## Special Notes:

1. **All fasteners features in this catalog are designed to function as a fastening system. Therefore, the integrity of each fastening system is guaranteed only as long as all elements of each fastening system are manufactured by Fairchild Fasteners.**

   **The substitution of components of other than those manufactured by Fairchild Fasteners can result in degradation of system performance even though such components may be dimensionally interchangeable.**

2. **Not all part numbers listed in this catalog are "stock" items. Please contact Fairchild Fastners for availabiltiy.**

Fairchild Fasteners

SECTION

# SELECTOR GUIDE/INDEX

# Live Lock
# Structural Panel Fasteners

Provide high-strength, quick operation and exceptionally high cycle for use on high performance aircraft, on elctronic, and on avionic applications. There are many more types and styles available which are not featured in this catalog. Contact the Technical Sales Group.

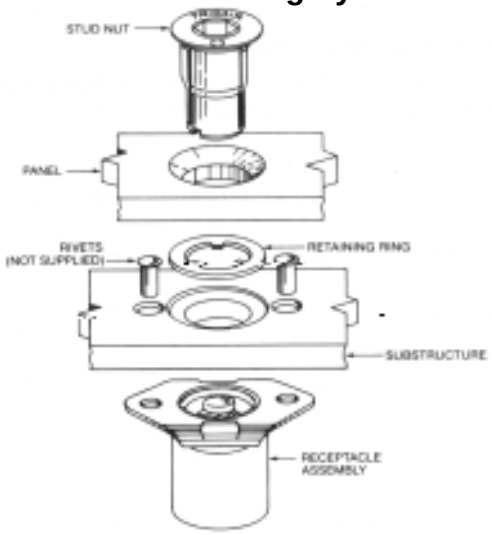
**Features:**

- Low prevailing installation and removal torques required, yet provides high vibration resistance.
- Receptacles offer radial float; most versions can be replaced without removing rivets.
- Positive stud nut retention.
- Stud nut hold-out featrue available.
- Locking element is totally encapsulated.
- Total CRES (corrosion resistant) configurations available.

**Index**



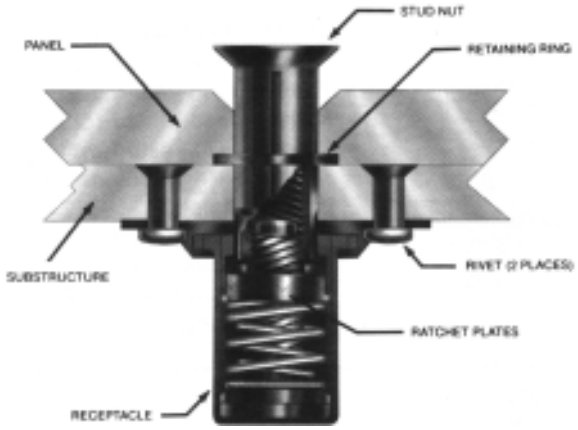
## Typical Live Lock Fastening System:




**Exploded View**

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.

## Locking Mechanism Design Principle: Spring Loaded Ratchet Plates.




**Typical Installation**

Spring-loaded ratchet design insures positive locking action and vibration resistance without relying on prevailing torque. Spring(s) nullify effects of resonant vibrations.

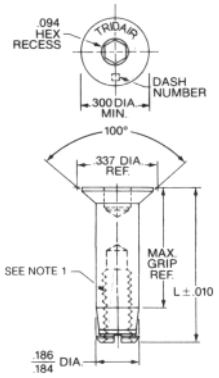
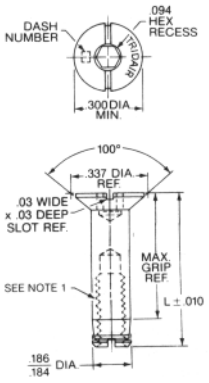
# Live Lock
# CA2000 Series.

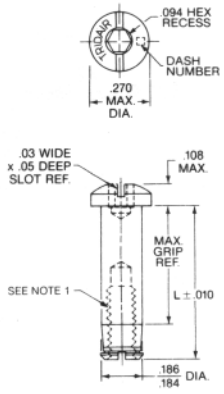
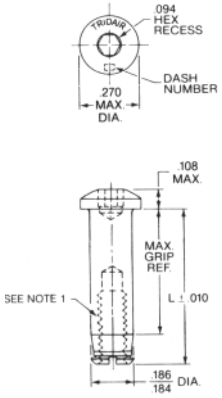
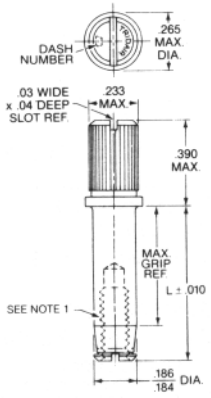
## Stud Nuts.

**Thread Size: .1120-40, 2 Lead**

**Notes:**

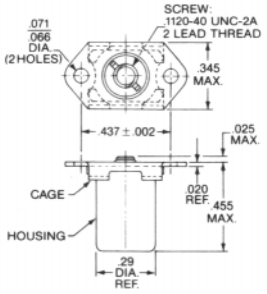
1. Thread size: .1120-40 UNC-2B, modified minor diameter, 2 lead thread.
2. Recommended tightening torque: 15 inch punds.
3. Stud Nut part numbers shown are basic part numbers only. See Ordering Information on page 9 for required dash number, weight information and "L" dimension.

| | Flush Head | |
|---|---|---|
| |  **100° C'Sink Hex Recess** |  **100° C'Sink Hex Recess Slotted** |
| Material | Part No. | Part No. |
| Material: 300 Series CRES<br>Finish: Passivated per QQ-P-35 | CA2020-( ) | CA2023-( )S |
| Material: A-286 CRES<br>Finish: Passivated per QQ-P-35 | CA20000T-( ) | -- |
| Material: Alloy Steel<br>Heat Treat: Per MIL-H-6875<br>Finish: Cadmium Plated per QQ-P-416, Type II, Class 2 | -- | CA2023-( ) |

