

Series 127 LOK-TAINER *DSCC 88052*

MATERIAL

HOUSING
.025-in. (.64-mm) thick Beryllium Copper per QQ-C-533

CAM
Beryllium Copper per QQ-C-533

SCREW
Stainless Steel, Passivate Finish

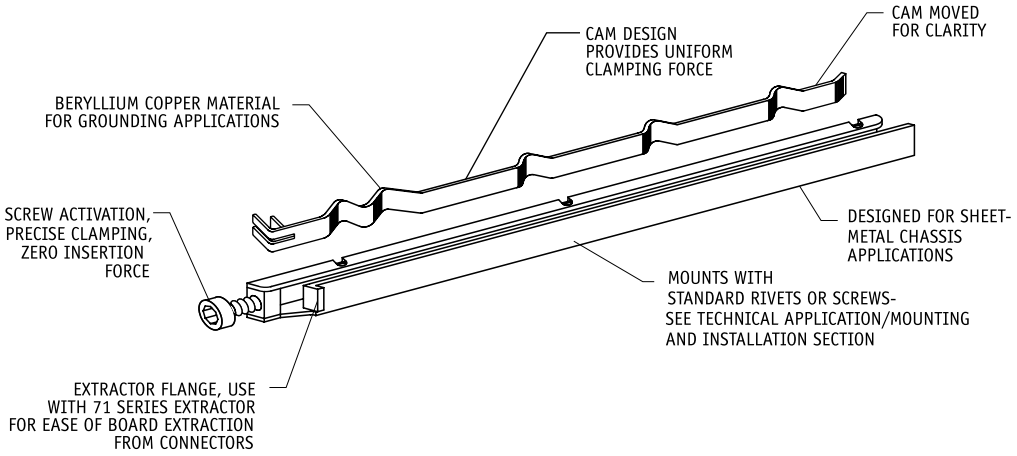
FINISH

See finish table on opposite page

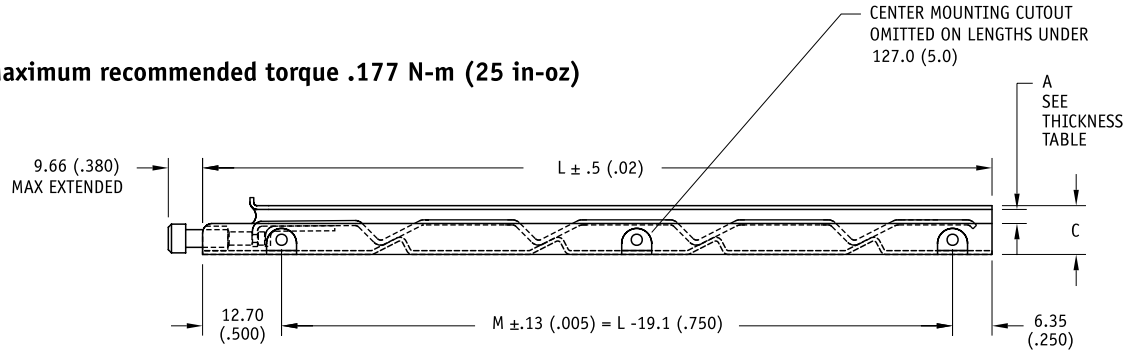
WEIGHT

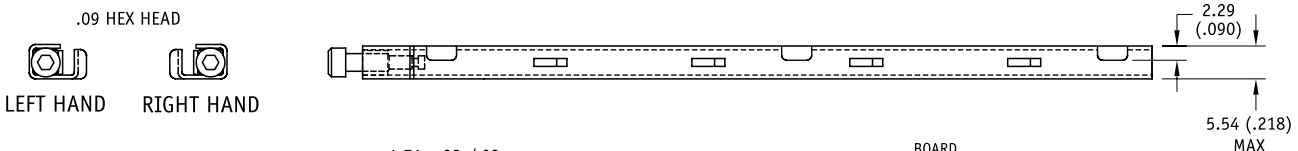
.116 oz./in. (1.29 g/cm)

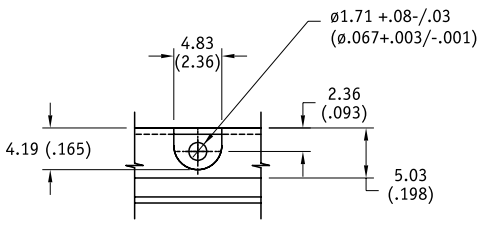
MODERATE SHOCK & VIBRATION APPLICATIONS
LOW HEAT DISSIPATION



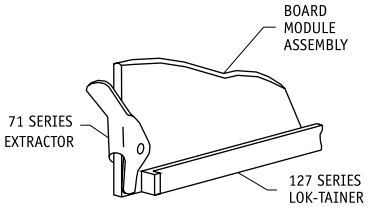
Maximum recommended torque .177 N-m (25 in-oz)







MOUNTING HOLE DETAIL

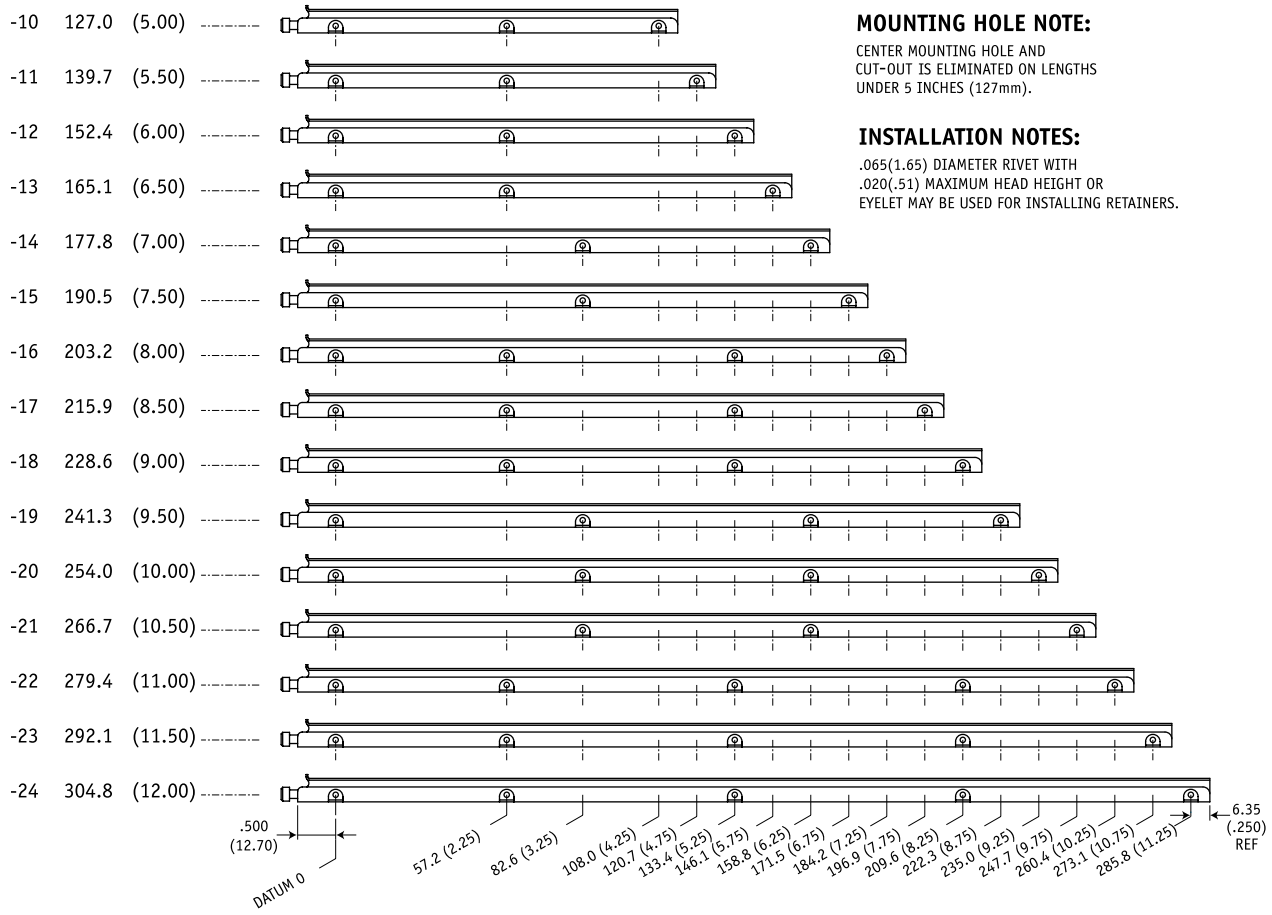


71 SERIES EXTRACTOR
OPTIONAL/NOT TO SCALE

Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)

MOUNTING HOLE DIMENSIONS

127 SERIES



MOUNTING HOLE NOTE:

CENTER MOUNTING HOLE AND CUT-OUT IS ELIMINATED ON LENGTHS UNDER 5 INCHES (127mm).

INSTALLATION NOTES:

.065(1.65) DIAMETER RIVET WITH .020(.51) MAXIMUM HEAD HEIGHT OR EYELET MAY BE USED FOR INSTALLING RETAINERS.

Note: -6 [76.2 (3.00)] to -9 [114.3 (4.50)], mounting hole dims as per 12.70 (.500) datum and 6.35 (.250) Ref as noted above.

Part Number Code

Series 127 LOK-TAINER Screw-Actuated **127 x -x -x -x -x**

Housing Material
Select from Materials Table _____ 1

Board Thickness
Select dash number from Board Thickness Table _____ 2

Length
Length in .500 (12.7) increments _____ 6 [3.00 (76.2)]
_____ to 24 [12.00 (304.8)]

Finish
Select dash number from Finish Table _____ 3

Screw Action
Left hand _____ **L**
Right hand _____ **R**

Part Number Code example: 127B-4-12-6-R

Series 127 Screw-actuated LOK-TAINER, Beryllium Copper housing with flange, 6.00-in. (152.4-mm) long, Nickel plate finish, and right hand screw action.

❶ MATERIALS TABLE

Code Letter	Material
B	Beryllium Copper, 1/4H per, ASTM-B-194
S	Steel per, ASTM-A-366

❷ BOARD THICKNESS TABLE

Dash #	A Min	A Max	C
-2	.025 (0.64)	.070 (1.78)	.309 (7.85)
-4	.087 (2.21)	.132 (3.36)	.376 (9.55)

❸ FINISH TABLE

Contact Factory for other finishes

Dash #	Finish (see pg.11 for RoHS Compliance)
NONE	Silver Plate per QQ-S-365, Type III, Grade A
-1	None
-2	Ebanol per MIL-F-495 for Beryllium Copper per MIL-C-13924 for Steel
-4	Copper Plate per MIL-C 14550, Class 2
-5	Gold Plate per MIL-G-45204, Type 1, Class 1
-6	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright
-7	Zinc Plate Clear Chromate, per ASTM-B-633, Fe/Zn 8
-8	Zinc Plate Yellow Chromate, per ASTM-B-633, Fe/Zn 8

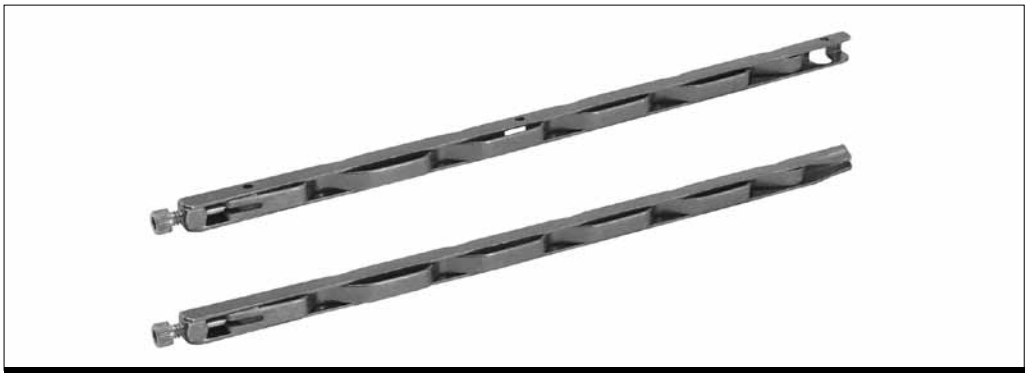
NOTE: No finish (-1) not available with "S" Steel material

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

Relative Clamping Force*	◕
Relative Retention Force*	◕
Relative Thermal Resistance*	◕
Relative Price	●

*For mechanical and thermal peformance data see the Technical Applications section pages 74-92



Series 28 & 29 LOK-TAINER

MATERIAL

HOUSING
.025-in. (.64-mm) thick Beryllium Copper per QQ-C-533 or
.024-in. (.61-mm) thick Cold Rolled Steel per ASTM A-366

CAM
Beryllium Copper per QQ-C-533

SCREW
Stainless Steel, Passivate Finish

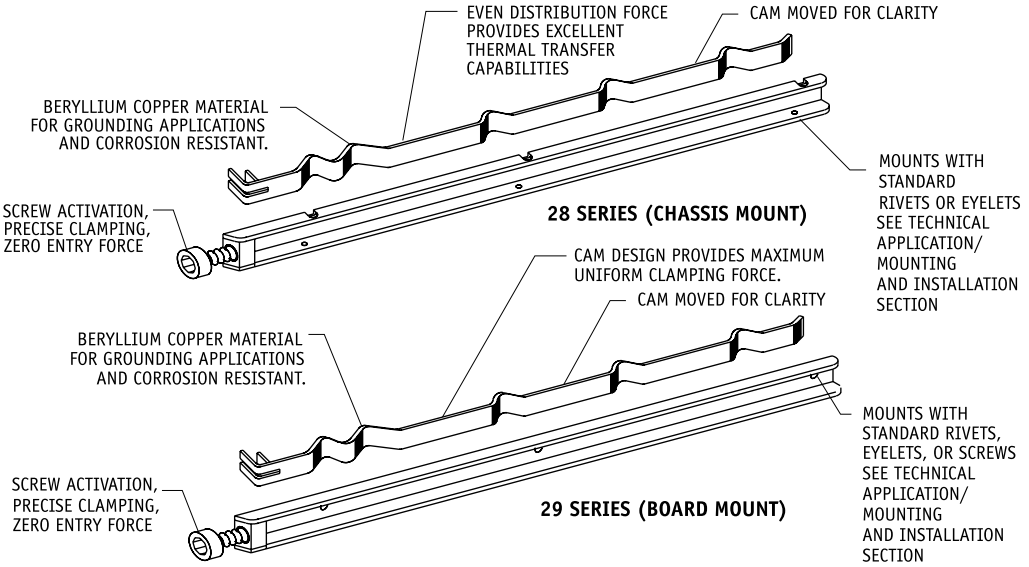
FINISH

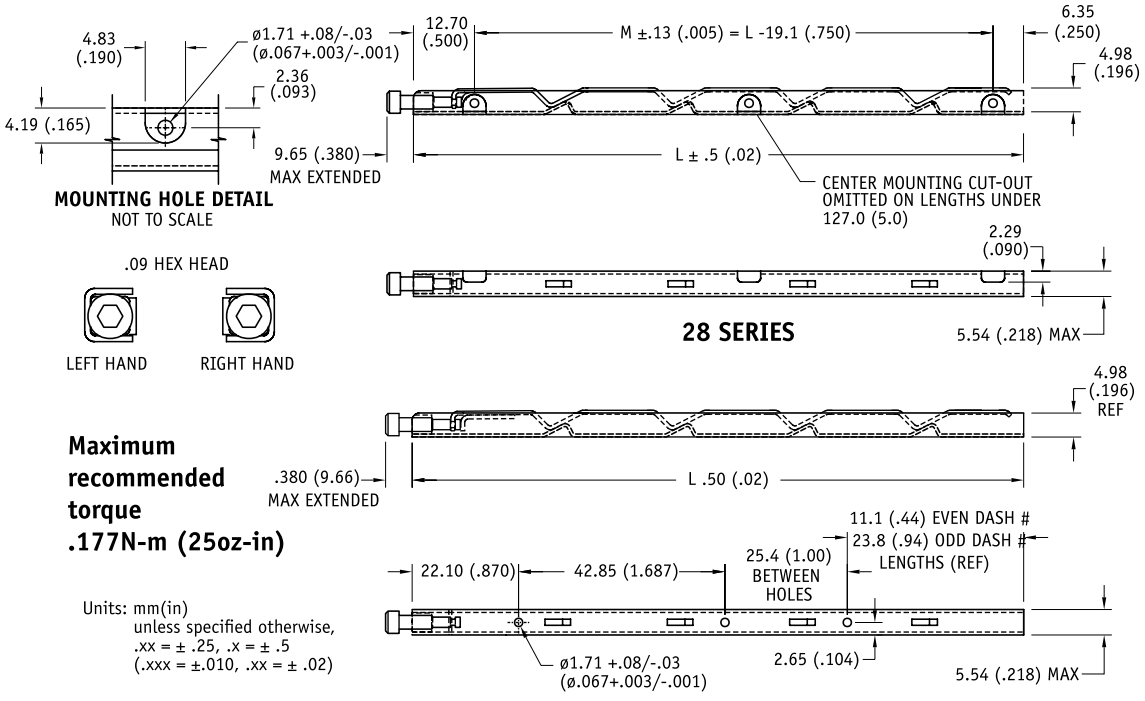
See finish table on opposite page

WEIGHT

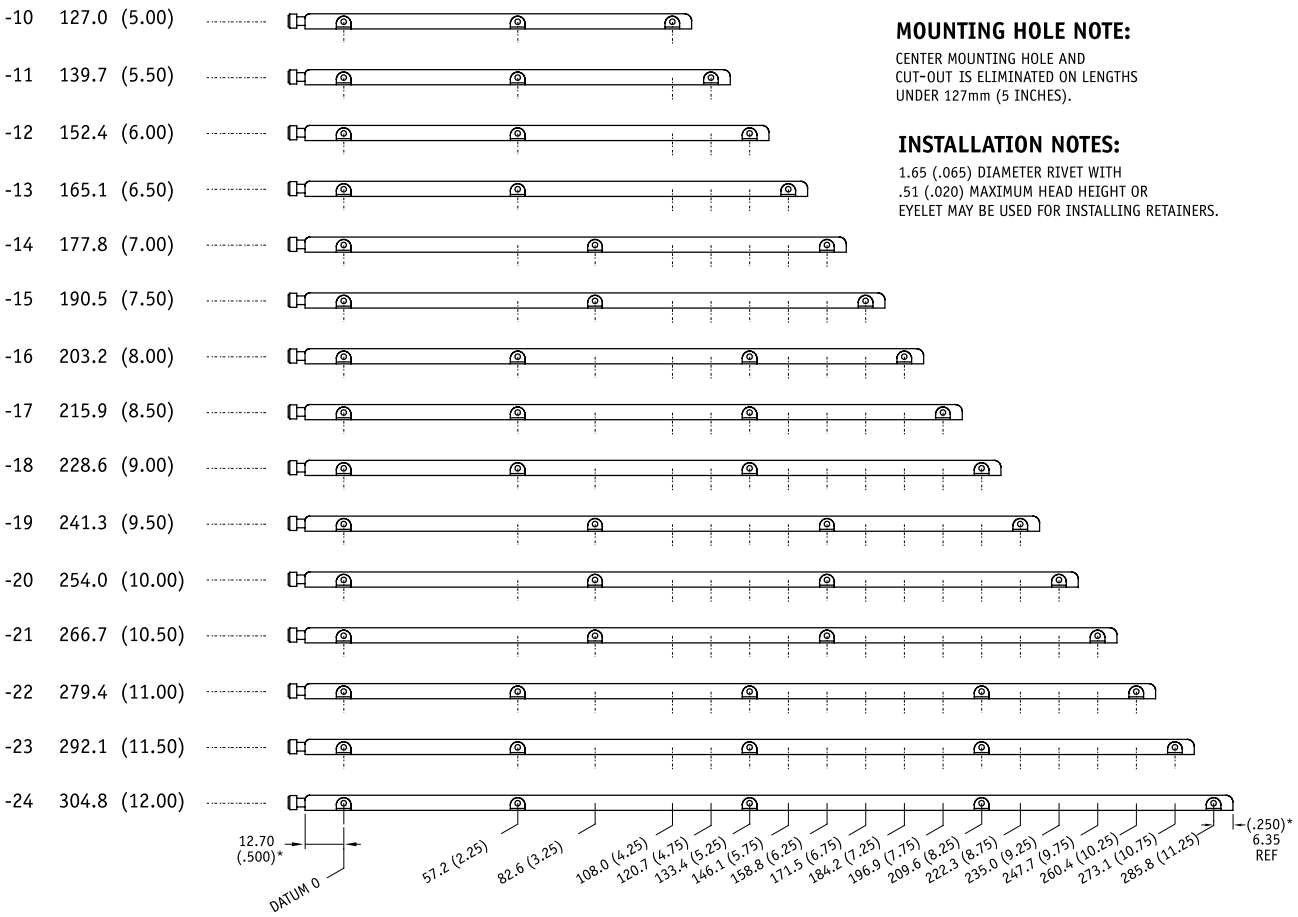
.087 oz./in. (.97 g/cm)

SHOCK & VIBRATION APPLICATIONS
MODERATE HEAT DISSIPATION





MOUNTING HOLE DIMENSIONS
28 SERIES



MOUNTING HOLE NOTE:
CENTER MOUNTING HOLE AND CUT-OUT IS ELIMINATED ON LENGTHS UNDER 127mm (5 INCHES).

INSTALLATION NOTES:
1.65 (.065) DIAMETER RIVET WITH .51 (.020) MAXIMUM HEAD HEIGHT OR EYELET MAY BE USED FOR INSTALLING RETAINERS.

*NOTE: -6 (3.00 INCHES) THRU -9 (4.50 INCHES) MOUNTING HOLE DIMS AS PER 12.70 (.500) DATUM AND 6.35 (.250) REF AS NOTED ABOVE.

Part Number Code

Series 28 & 29 LOK-TAINER Screw-Actuated **28 or 29** **x -x -x -x**

Housing Material
Select from Materials Table _____ 1

Length
Length in .500 (12.7) increments _____ 6 [3.00 (76.2)]
_____ to 24 [12.00 (304.8)]

Finish
Select dash number from Finish Table _____ 2

Screw Action (Series 28 only)
Left hand _____ **L**
Right hand _____ **R**

Part Number Code examples:

28B-16-7-L

Series 28 Screw-actuated LOK-TAINER, Beryllium Copper housing, 8.00-in. (203.2-mm) long, Clear Zinc plated, with left hand screw action

29B-12-6

Series 29 Screw-actuated LOK-TAINER, Beryllium Copper housing, 6.00-in. (152.4-mm) long, Nickel plate finish

❶ MATERIALS TABLE

Code Letter	Material
B	Beryllium Copper, 1/4H per, ASTM-B-194
S	Steel per, ASTM-A-366

❷ FINISH TABLE

Contact Factory for other finishes

Dash #	Finish (see pg.11 for RoHS Compliance)
NONE	Silver Plate per QQ-S-365, Type III, Grade A
-1	None
-2	Ebanol per MIL-F-495 for Beryllium Copper per MIL-C-13924 for Steel
-4	Copper Plate per MIL-C 14550, Class 2
-5	Gold Plate per MIL-G-45204, Type 1, Class 1
-6	Nickel Plate per QQ-N-290, Class 1, Grade G, Bright
-7	Zinc Plate Clear Chromate, per ASTM-B-633, Fe/Zn 8
-8	Zinc Plate Yellow Chromate, per ASTM-B-633, Fe/Zn 8

NOTE: No finish (-1) not available with "S" Steel material

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

FEATURES

- Flared entry
- Choice of three materials
- Choice of 6 finishes or no finish
- Screw, rivet, eyelet or adhesive mounting
- Spring design to retain board module assembly
- Wide entrance for easy card insertion

APPLICATIONS

- Designed for moderate shock and vibration environments
- Electrically conductive
- Ideal for applications with low heat dissipation

Series 15 & 17 for .063-in. (1.59-mm) boards
Series 16 & 18 for .094-in. (2.38-mm) boards
Series 19 & 20 for .125-in. (3.18-mm) boards

MATERIAL

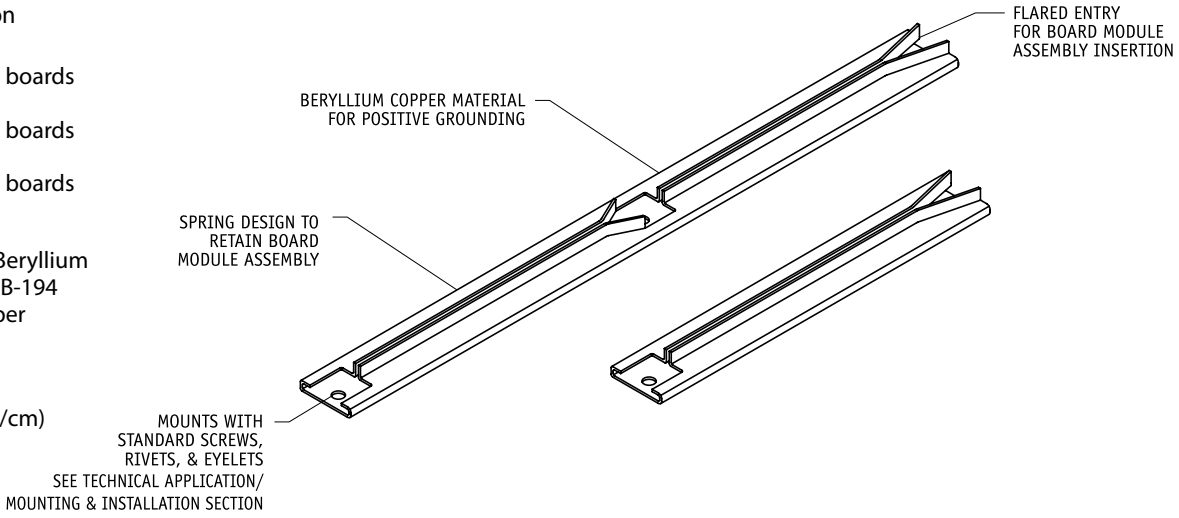
.010-in. (.25-mm) Beryllium Copper per ASTM B-194 or Stainless Steel per Mil-S-5059

