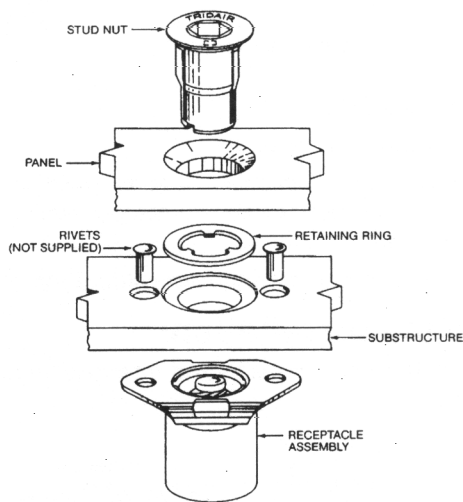


# Live Lock Structural Panel Fastener.

Because the size, range and scope of the Live Lock Structural Panel Fastener is so varied, it would be too cumbersome to include panel/substructure preparation and installation data for all configurations. Therefore, only the CA 1800/CA 18000 Series with 2-lug receptacle is shown in this handbook. Please refer to the Live Lock Structural Panel Fastener Catalog No. 3500 for data regarding the other versions or consult your engineering department.

## Typical Live Lock Fastening System:



Not shown are optional stud hold-out grommets and cages designed for applications where stud hold-out and bottom flush condition is required. Shims are also available if required.

## General Design Features:

- Spring-loaded ratchet design insures positive locking action and vibration resistance without relying on prevailing torque.
- Exceptionally high cycle life.
- Multiple lead thread permits rapid installation and removal.
- Positive stud nut retention and some versions feature hold-out to facilitate curved door handling.
- Receptacle offers radial float to accommodate misalignment and some versions can be removed without removing rivets.
- Nominal thread size range: .1120-40 through .2500-28. Encapsulated receptacle make Live Lock an excellent candidate for electronic and avionic applications.

## Important 'Do's and Dont's'.

1. **There Must Be a Counterbore.**  
Counterbore is required to keep retaining ring from being crushed and to spin freely at clamp-up.
2. **Prepare Counterbore Per Specification.**  
Make sure the retaining ring counterbore has the proper depth and diameter as specified in this handbook for CA1800/CA1800 Series. (For other series dimensions refer to our Live Lock Catalog No. 3500.) Also, the counterbore must be concentric with through hole. Radius in counterbore is .010 max.
3. **Remove Any Foreign Material From Counterbore.**  
Remove any gasket material, metal chips or other foreign debris from retaining ring recess which could keep the retaining ring from spinning freely.
4. **Use Approved Installation Tools.**  
Use only approved installations tools. Use of "home made" tools could damage both the fastener as well as the parent material.
5. **Install Within Recommended Torque Tolerance at Clamp-Up.**  
Over-torquing of the stud nut at clamp-up could deform both fastener and the parent material. Under-torquing would not provide adequate pre-load to joint. Please consult your engineering department or Fairchild Fasteners.
6. **Prepare Countersink Per Specifications For Flush-Mounting Head Styles.**  
Countersinks prepared too shallow or too deep could damage parent material and fastener.
7. **Rivet Holes.**  
Drill rivet holes in line with center hole otherwise stud nut may not engage threads in receptacle.
8. **Rivet Installations.**  
Install rivets flush to surface of substructure. Panel and substructure must be flush at clamp-up unless spacer or grommet is used.
9. **Through Hole Alignment.**  
Be sure to align through holes in both panel and substructure for proper fit of stud nut and receptacle.
10. **If Head Style Has Hexagon Socket Configuration Use Quality Hexagon Key.**
  - Select quality hexagon key. (see Page 16).
  - Insert tool to full depth of hexagon recess.
  - Do not apply side load to hexagon key.