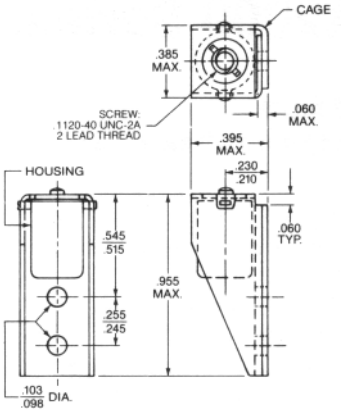
| | Protruding Head | | |
|---|---|---|---|
| |  **Pan Head Hex Recess Slotted** |  **Pan Head Hex Recess** |  **Knurled Head Slotted** |
| Material | Part No. | Part No. | Part No. |
| Material: 300 Series CRES<br>Finish: Passivated per QQ-P-35 | CA2021-( ) | CA2022-( ) | CA2024-( ) |
| Material: A-286 CRES<br>Finish: Passivated per QQ-P-35 | -- | CA20043T-( ) | -- |

# Live Lock
# CA2000 Series.

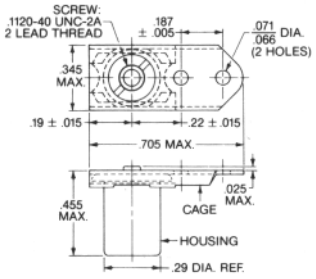
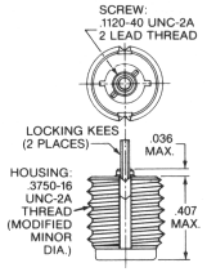
## Receptacles.




**2-Lug**
**.020 Radial Float**




**Right Angle Mount**
**.020 Radial Float**

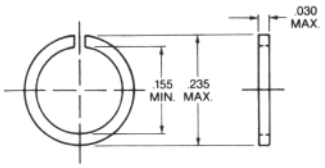
| Material | Part No. | Approx. Weight lbs./ea. | Part No. | Approx. Weight lbs./ea. |
|---|---|---|---|---|
| Cage: 300 Series CRES<br>Screw: A-286 CRES<br>Housing: 300 Series CRES<br>Heat Treat:<br>Screw: Per MIL-H-6875<br>Finish: Cage and Housing: Passivated per QQ-P-35<br>Screw: Dry Film Lubed | CA2010 | .0059 | Ca2014 | .0106 |
| Same as above except Cage Finish: Cadmium Plated per QQ-P-416, Type II, Class 2 | CA2010C | | — | — |
| |  <br>**1-Lug**<br>**.020 Radial Float** | |  <br>**LiveSert*** | |
| Material | Part No. | Approx. Weight lbs./ea. | Part No. | Approx. Weight lbs./ea. |
| Cage: 300 Series CRES<br>Screw: A-286 CRES<br>Housing: 300 Series CRES<br>Heat Treat:<br>Screw: Per MIL-H-6875<br>Finish: Cage and Housing: Passivated per QQ-P-35<br>Screw: Dry Film Lubed | CA2044 | .0062 | -- | -- |
| Same as above except Cage Finish: Cadmium Plated per QQ-P-416, Type II, Class 2 | CA2044C | | -- | -- |
| Screw: A-286 CRES<br>Housing: 300 Series CRES<br>Heat Treat:<br>Screw: Per MIL-H-6875<br>Finish: Housing: Passivated per QQ-P-35<br>Screw: Dry Film Lubed | -- | -- | CA2058 | .0068 |

*LiveSerts with radial float are available; contact Technical Sales.

# Live Lock
# CA2000 Series.

## Retaining Rings.

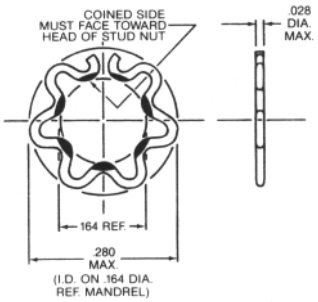
### CA2025 Split Ring




| Material | Part No. |
|---|---|
| 17-7PH CRES<br>Heat Treat: Per MIL-H-6875<br>Finish: Passivated per QQ-P-35 | CA2025 |
| Same as CA2025 except Finish:<br>Black Oxide per MIL-C-13924 | CA2025B |
| Same as CA2025 except Finish:<br>Cadmium Plated per QQ-P-416, Type II , Class 2 | CA2025C |

**Weight:**
.0098 lbs. per hundred (approx.)

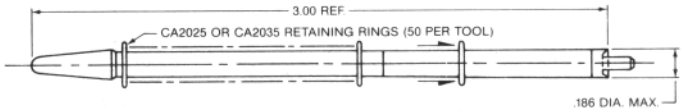
### CA2035 Wire Form Ring




**Material:**
Elgiloy Wire
**Heat Treat:**
Stress relieved and spring tempered
**Finish:**
Passivated per QQ-P-35
**Weight:**
.0062 per hundred (approx.)

**Notes:**
1. Use CA2035 ring when through hole in substructure "$T_2$" exceeds .218 diameter. See hole preparation on Pages 6 and 7.
2. **IMPORTANT:** Coined side of ring must face torward head of stud nut.

### Installation Tool for CA2025 or CA2035 Retaining Rings




**Note:** Fifty (50) retaining rings are sold mounted on an installation tool to insure proper installation.

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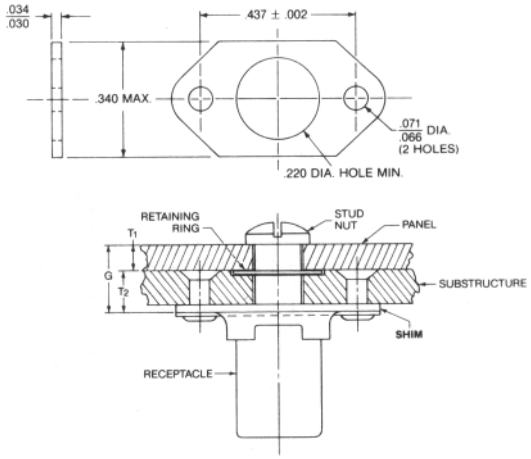
## Shim.

### CA2077




**Typical Installation**
**Showing Proper Use of Shim**

**Material:**
Aluminum per QQ-A-250
**Finish:**
Anodized per MIL-A-8625
**Weight:**
.0003 lbs. each (approx.)

**Notes:**
1. For use with CA2010 or CA2010C receptacle if required.
2. Shim is required when "G" Grip Range is less than min. grip of stud nut (see ordering information on Page 9).