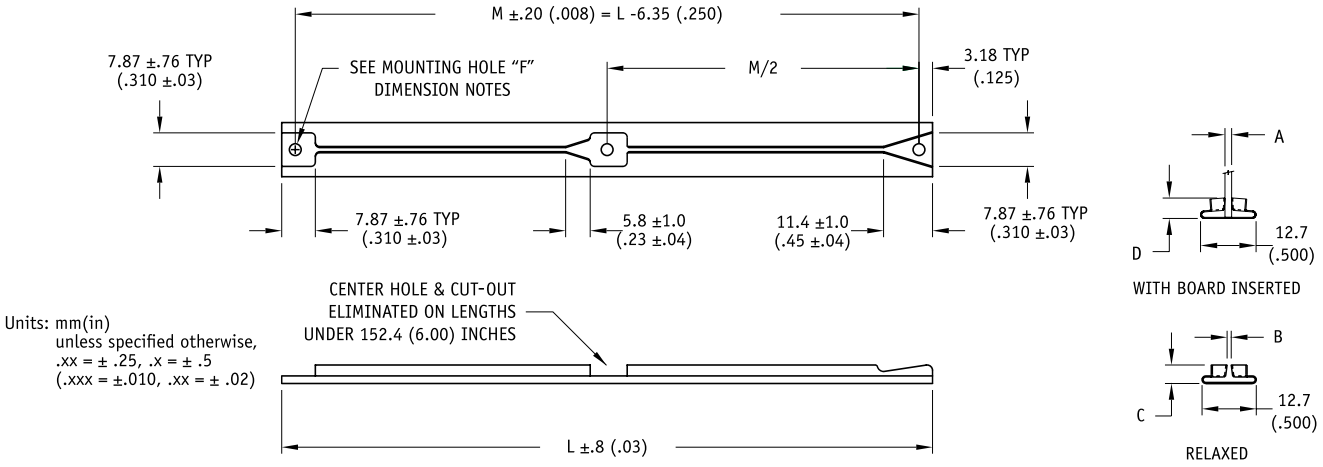
WEIGHT

.056 oz./in. (0.63 g/cm) Either material

Series 15 through 20 PCB-TAINER

SHOCK & VIBRATION APPLICATIONS
LOW HEAT DISSIPATION





❶ MATERIALS TABLE

CODE LETTER	MATERIAL
B	BERYLLIUM COPPER, 1/4H PER, ASTM-B-194
BH	BERYLLIUM COPPER, 1/4 HT PER QQ-C-533, HEAT TREATED
CR	STAINLESS STEEL, TYPE 301 COND 1/4 H PER AMS 5517

❷ FINISH TABLE

CONTACT FACTORY FOR OTHER FINISHES

DASH #	FINISH (see pg.11 for RoHS Compliance)
[blank]	SILVER PLATE PER QQ-S-365, TYPE III, GRADE A
-1	NONE
-4	COPPER PLATE PER MIL-C-14550, CLASS 2
-5	GOLD PLATE PER MIL-G-45204, TYPE 1, CLASS 1
-6	NICKEL PLATE PER QQ-N-290, CLASS 1, GRADE G, BRIGHT
-7	ZINC PLATE CLEAR CHROMATE, PER ASTM-B-633, Fe/Zn 8
-8	ZINC PLATE YELLOW CHROMATE, PER ASTM-B-633 Fe/Zn 8

DIMENSION NOTES

MOUNTING HOLE	
SERIES 15, 16, & 19	ø2.77 +.03\-.08 (ø.109 +.001\-.003)
SERIES 17, 18, & 20	ø2.49 +.03\-.08 (ø.098 +.001\-.003)

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

DIMENSION TABLE

SERIES #	A BOARD THICKNESS	B	C	D BERYLLIUM COPPER +.25\-.51 (+.010\.020)	D STAINLESS STEEL .51 (.020)	F MOUNTING HOLE +.03\-.08 (.001\-.003)
15	1.59 (.063)	0.97 (.038)	4.35 (.171)	4.83 (.190)	4.83 (.190)	2.77 (.109)
16	2.38 (.094)	1.73 (.068)	4.35 (.171)	4.83 (.190)	4.83 (.190)	2.77 (.109)
17	1.59 (.063)	0.97 (.038)	4.35 (.171)	4.83 (.190)	4.83 (.190)	2.49 (.098)
18	2.38 (.094)	1.73 (.068)	4.35 (.171)	4.83 (.190)	4.83 (.190)	2.49 (.098)
19	3.18 (.125)	2.54 (.100)	5.47 (.215)	6.35 (.250)	6.35 (.250)	2.77 (.109)
20	3.18 (.125)	2.54 (.100)	5.47 (.215)	6.35 (.250)	6.35 (.250)	2.49 (.098)

Part Number Code

Series 15, 16, 17, 18, 19, and 20 PCB-TAINER **x x -x -x**

Series
Enter Series number_____ **15, 16, 17, 18,19, or 20**

Material
Select Code Letter from Materials Table _____ 1

Length
Length in .500 (12.7) increments _____ 4 [2.00 (50.8)]
_____ to 20 [10.00 (254.0)]

Finish
Select dash number from Finish Table _____ 2

No dash number required for CR material. Stainless steel parts are passivated only.

Part Number Code example: 15B-18-6

15 Series PCB-TAINER, Beryllium Copper, for .063-in. (1.59-mm) thick board, 9.00-in. (228.7-mm) long, Nickel Plate finish.

FEATURES

- Narrow profile
- Flared entry
- Choice of two materials
- Choice of six finishes or no finish
- Screw, rivet, eyelet or adhesive mounting
- Spring design to retain board module assembly
- Wide entrance for easy card insertion
- Narrow .125 (3.18) x .190 (4.83) profile

APPLICATIONS

- Designed for moderate shock and vibration environments
- Electrically conductive
- Ideal for applications with low heat dissipation

MATERIAL

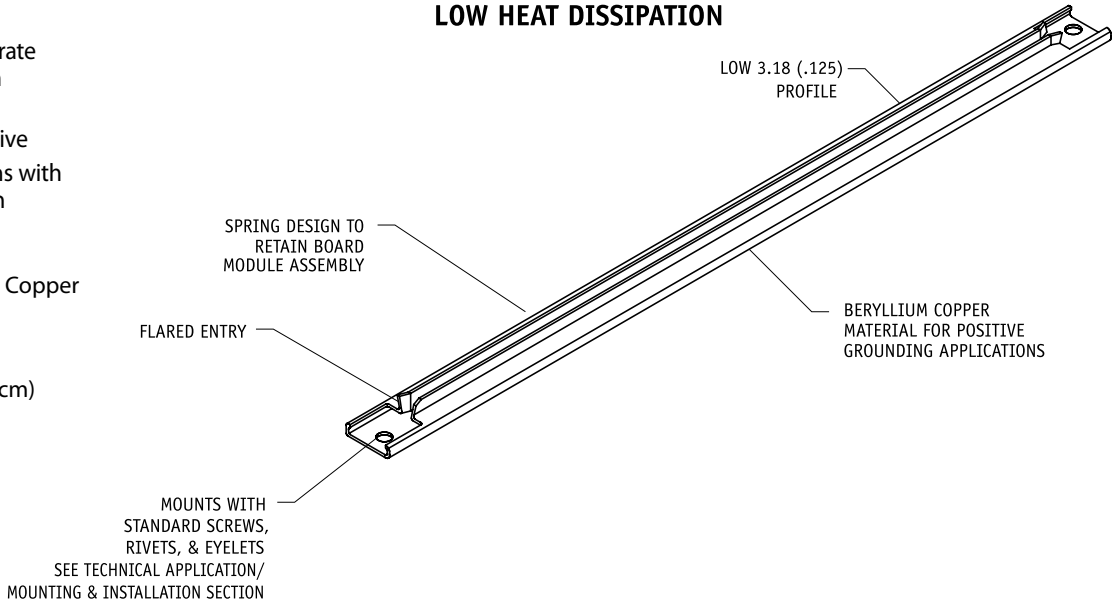
.15 (.006) Beryllium Copper per ASTM B-194

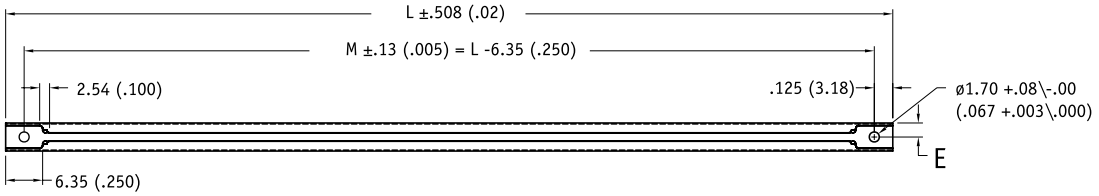
WEIGHT

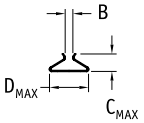
.012 oz./in. (0.14 g/cm) Either material

Series 21 PCB-TAINER

SHOCK & VIBRATION APPLICATIONS
LOW HEAT DISSIPATION







Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)

❶ MATERIALS TABLE

CODE LETTER	MATERIAL
B	BERYLLIUM COPPER, 1/4H PER, ASTM-B-194
BH	BERYLLIUM COPPER, 1/4 HT PER QQ-C-533, HEAT TREATED

❷ DIMENSION TABLE

DASH #	BOARD THICKNESS B	C MAX	D MAX	E
-1	0.79 (.031)	3.30 (.130)	4.83 (.190)	2.42 (.095)
-2	1.59 (.063)	3.30 (.130)	4.83 (.190)	2.42 (.095)
-3	2.38 (.094)	3.30 (.130)	5.08 (.200)	2.54 (.100)
-4	3.18 (.125)	3.30 (.130)	5.33 (.210)	2.67 (.105)

❸ FINISH TABLE

CONTACT FACTORY FOR OTHER FINISHES

DASH #	FINISH (see pg.11 for RoHS Compliance)
[blank]	SILVER PLATE PER QQ-S-365, TYPE III, GRADE A
-1	NONE
-4	COPPER PLATE PER MIL-C-14550, CLASS 2
-5	GOLD PLATE PER MIL-G-45204, TYPE 1, CLASS 1
-6	NICKEL PLATE PER QQ-N-290, CLASS 1, GRADE G, BRIGHT
-7	ZINC PLATE CLEAR CHROMATE, PER ASTM-B-633, Fe/Zn 8
-8	ZINC PLATE YELLOW CHROMATE, PER ASTM-B-633 Fe/Zn 8

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

Part Number Code

Series 21 PCB-TAINER **21** -x -x -x -x

Material
Select Code Letter from Materials Table _____ 1

Board Thickness
Select dash number from Board Thickness Table _____ 2

Length
Length in .500 (12.7) increments _____ 2 [1.00 (25.4)]
_____ to 12 [6.00 (152.4)]

Finish
Select dash number from Finish Table _____ 3

Part Number Code example: 21B-3-10-6

21 Series PCB-TAINER, Beryllium Copper, for .094 in. (2.39-mm) thick board, 5.00 in. (127.0) long, Nickel Plate finish

FEATURES

- Available with or without Flared Entry
- Choice of four board thicknesses
- Choice of three materials
- Choice of seven finishes or no finish for Beryllium Copper. Stainless steel parts are passivate only
- Spring design to retain board module assembly

APPLICATIONS

- Where metal guides are required
- Moderate heat transfer and vibration
- Electrically and thermally conductive
- Install with rivets, screws or adhesives

Meets the requirements of drawings 85020 and 85021 for flared entry, Defense Supply Center, Columbus.

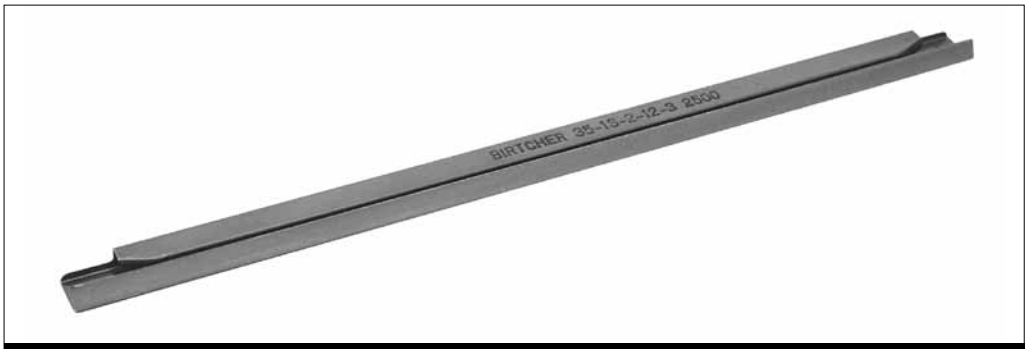
An optional 7.50-in. length is available as a special part: Part No. 35-1X-T-15-F

MATERIAL

.008-in. (.20-mm) thick Beryllium Copper or Stainless Steel

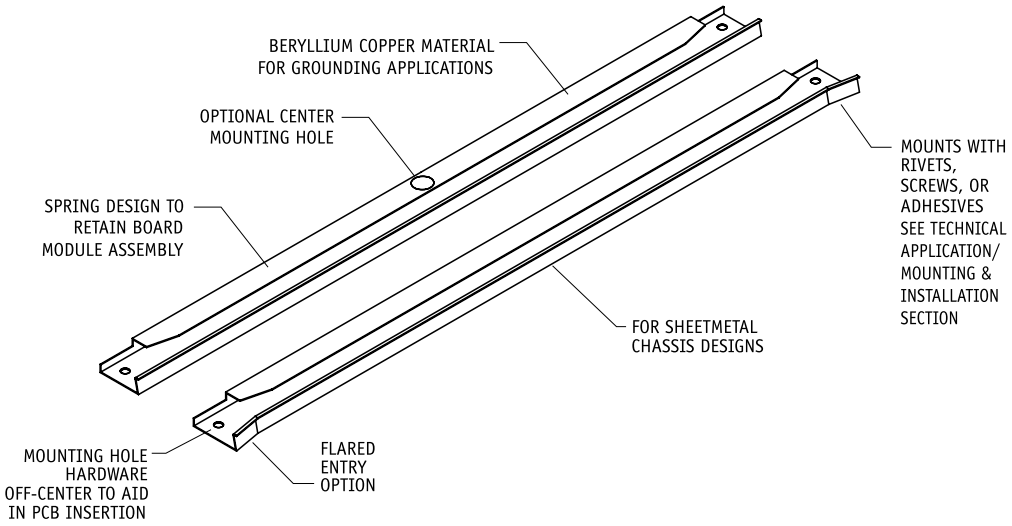
WEIGHT

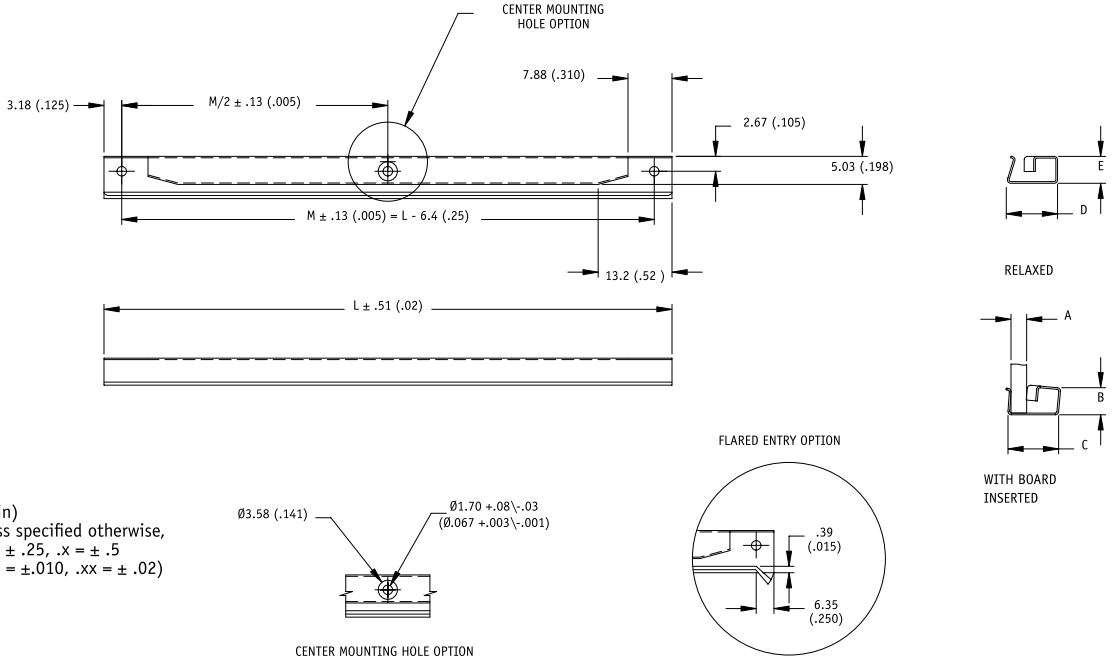
.033 oz./in. (0.37 g/cm) Either material



Series 35-1 PCB-TAINER ***DSCC 85020 & 85021***

MODERATE HEAT & VIBRATION APPLICATIONS ELECTRICALLY & THERMALLY CONDUCTIVE





Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)

❶ MATERIALS TABLE

CODE LETTER	MATERIAL
B	BERYLLIUM COPPER, 1/4H PER, ASTM-B-194
BH	BERYLLIUM COPPER, 1/4 HT PER QQ-C-533, HEAT TREATED
CR	STAINLESS STEEL, TYPE 301 COND 1/4 H PER AMS 5517

❷ DIMENSION TABLE

DASH #	A BOARD THICKNESS	B	C MAX 35-1	C MAX 35F-1	D	E
-1	0.79 (.031)	4.58 (.180)	8.39 (.330)	9.15 (.360)	7.57 (.298)	3.97 (.156)
-2	1.59 (.063)	4.58 (.180)	8.39 (.330)	9.15 (.360)	7.57 (.298)	3.97 (.156)
-3	2.38 (.094)	4.58 (.180)	8.39 (.330)	9.15 (.360)	7.57 (.298)	3.97 (.156)
-4	3.18 (.125)	4.58 (.180)	9.40 (.370)	10.16 (.400)	8.39 (.330)	3.97 (.156)

❸ FINISH TABLE

CONTACT FACTORY FOR OTHER FINISHES

DASH #	FINISH (see pg.11 for RoHS Compliance)
[blank]	SILVER PLATE PER QQ-S-365, TYPE III, GRADE A
-1	NONE
-2	EBANOL PER MIL-F-495 FOR BERYLLIUM COPPER
-4	COPPER PLATE PER MIL-C-14550, CLASS 2
-5	GOLD PLATE PER MIL-G-45204, TYPE 1, CLASS 1
-6	NICKEL PLATE PER QQ-N-290, CLASS 1, GRADE G, BRIGHT
-7	ZINC PLATE CLEAR CHROMATE, PER ASTM-B-633, Fe/Zn 8
-8	ZINC PLATE YELLOW CHROMATE, PER ASTM-B-633 Fe/Zn 8

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

Part Number Code

Series 35-1 PCB-TAINER **35 x x -1x -x -x -x**

Center Mounting Hole:
Center Mounting Hole: _____ **C**
None: _____ **[Blank]**

Flared Entry
Flared Entry: _____ **F**
None: _____ **[Blank]**

Material
Select Code Letter from Material Table _____ 1

Board Thickness
Select from Board Thickness Table _____ 2

Length
Length in .500 (12.7) increments _____ 4 [2.00 (50.8)]
_____ to 12 [6.00 (152.4)]
Special Length _____ 15 [7.50 (190.5)]

Finish (Beryllium Copper only)
Select from Finish Table _____ 3

No dash number required for CR material. Stainless steel parts are passivated only.

Part Number Code example: 35C-1B-2-4-7

Series 35-1 PCB-TAINER, with center mounting hole, Beryllium Copper, for .063-in. (1.59-mm) thick board, 2.00-in. (50.8-mm) long, zinc plate clear chromate finish

FEATURES

- Low profile, .125-in. (3.18-mm) high
- Choice of four board thicknesses
- Choice of three materials
- Choice of seven finishes or no finish for Beryllium Copper. Stainless steel parts are passivate only
- Spring design to clamp board module assembly

APPLICATIONS

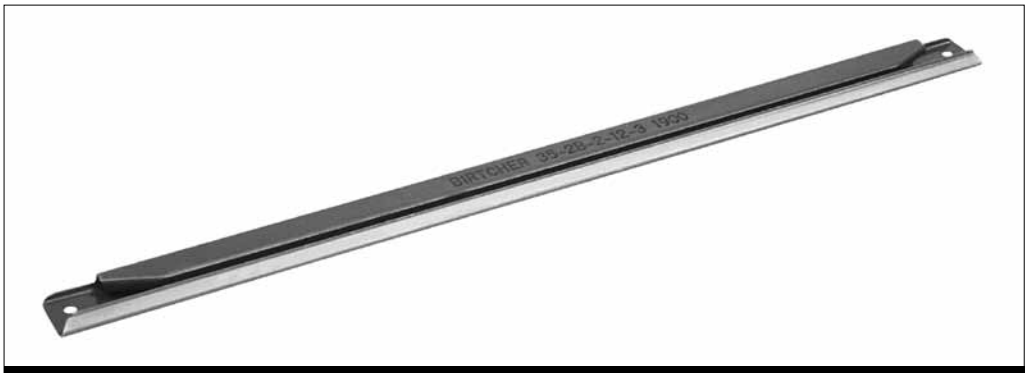
- Where metal guides are required
- Moderate heat transfer and vibration
- Electrically and thermally conductive
- Install with rivets, screws or adhesives

MATERIAL

.008-in. (.20-mm) thick Beryllium Copper per ASTM B-194
or Stainless Steel per ASTM A-366

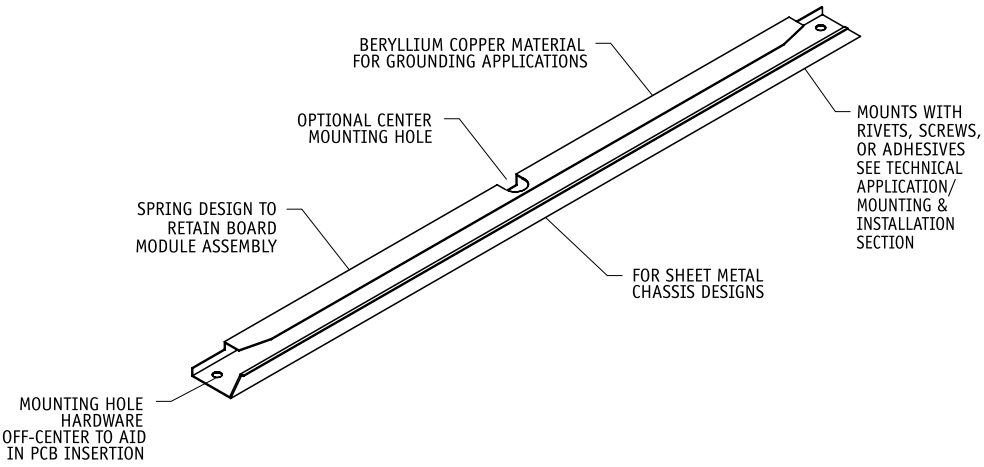
WEIGHT

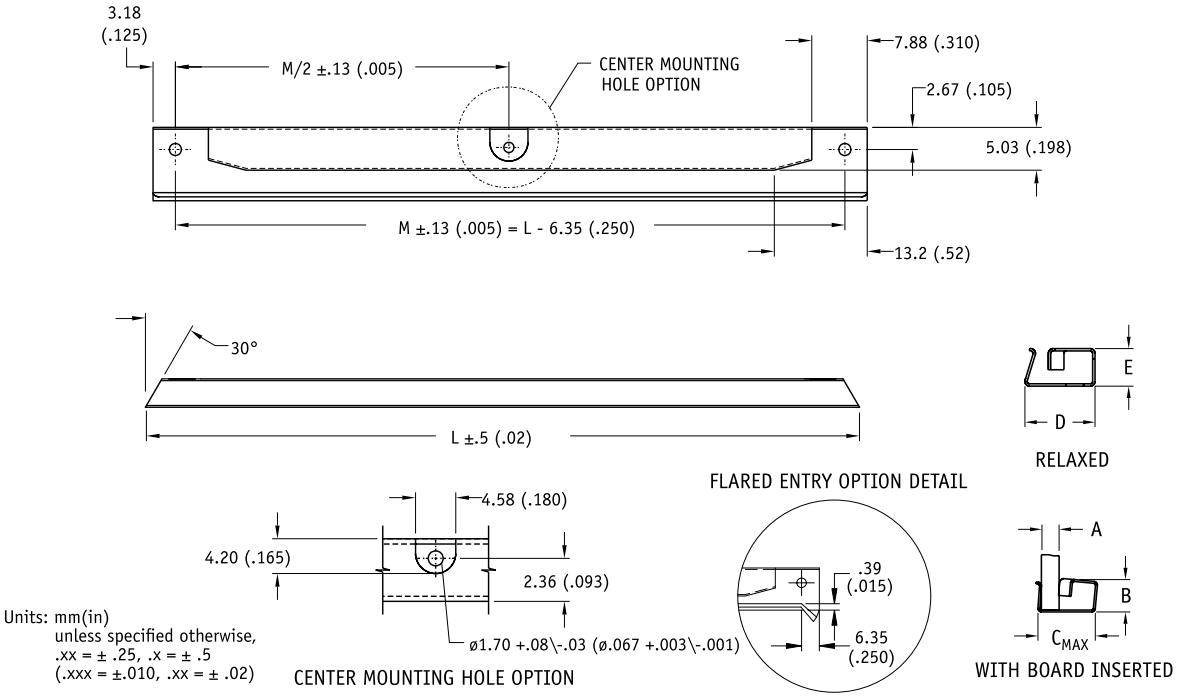
.033 oz./in. (0.37 g/cm)
Either material



Series 35-2 PCB-TAINER

MODERATE HEAT & VIBRATION APPLICATIONS
ELECTRICALLY & THERMALLY CONDUCTIVE





❶ MATERIALS TABLE

CODE LETTER	MATERIAL
B	BERYLLIUM COPPER, 1/4H PER, ASTM-B-194
BH	BERYLLIUM COPPER, 1/4 HT PER QQ-C-533, HEAT TREATED
CR	STAINLESS STEEL, TYPE 301 COND 1/4 H PER AMS 5517

❷ DIMENSION TABLE

DASH #	A BOARD THICKNESS	B	C MAX	D	E
-1	0.79 (.031)	3.31 (.130)	8.13 (.320)	7.57 (.298)	3.18 (.125)
-2	1.60 (.063)	3.31 (.130)	8.13 (.320)	7.57 (.298)	3.18 (.125)
-3	2.39 (.094)	3.31 (.130)	9.15 (.360)	7.57 (.298)	3.18 (.125)
-4	3.18 (.125)	3.31 (.130)	9.40 (.370)	8.87 (.349)	3.18 (.125)

❸ FINISH TABLE

CONTACT FACTORY FOR OTHER FINISHES

DASH #	FINISH (see pg.11 for RoHS Compliance)
[blank]	SILVER PLATE PER QQ-S-365, TYPE III, GRADE A
-1	NONE
-2	EBANOL PER MIL-F-495 FOR BERYLLIUM COPPER
-4	COPPER PLATE PER MIL-C-14550, CLASS 2
-5	GOLD PLATE PER MIL-G-45204, TYPE 1, CLASS 1
-6	NICKEL PLATE PER QQ-N-290, CLASS 1, GRADE G, BRIGHT
-7	ZINC PLATE CLEAR CHROMATE, PER ASTM-B-633, Fe/Zn 8
-8	ZINC PLATE YELLOW CHROMATE, PER ASTM-B-633 Fe/Zn 8

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

Part Number Code

Series 35-2 Low Profile PCB-TAINER **35 x x -2x -x -x -x**

Center Mounting Hole:
Center Mounting Hole: _____ **C**
None: _____ **[Blank]**

Flared Entry
Flared Entry: _____ **F**
None: _____ **[Blank]**

Material
Select Code Letter from Material Table _____ 1

Board Thickness
Select from Board Thickness Table _____ 2

Length
Length in .500 (12.7) increments _____ 4 [2.00 (50.8)]
_____ to 12 [6.00 (152.4)]

Finish
Select from Finish Table _____ 3

No dash number required for CR material. Stainless steel parts are passivated only.