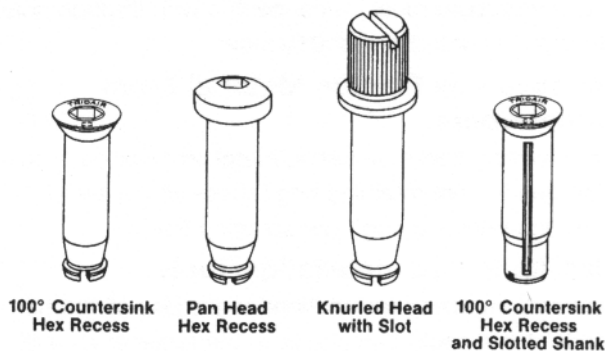
**11. Keep Receptacle Free Of Dirt Or Other Foreign Material.**

Excessive dirt or other foreign material in receptacle can restrict its performance.

**Stud Nut**

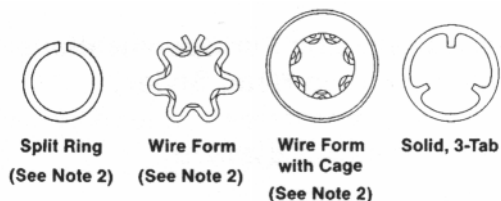
Stud nut is held in the panel by a retaining ring. Care must be taken to choose the proper length stud nut to suit specific grip range.

**Typical Stud Nuts:**



1. Multiple lead thread for quick intallation and operation.
2. Flush or protruding head styles with various tool or hand operated configuration.
3. Various thread sizes available.

**Typical Retaining Rings:**

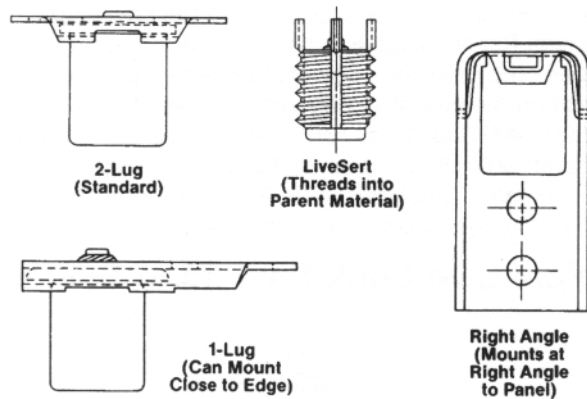


1. Captivates stud nut to panel to prevent:
  - Loss of stud nut
  - Installation of incorrect stud nuts into wrong hole.
  - Foreign objects damage from stud nut.
2. Split Ring, Wire Form and Wire Form with Cage are sold mounted on an installation tool (50 retaining rings per tool) to insure proper orientation at installation. These retaining rings are coined on one side and must be installed with coined side facing toward head of stud nut.

**Note:** Care should be taken not to damage these rings. The retaining ring cavity should always be checked to make sure it is clear of debris. If a ring is ever damaged, it should be replaced immediately using the correct tool.

**Typical Receptacles (Side Views):**

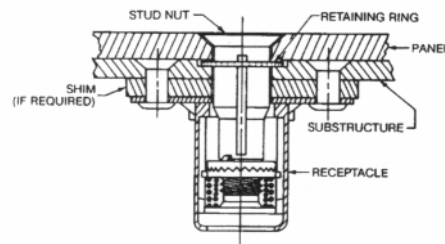
**Typical Receptacles (Side Views):**



1. Allows radial float.
2. Exceptionally high cycle life.
3. Spring loaded ratchet design insures positive loading action and vibration resistance without relying on prevailing torque.
4. Some versions can be removed without removing rivets.

**Compele Installation:**

Receptacle is riveted in place and retaining ring is captivated.

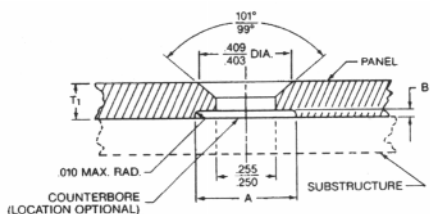


# Panel/Substructure Preparation and Installation Data.

Because the size, ranges and scope of the Live Lock Structural Panel Fastener is so varied, it would be too cumbersome to include panel/substructure preparation and installation data for all configurations. Therefore, only the CA1800/CA18000 Series with 2-lug receptacle is shown in this handbook. Please refer to the Live Lock Structural Panel Fastener Catalog No. 3500 for data regarding the other versions or consult your engineering department.