# Live Lock
# CA2000 Series.

## Panel/Substructure Preparation and Installation Data.

### Panel:
**Flush Head Stud Nuts**

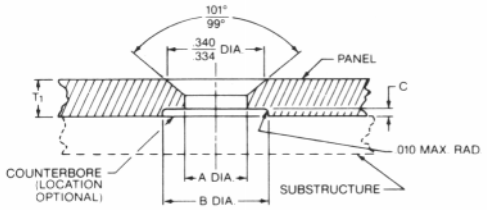



**Table I**

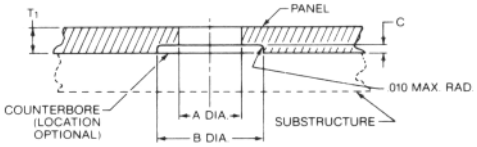
| Basic Retaining Ring Part No. | A Dia. | B Dia. | C Depth |
|---|---|---|---|
| CA2025 | .189<br>.187 | .255<br>.245 | .035<br>.030 |
| CA2035 | | .317<br>.307 | .025<br>.020 |

1. Locate and drill “A” diameter hole through panel.

2. Countersink $\frac{101^{\circ}}{99^{\circ}}$ to $\frac{.340}{.334}$ diameter.

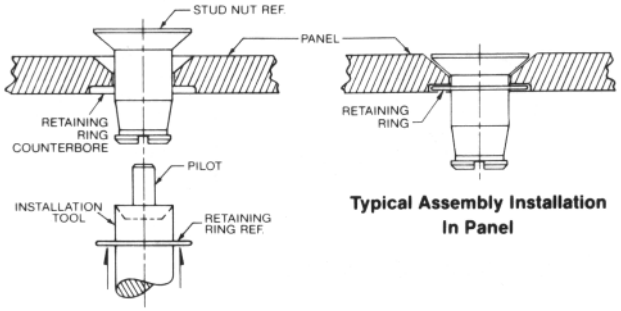
3. If “$T_1$” is greater than .090, counterbore panel to “B” diameter by “C” depth. Preferred location for counterbored retaining ring recess is in panel “$T_1$”.

### Panel:
**Protruding Head Stud Nuts**



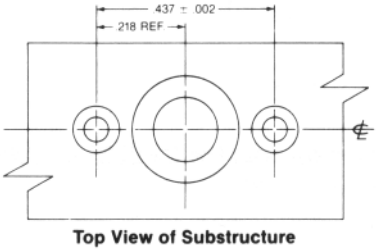

1. Refer to Table I above.
2. Locate and drill “A” diameter hole through panel.
3. If “$T_1$” is greater than .060, counterbore panel to “B” diameter by “C” depth. Preferred location for counterbored retaining ring recess is in panel “$T_1$”.

**Retaining Ring Installation**




To install CA2025 or CA2035 retaining ring on stud nut, insert pilot of tool completely into stud nut threads and slide the retaining ring onto the stud nut.

### Substrucutre:
**2-Lug Receptacle**




**Top View of Substructure**

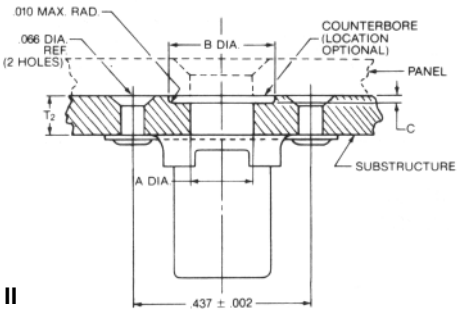



**Table II**

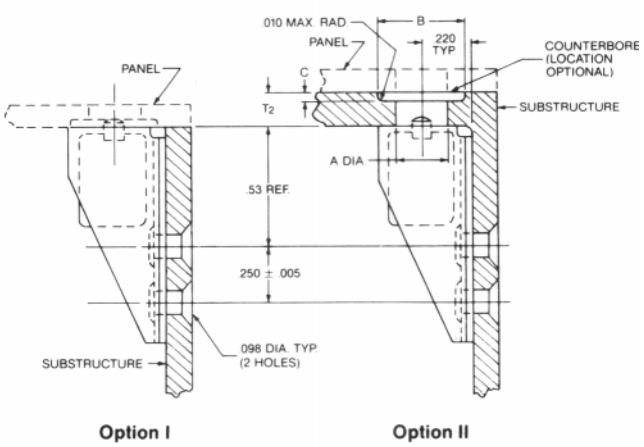
| Application | A Dia. | B Dia. | C Depth | Basic Retaining Ring Part No. |
|---|---|---|---|---|
| Shear | .189<br>.187 | .255<br>.245 | .035<br>.030 | CA2025 |
| Allow for Panel misalignment | .210 Max. | .266 Min. | | |
| Allow for maximum panel misalignment | | .328 Min. | .025<br>.020 | CA2035 |

1. Locate and drill “A” diameter hole through substructure.
2. If required, counterbore to “B” diameter by “C” depth. (See flush head or protruding head, Note 3 on this page.)
3. Locate, drill and countersink two holes for flush mount rivets (not supplied). Holes must be symmetrical to “A” diameter.
4. Rivet receptacle in place.

# Live Lock
# CA2000 Series.

## Panel/Substructure Preparation and Instllation Data (cont'd.).

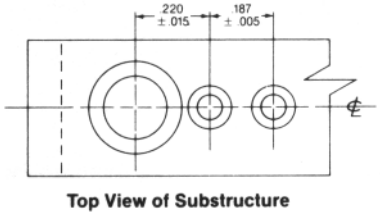
### Substructure:
**Right Angle Receptacle**



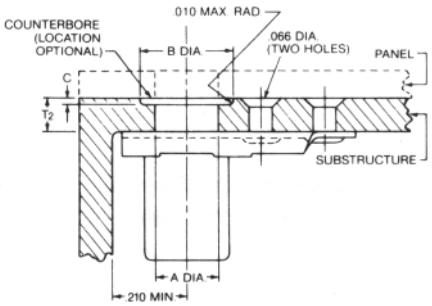

**Option I Installation:**
1. Requires retaining ring counterbore recess to be in panel.
2. Locate and drill two holes for rivets (not supplied).
3. Rivet receptacle in place.

**Option II Installation:**
1. Refer to Table II on Page 6.
2. Locate and drill "A" diameter hole through substructure.
3. If required, counterbore to "B" diameter by "C" depth (see flush or protruding head, Note 3, Page 6).
4. Locate and drill two holes for rivets (not supplied).
5. Rivet receptacle in place.

### Substructure:
**1-Lug Receptacle**




Top View of Substructure




**Notes:**
1. Refer to Table II on Page 6.
2. Locate and drill "A" diameter hole through substrucutre.
3. If required, counterbore to "B" diameter by "C" depth (see panel preparation for flush or protruding head, Page 6, Note 3.)
4. Locate, drill and countersink two holes for flush mount rivets (not supplied). Holes must be symmetrical to "A" diameter.
5. Rivet receptacle in place.