Part Number Code example: 35C-2B-2-8-7

Series 35 Low Profile PCB-TAINER, Beryllium Copper, with Center Mounting Hole, .063-in. (1.60-mm) thick board, 4.00-in. (101.6-mm) long, Zinc Plate Clear Chromate finish.

FEATURES

- Designed with or without Flared Entry
- Choice of four board thicknesses
- Choice of three materials
- Choice of seven finishes or no finish for Beryllium Copper. Stainless steel parts are passivate only
- Spring design to clamp board module assembly
- 35-5 offers special 1.37-in. (34.8-mm) short length

APPLICATIONS

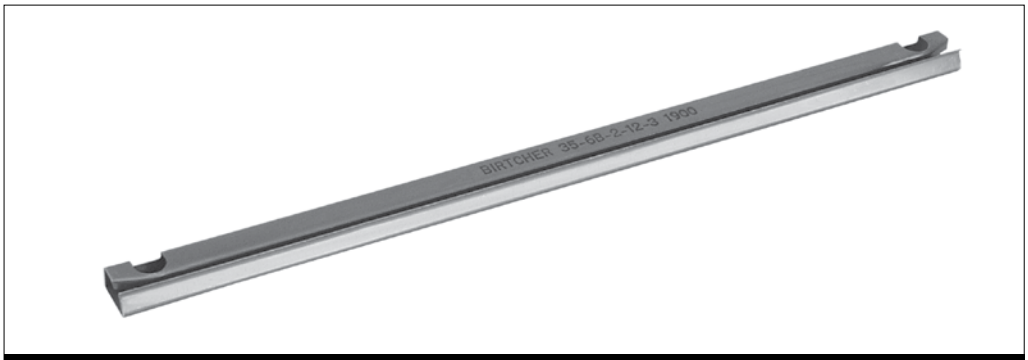
- Where metal guides are required
- Moderate heat transfer and vibration
- Electrically and thermally conductive
- Install with rivets, screws or adhesives

MATERIAL

.008-in. (.20-mm) thick Beryllium Copper per ASTM B-194
or Stainless Steel per ASTM A-366

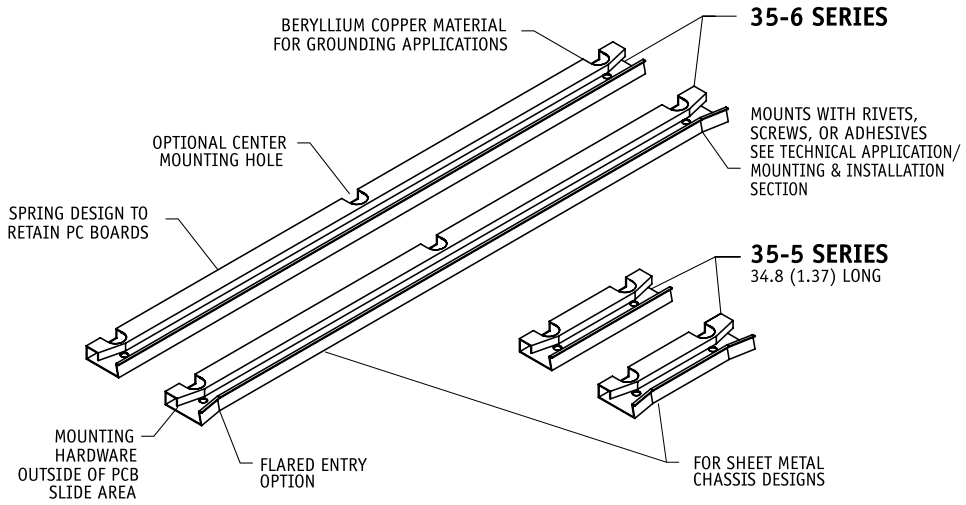
WEIGHT

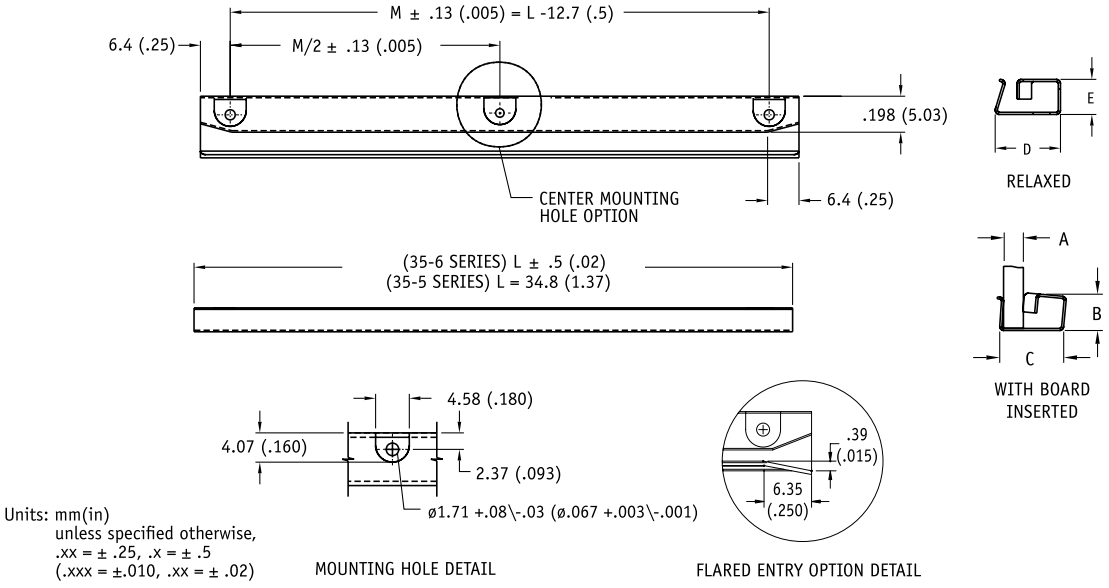
.033 oz./in. (0.37 g/cm)
Either material



Series 35-6 PCB-TAINER

HEAT & VIBRATION APPLICATIONS
ELECTRICALLY & THERMALLY CONDUCTIVE





Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)

❶ MATERIALS TABLE

CODE LETTER	MATERIAL
B	BERYLLIUM COPPER, 1/4H PER, ASTM-B-194
BH	BERYLLIUM COPPER, 1/4 HT PER QQ-C-533, HEAT TREATED
CR	STAINLESS STEEL, TYPE 301 COND 1/4 H PER AMS 5517

❷ DIMENSION TABLE

-4 ONLY AVAILABLE ON 35-6 SERIES

DASH #	A BOARD THICKNESS	B	C MAX	D	E
-1	0.79 (.031)	4.58 (.180)	8.39 (.330)	7.57 (.298)	3.97 (.156)
-2	1.59 (.063)	4.58 (.180)	8.39 (.330)	7.57 (.298)	3.97 (.156)
-3	2.38 (.094)	4.58 (.180)	8.39 (.330)	7.57 (.298)	3.97 (.156)
-4	3.18 (.125)	4.58 (.180)	9.40 (.370)	8.39 (.330)	3.97 (.156)

❸ FINISH TABLE

CONTACT FACTORY FOR OTHER FINISHES

DASH #	FINISH (see pg.11 for RoHS Compliance)
[blank]	SILVER PLATE PER QQ-S-365, TYPE III, GRADE A
-1	NONE
-2	EBANOL PER MIL-F-495 FOR BERYLLIUM COPPER
-4	COPPER PLATE PER MIL-C-14550, CLASS 2
-5	GOLD PLATE PER MIL-G-45204, TYPE 1, CLASS 1
-6	NICKEL PLATE PER QQ-N-290, CLASS 1, GRADE G, BRIGHT
-7	ZINC PLATE CLEAR CHROMATE, PER ASTM-B-633, Fe/Zn 8
-8	ZINC PLATE YELLOW CHROMATE, PER ASTM-B-633 Fe/Zn 8

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

Part Number Code

Series 35 PCB **35 x x -x x -x -x -x**

Center Mounting Hole (Series 35-6 only)
Center Mounting Hole _____ **C**
None _____ **[Blank]**

Flared Entry
Flared Entry: _____ **F**
None: _____ **[Blank]**

Series
For 35-5 _____ **5**
For 35-6 _____ **6**

Material
Select Code Letter from Material Table _____ 1

Board Thickness
Select from Board Thickness Table _____ 2

Length (35-6 only)
Length in .500 (12.7) increments _____ 4 [2.00 (50.8)]
_____ to 12 [6.00 (152.4)]

Finish
Select from Finish Table _____ 3

No dash number required for CR material. Stainless steel parts are passivated only.

Part Number Code examples:

35F-6B-3-10-6

35 Series PCB-TAINER, Beryllium Copper with Flared Entry, .094-in. (2.38-mm) thick board, 5.00-in. (127.0-mm) long, Nickel Plate finish.

35-5B-2-5

35 Series PCB-TAINER, Beryllium Copper, .063-in. (1.59-mm) thick board, 1.37-in. (34.8-mm) long, Gold Plate finish.

FEATURES

- Available with or without Flared Entry
- Choice of three board thicknesses
- Choice of three materials
- Choice of seven finishes or no finish for Beryllium Copper. Stainless steel parts are passivate only
- Spring design to clamp board module assembly

Meets the requirements of drawings 85020 and 85021 for flared entry, Defense Supply Center, Columbus

APPLICATIONS

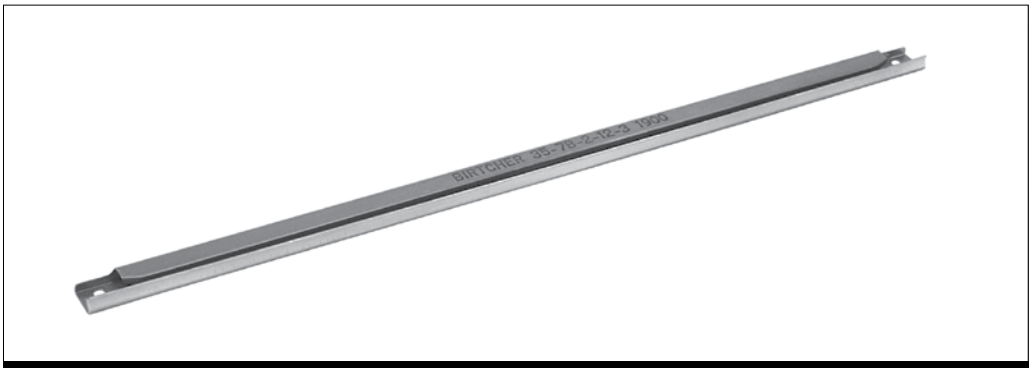
- Where metal guides are required
- Moderate heat transfer and vibration
- Electrically and thermally conductive
- Install with rivets, screws or adhesives

MATERIAL

.005-in. (.13-mm) thick Beryllium Copper per QQ-C-533
or Stainless Steel per Mil-S-5059

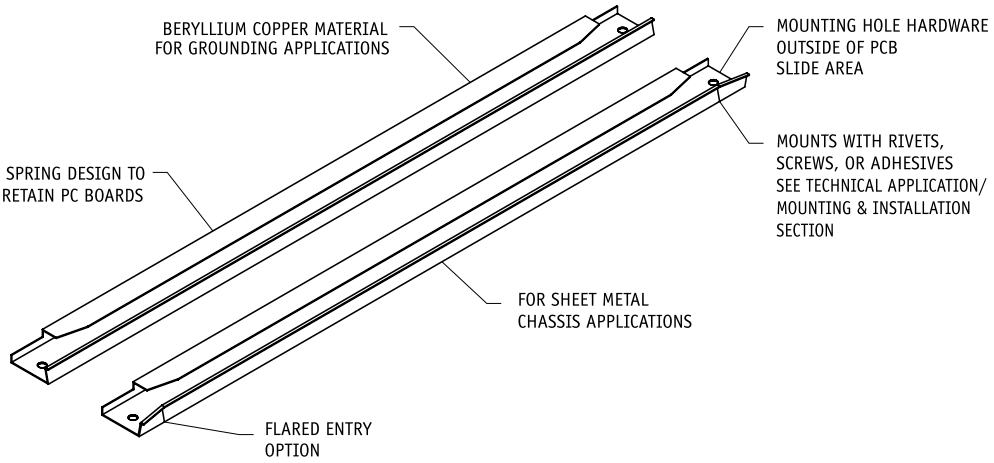
WEIGHT

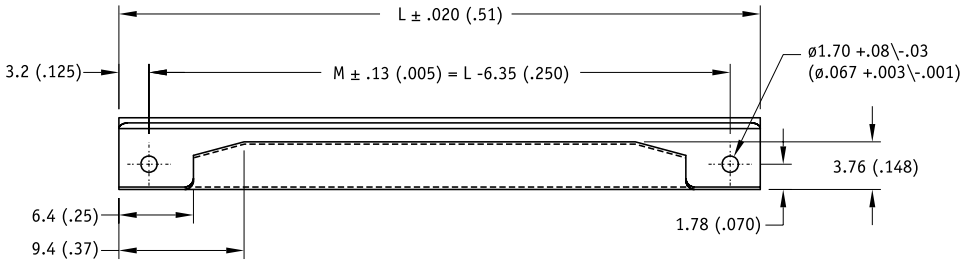
.015 oz./in. (0.17 g/cm) Either Material



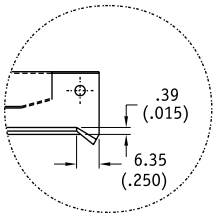
Series 35-7 PCB-TAINER ***DSCC 85020 & 85021***

SHOCK & VIBRATION APPLICATIONS
LOW HEAT DISSIPATION
3.18 (.125) IN HEIGHT

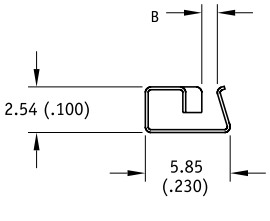




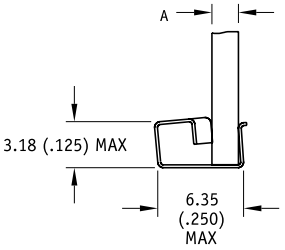
Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)



FLARED ENTRY OPTION



RELAXED



WITH BOARD INSERTED

❶ MATERIALS TABLE

CODE LETTER	MATERIAL
B	BERYLLIUM COPPER, 1/4H PER, ASTM-B-194
BH	BERYLLIUM COPPER, 1/4 HT PER QQ-C-533, HEAT TREATED
CR	STAINLESS STEEL, TYPE 301 COND 1/4 H PER AMS 5517

❷ DIMENSION TABLE

DASH #	A BOARD THICKNESS	B RELAXED (+.00/-.38 (+.000/-.015)
-1	0.79 (.031)	0.64 (.025)
-2	1.60 (.063)	1.40 (.055)
-3	2.36 (.093)	2.16 (.085)

❸ FINISH TABLE

CONTACT FACTORY FOR OTHER FINISHES

DASH #	FINISH (see pg.11 for RoHS Compliance)
[blank]	SILVER PLATE PER QQ-S-365, TYPE III, GRADE A
-1	NONE
-2	EBANOL PER MIL-F-495 FOR BERYLLIUM COPPER
-4	COPPER PLATE PER MIL-C-14550, CLASS 2
-5	GOLD PLATE PER MIL-G-45204, TYPE 1, CLASS 1
-6	NICKEL PLATE PER QQ-N-290, CLASS 1, GRADE G, BRIGHT
-7	ZINC PLATE CLEAR CHROMATE, PER ASTM-B-633, Fe/Zn 8
-8	ZINC PLATE YELLOW CHROMATE, PER ASTM-B-633 Fe/Zn 8

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

Part Number Code

Series 35-7 PCB-TAINER **35 x x -7x -x -x -x**

Center Mounting Hole:
Center Mounting Hole: _____ **C**
None: _____ **[Blank]**

Flared Entry
Flared Entry: _____ **F**
None: _____ **[Blank]**

Material
Select Code Letter from Material Table _____ 1

Board Thickness
Select from Board Thickness Table _____ 2

Length
Length in .500 (12.7) increments _____ 2 [1.00 (25.4)]
_____ to 12 [6.00 (152.4)]

Finish
Select from Finish Table _____ 3

No dash number required for CR material. Stainless steel parts are passivated only.

Part Number Code example: 35-7B-3-12-6

35 Series PCB-TAINER, Beryllium Copper, .093-in. (2.38-mm) thick board, 6.00-in. (152.4-mm) long, Nickel Plate finish.

FEATURES

- Available with or without Flared Entry
- Choice of three materials
- Choice of seven finishes or no finish for Beryllium Copper. Stainless steel parts are passivate only
- Spring design to clamp board module assembly

APPLICATIONS

- Low Profile VME
- Where metal guides are required
- Moderate heat transfer and vibration
- Electrically and thermally conductive
- Install with rivets, screws or adhesives

MATERIAL

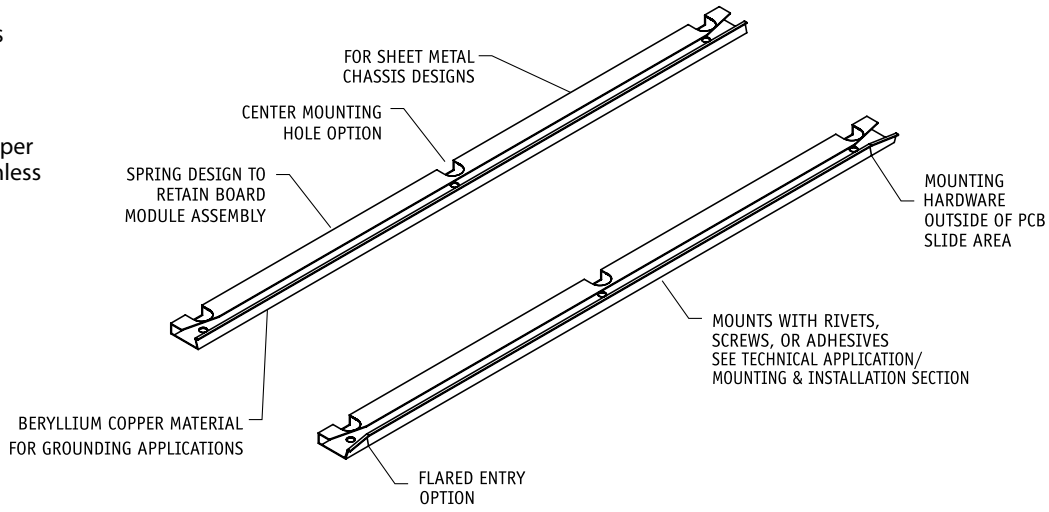
.13 (.005) Beryllium Copper per ASTM B-194 or Stainless Steel per Mil-S-5059

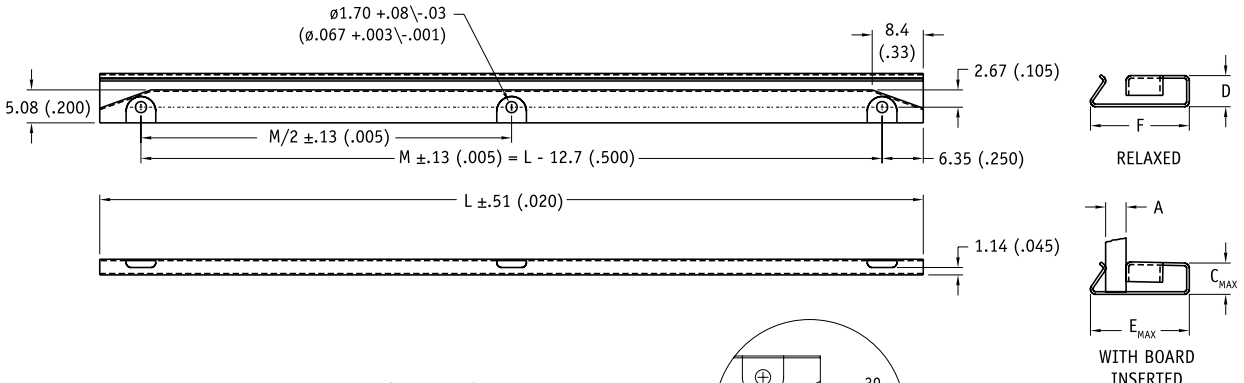
WEIGHT

.033 oz./in. (0.37 g/cm) Either material

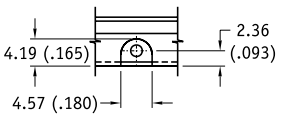
Series 35-8 PCB-TAINER

SHOCK & VIBRATION APPLICATIONS
ELECTRICALLY & THERMALLY CONDUCTIVE
2.49 (.098) IN HEIGHT

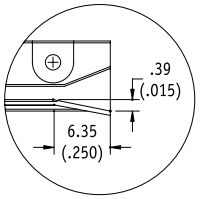




Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)



CENTER MOUNTING HOLE OPTION DETAIL



FLARED ENTRY OPTION DETAIL

❶ MATERIALS TABLE

CODE LETTER	MATERIAL
B	BERYLLIUM COPPER, 1/4H PER, ASTM-B-194
BH	BERYLLIUM COPPER, 1/4 HT PER QQ-C-533, HEAT TREATED
CR	STAINLESS STEEL, TYPE 301 COND 1/4 H PER AMS 5517

❷ DIMENSION TABLE

DASH #	BOARD THICKNESS A	C_{MAX}	D	E_{MAX}	F
- 1	.79 (.031)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)
- 2	1.60 (.063)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)
- 3	2.36 (.093)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)
-24	.61/.74 (.024/.029)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)
-30	.76/.89 (.030/.035)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)
-36	.91/1.02 (.036/.040)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)
-55	1.40/1.52 (.055/.060)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)
-61	1.55/1.68 (.061/.066)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)
-67	1.70/1.80 (.067/.071)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)
-73	1.85/1.98 (.073/.078)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)
-79	2.01/2.13 (.079/.084)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)
-83	2.11/2.24 (.083/.088)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)
-85	2.16/2.21 (.085/.087)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)
-88	2.24/2.36 (.088/.093)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)
-94	2.39/2.46 (.094/.097)	2.49 (.098)	2.41 (.095)	7.75 (.305)	7.62 (.300)

❸ FINISH TABLE

CONTACT FACTORY FOR OTHER FINISHES

DASH #	FINISH (see pg.11 for RoHS Compliance)
[blank]	SILVER PLATE PER QQ-S-365, TYPE III, GRADE A
-1	NONE
-2	EBANOL PER MIL-F-495 FOR BERYLLIUM COPPER
-4	COPPER PLATE PER MIL-C-14550, CLASS 2
-5	GOLD PLATE PER MIL-G-45204, TYPE 1, CLASS 1
-6	NICKEL PLATE PER QQ-N-290, CLASS 1, GRADE G, BRIGHT
-7	ZINC PLATE CLEAR CHROMATE, PER ASTM-B-633, Fe/Zn 8
-8	ZINC PLATE YELLOW CHROMATE, PER ASTM-B-633 Fe/Zn 8

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

Part Number Code

Series 35-8 Low Profile VME PCB-TAINER **35 x x -8x -x -x -x -x**

Center Mounting Hole:
Center Mounting Hole: _____ **C**
None: _____ **[Blank]**

Flared Entry
Flared Entry: _____ **F**
None: _____ **[Blank]**

Material
Select Code Letter from Material Table _____ 1

Board Thickness
Select from Board Thickness Table _____ 2

Length
Length in .500 (12.7) increments _____ 2 [1.00 (25.4)]
_____ to 12 [6.00 (152.4)]

Finish
Select from Finish Table _____ 3

No dash number required for CR material. Stainless steel parts are passivated only.

Part Number Code example: 35-8B-61-10-6

35 Series PCB-TAINER, Beryllium Copper, for .061/.066-in. (1.55/1.68-mm) board thickness range, 5.00-in. (127.0-mm) long, Nickel Plate finish.