The following is for CA 1800/CA18000 Series ONLY:

## Panel: Flush Head Stud Nuts

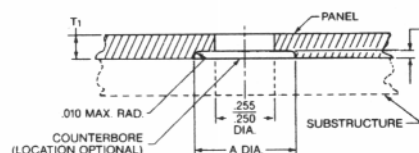


Type of Retaining Ring	Stud Nut Ref. Part No.	A Dia. Min.	B C'Bore Depth Min.
Wire Form	CA1800 Series	.468	.025
Wire Form Caged		.484	.045
Solid 3-Tabs	CA18121-( ) Series CA18161-( ) Series	.406	.030

### Notes:

1. Locate and drill .255 Dia. hole through panel.
2. Countersink  $101^\circ$  to  $99^\circ$  to .403 Dia.
3. If " $T_1$ " is .135 or greater, counterbore panel to "A" Dia. by "B" depth. Preferred location for counterbore retaining ring recess is in panel " $T_1$ ".
4. Panel " $T_1$ " = .090 min. when counterbore is located in substructure.

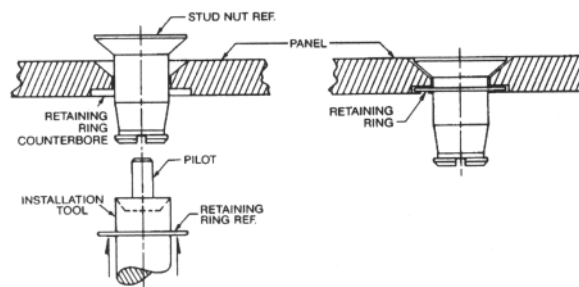
## Panel: Protruding Head Stud Nuts



### Notes:

1. Refer to table on Page 29.
2. Locate and drill .255 Dia. hole through panel.
3. If " $T_1$ " is .090 or greater, counterbore panel to "A" Dia. by "B" depth. Preferred location for counterbored retaining ring recess is in panel " $T_1$ ".

## Retaining Ring Installation:

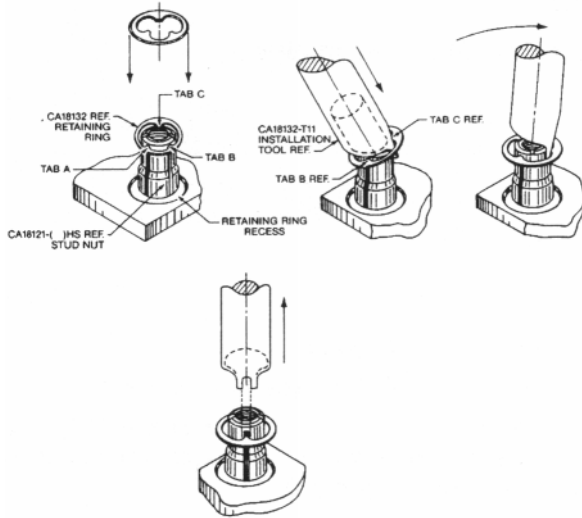


### Wire Form and Wire Form Caged Retaining Rings

To install CA1825 wire form or CA1826-1 wire form caged retaining ring on stud nut, insert pilot of tool completely into stud nut threads and slide the retaining ring onto the stud nut.

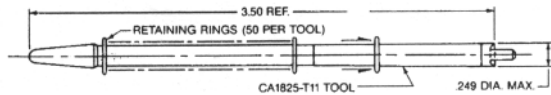
### Solid, 3-Tabs Retaining Ring

To install CA18132 solid 3-tab retaining ring on stud nut part number CA18121-( ) Series of CA18161-( ) Series, follow steps I through III:



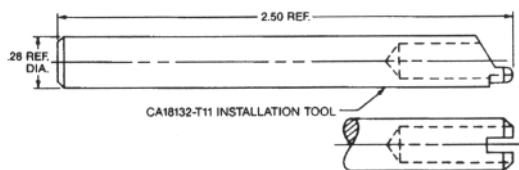
- Step I:** Install Tabs "A" and "B" retaining ring into two of the stud nut grooves.
- Step II:** Lower tool straddling tab "C" as shown, then swing tool to an upright position to strap tab "C" into third groove of stud nut.
- Step III:** Remove tool from assembly.