# Live Lock
# CA2000 Series.

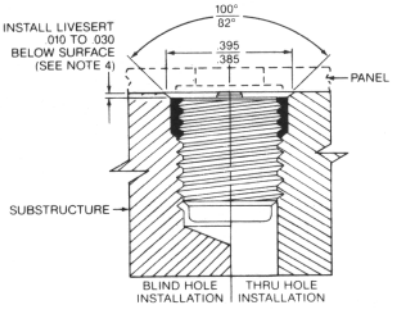
## Panel/Substructure Preparation and Installation Data (cont'd.).

### Substructure:
**LiveSert Receptacle**

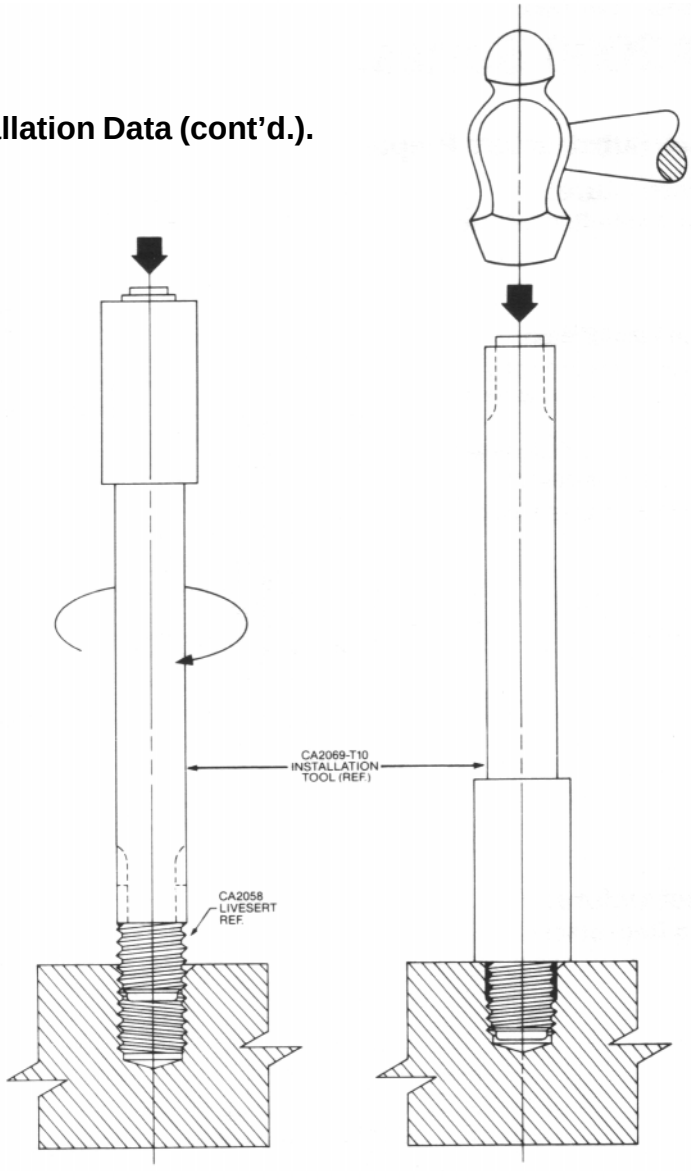
**Notes:**
1. Locate and drill $\frac{.336}{.331}$ diameter to .437 minimum depth.

2. Countersink $\frac{100^\circ}{82^\circ}$ to $\frac{.395}{.385}$ diameter.

3. Tap .375-16 UNC-2B thread, .388 minimum depth.
4. Install LiveSert with CA2069-T10 installation tool (Step I). Live Sert is designed to stop at the correct depth below the surface of the substructure.
5. Invert CA2069-T10 tool and drive in the kees (Step II).
6. Retaining ring counterbore recess must be in panel "$T_1$".
7. **Caution:** Always wear eye protection when striking tool with hammer.



**Shown With Locking KEES Installed**

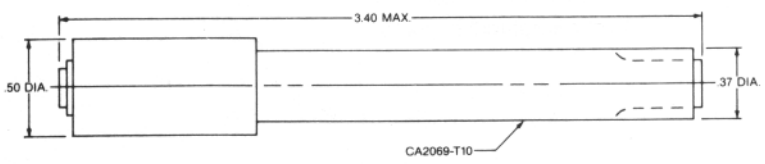


**Step I**
**Screw in LiveSert**

**Step II**
**Tap Down Locking KEES**

---

### LiveSert Installation Tool
**CA2069-T10**




**Material:** Alloy Steel
**Finish:** Black Oxide

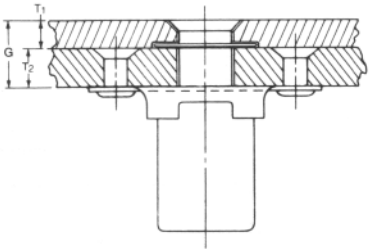
**Note:** Installation tool CA2069-T10 is required to install CA2058 LiveSert receptacle.

# Live Lock
# CA2000 Series.

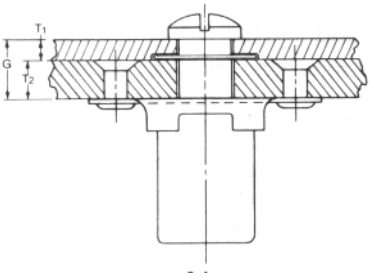
## Ordering Information.

### To Select Stud Nut Dash Number

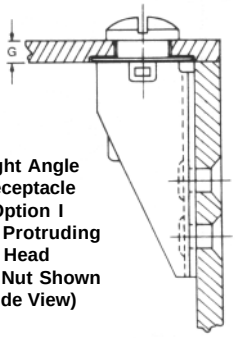
1. Determine “G” thickness:
   a. “G” = “T1”+”T2,” plus any compressed gasketing material, shim, paint or other finishes.
2. Locate “G” grip range in the table.
3. Find the corresponding stud nut dash number in the column designated for the selected stud nut.