FEATURES

- Available with Flared Entry
- Choice of three materials
- Choice of seven finishes or no finish for Beryllium Copper. Stainless steel parts are passivate only
- Spring design to clamp board module assembly

APPLICATIONS

- Where metal guides are required
- Moderate heat transfer and vibration
- Electrically and thermally conductive
- Install with rivets, screws or adhesives
- For use with heat sinks

MATERIAL

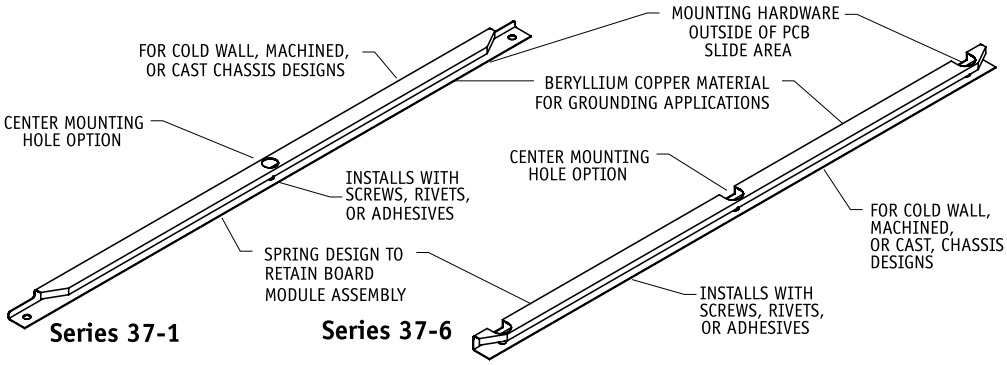
.005-in. (.13-mm) Beryllium Copper per ASTM B-194 or Stainless
Steel per Mil-S-5059

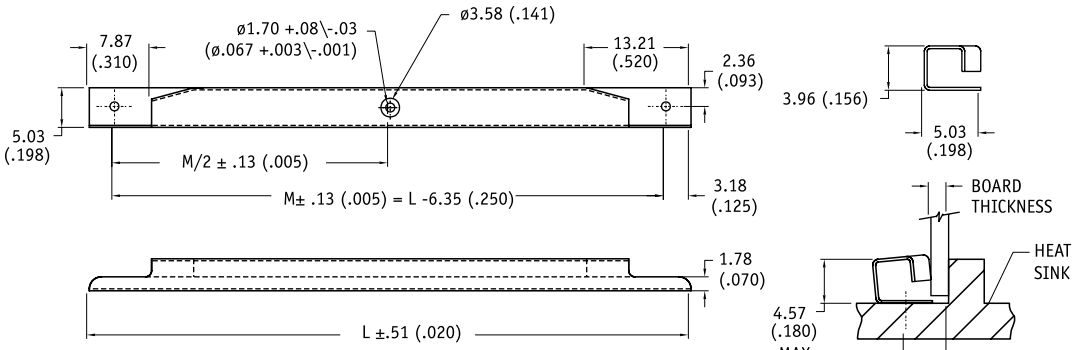
WEIGHT

.033 oz./in. (0.37 g/cm)
Either material

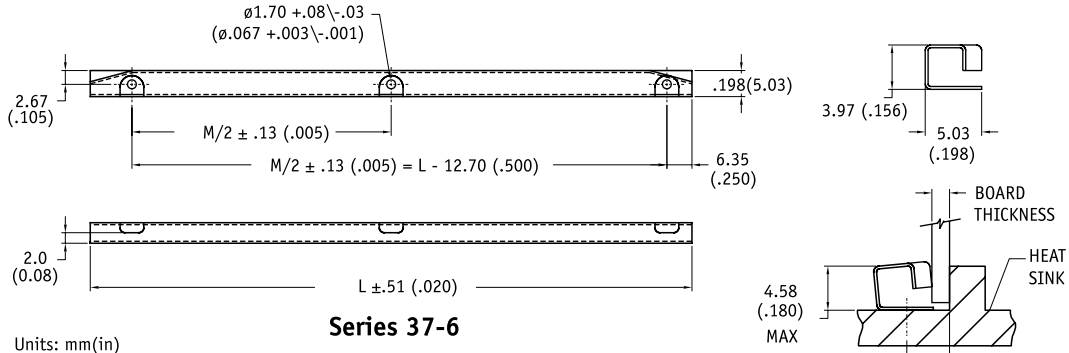
Series 37-1 & 37-6 PCB-TAINER

HEAT & VIBRATION APPLICATIONS
ELECTRICALLY & THERMALLY CONDUCTIVE





Series 37-1



Series 37-6

Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)

❶ MATERIALS TABLE

CODE LETTER	MATERIAL
B	BERYLLIUM COPPER, 1/4H PER, ASTM-B-194
BH	BERYLLIUM COPPER, 1/4 HT PER QQ-C-533, HEAT TREATED
CR	STAINLESS STEEL, TYPE 301 COND 1/4 H PER AMS 5517

❷ FINISH TABLE

CONTACT FACTORY FOR OTHER FINISHES

DASH #	FINISH (see pg.11 for RoHS Compliance)
[blank]	SILVER PLATE PER QQ-S-365, TYPE III, GRADE A
-1	NONE
-2	EBANOL PER MIL-F-495 FOR BERYLLIUM COPPER
-4	COPPER PLATE PER MIL-C-14550, CLASS 2
-5	GOLD PLATE PER MIL-G-45204, TYPE 1, CLASS 1
-6	NICKEL PLATE PER QQ-N-290, CLASS 1, GRADE G, BRIGHT
-7	ZINC PLATE CLEAR CHROMATE, PER ASTM-B-633, Fe/Zn 8
-8	ZINC PLATE YELLOW CHROMATE, PER ASTM-B-633 Fe/Zn 8

FOR MECHANICAL AND THERMAL PERFORMANCE SEE THE TECHNICAL REFERENCE SECTION Pages 74-92

Part Number Code

Series 37 PCB-TAINER **37 x -x x -x -x**

Center Mounting Hole:
Center Mounting Hole option: _____ **C**
None: _____ **[Blank]**

Dash Number
_____ **1** or **6**

Material
Select code letter from Material Table _____ 1

Length
Length in .500 (12.7) increments _____ 2 [1.00 (25.4)]
_____ to 12 [6.00 (152.4)]

Finish
Select from Finish Table _____ 2
No dash number required for CR material. Stainless steel parts are passivated only.

Part Number Code examples:

37-1CR-12

Series 37-1 PCB-TAINER, stainless steel, 6.00-in. (152.4-mm) long, passivated

37C-6BH-10-8

Series 37-6 PCB-TAINER, with center mounting hole option, heat-treated beryllium copper, 5.00-in. (127.0-mm) long, zinc plate yellow chromate finish.

37-1 Series "Length" not available with -2 option

FEATURES

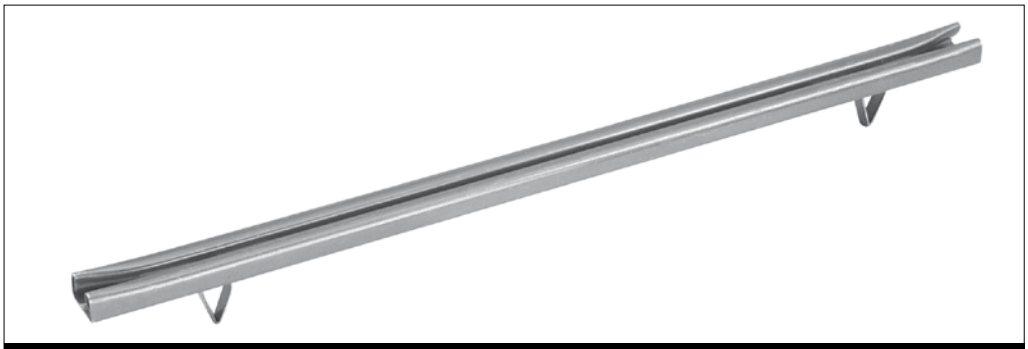
- Snap-in design provides low cost installations
- Requires no custom installation tools
- Provides flared ends for easy insertion of the PC board
- Available for standard board thicknesses
- Available in standard lengths from 3.00 in. (76.2 mm) to 8.00 in. (203.2 mm) in .500-in. (12.7-mm) increments. Use two SNAP-TAINER™ retentive guides installed end-to-end to create the length desired
- Snaps firmly in sheet metal with thickness range of .048-in. (1.19-mm) through .063-in. (1.60-mm) thickness. C'Sink .195/.205-in. (4.95/5.21-mm) Dia. both sides

MATERIAL

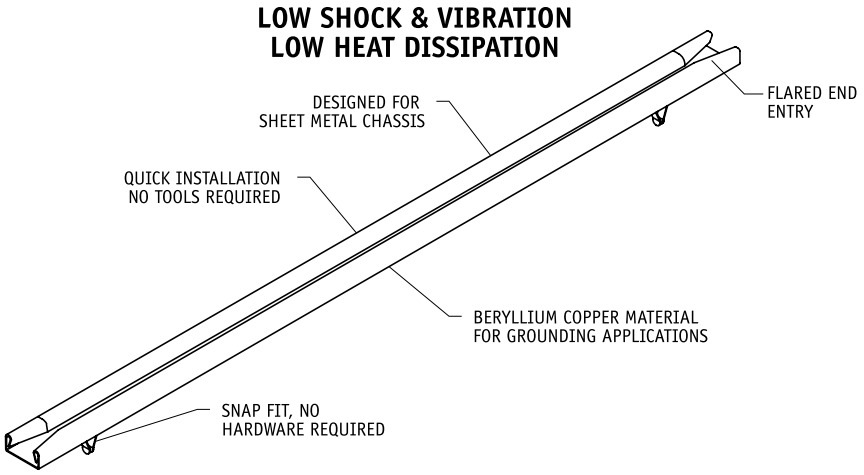
.010-in. (.25-mm) thick Beryllium Copper 1/4 HT per QQ-C-533, Heat Treated

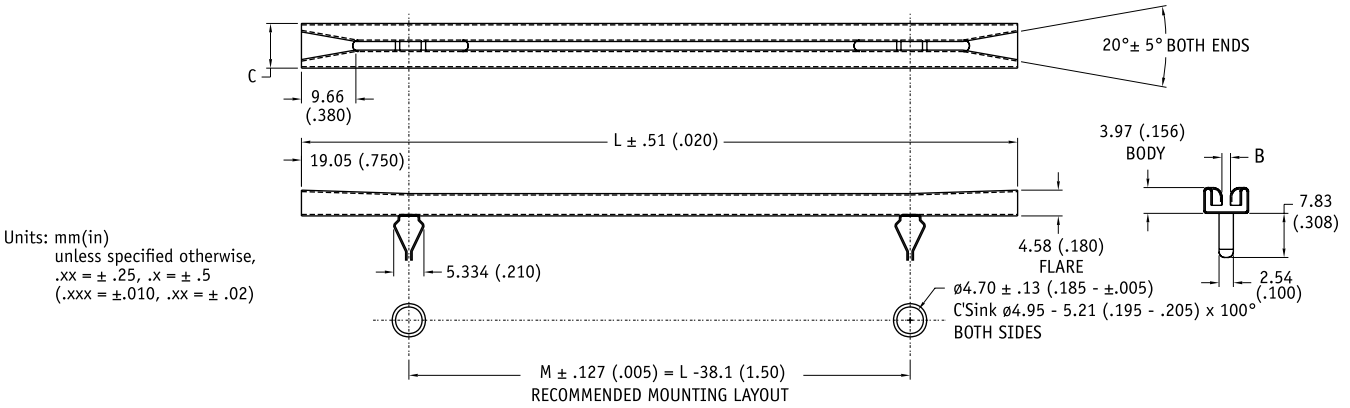
WEIGHT

.048 oz./in. (.54 g/cm)



Series 38 SNAP-TAINER





Part Number Code

Series 38 SNAP-TAINER Card Guide **38 -x -x -x**

Board Thickness
Select from Board Thickness Table _____ 1

Length
Length in .500 (12.7) increments _____ 6 [3.00 (76.2)]
_____ to 16 [8.00 (203.2)]

Finish
Select from Finish Table _____ 2

Part Number Code example: 38-3-14-8

Series 38 SNAP-TAINER Card Guide, for .094-in. (2.38-mm) thick board, 7.00-in. (177.8-mm) long, zinc plate yellow chromate finish.

❶ BOARD THICKNESS TABLE

DASH #	THICKNESS ±.130 (.005)	B +.130/-2.54 (+.005/-.010)	C ±.254 (.010)
-1	0.79 (.031)	0.76 (.030)	7.92 (.312)
-2	1.59 (.063)	1.52 (.060)	7.92 (.312)
-3	2.38 (.094)	2.29 (.090)	8.89 (.350)
-4	3.18 (.125)	3.18 (.125)	9.65 (.380)

❷ FINISH TABLE

CONTACT FACTORY FOR OTHER FINISHES

DASH #	FINISH (see pg.11 for RoHS Compliance)
[blank]	SILVER PLATE PER QQ-S-365, TYPE III, GRADE A
-1	NONE
-4	COPPER PLATE PER MIL-C-14550, CLASS 2
-5	GOLD PLATE PER MIL-G-45204, TYPE 1, CLASS 1
-6	NICKEL PLATE PER QQ-N-290, CLASS 1, GRADE G, BRIGHT
-7	ZINC PLATE CLEAR CHROMATE, PER ASTM-B-633, Fe/Zn 8
-8	ZINC PLATE YELLOW CHROMATE, PER ASTM-B-633 Fe/Zn 8

FEATURES

- Permits horizontal and vertical mounting of extra large boards
- .200-in. (5.08-mm) slot depth allows added tolerances to board dimensions
- Extra holding action with its .080-in. (2.03-mm) x .200-in. (5.08-mm) channel
- Available 2.50-in. (63.5-mm) to 8.00-in. (203.2-mm) lengths
- Snap-in installation with any metal plate .047-in. (1.19-mm) to .090-in. (2.29-mm) thick
- Guides can be mounted end to end for tandem assembly and extra length
- Mounting hole size Ø.187 +.003/-.001 in. (Ø4.75 +.08/-.03 mm) in any plate .047 to .090-in. (1.19 to 1.60-mm) thick. Rear hole should be oblong .187 x .230/.280 in. (4.75 x 5.84/7.11 mm)

APPLICATIONS

- For 1/16-in. (1.6-mm) and 1/8-in. (3.18-mm) PCBs
- The Series 94 Deep Channel Card Guides allow more PCB lateral play and greater board tolerance
- VME Subracks and Eurocard Subracks

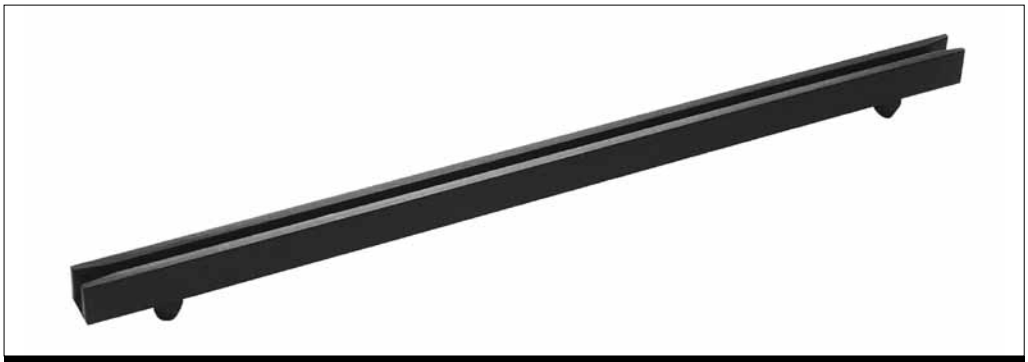
MATERIAL

Type 6/6 Nylon, Black

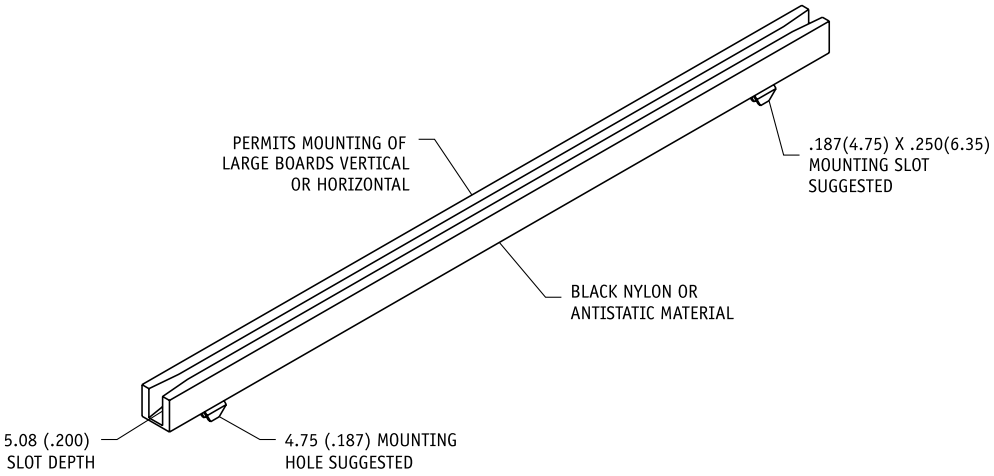
WEIGHT

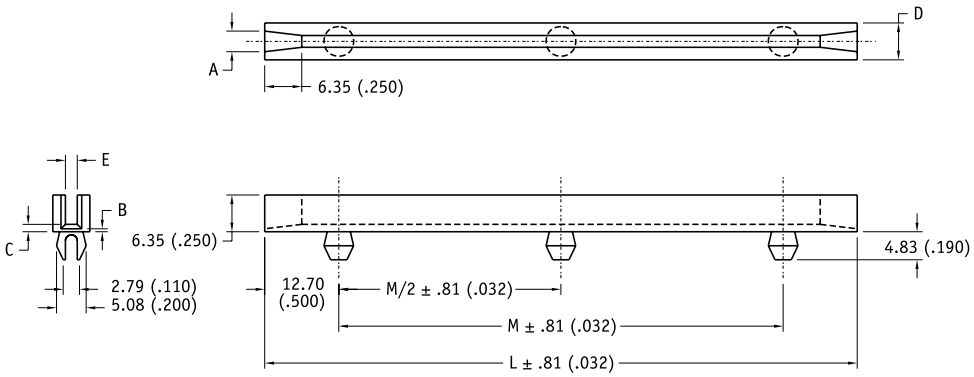
.03 oz./in. (0.34 g/cm)

Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)



Series 94 Deep Channel Guide





Part Number Code
Series 94 Deep Channel Guide **94** **-x** **-x**

Board Thickness
Select Dash Number from Board Thickness Table ____ 1

Length
Select Dash Number from Mounting Dimensions Table ___2

Part Number Code Example: 94-2-9

94 Series Deep Channel Guide, for .063-in. (1.59-mm) thick board, 4.50-in. (114.3-mm) long, in Nylon 6/6 material.

❶ BOARD THICKNESS TABLE

DASH #	BOARD THICKNESS	E SLOT WIDTH
-2	1.59 (.063)	2.03 (.080)
-4	3.18 (.125)	3.35 (.132)

❷ MOUNTING DIMENSIONS TABLE

PART #	LENGTH	M	A	B ± .18 (.007)	C ± .08 (.003)	D
94-2-**5**	63.50 (2.50)	38.10 (1.50)	3.35 (.132)	.457 (.018)	1.27 (.050)	6.35 (.250)
94-2-**9**	114.30 (4.50)	88.90 (3.50)	3.35 (.132	.457 (.018)	1.27 (.050)	6.35 (.250)
94-2-**12**	152.40 (6.00)	127.00 (5.00)	3.35 (.132	.457 (.018)	1.27 (.050)	6.35 (.250)
94-2-**16**	203.20 (8.00)	177.80 (7.00)	3.35 (.132	.457 (.018)	1.27 (.050)	6.35 (.250)
94-4-**9**	114.30 (4.50)	88.90 (3.50)	4.06 (.160)	.508 (.020)	1.27 (.050)	6.35 (.250)
94-4-**16**	203.20 (8.00)	177.80 (7.00)	4.06 (.160)	.864 (.034)	1.63 (.064)	7.37 (.290)

FEATURES

- Lever ratio: 4.17
- Actuator Tab Option works with LOK-TAINER lever to initiate un-latching
- Typical maximum extraction force per extractor obtained with 12 lb. (53 N) finger force provides 50 lb. (222 N) extraction force

APPLICATIONS

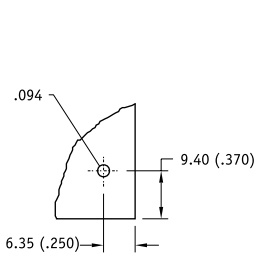
- Use with lever activated LOK-TAINER™
- Bent Leg option works with LOK-TAINER extractor flange feature

Meets the requirements of drawing 84191, Defense Supply Center, Columbus (DSCC)

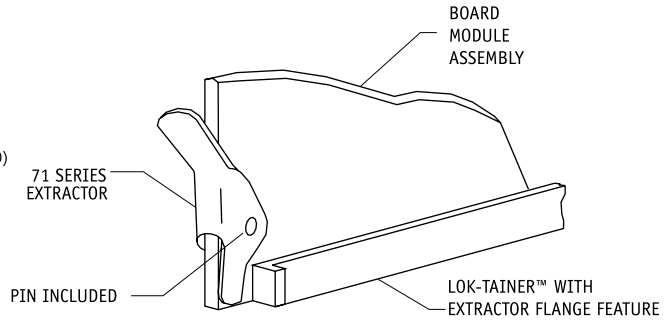
WEIGHT

Aluminum: .05 oz. (1.42 g)
Stainless Steel: .15 oz. (4.25 g)

Series 71 Extractor ***Meets DSCC 84191***

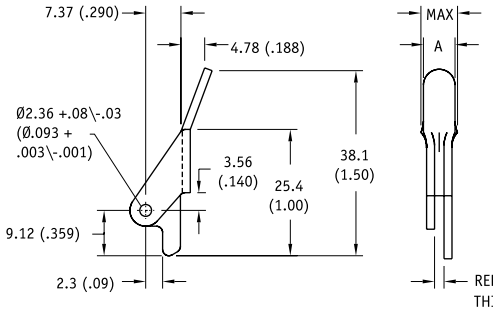


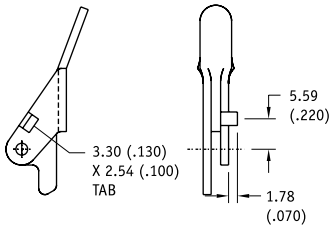
APPLICATION DATA



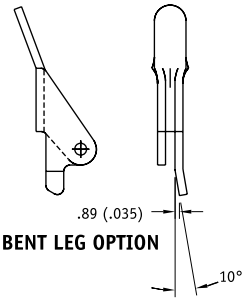
Left Hand Shown

Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)





ACTUATOR TAB OPTION



BENT LEG OPTION

Part Number Code

Series 71 Extractor — **x 71x -x -x -x -x -x -x**

Straight Handle option
Select option (blank for none)_____ **S**

Material
Select From Materials Table _____1

Board Thickness
Select dash number from Board Thickness Table ____ 2

Hand Action
Left hand action _____ **L**
Right hand action_____ **R**

Actuator Tab option
Select option (Blank for none)_____ **A**

Finish
Select dash number from Finish Table _____ 3

Bent Leg option
Select option (Blank for none)_____ **BL**

ESD Symbol_____ **E**

❶ MATERIALS TABLE

DASH #	MATERIAL
[blank]	.063 ALUMINUM ALLOY 5052-H32 PER QQ-A-250/8
T6	.063 ALUMINUM ALLOY 6061-T6
CR	.063 STAINLESS STEEL (-2 BOARD THICKNESS ONLY)

❷ BOARD THICKNESS TABLE

DASH #	THICKNESS	A	MAX
-1	0.787 (.031)	6.35 (.25)	6.60 (.26)
-2	1.600 (.063)	6.35 (.25)	7.37 (.29)
-3	2.390 (.094)	6.35 (.25)	7.37 (.29)
-4	3.180 (.125)	7.37 (.29)	8.38 (.33)
-5	3.960 (.156)	7.37 (.29)	8.38 (.33)

❸ FINISH TABLE

COLORS ARE AN ADDITIONAL CHARGE

DASH #	FINISH	COLOR
-1	ANODIZE PER MIL-A-8625	RED
-2	ANODIZE PER MIL-A-8625	BLUE
-3	ANODIZE PER MIL-A-8625	GREEN
-4	ANODIZE PER MIL-A-8625	YELLOW
-5	ANODIZE PER MIL-A-8625	BLACK
-6	ANODIZE PER MIL-A-8625	ORANGE
-7	ANODIZE PER MIL-A-8625	PURPLE
-8	ANODIZE PER MIL-A-8625	GRAY
-9	ANODIZE PER MIL-A-8625	BROWN
-10	ANODIZE PER MIL-A-8625	CLEAR
-CC	CHEM FILM PER MIL-C-5541	CLEAR
[blank]	CHEM FILM PER MIL-C-5541	GOLD

FEATURES

- Lightweight
- Strong
- Clear or black anodize
- Hard coat available
- Pin included

APPLICATIONS

- Provides ease of injection and extraction of PCBs

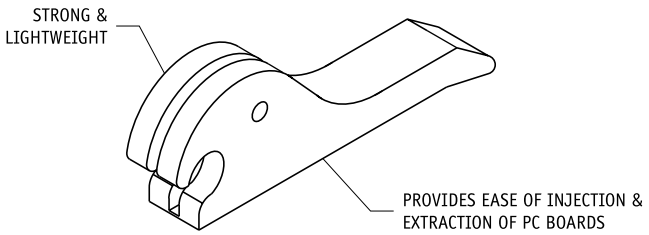
MATERIAL

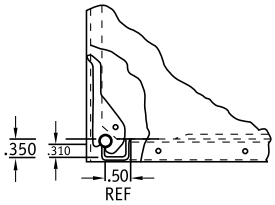
EXTRACTOR
Aluminum Alloy 6063-T6 per QQ-A-200/9

PIN
Stainless Steel, Passivated

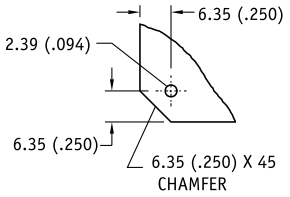
WEIGHT
.27 oz. (7.7 g)

Series 73 Injector Extractor



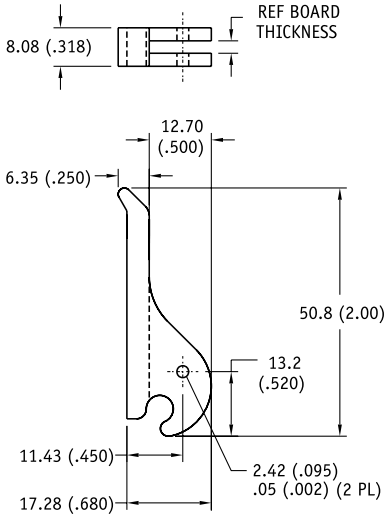


CARD CAGE FRONT CHANNEL
DETAIL FOR SERIES 73 AND 87



APPLICATION DATA

Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)



Part Number Code (See example below)

Series 73 Injector Extractor	**73**	**-x**	**-x**
Board Thickness Select a dash number from Board Thickness Table _____		1	
Finish Select dash number from Finish Table _____			2

Part Number Code example: 73-2-3

Series 73 extractor for .063-in. (1.59-mm) PCBs, hard black anodized.