**Installation Too for CA1825 or CA1826-1 Retaining Rings**

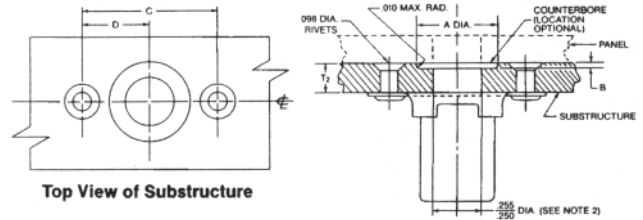


- Notes:**
- Above retaining rings can be used with CA1800 series studs nuts only.
  - Fifty (50) retaining rings are sold mounted on an installation tool to insure proper installation.

**Installation Tool for CA18132 Retaining Ring.**



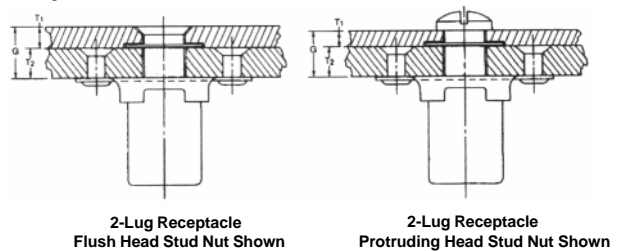
**Substructure: 2-Lug Receptacles**



Receptacle Part No.	C	D Ref.
CA1810 CA1810C	.689	.343
CA18157 CA18157C	.685	
CA18193	.752 .748	.375

- Notes:**
- Refer to table on Page 29.
  - Locate and drill  $\frac{.255}{.250}$  Dia. hole through substructure.
    - To allow for misalignment, open through hole to .250 plus min. receptacle float. In addition, if counterbore is located in substructure, open "A" Dia. plus min. receptacle float.
  - If required, counterbore to "A" Dia. by "B" depth (see panel preparation for flush or protruding head, Note 3, Pages 29 or 30).
  - Locate, drill and countersink two holes for flush mount rivets (not supplied). Holes must be symmetrical to  $\frac{.255}{.250}$  Dia. hole.
  - Rivet receptacle in place.

**Complete Installation:**



## To Select Stud Nut Dash Number:

- Determine "G" Thickness:  
**2-Lug Receptacle:** "G" = "T1 + "T2," plus shim, any compressed gasketing material, paint or other finishes.
- Locate "G" grip range in one of the following tables.

Stud Nut Dash Number Selection***						
L	"G" Grip Range	CA1820**	CA1832**	CA1821**	CA1824**	CA1828**
		Dash No.	Dash No.	Dash No.	Dash No.	Dash No.
.375*	.098-.155	-0	-0	-0*	-0*	-0*
.437	.156-.250	-1	-1	-1	-1	-1
.531	.251-.343	-2	-2	-2	-2	-2
.625	.344-.437	-3	-3	-3	-3	-3
.718	.438-.531	-4	-4	-4	-4	-4
.812	.532-.625	-5	-5	-5	-5	-5
.906	.626-.718	-6	-6	-6	-6	-6
1.000	.719-.812	-7	-7	-7	-7	-7

\*(-) "L" dimension is .343 for part numbers CA1821, CA1824 and CA1828  
 \*\*If "G" is .097 or less shim is required. Please contact your engineering department or Fairchild Fasteners, Tridair Products.

Stud Nut Dash Number Selection***				
L	"G" Grip Range	CA18121	CA18161	
		Dash No.	Dash No.	Dash No.
.430	.150-.220	-1HS	-1HS	-1HS
.500	.221-.290	-2HS	-2HS	-2HS
.570	.291-.360	-3HS	-3HS	-3HS
.640	.361-.430	-4HS	-4HS	-4HS
.710	.431-.500	-5HS	-5HS	-5HS
.780	.501-.570	-6HS	-6HS	-6HS
.850	.571-.640	-7HS	-7HS	-7HS
.920	.641-.710	-8HS	-8HS	-8HS
.990	.711-.780	-9HS	-9HS	-9HS
1.060	.781-.850	-10HS	-10HS	-10HS