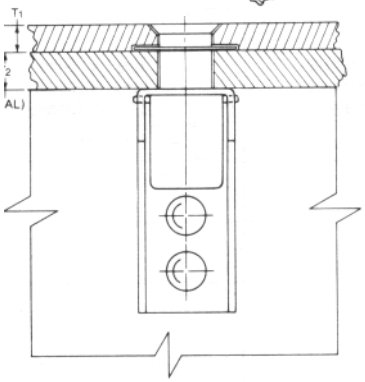
**2-Lug Receptacle Flush Head Stud Nut Shown**



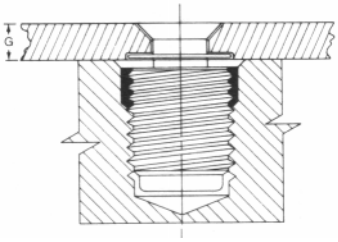
**2-Lug Receptacle Protruding Head Stud Nut Shown**



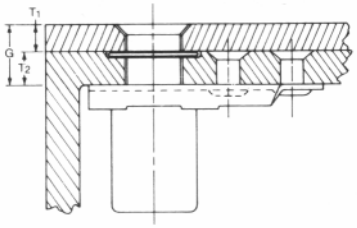
**Right Angle Receptacle Option I With Protruding Head Stud Nut Shown (Side View)**



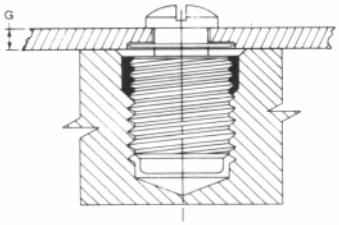
**Right Angle Receptacle Option II With Flush Head Stud Nut Shown (Front View)**



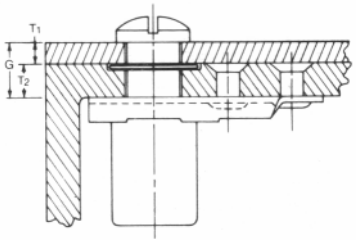
**LiveSert Receptacle Flush Head Stud Nut Shown**



**1-Lug Receptacle Flush Head Stud Nut Shown**



**LiveSert Receptacle Protruding Head Stud Nut Shown**



**1-Lug Receptacle Protruding Head Stud Nut Shown**

| Stud Nut Dash Number Selection*** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L | "G" Grip Range** | CA2020/CA20000T | | CA2021 | | CA2022/CA20043T | | CA2023 | | CA2024* | |
| | | Dash No. | Weight lbs./100 | Dash No. | Weight lbs./100 | Dash No. | Weight lbs./100 | Dash No. | Weight lbs./100 | Dash No. | Weight lbs./100 |
| .250 | .090-.124 | N/A | -- | -0 | .23 | -0 | .24 | N/A | -- | -0 | .25 |
| .312 | .125-.187 | -1 | .20 | -1 | .26 | -1 | .26 | -1 | .20 | -1 | .31 |
| .375 | .188-.250 | -2 | .24 | -2 | .29 | -2 | .29 | -2 | .24 | -2 | .38 |
| .437 | .251-.312 | -3 | .28 | -3 | .32 | -3 | .32 | -3 | .28 | -3 | .44 |
| .500 | .313-.375 | -4 | .32 | -4 | .34 | -4 | .34 | -4 | .32 | -4 | .50 |
| .562 | .376-.437 | -5 | .36 | -5 | .37 | -5 | .37 | -5 | .36 | -5 | .56 |
| .625 | .438-.500 | -6 | .40 | -6 | .40 | -6 | .40 | -6 | .40 | -6 | .62 |
| .687 | .501-.562 | -7 | .44 | -7 | .42 | -7 | .42 | -7 | .44 | -7 | .69 |

*For Dash Number “-0” minimum grip = .062 inch.
**For “G” grip range greater than grip shown, contact Technical Sales.
***If “G” is less than grip shown and CA2010 type receptacle is used, shim CA2077 is required (see Page 5 for typical shim installation).

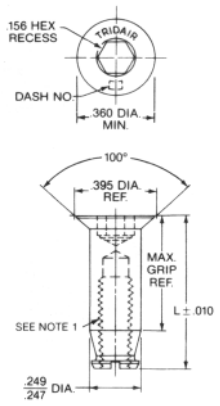
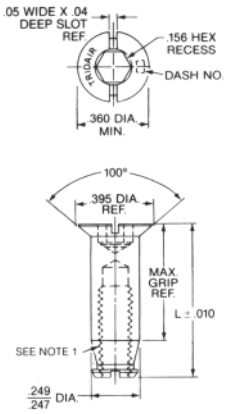
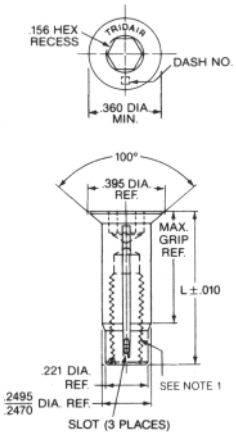
# Live Lock
# CA1800/CA18000 Series.

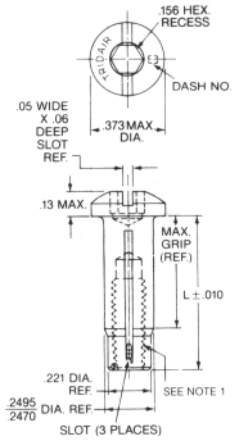
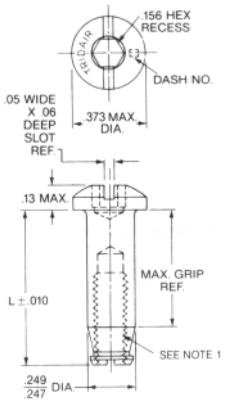
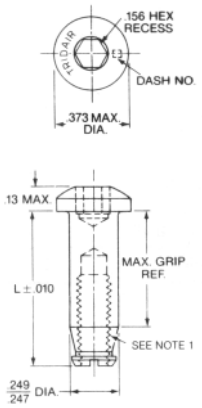
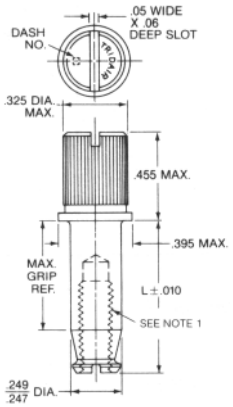
## Stud Nuts.