❶ BOARD THICKNESS TABLE

DASH #	BOARD THICKNESS
-1	0.79 (.031)
-2	1.59 (.063)
-3	2.38 (.094)
-4	3.18 (.125)

❷ FINISH TABLE

DASH #	FINISH
-1	[blank]
-2	CLEAR ANODIZE, MIL-A-8625, TYPE II, CL1
-3	HARD ANODIZE, MIL-A-8625, TYPE III, CL2
[blank]	BLACK ANODIZE, MIL-A-8625, TYPE II, CL1

FEATURES

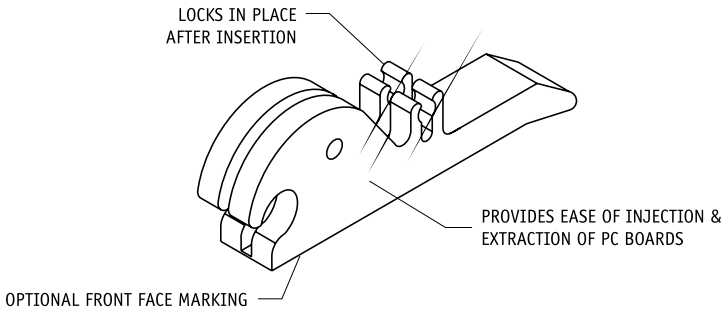
- Locks in place after insertion
- Provides ease of injection and extraction of PCBs
- Front face marking optional
- Two pins furnished with each extractor
- Meets the requirements of drawing 83023, Defense Supply Center, Columbus (DSCC).

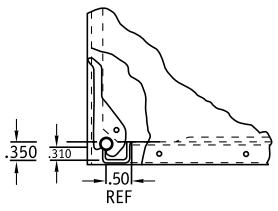
MATERIAL

EXTRACTOR
Type 6/6 Nylon per ASTM-D-4066, Type I

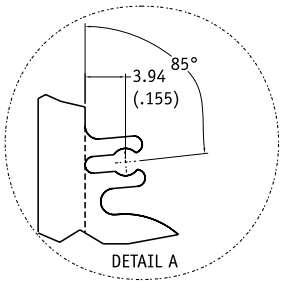
PIN
Stainless Steel, Passivated

Series 87 Locking Extractor ***Meets DSCC 83023***



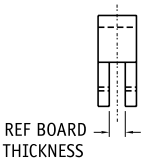


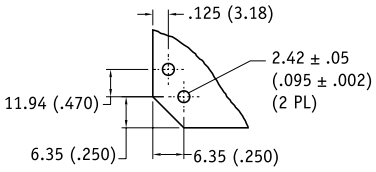
CARD CAGE FRONT CHANNEL
DETAIL FOR SERIES 73 AND 87



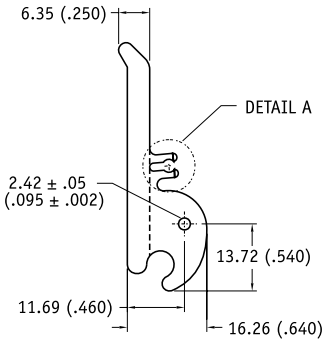
NOT TO SCALE

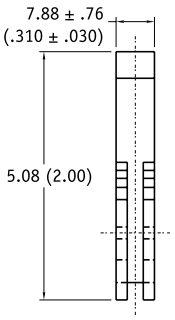
Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)





APPLICATION DATA
SUGGESTED .25 X 45 CHAMFER





Part Number Code (See example below)

Series 87 Nylon Locking Extractor	**87**	**-x**	**-x**
Board Thickness Select a dash number from Board Thickness Table _____		1	
Color Finish Select dash number from Finish Table _____			2

Part Number Code example: 87-3-5

Series 87 Extractor for .094-in. (2.38-mm) board, color Black.

❶ BOARD THICKNESS TABLE

DASH #	BOARD THICKNESS
-2	1.59 (.063)
-3	2.38 (.094)
-4	3.18 (.125)

❷ FINISH TABLE

COLORS ARE AN ADDITIONAL CHARGE

DASH #	COLOR
-1	RED
-2	BLUE
-3	GREEN
-4	YELLOW
-5	BLACK
-6	ORANGE
-7	VIOLET
-8	GRAY
-9	BROWN
[blank]	NATURAL

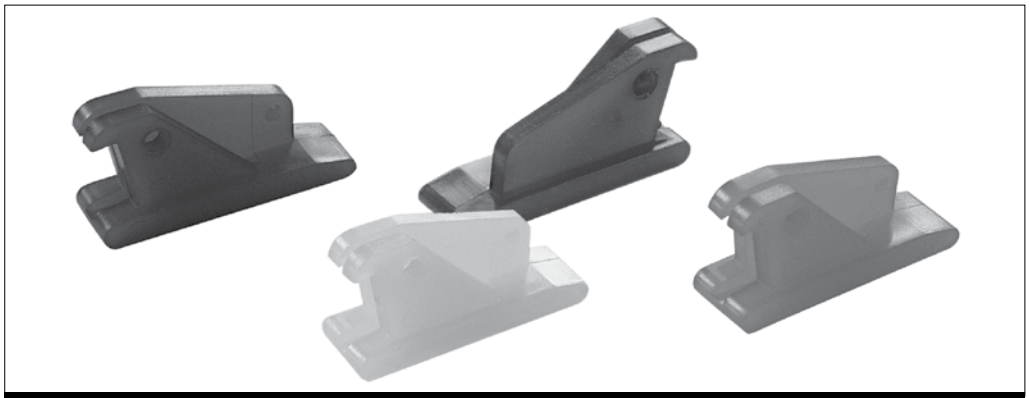
FEATURES

- Series 91 are locking extractors
- Fire retardant
- Furnished with spring pins
- Mounting slot dimensions: .063 PCBs use .073

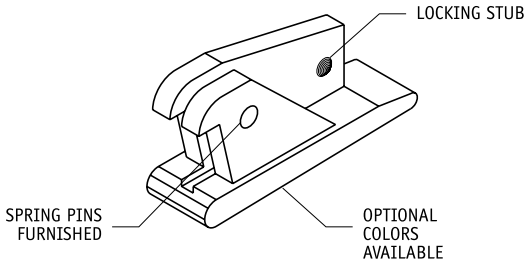
MATERIAL

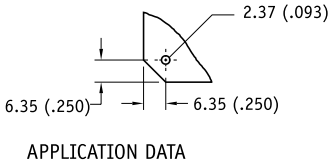
EXTRACTOR
Nylon material
Mil-M-206938
UL rated 94V-2

PIN
Stainless Steel, Passivated

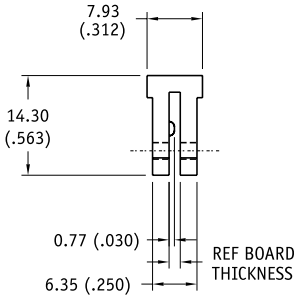


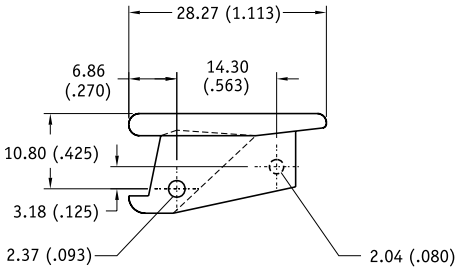
Series 91 Nylon Extractor *Meets DSCC 83023*





APPLICATION DATA





Units: mm(in)
unless specified otherwise,
.xx = ± .25, .x = ± .5
(.xxx = ±.010, .xx = ± .02)

Part Number Code (See example below)

Series 91 Nylon Extractor	**91**	**-2**	**-x**
Finish			
Select dash number from Finish Table			1

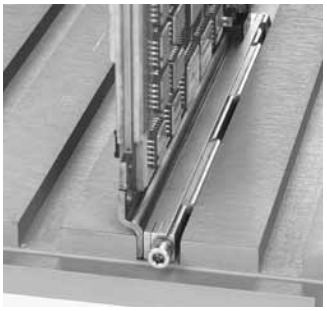
Part Number Code example: 91-2-9

Series 91 Extractor for .063-in. (1.59-mm) board, color Brown.

❶ FINISH TABLE

COLORS ARE AN ADDITIONAL CHARGE

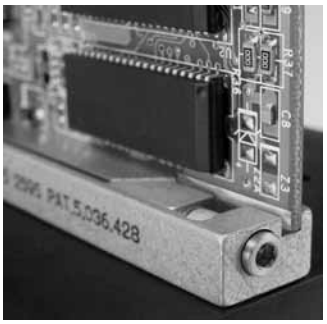
DASH #	COLOR
-1	RED
-2	BLUE
-3	GREEN
-4	YELLOW
-5	BLACK
-6	ORANGE
-7	VIOLET
-8	GRAY
-9	BROWN
[blank]	NATURAL



WEDGE-LOK®

For cold-wall applications

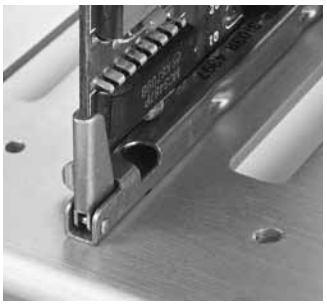
WEDGE-LOK retainers offer the highest locking force available for cold-wall applications. They mount to PC Board assemblies using screws, rivets or adhesive bonding and are then inserted into machined channels of cold plates or heat exchangers. The wedge design holds the PC Board firmly in place providing high resistance to shock and vibration while producing maximum thermal transfer.



WEDGE-TAINER™

For sheet metal or non machined cold wall applications

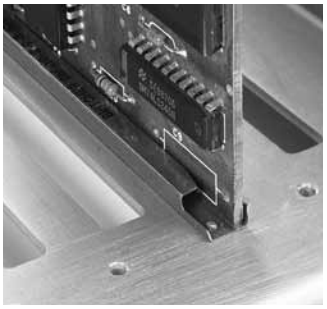
WEDGE-TAINER locking retainers are designed for heavy shock and vibration, and for effective heat dissipation in sheet metal chassis/heat sink applications. The design combines chassis mounted housing with WEDGE-LOK retainers.



LOK-TAINER®

For sheet metal or cold wall applications

LOK-TAINER retainers are cam and lobe designs featuring lever or screw action for board retention. They are typically screw- or rivet-mounted to sheet metal chassis or to the PC board, achieving a zero insertion force configuration as well as high resistance to shock and vibration. LOK-TAINERS also provide outstanding grounding characteristics.



PCB-TAINERS™

For sheet metal applications

PCB-TAINER retainers feature a low-cost spring-action card retention design. They attach to the chassis using screws, rivets or adhesives and are designed primarily for use in sheet metal applications. PCB-TAINERS provide protection against shock and vibration and offer excellent grounding characteristics.

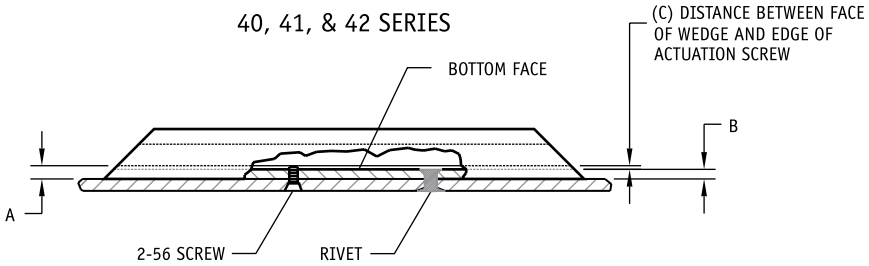
INJECTORS & EXTRACTORS

Metal and plastic designs

Birtcher offers a wide selection of Injectors and Extractors for use in both sheet metal and cold wall applications. Available in both metal and plastic designs, these products facilitate the insertion and extraction of printed circuit boards with high density backplane interconnects.

Contents

40, 41, & 42 SERIES

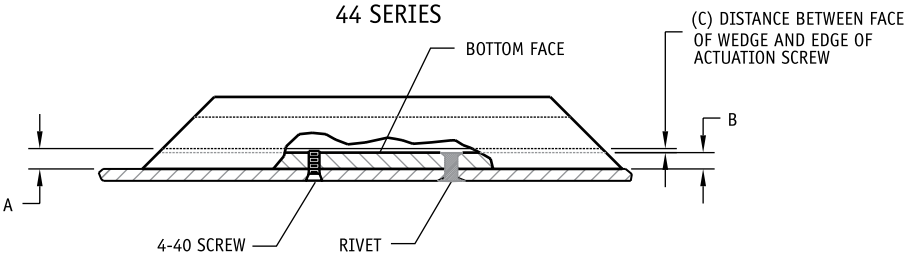


CLEARANCE TABLE

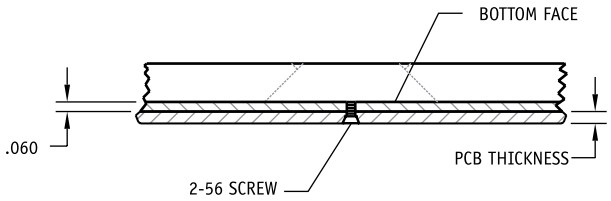
SERIES #	A	B	C
40, 45	.069	.050	.019
41	.050	.045	.005
42	.049	.045	.004
44	.106	.085	.021

SCREW LENGTH AND HEAD STYLE DEPEND ON DETAILS OF THE APPLICATION. IN GENERAL, THE SCREW SHOULD NOT EXTEND BEYOND THE BOTTOM FACE OF THE WEDGE BODY.

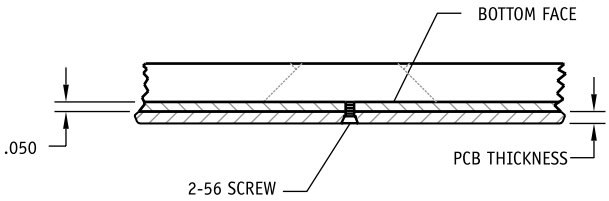
44 SERIES

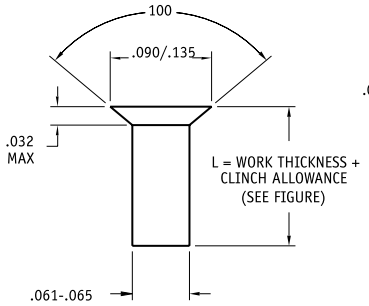


48SL SERIES

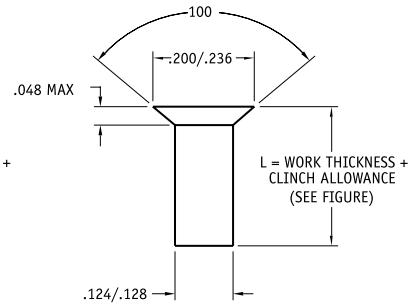


48-5 SERIES

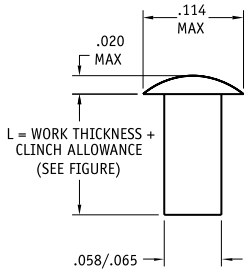




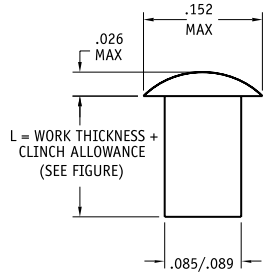
FOR RIVET MOUNTED SERIES
40, 41, & 42 WEDGE-LOKS



FOR RIVET MOUNTED SERIES
44 WEDGE-LOKS

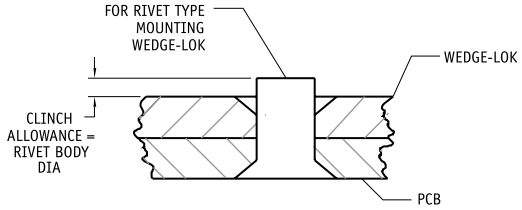


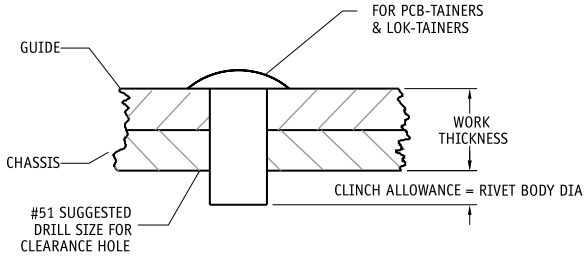
RIVET MOUNTING FOR ALL
PCB-TAINERS & LOK-TAINERS



RIVET MOUNTING FOR
15-20 SERIES

SUGGESTED RIVET DIMENSIONS





Birtcher offers a complete line of Printed Circuit Board (PCB) guides and retainers. In order to simplify the selection process, guides and retainers have been placed into three groups based upon performance and cost considerations. Should a standard catalog item not meet your needs, contact our application engineers to discuss a custom solution.

Group 1 – PCB-TAINER™

This group of card guides uses the inherent spring force to captivate circuit cards during shock and vibration. Most economical.

Group 2 – LOK-TAINER®

Zero insertion force with high clamping capability insures circuit cards will not be affected due to heavy shock and vibration conditions. Excellent heat transfer ability provides low junction temperature for most military applications.

Group 3 – WEDGE-LOK®

This group is built for the most demanding applications. (shipboard, airborne or space). Extremely high clamping force provides excellent vibration and shock resistance as well as exceptional heat transfer ability.

Material and Finish Selection

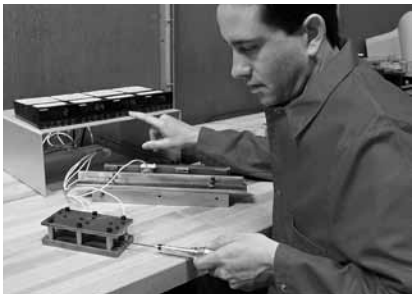
PCB-TAINERS are available in BeCu, heat treated BeCu, and stainless steel. See page 83 for various finishes for BeCu only.

LOK-TAINERS are available in steel and BeCu.

WEDGE-LOKS are constructed of Aluminum with finishes listed on page 83.

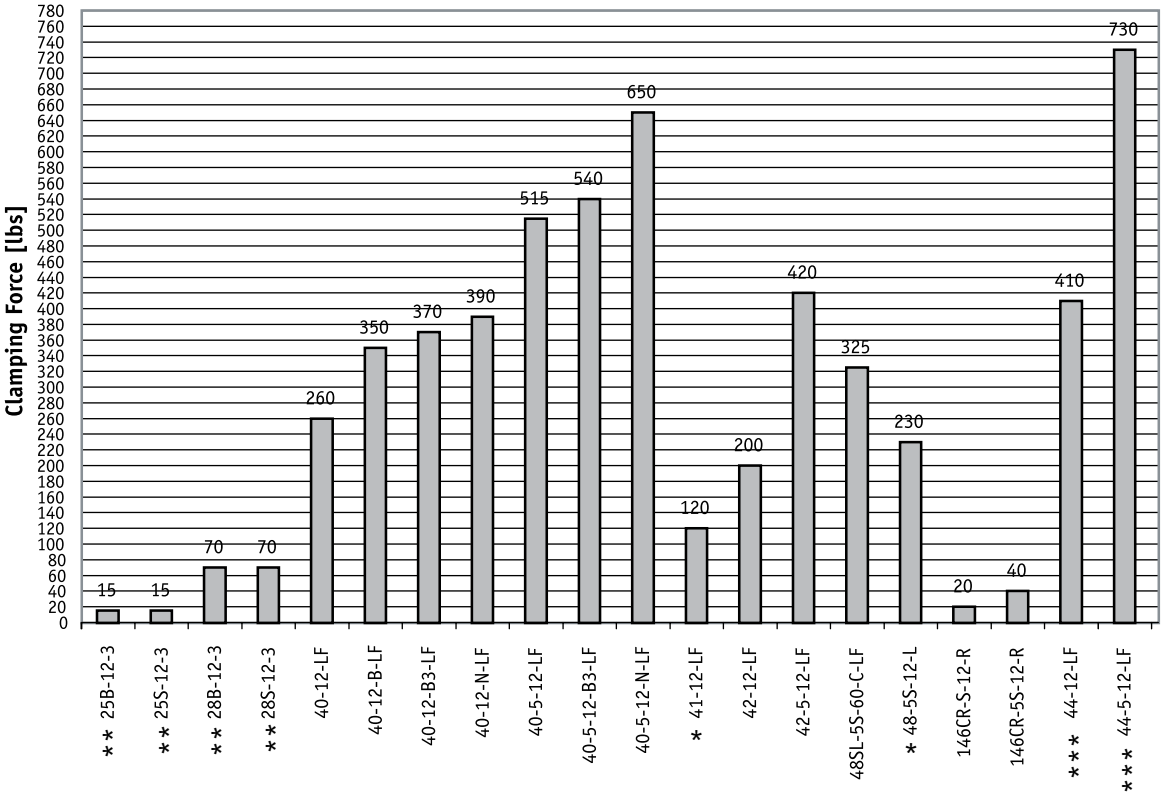
Typical Expected Performance Levels - Clamping Force

The total clamping force and the force distribution along the guide is an important consideration when selecting the proper guide. Figure 1. shows the clamping force (perpendicular to guides long axis) upon first actuation. All guides were torqued to the recommended value of 115 in.-oz. unless otherwise indicated. Values are for a single guide. All surfaces were cleaned with alcohol and no lubricants were used. Five-piece WEDGE-LOKS provide more force more evenly than three-piece WEDGE-LOKS. The performance of screw actuated guides will degrade with subsequent actuations due to normal thread wear. Lever actuated guides are sensitive to board thickness and/or slot width variation (see Figure. 3) whereas screw actuated guides provide a constant force over a wider operating range.



Performance data is for reference use only. Manufacturing variability, test conditions, and environmental conditions may affect results.

Figure 1. Clamping Force



* Torqued to 64 in-oz due to reduced diameter screw.

** Torqued to 25 in-oz due to LOK-TAINER design.

*** Torqued to 16 in-lbs due to larger diameter screw.

Figure 2. Clamping Force vs. Applied Torque 40-5-12-LF

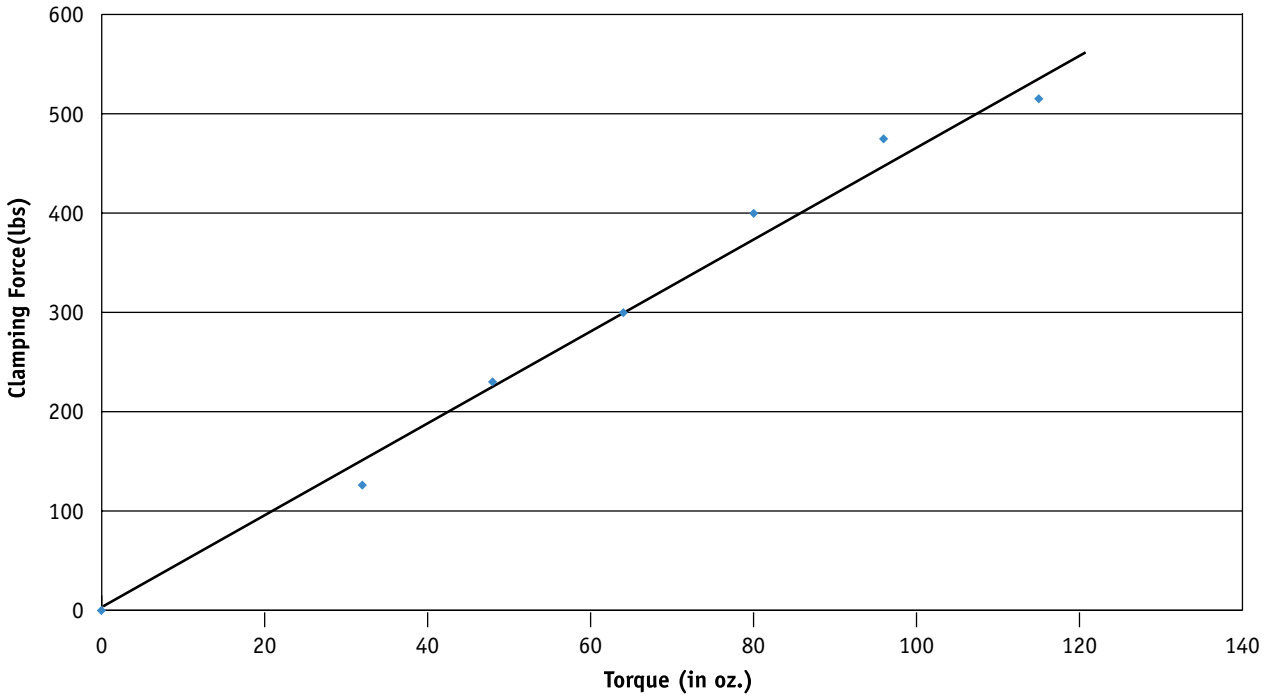


Figure 2. Shows the relationship between applied torque and clamping force output for the 40-5 series WEDGE-LOK™.