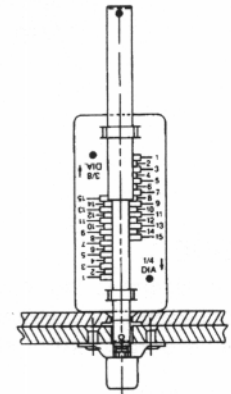
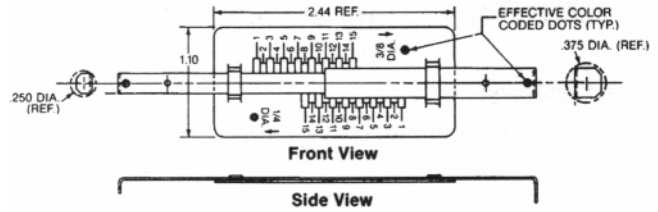
\*\*\* For "G" greater or lesser than grip shown, contact your engineering department or Fairchild Fasteners Tridair Products.

## Selecting Proper Grip Range For Stud Bolt:

Different grip ranges are sometimes used in the same panel, or stud bolts sometimes need to be replaced. It is important that stud nuts be selected with the proper grip range. This range may be selected using a reading from the grip gage shown here. Whenever stud nut length selection shown on gage conflicts with engineering drawing, gage measurement will dictate. The gage may be obtained from Fairchild Fasteners, Tridair Products.

### Typical Grip Gage:

Important: This grip gage only applies to slotted shank stud nuts!



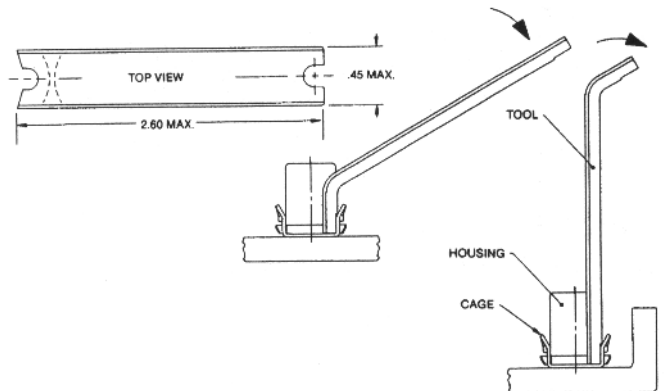
NOTE: BOTH PANEL AND SUBSTRUCTURE, PLUS ANY GASKET MATERIAL, MUST BE IN CONTACT AS SHOWN BEFORE USING GAGE.

## To Use Grip Gage:

- Place gage in through hole of both panel and substructure and seat in receptacle.
- No gap is permitted between panel and substructure while measuring, unless "Form-In-Place" gasket is used.
- Grip gage measures total grip ( $T_1 + T_2 +$  "Form-In-Place" gasket, if used).
- Grip indicator number indicates correct stud nut dash number to be used.
- If bordering grip condition, use lower dash number.

## Receptacle Removal:

Use Tridair tools to remove receptacle.



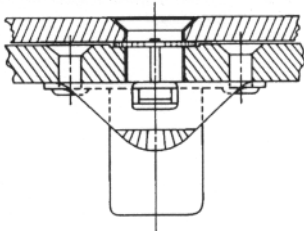
- Insert tool between cage and housing or nut straddling one lug as shown.
- Apply downward pressure on tool to snap housing or nut out of cage.



# Problems/Causes/ Solutions

## 1. Problem

Retaining ring is deformed during clamp-up.



### Cause:

Counterbore is too shallow or excessive radius in corner of counterbore; or counterbore diameter is undersize; or counterbore is out of alignment with through hole.

### Solution:

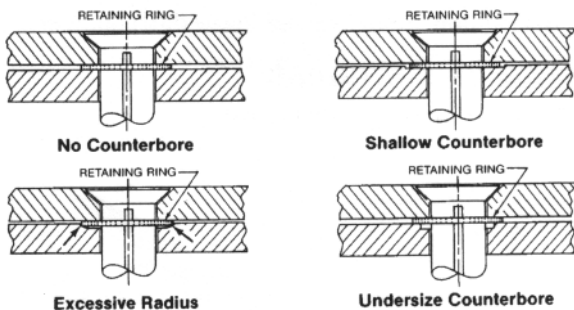
Rework counterbore as shown on Page 29.