**Thread Size:.1640-32, 4 Lead**

**Notes:**

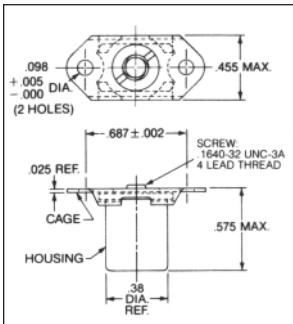
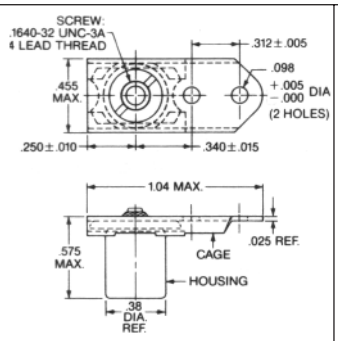
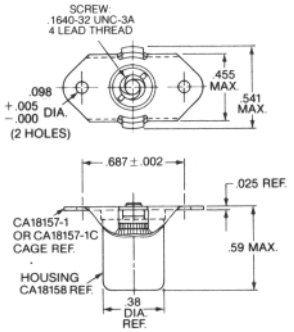
**1. Thread Size:.1640-32 UNC-3B, modified minor diameter, 4 lead thread.**
**2. Recommended tightening torque: 30 inch punds.**
**3. Part numbers shown are basic part numbers only. See Ordering Information on page 19 for required dash number, weight information and "L" dimension.**

| | Flush Head | | |
|---|---|---|---|
| |  **100° C'Sink Hex Recess** |  **100° C'Sink Hex Recess Slotted** |  **100° C'Sink Hex Recess Slotted Shank** |
| Material | Part No. | Part No. | Part No. |
| Material: 300 Series CRES<br>Finsih: Passivated per QQ-P-35 | CA1820-( ) | CA1832-( ) | -- |
| Material: 300 Series CRES<br>Finish: Black Oxide per MIL-C-13924 | CA1820-( )B | CA1832-( )B | -- |
| Material: 300 Series CRES<br>Finish: Cadmium Plated per QQ-P-416,<br>Type II, Class 2 | CA1820-( )C | -- | -- |
| Material: Alloy Steel<br>Heat Treat: Per MIL-H-6875<br>Fininsh: Cadmium Plated per QQ-P-416, Type II<br>Class 2 | -- | -- | CA18121-( )HS |
| Material: A-286 CRES<br>Heat Treat: Per MIL-H-6875<br>Finish: Passivated per QQ-P-35 | CA18187T-( ) | -- | -- |

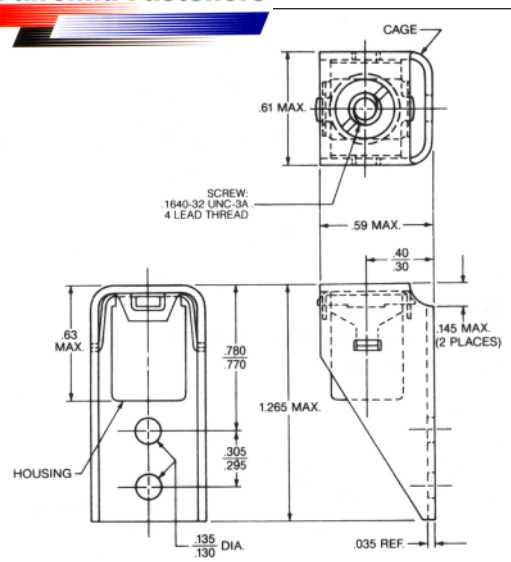
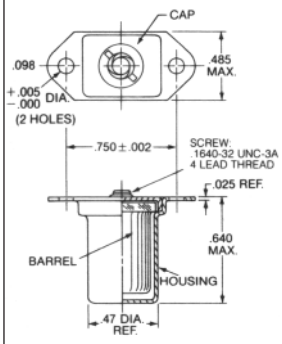
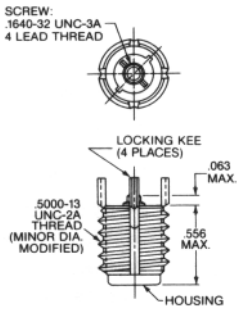
| Protruding Head | | | |
|---|---|---|---|
|  |  |  |  |
| **Pan Head Hex Recess Slotted Shank** | **Pan Head Hex Recess Slotted** | **Pan Head Hex Recess** | **Knurled Head Slotted** |
| Part No. | Part No. | Part No. | Part No. |
| CA18161-( )HS | CA1821-( ) | CA1824-( ) | CA1828-( ) |
| CA18161-( )BHS | CA1821-( )B | CA1824-( )B | CA1828-( ) |
| CA18161-( )CHS | -- | -- | -- |
| -- | -- | -- | -- |
| -- | -- | -- | -- |

# Live Lock
# CA1800/CA18000 Series.

## Receptacles.

| |  <br>Weight:<br>0.014 obls./ea. approx.<br>**2-Lug**<br>**.025 Radial Float** |  <br>Weight:<br>0.015 lbs./ea. approx.<br>**1-Lug**<br>**.025 Radial Float** |  <br>Weight:<br>0.011 lbs./ea. approx.<br>**2-Lug, Light Weight,***<br>**Replaceable**<br>**.025 Radial Float** |
|---|---|---|---|
| Material | Part No. | Part No. | Part No. |
| Housing: Aluminum Alloy per QQ-A-225<br>Screw: Alloy Steel<br>Cage: 17-7PH CRES<br>Heat Treat: Screw: Per MIL-H-6875<br>Cage: Per MIL-H-6875<br>Finish: Housing: Blue Anodized per MIL-A-8625<br>Screw: Cadmium Plated per QQ-P-416, Type II, Class 2<br>Cage: Passivated per QQ-P-35 | -- | -- | CA18157* |
| Same as Pat No. CA18157 Except Cage is Cadmium Plated per QQ-P-416, Type II, Class 2 | -- | -- | CA18157C* |
| Housing: 300 Series CRES<br>Screw: A286 CRES<br>Heat Treat: Screw: Per MIL-H-6875<br>Finish: Housing: Passivated per QQ-P-35<br>Screw: Dry Film Lubed | -- | -- | -- |
| Housing & Cage: 300 Series CRES<br>Screw: A286 CRES<br>Heat Treat: Screw: Per MIL-H-6875<br>Finish: Housing & Cage: Passivated per QQ-P-35<br>Screw: Dry Film Lubed | CA1810 | CA1812 | -- |
| Same as Part No. CA1810 Except Cage is Cadmium Plated per QQ-P-416, Type II, Class 2 | CA1810C | CA1812C | -- |
| Barrel. Housing & Cap: 300 Series CRES<br>Screw: A286 CRES<br>Heat Treat: Screw: Per MIL-H-6875<br>Finish: Barrel, Housing & Cap: Passivated per QQ-P-35<br>Screw: Dry Film Lubed | -- | -- | -- |
| Housing: 300 Series CRES<br>Screw: A286 CRES<br>Cage: 17-7PH CRES<br>Heat Treat: Screw: Per MIL-H-6875<br>Finish: Housing & Cage: Passivated per QQ-P-35<br>Screw: Dry Film Lubed | -- | -- | -- |