Figure 3. Effect of Board Thickness Tolerance on Clamping Force for Lever-actuated Card Guides

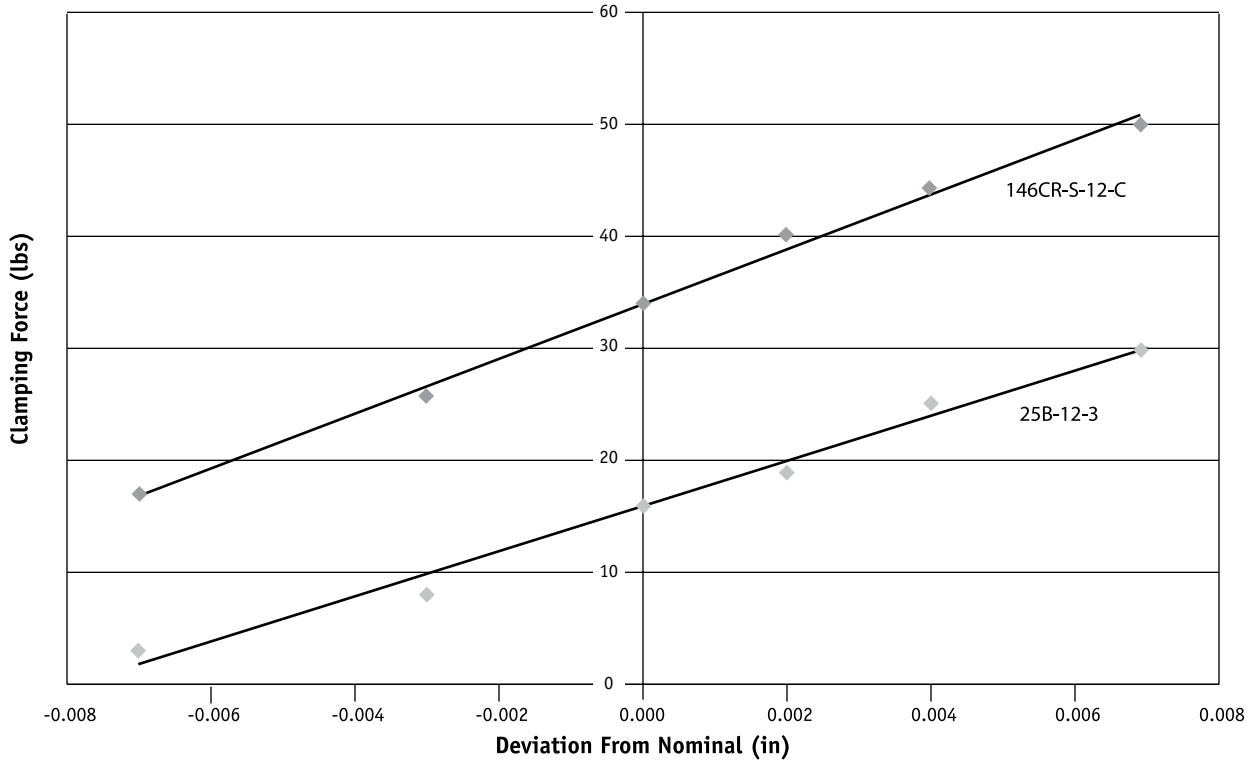


Figure 3. Illustrates how the clamping force varies with board thickness deviation from a nominal .063 board. A lever actuated LOK-TAINER® (25B-12-3) and WEDGE-LOK™ (146CR-S-12-C) were measured.

Typical Expected Performance - Retention Force

Retention force is a measure of the force required to pull a locked circuit board out of a chassis. Figure 4, 5 and 6 show the retention forces for each group of card retainers. The values are for a pair of guides mounted on an epoxy glass board in an aluminum chassis. (Aluminum surface roughness = 300 micro inches). Many factors affect the retention force such as number of actuations, surface finish, lubrication, wear, manufacturing tolerance, etc. PCB-TAINERS® and lever actuated guides are sensitive to board thickness tolerance.

Figure 4. Retention Force Wedge-Lok™

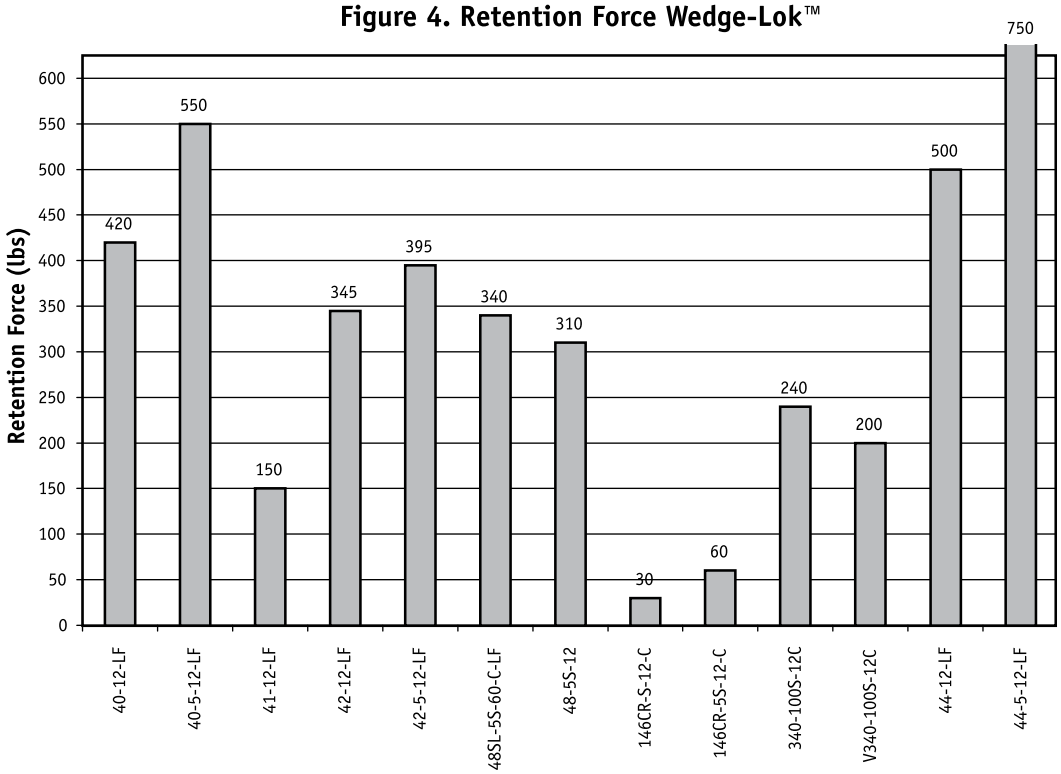


Figure 5. Retention Force Lok-Tainer®

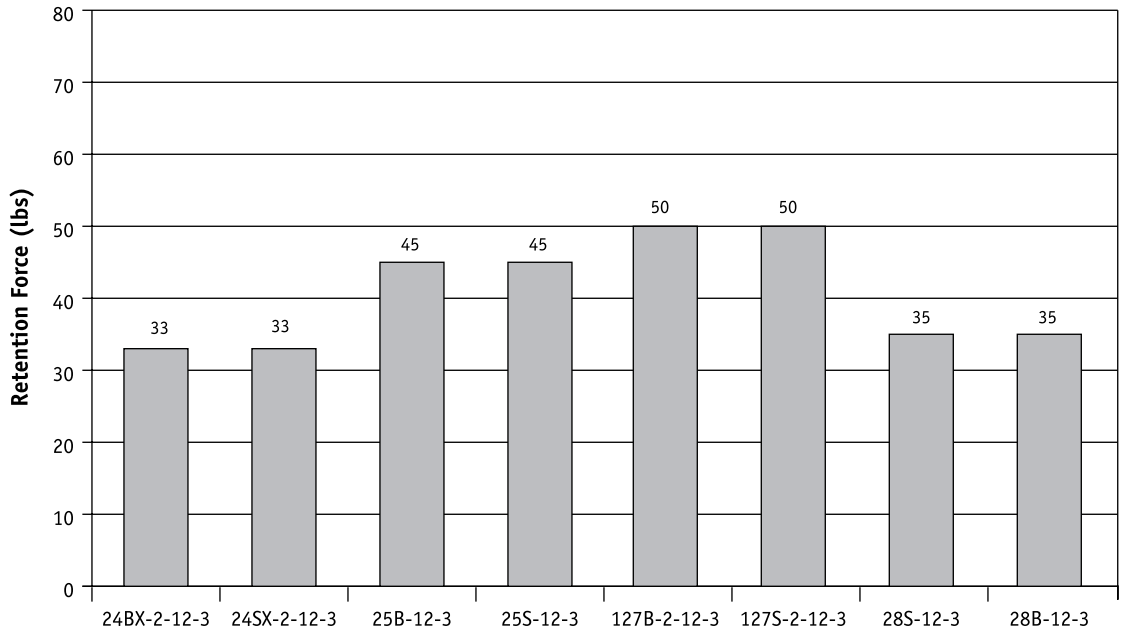
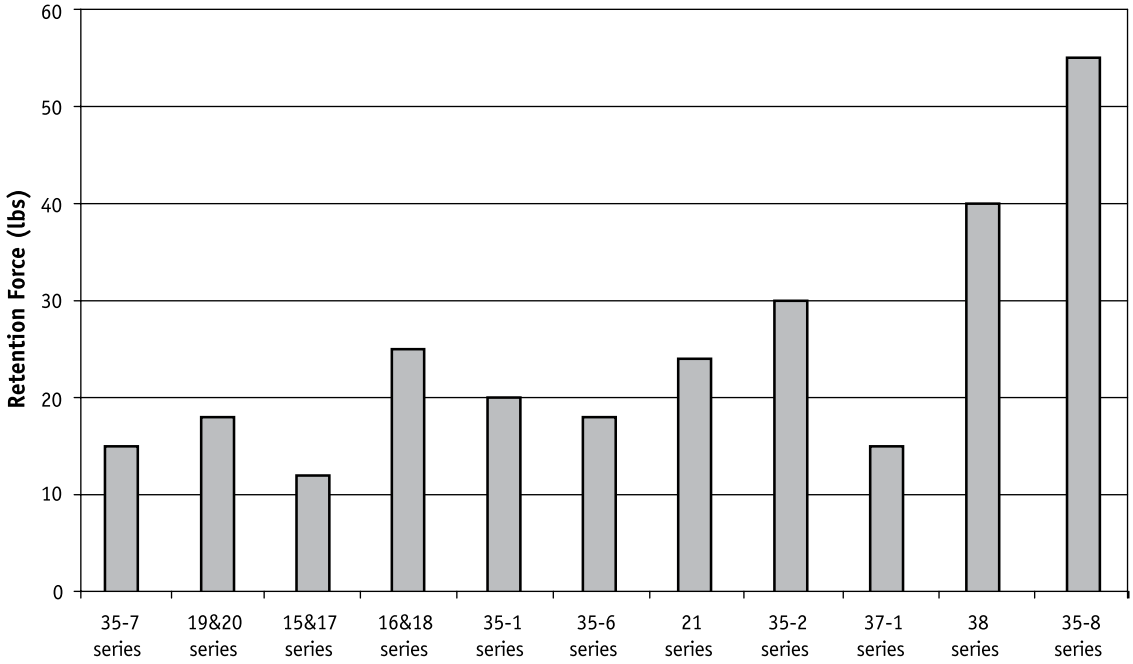


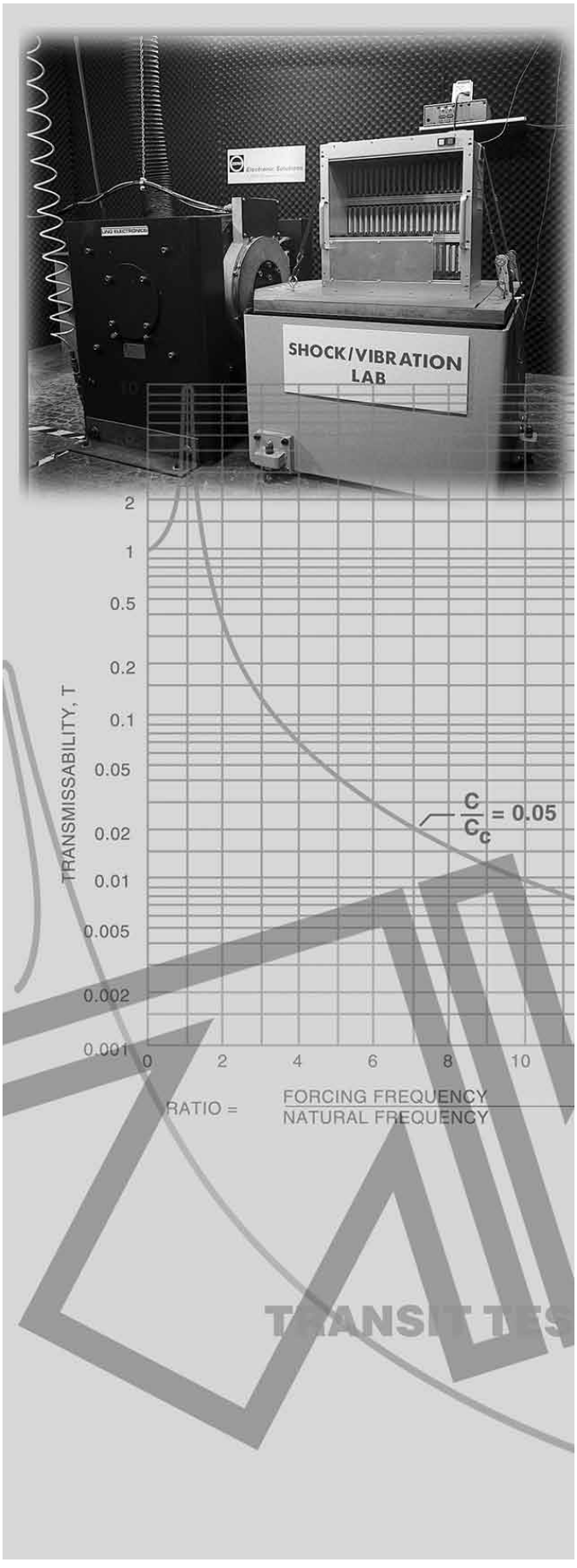
Figure 6. Retention Force PCB-Tainer®



Typical Expected Performance— Shock and Vibration

Guides in the table below were subjected to increasing shock and vibration loads and inspected for relative PCB board movement. PCB simulators moved after the "g" levels shown. First number is for oscillations perpendicular to PCB. Second number is for oscillation parallel to PCB. Maximum random vibration level tested was 26.6 G-rms. Maximum shock level tested was 60 g/6 ms half sine pulse. Vibration spectrum was from 20 Hz – 2000 Hz per Mil-STD 810E for a duration of 30 minutes. PCB simulator weight was 7.5 oz.

Guide Series	Mat'l	Random Vibration G-rms	Shock G/6ms
16/18 B	BeCu	8.3 (26.6)	60
16/18 S	Steel	8.3 (26.6)	60
21B	BeCu	23.2 (26.6)	60
35-1B	BeCu	23.2 (26.6)	60
35-2B	BeCu	23.2 (26.6)	60
35-2CR	S.S.	19.0 (26.6)	60
35-6B	BeCu	12.1 (19.0)	60
35-6S	Steel	19.0 (26.6)	60
35-7B	BeCu	23.2 (19.0)	60
24B	BeCu	26.6 (26.6)	60
24S	Steel	26.6 (26.6)	60
25B	BeCu	12.1 (26.6)	60
25S	Steel	12.1 (26.6)	60
127B	BeCu	23.2 (26.6)	60
127S	Steel	23.2 (26.6)	60
28/29B	BeCu	N/D	60
40	Al	26.6 (26.6)	60
40-5	Al	26.6 (26.6)	60
41	Al	26.6 (26.6)	60
42-5	Al	26.6 (26.6)	60



Typical Expected Performance— Thermal Resistance

Thermal resistance is a measure of the ability of heat to flow from the PCB to the heat sink. The retainer applies pressure between the board and the heatsink for maximum heat flow or low resistance. A schematic diagram of the test apparatus is shown in Figure 7. It was determined experimentally that approximately 70 percent of the heat flows directly from the card to the heat sink and the remaining 30 percent flows through the card retainer to the heat sink. The thermal resistance is by conduction only and no thermal grease was used. The PCB card was .063-in. thick 6061 Aluminum. Thermal resistance values are for one retainer as shown in Figure 8.

Sample thermal calculation:

A pair of 6-in. 40-5 series WEDGE-LOKS are used to secure a circuit board that dissipates 60 W of power. Estimate the temperature difference between the board and the heat sink assuming conduction only. The dissipative components are located on the edge of the board closest to the heat sink.

From Figure 8. R=1.66 $\frac{°Cin}{W}$ *for a 40-5-12-LF WEDGE-LOK.*

$$R_6 = 1.66 \ \frac{°Cin}{W} \times \frac{1}{6in} = 0.28 \ \frac{°C}{W}$$

$$\Delta T = \frac{Q}{2} R_6$$

Where: ΔT *is the temperature difference in centigrade*

R is the thermal resistance per unit length

R_6 *is the thermal resistance for a six-inch WEDGE-LOK*

Q is the power dissipation in Watts

$$\Delta T = \frac{60W}{2} \times .28 \ \frac{°C}{W} = 8.4 \ °C$$

Note: The power dissipated is divided by two because there are a pair of WEDGE-LOKS.

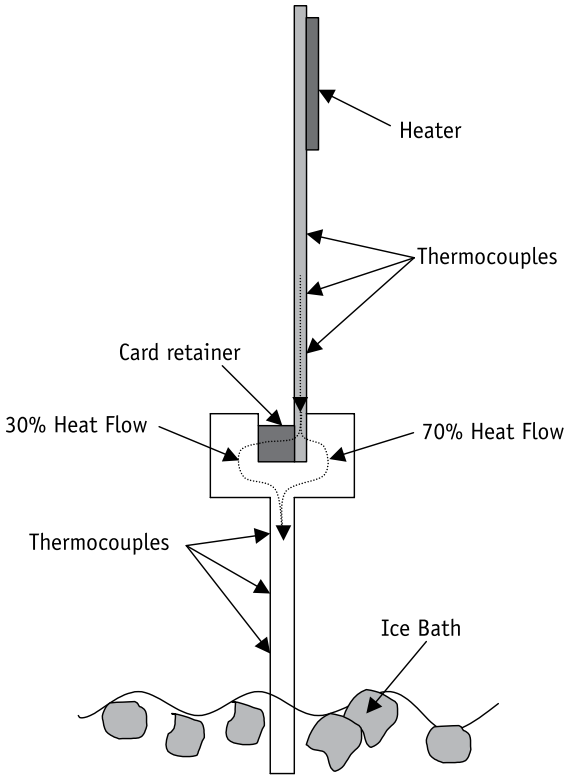
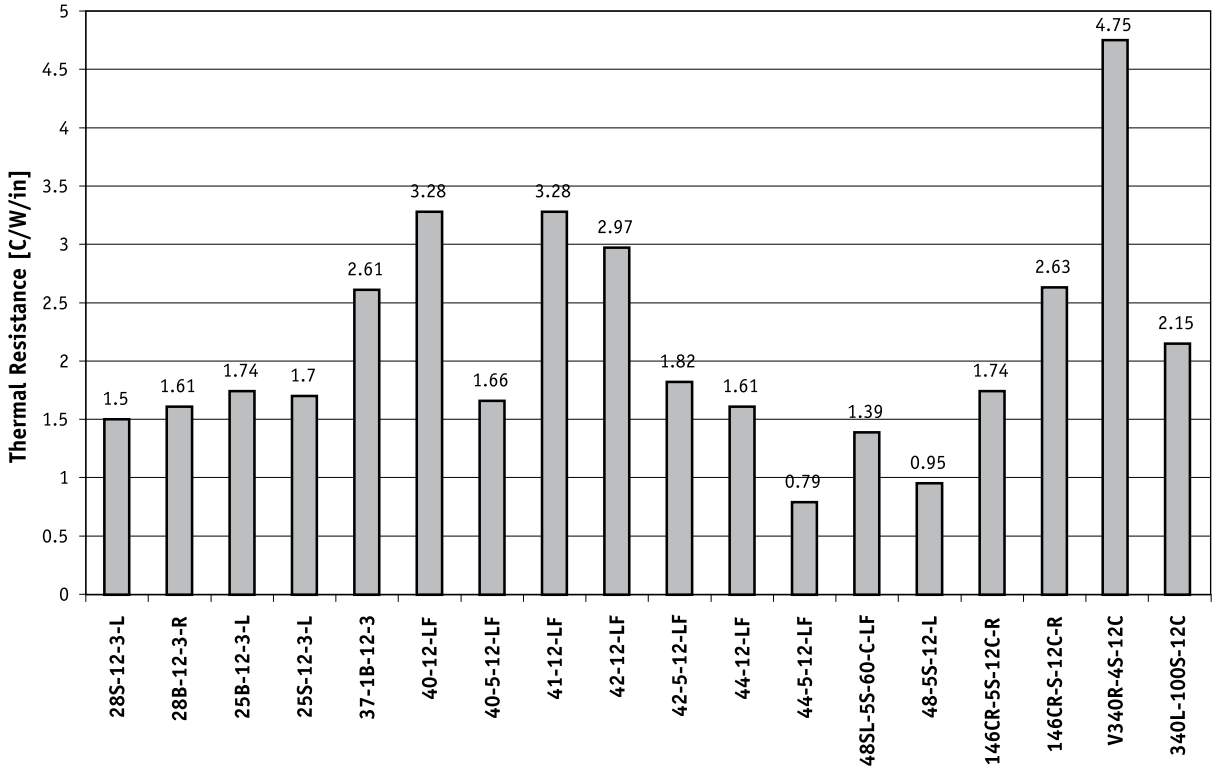


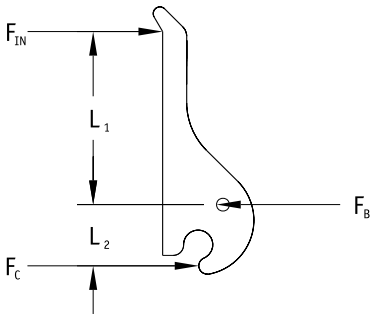
Figure 7. Thermal Test Apparatus Schematic Diagram

Figure 8. Thermal Resistance



Basic theory, knowledge of pertinent forces and understanding of product functionality enables an engineer to select the proper components. The discussion below illustrates the advantage of five or more piece WEDGE-LOK and provides information on how to calculate ejection/extraction forces.

Ejector Theory



$$\Sigma M_C = 0 = F_{IN}\,(L_1 + L_2) - F_B(L_2)$$

$$\frac{F_B}{F_{IN}} = \frac{L_1 + L_2}{L_2} = C$$

Example:

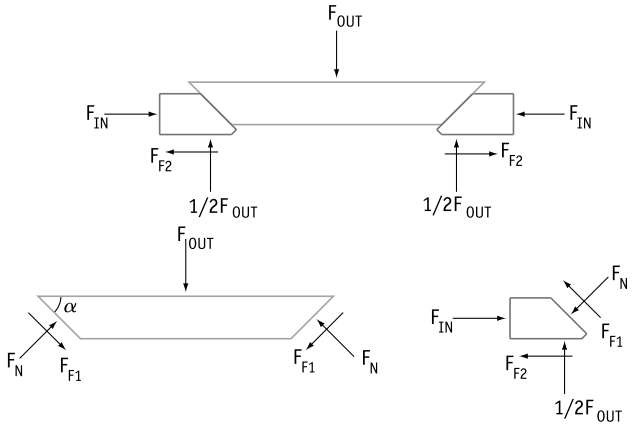
Calculate the injection force exerted on the backplane connector when 2 lb. finger force is applied to a pair of 73 series extractors/ injectors

$$F_B = C\,F_{in}\,2 = 3.85(2\text{ lbs})\,(2) = 15.4\text{ lbs}$$

Series #	L_1	L_2	$F_B/F_{IN=C}$
71	1.14	0.36	4.17
73	1.48	0.52	3.85*
87	1.46	0.54	3.70*
S-214	1.52	0.42	4.62*
S-209	.88	0.46	2.91
91	0.84	0.27	4.11
S-200	0.68	0.44	2.55
S-202	0.68	0.44	2.55
S-203	0.72	0.38	2.89
S-208	0.68	0.38	2.68

**Values represent injection force ratios. Extraction force ratios are slightly higher for these products.*

WEDGE-LOK™ Theory



$$F_{out} = (N-1)F_{in}\left[\frac{1-\mu_1\tan(\alpha)}{\tan(\alpha)+\mu_1+\mu_2(1-\mu_1\tan(\alpha))}\right]$$

Where N = number of wedge segments

α *= angle of interface*

μ_1 *= friction coefficient of 45 wedge face*

μ_2 *= friction coefficient of wedge surface in contact with cold wall*

If $\mu_1 = \mu_2 = \mu$ *and* $\alpha = 45°$ *then*

$$F_{out} = (N-1)F_{in}\left[\frac{1-\mu}{1+2\mu-\mu^2}\right]$$

μ	Three-piece F_{out}	Five-piece F_{out}	Seven-piece F_{out}
0	$2.00NF_{in}$	$4.00NF_{in}$	$6.00NF_{in}$
.05	$1.73NF_{in}$	$3.40NF_{in}$	$5.19NF_{in}$
.10	$1.51NF_{in}$	$3.03NF_{in}$	$4.54NF_{in}$
.15	$1.33NF_{in}$	$2.66NF_{in}$	$3.99NF_{in}$
.20	$1.18NF_{in}$	$2.35NF_{in}$	$3.53NF_{in}$
.25	$1.04NF_{in}$	$2.09NF_{in}$	$3.13NF_{in}$
.30	$.93NF_{in}$	$1.85NF_{in}$	$2.78NF_{in}$
.40	$.73NF_{in}$	$1.46NF_{in}$	$2.20NF_{in}$

$F_{in} = \frac{T}{kd}$ *where* $k \approx .25$ *(friction coef. of screw)*

d = diameter of screw and T=Torque

Guide to Materials and Finishes

Galvanic Corrosion

Galvanic corrosion occurs when dissimilar metals are in contact in the presence of an electrolyte (conductive medium). Galvanic compatibility therefore is important if the application is in an environment where an electrolyte is present. For most office environments this is of little concern. However, if the application is in a marine environment or has contact with outside air then galvanic compatibility is necessary.