## 2. Problem:

Retaining ring breaks and stud falls free from panel.

### Cause:

Solid, 3-tab ring becomes captive between panel and substructure and will not turn with stud nut, causing retaining ring tabs to shear off. Counterbore is too shallow, or excessive radius in corner of counterbore; or counterbore diameter is undersize; or counterbore is out of alignment with through hole.

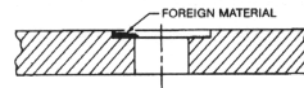


### Solution:

Rework counterbore as shown on Page 16.

## 3. Problem:

Retaining ring breakage.



### Cause:

Metal chips or gasket material in counterbore.

### Solution:

Clean out all foreign material from counterbore.

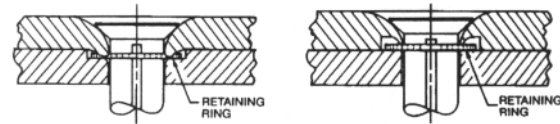
## 4. Problem

Head breaking through panel and top panel being dimpled into retaining ring counterbore. Possible retaining ring damage.

### Cause:

Excessive torque being applied to stud nut during clamp-up.

Or, deep counterbore in panel weakens panel and allows panel to deform under normal pressure.



### Solution:

Repair panel using a dimpled washer or grommet. Contact your engineering department of Fairchild Fasteners Tridair Products, for recommended torque values.

## 5. Problem:

Stud nut head protrudes above surface of panel (flush head style).

### Cause:

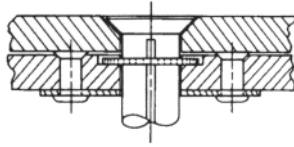
Shallow countersink.

### Solution:

Rework countersink to proper dimensions. See page 29-30 for CA1800/CA18000 series only or contact your engineering department or Fairchild Fasteners Tridair Products.

**6. Problem**

Panels do not mate correctly.



**Cause:**

Head of rivet protrudes above surface of substructure.

**Solution:**

Rework rivet countersink as shown on Page 31.

**7. Problem:**

Hexagon recess in stud bolt damaged.

**Cause:**

Hexagon key or bit does not dimensionally conform to ANSI B18.3 requirements and strength level is too low.

**Solution:**

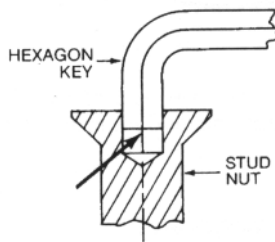
Use only hexagon key or bit that conforms to ANSI B18.3 Requirements. See Page 16 for selector guide.

**Or, an other Cause:**

Excessive torque applied during clamp-up.

**This Solution:**

Control Maximum installation torque.



**Or, a third Cause:**

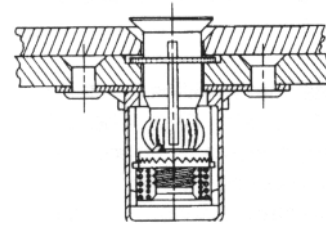
Hexagon key not pushed to bottom of hexagon recess.

**This Solution:**

Seat key bit fully into hexagon recess before applying torque.

**8. Problem:**

End of stud nut deforms during clamp-up.



**Cause:**

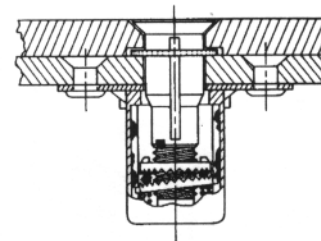
Stud nut length is too long.

**Solution:**

See Page 33 for CA1800/CA18000 series only or contact your engineering department or Fairchild Fasteners Tridair Products.

**9. Problem:**

Locking mechanism in receptacle is jamming.



**Cause:**

Excessive dirt or other foreign material hindering locking mechanism.

**Solution:**

Blow out foreign material using low air pressure; or if using a receptacle that is replaceable, it can be changed.