*** The 2-Lug, Light Weight receptacle is removable and replaceable. For replacement, order housing Part No. CA18158 and tool Part No. CA18157-T10. Replacement cage Part No. CA18157-1 or CA18157-1C.**

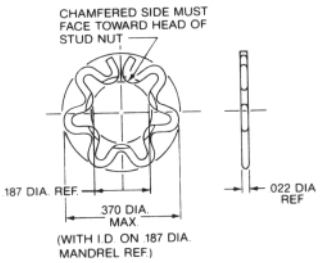
| | | |
|---|---|---|
|  |  |  |
| Weight:<br>0.029 lbs./ea. approx.<br>**Right Angle Mount**<br>**.025 Radial Float** | Weight:<br>0.021 lbs./ea. approx.<br>**2-Lug, Encapsulated**<br>**.020 Radial Float** | Weight:<br>0.018 lbs./ea. approx.<br>**LiveSert**** |
| Part No. | Part No. | Part No. |
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | CA18062 |
| -- | -- | -- |
| -- | -- | -- |
| -- | CA18193 | -- |
| CA1879 | -- | -- |

**LiveSerts with radial float are avaiable; contact Technical Sales.

# Live Lock
# CA1800/CA18000 Series.

## Retaining Rings.

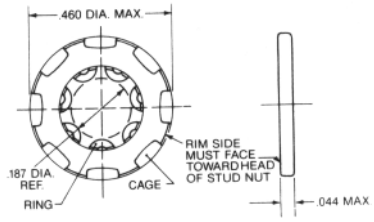
### CA1825 Wire Form




**Material:**
Elgiloy Wire
**Finish:**
Passivated per QQ-P-35
**Heat Treat:**
Spring Tempered
**Weight:**
.019 lbs. per hundred (approx.)

**IMPORTANT:** Chamfered side must face toward head of stud nut.

### CA18377 Wire Form Caged

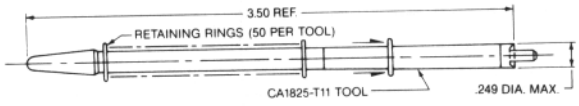



**Weight:**
.071 lbs. per hundred (approx.)

**IMPORTANT:** Rim side must face toward head of stud nut.

| Material | Part No. |
|---|---|
| Ring: Elgiloy Wire<br>Finish: Passivated per QQ-P-35<br>Heat Treat: Spring Tempered<br>Cage: 300 Series CRES<br>Finish: Passivated per QQ-P-35 | CA18377 |

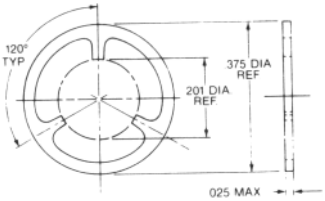
### Installation Tool for CA1825 or CA18377 Retaining Rings




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

### CA18132 Solid, 3-Tabs

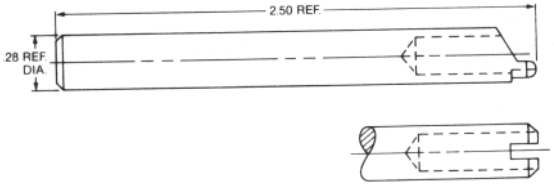
Use with stud nut part number CA18121-( ) series or CA18161-( ) series only.




**Weight:**
.036 lbs. per hundred (approx.)

| Material | Part No. |
|---|---|
| Material: 17-7PH CRES<br>Finish: Passivated per QQ-P-35<br>Heat Treat: Per MIL-H-6875 | CA18132 |
| Same as Part No. CA18132 Except Finish: Cadmium Plated per QQ-P-416, Type II, Class 2 | CA18132C |

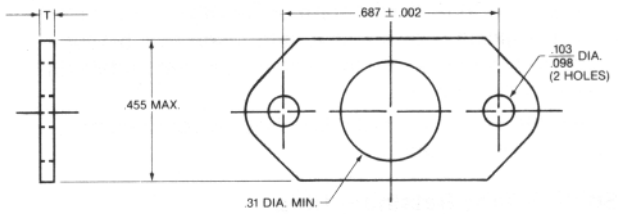
### Installation Tool for CA18132 Retaining Ring CA18132-T11



# Live Lock
# CA1800/CA18000 Series.

## Shims.*

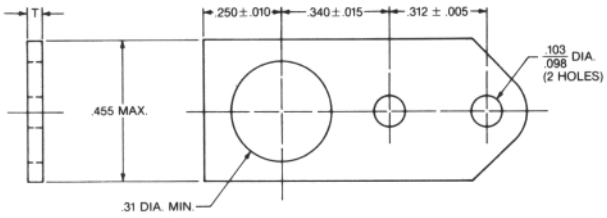
### 2-Lug Shim
### CA1818-( ) and CA18029-( )




**Note:** Shims noted in following table can be used with receptacle part numbers CA1810, CA1810C, CA18157 and CA18157C only.

| Material | Part No. | T | Weight lbs./100 Approx. |
|---|---|---|---|
| Material: 300 Series CRES Finish: Passivated per QQ-P-35 | CA1818-1 | .037<br>.027 | .2390 |
| | CA1818-2 | .107<br>.097 | .7810 |
| | CA1818-3 | .068<br>.058 | .3970 |
| Material: 300 Series CRES Finish: Cadmium Plated per QQ-P-416, Type II, Class2 | CA1818-1C | .037<br>.027 | .2390 |
| | CA1818-2C | .107<br>.097 | .7810 |
| | CA1818-3C | .068<br>.058 | .3970 |
| Material: Aluminum Alloy per QQ-A-250 Finish: Chemical Film per MIL-C-5541 | CA18029-1 | .037<br>.027 | .0812 |
| | CA18029-2 | .068<br>.058 | .1500 |
| | CA18029-3 | .095<br>.085 | .2200 |

### 1-Lug Shim
### CA1878-( )



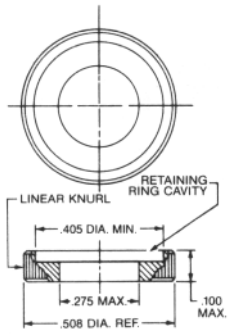

**Material:** 300 Series CRES
**Finish:** Passivated per QQ-P-35.

| Part No. | T | Weight lbs./100 Approx. |
|---|---|---|
| CA1878-1 | .037<br>.027 | .2370 |
| CA1878-2 | .068<br>.058 | .3950 |
| CA1878-3 | .095<br>.085 | .7790 |

**Note:** CA1878-( ) shim to be used with CA1812 or CA1812C 1-lug receptacles only.

*See Page 5 for typical shim installation.