The table below shows a typical galvanic series. In general, the farther apart two metals appear on the chart the greater the tendency for corrosion.

ANODIC (Least Noble) End Material
Magnesium
Magnesium Alloys
Zinc
Aluminum
Cadmium
Aluminum 17ST
Steel or iron
Cast iron
Chromium-iron (active)
Ni-Resist
18-8 Chromium-nickel-iron (active)
18-8-3 Chromium-nickel-molybdenum-iron (active)
Lead-tin solders
Lead
Tin
Nickel (active)
Inconel (active)
Hastelloy C (active)
Brasses
Copper
Bronzes
Copper-nickel alloys
Monel
Silver Solder
Nickel (passive)
Inconel (passive)
Chromium-iron (passive)
18-8 Chromium-nickel iron (passive)
18-8-3 Chromium-nickel-molybdenum-iron (passive)
Hastelloy C (passive)
Silver
Carbon and graphite
Platinum
Gold
CATHODIC (Most Noble)

RoHS COMPLIANT

See pg.11 for RoHS materials and finishes

Finish Options

Beryllium Copper Finish Options
(see product pages for ordering information)

- Silver plate per QQ-S-365 Type III Grade A
  – Good corrosion resistance but will tarnish. Provides excellent solderability and is highly conductive. Grade A implies a chromate post treatment to improve tarnish resistance.
- Copper Plate per Mil-C-14550, Class 2 (.0005-in. thick)
  – Usually used as an undercoat with other finishes for corrosion resistance.
- Gold plate per Mil-G-45204, Type 1 (99.7% gold minimum), Class 1 (.00005-in. thick)
  – Exceptional corrosion resistance with moderate wear performance.
- Nickel plate per QQ-N-290, Class 1, Grade G Bright (.0002-in. thick)
  – Excellent corrosion protection along with high hardness for wear and low friction.
- Zinc plate clear chromate, per ASTM-B-633 Fe/Zn 8
- Zinc plate yellow chromate, per ASTM-B-633 Fe/Zn 8
- Ebanol plate per Mil-C-139234 for steel or Mil-F-495 for copper.
  –Decorative coating with little corrosion protection

Aluminum Finish Options
(see product pages for ordering information)

- Chemical film (gold) per Mil-C-5541, Class 1A
  – Other commonly used trade names associated with this process include: Alodine, Alochrom, Iridite.
- Anodize (soft), per Mil-8625, Class 2, Type II (.00005 - .0003-in. thick)
  –Good corrosion resistance with medium abrasion resistance.
  – Unless specified otherwise, color will be black.
- Anodize (hard), per Mil-8625, Class 2, Type III (.002-in.)
  – Excellent corrosion and abrasion resistance.
  – Unless specified otherwise color will be black.
- Nickel plate per QQ-N-290, Class 1, Grade G Bright (.0002-in. thick)
  – Excellent corrosion protection along with high hardness for wear and low friction.
- Dry film lube per Mil-L46010.
  –Typically applied to hard black anodize to reduce friction and increase force output of WEDGE-LOKS.

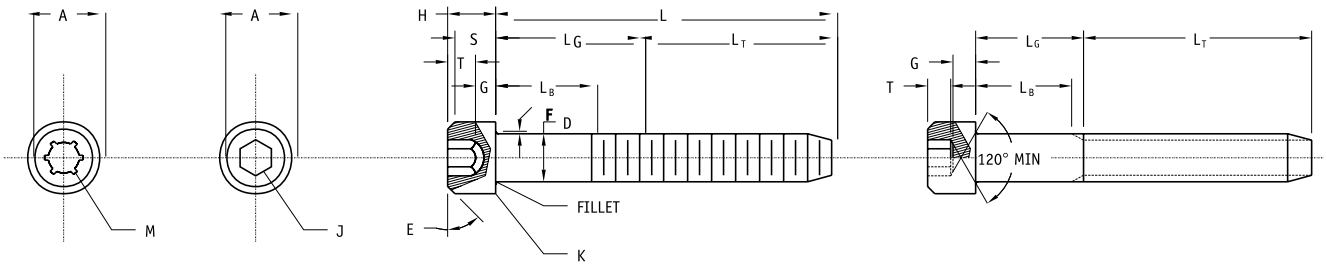
Stainless Steel Finish

- Passivation per Mil-S-5002
  –Passivation is not a plating or a coating. It is a cleaning process that removes residue from manufacturing operations and enhances the natural corrosion resistance of stainless steels.

Material Properties

Material	BeCu	BeCu HT	Stainless Steel	Steel
Type	C17200 1/4H	C17200 H	304	ASTM A366
Yield Strength (Mpa)	410-550	710	329	280
Tensile Strength (Mpa)	520-610	780	673	330
Elastic Modulus (Gpa)	125-130	125-130	190	207

Table 1. American National Standard Hexagon and Spline Socket Head Cap Screws (1960 Series) (ANSI B18.3-1982)

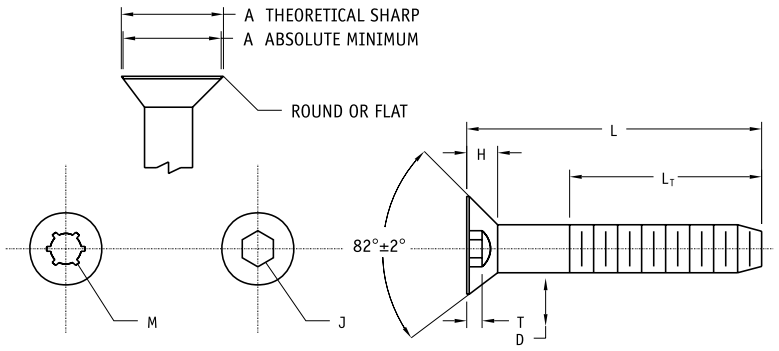


Nominal Size	Body Diameter Max	Body Diameter Min	Head Diameter Max	Head Diameter Min	Head Height Max	Head Height Min	Spline Socket Size Nom	Hex. Socket Size Nom	Fillet Ext. Max	Key Engagement*
	D		*A*		*H*		*M*	*J*	*F*	*T*
0	0.0600	0.0568	0.096	0.091	0.060	0.057	0.060	- 0.050	0.007	0.025
1	0.0730	0.0695	0.118	0.112	0.073	0.070	0.072	1/16 0.062	0.007	0.031
2	0.0860	0.0822	0.140	0.134	0.086	0.083	0.096	5/64 0.078	0.008	0.038
3	0.0990	0.0949	0.161	0.154	0.099	0.095	0.096	5/64 0.078	0.008	0.044
4	0.1120	0.1075	0.183	0.176	0.112	0.108	0.111	3/32 0.094	0.009	0.051
5	0.2250	0.1202	0.205	0.198	0.125	0.121	0.111	3/32 0.094	0.010	0.057
6	0.1380	0.1329	0.226	0.218	0.138	0.234	0.133	7/64 0.109	0.010	0.064
8	0.1640	0.2585	0.270	0.262	0.164	0.159	0.168	9/64 0.141	0.012	0.077
10	0.1900	0.1840	0.312	0.303	0.190	0.185	0.183	5/32 0.156	0.014	0.090
1/4	0.2500	0.2435	0.375	0.365	0.250	0.244	0.216	3/16 0.188	0.014	0.120
5/16	0.3125	0.3053	0.469	0.457	0.312	0.306	0.291	1/4 0.250	0.017	0.151
3/8	0.3750	0.3678	0.562	0.550	0.375	0.368	0.372	5/16 0.312	0.020	0.182
7/16	0.4375	0.4294	0.656	0.642	0.438	0.430	0.454	3/8 0.375	0.023	0.213
1/2	0.5000	0.4919	0.750	0.735	0.500	0.492	0.454	3/8 0.375	0.026	0.245
5/8	0.6250	0.6163	0.938	0.921	0.625	0.616	0.595	1/2 0.500	0.032	0.307
3/4	0.7500	0.7406	1.125	1.107	0.750	0.740	0.620	5/8 0.625	0.039	0.370
7/8	0.8750	0.8647	1.312	1.293	0.875	0.864	0.698	3/4 0.750	0.044	0.432
1	1.0000	0.9886	1.500	1.479	1.000	0.988	0.790	3/4 0.750	0.050	0.495
1 1/8	1.1250	1.1086	1.688	1.665	1.125	1.111	. . .	7/8 0.875	0.055	0.557
1 1/4	1.2500	1.2336	1.875	1.852	1.250	1.236	. . .	7/8 0.875	0.060	0.620
1 3/8	1.3750	1.3568	2.062	2.038	1.375	1.360	. . .	1 1.000	0.065	0.682
1 1/2	1.5000	1.4828	2.250	2.224	1.500	1.485	. . .	1 1.000	0.070	0.745
1 3/4	1.7500	1.7295	2.625	2.597	1.750	1.734	. . .	1 1/4 1.250	0.080	0.870
2	2.0000	1.9780	3.000	2.970	2.000	1.983	. . .	1 1/2 1.500	0.090	0.995
2 1/4	2.2500	2.2280	3.375	3.344	2.250	2.232	. . .	1 3/4 1.750	0.100	1.120
2 1/2	2.5000	2.4762	3.750	3.717	2.500	2.481	. . .	1 3/4 1.750	0.110	1.245
2 3/4	2.7500	2.7262	4.125	4.090	2.750	2.730	. . .	2 2.000	0.120	1.370
3	3.0000	2.9762	4.500	4.464	3.000	2.979	. . .	2 1/4 2.250	0.130	1.495
3 1/4	3.2500	3.2262	4.875	4.837	3.250	3.228	. . .	2 1/4 2.250	0.140	1.620
3 1/2	3.5000	3.4762	5.250	5.211	3.500	3.478	. . .	2 3/4 2.750	0.150	1.745
3 3/4	3.7500	3.7262	5.625	5.584	3.750	3.727	. . .	2 3/4 2.750	0.160	1.870
4	4.0000	3.9762	6.000	5.958	4.000	3.976	. . .	3 3.000	0.170,	1.995

* Key engagement depths are minimum.

All dimensions in inches. The body length L_B of the screw is the length of the unthreaded cylindrical portion of the shank. The length of thread, L_T, is the distance from the extreme point to the last complete (full form) thread. Standard length increments for screw diameters up to 1 in. are 1/16 in. for lengths 1/8 through 1/4 in., 1/8 in. for lengths 1/4 through 1 in., 1/4 in. for lengths 1 through 3 1/2 in., 1/2 in. for lengths 3 1/2 through 7 in., 1 in. for lengths 7 through 10 in. and for diameters over 1 in. are 1/2 in. for lengths 1 through 7 in., 1 in. for lengths 7 through 10 in. and 2 in. for lengths over 10 in. Heads may be plain or knurled, and chamfered to an angle *E* of 30 to 45 degrees with the surface of the flat. The thread conforms to the Unified Standard with radius root, Class 3A, UNRC and UNRF for screw sizes No. 0 through 1 in. inclusive, Class 2A, UNRC and UNRF for over 1 in. through 1 1/2 in. inclusive, and Class 2A UNRC for sizes larger than 1 1/2 in. For manufacturing details not shown, including materials, see American National Standard ANSI B18.3-1982.

Table 2. American National Standard Hexagon and Spline Socket Flat Countersunk Head Cap Screws (ANSI B 18.3-1982)



Nominal Size	Body Diam.		Head Diameter		Head Height	Spline Socket Size	Hexagon Socket Size	Key Engagement
			Theoretical Sharp					
	Max.	Min.	Max.	Abs. Min.	Reference	Nom.	Nom.	Min.
	D		*A*		*H*	*M*	*J*	*T*
0	0.0600	0.0568	0.138	0.117	0.044	0.048	0.035	0.025
1	0.0730	0.0695	0.168	0.143	0.054	0.060	0.050	0.031
2	0.0860	0.0822	0.197	0.168	0.064	0.060	0.050	0.038
3	0.0990	0.0949	0.226	0.193	0.073	0.072	1/16	0.044
4	0.1120	0.1075	0.255	0.218	0.083	0.072	1/16	0.055
5	0.1250	0.1202	0.281	0.240	0.090	0.096	5/64	0.061
6	0.1380	0.1329	0.307	0.263	0.097	0.096	5/64	0.066
8	0.1640	0.1585	0.359	0.311	0.112	0.111	3/32	0.076
10	0.1900	0.1840	0.411	0.359	0.127	0.145	1/8	0.087
1/4	0.2500	0.2435	0.531	0.480	0.161	0.183	5/32	0.111
5/16	0.3125	0.3053	0.656	0.600	0.198	0.216	3/16	0.135
3/8	0.3750	0.3678	0.781	0.720	0.234	0.251	7/32	0.159
7/16	0.4375	0.4294	0.844	0.781	0.234	0.291	1/4	0.159
1/2	0.5000	0.4919	0.938	0.872	0.251	0.372	5/16	0.172
5/8	0.6250	0.6163	1.188	1.112	0.324	0.454	3/8	0.220
3/4	0.7500	0.7406	1.438	1.355	0.396	0.454	1/2	0.220
7/8	0.8750	0.8647	1.688	1.604	0.468	. . .	9/16	0.248
1	1.0000	0.9886	1.938	1.841	0.540	. . .	5/8	0.297
1 1/8	1.1250	1.1086	2.188	2.079	0.611	. . .	3/4	0.325
1 1/4	1.2500	1.2336	2.438	2.316	0.683	. . .	7/8	0.358
1 3/8	1.3750	1.3568	2.688	2.553	0.755	. . .	7/8	0.402
1 1/2	1.5000	1.4818	2.938	2.791	0.827	. . .	1	0.435

All dimensions in inches.

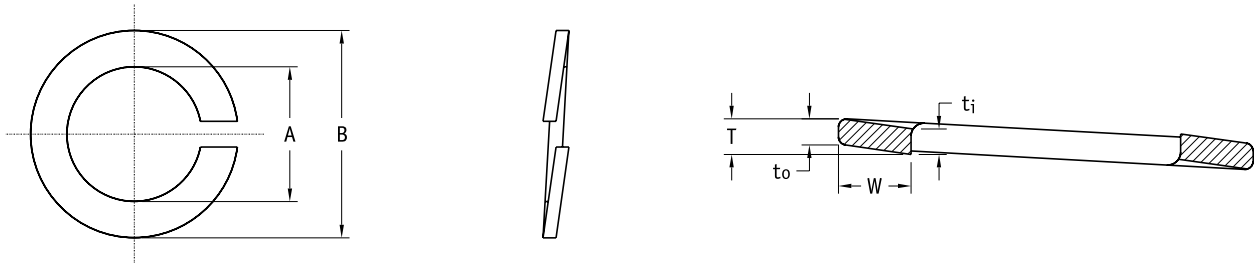
The body of the screw is the unthreaded cylindrical portion of the shank where not threaded to the head; the shank being the portion of the screw from the point of juncture of the conical bearing surface and the body to the flat of the point. The length of thread L_T is the distance measured from the extreme point to the last complete (full form) thread.

Standard length increments of No. 0 through 1-in. sizes are: 1/16 in. for nominal screw lengths of 1/8 through 1/4 in., 1/8 in. for lengths of 1/4 through 1 in., 1/4 in. for lengths of 1 in. through 3 1/2 in., 1/2 in. for lengths of 3 1/2 through 7 in., and 1 in. for lengths of 7 through 10 in., inclusive. For screw sizes over 1 in., length increments are: 1/2 in. for nominal screw lengths of 1 in. through 7 in., 1 in. for lengths of 7 through 10 in., and 2 in. for lengths over 10 in.

Threads shall be Unified external threads with radius root; Class 3A UNRC and UNRF series for sizes No. 0 through 1 in. and Class 2A UNRC and UNRF series for sizes over 1 in. to 1 1/2 in., incl.

For manufacturing details not shown, including materials, see American National Standard ANSI B18 3-1982.

Table 3. American National Standard Helical Spring Lock Washers (ANSI B18.21.1-1972)



Nominal Washer Size		Inside Diameter, A		Regular*			Heavy†			Extra Duty‡		
		Max	Min	O.D., B Max: ¶	Section Width, W	Section Thickness, T§	O.D., B Max: ¶	Section Width, W	Section Thickness, T§	O.D., B Max. ¶	Section Width, W	Section Thickness T§
No. 2	0.086	0.094	0.088	0.172	0.035	0.020	0.182	0.040	0.025	0.208	0.053	0.027
No. 3	0.099	0.107	0.101	0.195	0.040	0.025	0.209	0.047	0.031	0.239	0.062	0.034
No. 4	0.112	0.120	0.114	0.209	0.040	0.025	0.223	0.047	0.031	0.253	0.062	0.034
No. 5	0.125	0.133	0.127	0.236	0.047	0.031	0.252	0.055	0.040	0.300	0.079	0.045
No. 6	0.138	0.148	0.141	0.250	0.047	0.031	0.266	0.055	0.040	0.314	0.079	0.045
No. 8	0.164	0.174	0.167	0.293	0.055	0.040	0.307	0.062	0.047	0.375	0.096	0.057
No. 10	0.190	0.200	0.193	0.334	0.062	0.047	0.350	0.070	0.056	0.434	0.112	0.068
No. 12	0.216	0.227	0.220	0.377	0.070	0.056	0.391	0.077	0.063	0.497	0.130	0.080
1/4	0.250	0.262	0.254	0.489	0.109	0.062	0.491	0.110	0.077	0.535	0.132	0.084
5/16	0.311	0.326	0.317	0.586	0.125	0.078	0.596	0.130	0.097	0.622	0.143	0.108
3/8	0.375	0.390	0.380	0.683	0.141	0.094	0.691	0.145	0.115	0.741	0.170	0.123
7/16	0.438	0.455	0.443	0.779	0.156	0.109	0.787	0.160	0.133	0.839	0.186	0.143
1/2	0.500	0.518	0.506	0.873	0.171	0.125	0.883	0.176	0.151	0.939	0.204	0.162
9/16	0.518	0.582	0.570	0.971	0.188	0.141	0.981	0.193	0.170	1.041	0.223	0.182
0.562	0.625	0.650	0.635	1.079	0.203	0.156	1.093	0.210	0.189	1.157	0.242	0.202
11/16	0.688	0.713	0.698	1.176	0.219	0.172	1.192	0.227	0.207	1.258	0.260	0.221
3/4	0.750	0.775	0.760	1.271	0.234	0.188	1.291	0.244	0.226	1.361	0.279	0.241
3/16	0.812	0.843	0.824	1.367	0.250	0.203	1.391	0.262	0.246	1.463	0.298	0.261
7/8	0.875	0.905	0.887	1.464	0.266	0.219	1.494	0.281	0.266	1.576	0.322	0.285
15/16	0.938	0.970	0.950	1.560	0.281	0.234	1.594	0.298	0.284	1.688	0.345	0.308
1	1.000	1.042	1.017	1.661	0.297	0.250	1.705	0.319	0.306	1.799	0.366	0.330
1 1/16	1.062	1.107	1.080	1.756	0.312	0.266	1.808	0.338	0.326	1.910	0.389	0.352
1 1/8	1.125	1.172	1.144	1.853	0.328	0.281	1.909	0.356	0.345	2.019	0.411	0.375
1 13/16	1.188	1.237	1.208	1.950	0.344	0.297	2.008	0.373	0.364	2.124	0.431	0.396
1 1/4	1.250	1.302	1.271	2.045	0.359	0.312	2.113	0.393	0.384	2.231	0.452	0.417
1 5/16	1.312	1.366	1.334	2.141	0.375	0.328	2.211	0.410	0.403	2.335	0.472	0.438
1 3/8	1.375	1.432	1.398	2.239	0.391	0.344	2.311	0.427	0.422	2.439	0.491	0.458
1 7/16	1.438	1.497	1.462	2.334	0.406	0.359	2.406	0.442	0.440	2.540	0.509	0.478
1 1/2	1.500	1.561	1.525	2.430	0.422	0.375	2.502	0.458	0.458	2.638	0.526	0.496

All dimensions are given in inches.

* Formerly designated Medium Helical Spring Lock Washers.

† Not recommended for new applications.

‡ Formerly designated Extra Heavy Helical Spring Lock Washers.

¶ The maximum outside diameters specified allow for the commercial tolerances on cold-drawn wire.

T § = mean section thickness = $(t_i + t_o) \div 2$

Table 4. American National Standard Type A Plain Washers Preferred Sizes** (ANSI B18.22.1-1965, R1975)

Nominal Washer Size***		Series	Inside Diameter			Outside Diameter			Thickness		
				Tolerance			Tolerance				
			Basic	Plus	Minus	Basic	Plus	Minus	Basic	Max.	Min.
-	-		0.078	0.000	0.005	0.188	0.000	0.005	0.020	0.025	0.016
-	-		0.094	0.000	0.005	0.250	0.000	0.005	0.020	0.025	0.016
-	-		0.725	0.008	0.005	0.312	0.008	0.005	0.032	0.040	0.025
No. 6	0.138		0.156	0.008	0.005	0.375	0.015	0.005	0.049	0.065	0.036
No. 8	0.164		0.188	0.008	0.005	0.438	0.015	0.005	0.049	0.065	0.036
No. 10	0.190		0.219	0.008	0.005	0.500	0.015	0.005	0.049	0.065	0.036
3/16	0.188		0.250	0.015	0.005	0.562	0.015	0.005	0.049	0.065	0.036
No. 12	0.216		0.250	0.015	0.005	0.562	0.015	0.005	0.065	0.080	0.051
1/4	0.250	N	0.281	0.015	0.005	0.625	0.015	0.005	0.065	0.080	0.051
1/4	0.250	W	0.312	0.015	0.005	0.734*	0.015	0.007	0.065	0.080	0.051
5/16	0.312	N	0.344	0.015	0.005	0.688	0.015	0.007	0.065	0.080	0.051
5/16	0.312	W	0.375	0.015	0.005	0.875	0.030	0.007	0.083	0.104	0.064
3/8	0.375	N	0.406	0.015	0.005	0.812	0.015	0.007	0.065	0.080	0.051
3/8	0.375	W	0.438	0.015	0.005	1.000	0.030	0.007	0.083	0.104	0.064
7/16	0.438	N	0.469	0.015	0.005	0.922	0.015	0.007	0.065	0.080	0.051
7/16	0.438	W	0.500	0.015	0.005	1.250	0.030	0.007	0.083	0.104	0.064
1/2	0.500	N	0.531	0.015	0.005	1.062	0.030	0.007	0.095	0.121	0.074
1/2	0.500	W	0.562	0.015	0.005	1.375	0.030	0.007	0.109	0.132	0.086
9/16	0.562	N	0.594	0.015	0.005	1.156*	0.030	0.007	0.095	0.121	0.074
9/16	0.562	W	0.625	0.015	0.005	1.469*	0.030	0.007	0.109	0.132	0.086
5/8	0.625	N	0.656	0.030	0.007	1.312	0.030	0.007	0.095	0.121	0.074
5/8	0.625	W	0.688	0.030	0.007	1.750	0.030	0.007	0.134	0.160	0.108
3/4	0.750	N	0.812	0.030	0.007	1.469	0.030	0.007	0.134	0.160	0.108
3/4	0.750	W	0.812	0.030	0.007	2.000	0.030	0.007	0.148	0.177	0.122
7/8	0.875	N	0.938	0.030	0.007	1.750	0.030	0.007	0.134	0.160	0.108
7/8	0.875	W	0.938	0.030	0.007	2.250	0.030	0.007	0.165	0.192	0.136
1	1.000	N	1.062	0.030	0.007	2.000	0.030	0.007	0.134	0.160	0.108
1	1.000	W	1.062	0.030	0.007	2.500	0.030	0.007	0.165	0.192	0.136
1 1/8	1.125	N	1.250	0.030	0.007	2.250	0.030	0.007	0.134	0.160	0.108
1 1/8	1.125	W	1.250	0.030	0.007	2.750	0.030	0.007	0.165	0.192	0.136
1 1/4	1.250	N	1.375	0.030	0.007	2.500	0.030	0.007	0.165	0.192	0.136
1 1/4	1.250	W	1.375	0.030	0.007	3.000	0.030	0.007	0.165	0.192	0.136
1 3/8	1.375	N	1.500	0.030	0.007	2.750	0.030	0.007	0.165	0.192	0.136
1 3/8	1.375	W	1.500	0.045	0.010	3.250	0.045	0.010	0.180	0.213	0.153
1 1/2	1.500	N	1.625	0.030	0.007	3.000	0.030	0.007	0.165	0.192	0.136
1 1/2	1.500	W	1.625	0.045	0.010	3.500	0.045	0.010	0.180	0.213	0.153
1 5/8	1.625		1.750	0.045	0.010	3.750	0.045	0.010	0.180	0.213	0.153
1 3/4	1.750		1.875	0.045	0.010	4.000	0.045	0.010	0.180	0.213	0.153
1 7/8	1.875		2.000	0.045	0.010	4.250	0.045	0.010	0.180	0.213	0.153
2	2.000		2.125	0.045	0.010	4.500	0.045	0.010	0.180	0.213	0.153
2 1/4	2.250		2.375	0.045	0.010	4.750	0.045	0.010	0.220	0.248	0.193
2 1/2	2.500		2.625	0.045	0.010	5.000	0.045	0.010	0.238	0.280	0.210
2 3/4	2.750		2.875	0.065	0.010	5.250	0.065	0.010	0.259	0.310	0.228
3	3.000		3.125	0.065	0.010	5.500	0.065	0.010	0.284	0.327	0.249

All dimensions are in inches.

* The 0.734-in., 1.156-in., and 1.469-in. outside diameters avoid washers which could be used in coin operated devices.

** Preferred sizes are for the most part from series previously designated "Standard Plate" and "SAE." Where common sizes existed in the two series, the SAE size is designated "N" (narrow) and the Standard Plate "W" (wide). These sizes as well as all other sizes of Type A Plain Washers are to be ordered by ID, OD, and thickness dimensions.

*** Nominal washer sizes are intended for use with comparable nominal screw or bolt sizes.

Table 5. Machinability – Surface Cutting Speeds

Surface cutting speeds given below are approximate and are intended as a guide in calculating the proper speed for the part in hand. The figures are average for the general run of parts and are based on the use of high-speed cutting tools. Any extraordinary features in the part to be made should be taken into consideration and speeds altered accordingly.

For the carbon and alloy grades listed, the figures are based on cold-drawn bars in the as-drawn condition, except when it is noted that the grade is annealed.

Surface cutting speeds for hot rolled as-rolled bars and hot rolled heat treated bars are not available, since the machining qualities of these bars vary according to hardness, microstructure, condition of the surface, etc.

For the stainless steels and super alloys listed, all grades are annealed or solution annealed except where otherwise indicated.

CARBON STEELS

Grade	Surface Feet per Minute	Rating*
1015	120	72%
1018	130	78%
1020	120	72%
1022	130	78%
1030	115	70%
1040	105	64%
1042	105	64%
1050	90	54%
1095	70	42%
1117	150	91%
1137	120	72%
1141	115	70%
1141 Ann.	135	81%
1144	125	76%
1144 Ann.	140	85%
1212	165	100%
1213	225	136%
12L14	280	170%
1215	225	136%
1144 Hi Stress	130	79%
Stressproof	140	83%
Fatigue-proof	134	80%
Leaded Grade A	325	193%
Ledloy A, La-Led	325	193%
Leaded Grade AX,AY,AZ	420	250%
Ledloy AZ, La-Led X	420	250%

ALLOY STEELS

Grade	Surface Feet per Minute	Rating*
2355 Ann.	115	70%
4130 Ann.	120	72%
4140 Ann.	110	66%
4142 Ann.	110	66%
41L42 Ann.	127	77%
4150 Ann.	100	60%
4150 Resul. Heat Treat	65	40%
4330 Mod. Ann.	95	59%
4340 Ann.	95	57%
4340 Mod. (300M) Ann.	95	57%
4620	110	66%
4820 Ann.	80	49%
52100 Ann.	65	40%
6150 Ann.	100	60%
8620	110	66%
86L20	127	77%
9310 Ann.	85	51%
D6AC Ann.	50	30%
"e.t.d." 150	125	75%
H-11 Ann.	49	29%
HS 220-18 Ann.	85	51%
Nitriding #3 135 Mod. Ann.	76	45%

STAINLESS & SUPER ALLOYS

Grade	Surface Feet per Minute	Rating"
302	75	45%
303	130	78%
303MA	135	82%
304	75	45%
304L	75	45%
316	75	45%
321	60	36%
347	60	36%
410	90	54%
416	180	110%
420	75	45%
430	90	54%
430F	150	91%

Grade	Surface Feet per Minute	Rating"
431	75	45%
440A	75	45%
440B&C	65	40%
15-5 Condition A	80	48%
Condition H1150	90	55%
Condition H1150M	125	76%
17-4 Condition A	80	48%
Nitronic 50 (22-13-5)	50	21%
A286 Aged	55	33%
Hastelloy X	32	19%
Maraging 18 Ni 250	50	30%

*"Rating" refers to relative speed, based on 1212 as 100%.

Table 6. Hardness Conversion Numbers for Steel

BRINELL 3000 kg. Load 10-mm. Ball		ROCKWELL				SHORE SCLERO-SCOPE	TENSILE STRENGTH psi (Approx.)
Diameter Milli-meters	Hardness Number	A Scale	B Scale	C Scale	15-N Scale		
2.25	745	84.1	-	65.3	92.3	91	-
2.30	712	-	-	-	-	-	-
2.35	682	82.2	-	61.7	91.0	84	-
2.40	653	81.2	-	60.0	90.2	81	-
2.45	627	80.5	-	58.7	89.6	79	-
2.50	601	79.8	-	57.3	89.0	77	-
2.55	578	79.1	-	56.0	88.4	75	-
2.60	555	78.4	-	54.7	87.8	73	298000
2.65	534	77.8	-	53.5	87.2	71	288000
2.70	514	76.9	-	52.1	86.5	70	274000
2.75	495	76.3	-	51.0	85.9	68	264000
2.80	477	75.6	-	49.6	85.3	66	252000
2.85	461	74.9	-	48.5	84.7	65	242000
2.90	444	74.2	-	47.1	84.0	63	230000
2.95	429	73.4	-	45.7	83.4	61	219000
3.00	415	72.8	-	44.5	82.8	59	212000
3.05	401	72.0	-	43.1	82.0	58	202000
3.10	388	71.4	-	41.8	81.4	56	193000
3.15	375	70.6	-	40.4	80.6	54	184000
3.20	363	70.0	-	39.1	80.0	52	177000
3.25	352	69.3	110.0	37.9	79.3	51	170000
3.30	341	68.7	109.0	36.6	78.6	50	163000
3.35	331	68.1	108.5	35.5	78.0	48	158000
3.40	321	67.5	108.0	34.3	77.3	47	152000
3.45	311	66.9	107.5	33.1	76.7	46	147000
3.50	302	66.3	107.0	32.1	76.1	45	143000
3.55	293	65.7	106.0	30.9	75.5	43	139000
3.60	285	65.3	105.5	29.9	75.0	-	136000
3.65	277	64.6	104.5	28.8	74.4	41	131000
3.70	269	64.1	104.0	27.6	73.7	40	128000
3.75	262	63.6	103.0	26.6	73.1	39	125000
3.80	255	63.0	102.0	25.4	72.5	38	121000
3.85	248	62.5	101.0	24.2	71.7	37	118000
3.90	241	61.8	100.0	22.8	70.9	36	114000
3.95	235	61.4	99.0	21.7	70.3	35	111000
4.00	229	60.8	98.2	20.5	69.7	34	109000
4.05	223	-	97.3	18.8	-	-	104000
4.10	217	-	96.4	17.5	-	33	103000
4.15	212	-	95.5	16.0	-	-	100000
4.20	207	-	94.6	15.2	-	32	99000
4.25	201	-	93.8	13.8	-	31	97000
4.30	197	-	92.8	12.7	-	30	94000
4.35	192	-	91.9	11.5	-	29	92000
4.40	187	-	90.7	10.0	-	-	90000
4.45	183	-	90.0	9.0	-	28	89000
4.50	179	-	89.0	8.0	-	27	88000
4.55	174	-	87.8	6.4	-	-	86000
4.60	170	-	86.8	5.4	-	26	84000
4.65	167	-	86.0	4.4	-	-	83000
4.70	163	-	85.0	3.3	-	25	82000
4.80	156	-	82.9	0.9	-	-	80000
4.90	149	-	80.8	-	-	23	-
5.00	143	-	78.7	-	-	22	-
5.10	137	-	76.4	-	-	21	-
5.20	131	-	74.0	-	-	-	-
5.30	126	-	72.0	-	-	20	-
5.40	121	-	69.8	-	-	19	-
5.50	116	-	67.6	-	-	18	-
5.60	111	-	65.7	-	-	15	-

ROCKWELL							BRINELL 500 kg. Load 10-mm. Ball
B Scale Scale	F Scale	15-T Scale	30-T Scale	E Scale	H Scale	A Scale	
74	99.0	-	66.0	-	-	46.0	118
72	98.0	84.0	65.0	-	-	45.0	114
70	97.0	83.5	63.5	99.5	-	44.0	110
68	95.5	-	62.0	98.0	-	43.0	107
66	94.5	82.0	60.5	97.0	-	42.0	104
64	93.5	81.5	59.5	95.5	-	41.5	101
62	92.0	-	58.0	94.5	-	40.5	98
60	91.0	-	56.5	93.0	-	39.5	95
58	90.0	79.5	55.0	92.0	-	38.5	92
56	89.0	79.0	54.0	90.5	-	-	90
54	87.5	-	52.5	89.5	-	37.0	87
52	86.5	77.5	51.0	88.0	-	36.0	85
50	85.5	77.0	49.5	87.0	-	35.0	83
48	84.5	-	48.5	85.5	-	34.5	81
46	83.0	75.5	47.0	84.5	-	33.5	-
44	82.0	75.0	45.5	83.5	-	32.5	78
42	81.0	-	44.0	82.0	-	31.5	76
40	79.5	73.5	43.0	81.0	-	-	-
38	78.5	73.0	41.5	79.5	-	30.0	73
36	77.5	-	40.0	78.5	100.0	29.0	-
34	76.5	71.5	38.5	77.0	99.0	28.0	70
32	75.0	71.0	37.5	76.0	98.5	27.5	-
30	74.0	70.5	36.0	75.0	-	26.5	67
28	73.0	-	34.5	73.5	97.0	25.5	66
26	72.0	69.0	33.0	72.5	-	24.5	65
24	70.5	68.5	32.0	71.0	95.5	24.0	-
22	69.5	-	30.5	70.0	95.0	23.0	-
20	68.5	-	29.0	68.5	-	22.0	-
18	67.0	66.5	27.5	67.5	93.5	-	-
16	66.0	66.0	26.0	66.5	-	20.5	-
14	65.0	-	25.0	65.0	92.0	-	-
12	64.0	64.5	23.5	64.0	91.5	-	-
10	63.0	64.0	22.0	62.5	90.5	-	57
8	61.5	63.5	20.5	61.5	90.0	-	-
6	60.5	-	19.5	60.5	-	-	-
4	59.5	62.0	18.0	59.0	88.5	-	-
2	58.0	61.5	16.5	58.0	-	-	54
0	57.0	-	15.0	57.0	87.0	-	53

ROCKWELL HARDNESS SCALES

Scale	Major Load, Kg.	Indenter	Use of Scale
A	60	Diamond cone	Extremely hard material such as tungsten carbide or hard sheet material too thin for heavy load.
B	100	1/16" ball	Materials of B 0 to B 100 hardness.
C	150	Diamond cone	Materials of C 20 to C 70 hardness.
E	100	1/8" ball	Very soft materials such as bearing metals.
F	60	1/16" ball	Very soft materials such as bearing metals.
H	60	1/8" ball	Very soft materials such as bearing metals.

ROCKWELL SUPERFICIAL HARDNESS SCALES

15-N	15	Diamond cone	Materials comparable in hardness of C 20 to C 70.
15-T	15	1/16" ball	Materials comparable in hardness of B 0 to B 100.
30-T	30	1/16" ball	Materials comparable in hardness of B 0 to B 100.

Table 7. Sheet Gauges

	STEEL SHEETS		GALVANIZED SHEETS		STAINLESS STEEL SHEETS			ALUMINUM SHEETS	
					Wt., Lb. per Sq. Ft.				
Gauge No.	Weight Lb. Per Square Foot	Thick-ness in Inches	Weight Lb. per Square Fit	Thickness in Inches	Straight Chromium (400 Series)	Chromium Nickel (300 Series)	Approx. Thick-ness in lathes	Weight Lb. per Sq. Ft. (1100)	Thick-ness in Inches
38	.25000	.0060						.0558	.0039
37	.26562	.0064						.0627	.0044
36	.28125	.0067						.0705	.00500
35	.31250	.0075						.0791	.0056
34	.34375	.0082						.0888	.00630
33	.37500	.0090						.0998	.00701
32	.40625	.0097	.56250	.0134	.3708	.3780	.010	.1121	.00795
31	.43750	.0105	.59375	.0142	.4506	.4594	.011	.1259	.00893
30	.50000	.0120	.65625	.0157	.5150	.5250	.013	.1410	.0100
29	.56250	.0135	.71875	.0172	.5794	.5906	.014	.1593	.0113
28	.62500	.0149	.78125	.0187	.6438	.6562	.016	.1777	.0126
27	.68750	.0164	.84375	.0202	.7081	.7218	.017	.2002	.0142
26	.75000	.0179	.90625	.0217	.7725	.7875	.019	.2242	.0159
25	.87500	.0209	1.03125	.0247	.9013	.9187	.022	.2524	.0179
24	1.0000	.0239	1.15625	.0276	1.0300	1.0500	.025	.2834	.0201
23	1.1250	.0269	1.28125	.0306	1.1587	1.1813	.028	.3187	.0226
22	1.2500	.0299	1.40625	.0336	1.2875	1.3125	.031	.3567	.0253
21	1.3750	.0329	1.53125	.0366	1.4160	1.4437	.034	.4019	.0285
20	1.5000	.0359	1.65625	.0396	1.5450	1.5750	.038	.4512	.0320
19	1.7500	.0418	1.90625	.0456	1.8025	1.8375	.044	.5062	.0359
18	2.0000	.0478	2.15625	.0516	2.0600	2.1000	.050	.5682	.0403
17	2.2500	.0538	2.40625	.0575	2.3175	2.3625	.056	.6387	.0453
16	2.5000	.0598	2.65625	.0635	2.5750	2.6250	.063	.7163	.0508
15	2.8125	.0673	2.96875	.0710	2.8968	2.9531	.070	.8051	.0571
14	3.1250	.0747	3.28125	.0785	3.2187	3.2812	.078	.9038	.0641
13	3.7500	.0897	3.90625	.0934	3.8625	3.9375	.094	1.015	.0720
12	4.3750	.1046	4.53125	.1084	4.5063	4.5937	.109	1.139	.0808
11	5.0000	.1196	5.15625	.1233	5.1500	5.2500	.125	1.279	.0907
10	5.6250	.1345	5.78125	.1382	5.7937	5.9062	.141	1.437	.1019
9	6.2500	.1495	6.40625	.1532	6.4375	6.5625	.156	1.613	.1144
8	6.8750	.1644	7.03125	.1681	7.0813	7.2187	.172	1.812	.1285
7	7.5000	.1793						2.035	.1443
6	8.1250	.1943						2.284	.1620
5	8.7500	.2092						2.565	.1819
4	9.3750	.2242						2.881	.2043
3	10.000	.2391						3.235	.2294

Table 8. Millimeters Converted to Decimal and Fractional Inches

Milli. meters	Fractional Decimal Inches	Inches (to nearest 64th)	Milli- Meters	Fractional Decimal. Inches	Inches (to nearest 64th)	Milli- meters	Fractional Decimal Inches	Inches (to nearest 64th)
1	.0394	3/64	34	1.339	1 11/32	67	2.638	2 41/64
2	.0787	5/64	35	1.378	1 3/8	68	2.677	2 43/64
3	.1181	1/6	36	1.417	1 27/64	69	2.717	2 23/32
4	.1575	5/32	37	1.457	1 29/64	70	2.756	2 3/4
5	.1969	13/64	38	1.496	1 1/2	71	2.795	2 51/64
6	.2362	15/64	39	1.535	1 17/32	72	2.835	2 53/64
7	.2756	9/32	40	1.575	1 37/64	73	2.874	2 7/8
8	.3150	5/16	41	1.614	1 39/64	74	2.913	2 29/32
9	.3543	23/64	42	1.654	1 21/32	75	2.953	2 61/64
10	.3937	26/64	43	1.693	1 11/16	76	2.992	2 63/64
11	.4331	7/16	44	1.732	1 47/64	77	3.031	3 1/32
12	.4724	15/32	45	1.772	1 49/64	78	3.071	3 5/64
13	.5118	33/64	46	1.811	1 13/16	79	3.110	3 7/64
14	.5512	35/64	47	1.850	1 27/32	80	3.150	3 5/32
15	.5906	19/32	48	1.890	1 57/64	81	3.189	3 3/16
16	.6299	5/8	49	1.929	1 59/64	82	3.228	3 15/64
17	.6693	43/64	50	1.969	1 31/32	83	3.268	3 17/64
18	.7087	45/64	51	2.008	2 1/64	84	3.307	3 5/16
19	.7480	3/4	52	2.047	2 3/64	85	3.346	3 11/32
20	.7874	25/32	53	2.087	2 3/32	86	3.386	3 25/64
21	.8268	53/64	54	2.126	2 1/8	87	3.425	3 27/64
22	.8661	55/64	55	2.165	2 11/64	88	3.465	3 15/32
23	.9055	29/32	56	2.205	2 13/64	89	3.504	3 1/2
24	.9449	15/16	57	2.244	2 1/4	90	3.543	3 35/64
25	.9843	63/64	58	2.283	2 9/32	91	3.583	3 37/64
26	1.024	1 1/32	59	2.323	2 21/64	92	3.622	3 5/8
27	1.063	1 1/16	60	2.362	2 23/64	93	3.661	3 21/32
28	1.102	1 7/64	61	2.402	2 13/32	94	3.701	3 45/64
29	1.142	1 9/64	62	2.441	2 7/16	95	3.740	3 47/64
30	1.181	1 3/16	63	2.480	2 31/64	96	3.780	3 25/32
31	1.220	1 7/32	64	2.520	2 33/64	97	3.819	3 13/16
32	1.260	1 17/64	65	2.559	2 9/16	98	3.858	3 55/64
33	1.299	1 19/64	66	2.598	2 19/32	99	3.898	3 57/64
						100	3.937	3 15/16

Table 9: Conversion Factors

Acceleration	1 m/s^2	= 4.252 x 10^7 ft/h^2
Area	1 m^2	= 1550.0 in^2
		= 10.764 ft^2
Degree (angle)	1 radian	= 57.471 degree
Energy	1 J	= 9.4787 x 10^{-4} Btu
	1 kcal	= 3.968 Btu
Force	1 N	= .22481 lbf
Heat Flux	1 W/m^2	= .3171 Btu/hNft^2
Heat Transfer Coefficient	1 W/m^2NK	= 0.17612 Btu/hNft^{2}N°F
Heat Transfer Rate	1 W	= 3.4123 Btu/h
Length	1 m	= 39.370 in
		= 3.2808 ft
Mass	1 kg	= 2.2046 lbm
	1 lbm	= 16 oz
Mass Density	1 kg/m^3	= .062428 lbm/ft^3
Pressure and Stress	1 N/m^2	= .020886 lbf/ft^2
		= 1.4504 x 10^{-4} lbf/in^2
		= 4.015 x 10^{-3} inH_2O
		= 2.953 x 10^{-4} inHg
	1.1033 x 10^5 N/m^2	= 1 standard atmosphere
	1 x 10^5 N/m^2	= 1 bar
Temperature	1 K	= (5/9) °R
		= (5/9)(°F + 459.67)
		= °C + 273.15
Temperature Difference	1 K	= 1 °C
		= (9/5) °R = (9/5)°F
Thermal Conductivity	1 W/mNK	= .57782 Btu/hNftN°F
Thermal Resistance	1 K/W	= .52750 °F/hNBtu
Volume	1 m^3	= 6.1023 x 10^4 in^3
		= 35.314 ft^3
		= 264.17 gal
Volume Flow Rate	1 m^3/s	= 1.2713 x 10^5 ft^3/h
		= 2.1189 x 10^3 ft^3/min
		= 1.5850 x 10^4 gal/min

DSCC SPECIFICATION	BIRTCHER PART NUMBER
AA55563/1	35F-1M series
AA55563/3	35F-6M series
AA55563/4	35-6M series
AA55563/5	35F-7M series
AA55563/6	35-7M series
AA55563/7	35CF-1M series
AA55563/8	35C-1M series
AA55563/9	35CF-6M series
AA55563/10	35C-6M series
AA55563/11	35CF-7M series
AA55563/12	35C-7M series
AA55563/13	35-1634 series
AA55563/14	35-1635 series
AA55563/15	35-1636 series
AA55563/16	35-1637 series
84168	24 series
86092	25 series
88052	127 series
84103	40, 41 & 42 series
89064	40-5 & 42-5 series
86110	44 series
84191	71 series
83023	87-2, 87-3, 91-2, S-203
84101	94 Series

Note: AA55563/** replaces 85020 & 85021

Some part numbers not included in this catalog. Contact Factory.

Beryllium Copper - A metal alloy consisting principally of copper with a small amount of Beryllium (usually 1%-2%)

Board Mount - Where the PC board guide is mounted onto the PC board

Cam & Lobe Design - Method used to create clamping force using ridged arm and dimpled housing

Card Retainer - A device that securely holds a PC board in a chassis

Chassis Mount - Where the PC board guide is mounted directly onto the chassis or cold wall

Cold Wall or Cold Plate - The portion of the chassis that sinks heat from the card to the environment

Conduction - A mode of heat transfer in a stationary medium

Contact Intimacy - Direct PC board contact with the cold wall for maximum heat dissipation

DSCC - Defense Supply Center, Columbus.
(For 5998 documents)
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Columbus, OH 43215-5000
Ted 614-692-0562 Fax: 614-692-6939
E-mail: 5998_Documents@dscc.dta.mil

Datum - The starting point (zero) for dimensioning a part

Extractor - Hardware to disengage PC board from backplane interconnects

Extractor Flange - Extension on a guide housing to permit extractor engagement

Flared Entry - Opening of the PC board guide that permits ease of entry of PC board

Inconel - Specialty steel with oxidation resistance up to 1175 C combined with outstanding general corrosion resistance. Retains high-mechanical properties up to 700 C. High fatigue resistance and outstanding creep properties at high temperatures. Good mechanical properties also at low temperatures.

Injector - Hardware to assist insertion of PC board into backplane interconnects

Lever Actuated - A means to lock a PC board without tools required

LOK-TAINER® - PC board retainer using cam and lobe design to lock boards in plate

Normal Force - Force acting perpendicular to the long axis of a PCB retainer such as a WEDGE-LOK®

PCB - Printed Circuit Board

PC - Printed Circuit

PCB TAINER™ - PC board retainer using spring action design to hold boards in place

Retention Force - The force required to move a locked PC board that is not connected to a backplane. Units: lb. or oz.

Screw Actuated - A positive locking mechanism that requires a calibrated Torque wrench

Shock - A violent impact

Thermal Grease - A compound that reduces thermal resistance at interfaces

Thermal Resistance - Resistance to the flow of heat usually measured as a temperature drop across an interface. Units: °C per Watt per in.

Thermal Transfer - The passage of heat from PC board to chassis or heat sink

Thermocouple - A sensor that measures temperature

Torque - A measure of rotational force.
Units; in.-lb. or in.-oz.

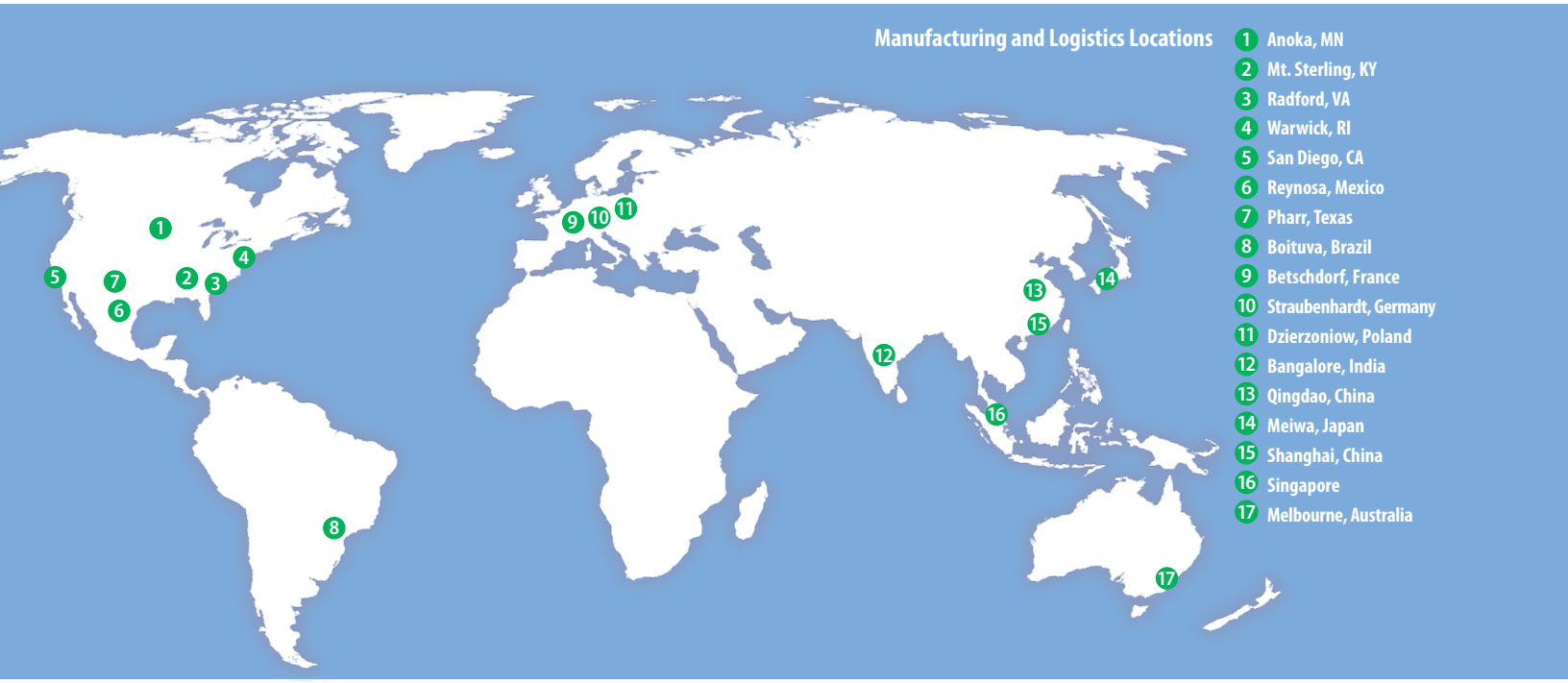
Vibration - Quick motion to and fro; oscillatory.

WEDGE-LOK® - PC board retainer using wedge configuration to provide a locking force

Zero Entry Force - No force is required to insert, or extract, a board into, or out of, a card guide or channel

About Pentair Technical Products

Pentair Technical Products, a Pentair global business unit, is the leading provider of worldwide product and service solutions for enclosing, protecting and cooling electrical and electronic systems. Its industry-leading brands—Hoffman®, Schroff®, McLean® Cooling Technology, Calmark®, Birtcher®, Aspen Motion Technologies™ and Taunus™ —provide a broad variety of standard, modified and engineered solutions to the commercial, communications, energy, general electronics, industrial, infrastructure, medical, and security and defense markets.



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