## Stud Nut Hold-out Cage.
### CA18014



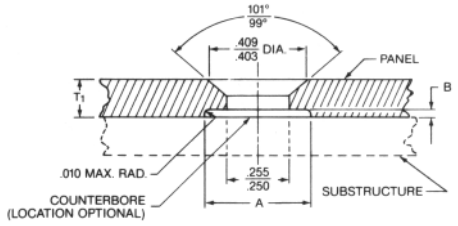

**Material:**
300 Series CRES
**Finish:**
Passivated per QQ-P-35
**Weight:**
.233 lbs. per hundred (approx.)

**Notes:**
1. For use wth CA1825 retaining ring.
2. See Page 17 for installation.
3. Stud nut hold-out grommets are also available; contact Technical Sales.

# Live Lock
# CA1800/CA18000 Series.

## Panel/Substructure Preparation and Installation Data.

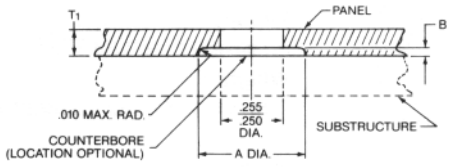
### Panel:
**Flush Head Stud Nuts**




| 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 $\frac{.255}{.250}$ Dia. hole through panel.
2. Countersink $\frac{101^{\circ}}{99^{\circ}}$ to $\frac{.409}{.403}$ 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**



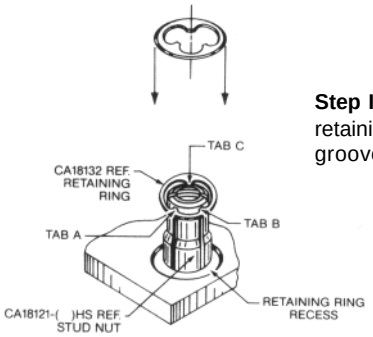

**Notes:**
1. Refer to table above.
2. Locate and drill $\frac{.255}{.250}$ Dia. hole through panel.
3. If "$T_1$" is .090 or greater, counterbore panel to "A" Dia. by "B" depth. Preferred location for counterbored retaining ring recess is in panel "$T_1$".
4. Panel "$T_1$"=.021 min. when counterbore is located in substructure.

### Retaining Ring Installation:
**Wire Form and Wire Form Caged Retaining Rings**

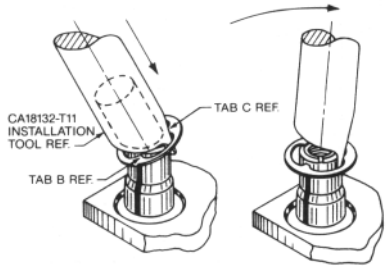
1. To install CA1825 wire form or CA18377 wire form caged retaining rings, on stud nuts, insert pilot of tool completely into stud nut threads and slide the retaining ring onto the stud nut.
2. See retaining ring installation, Page 6, for illustration of retaining ring installation.

**Solid, 3-Tabs Retaining Ring**

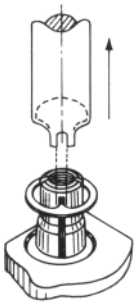
To install CA18132 solid 3-tab retaining ring on stud nut part number CA18121-( ) series or CA18161-( ) series, follow steps I through III:




**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 snap tab "C" into third groove of stud nut.



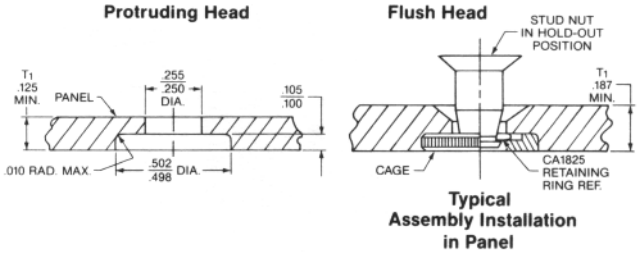
**Step III**: Remove tool from assembly.

# Live Lock
# CA1800/CA18000 Series.

## Panel/Substructure Preparation and Installation Data (cont'd.).

### Panel:

#### Stud Nut Hold-out Cage (optional)



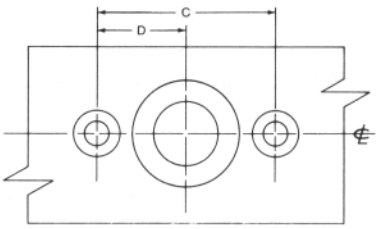

Typical Assembly Installation in Panel

**Notes:**

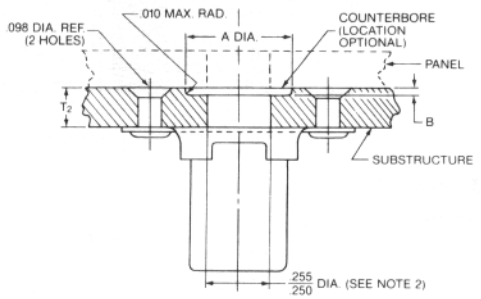
1. Use with retaining ring part number CA1825.
2. Locate and drill $\frac{.255}{.250}$ Dia. hole through panel.
3. Counterbore underside of panel $\frac{.502}{.498}$ Dia. to $\frac{.105}{.100}$ depth.
4. Install stud nut through $\frac{.255}{.250}$ Dia. hole.
5. Install CA1825 wire form retaining ring on stud.
6. Press cage into counterbore until flush with panel.

### Substructure:

#### 2-Lug Receptacles




Top View of Substructure




| Receptacle Part No. | C | D Ref. |
|---|---|---|
| CA1810<br>CA1810C | .689<br>.685 | .343 |
| CA18157<br>CA18157C | | |
| CA18193 | .752<br>.748 | .375 |

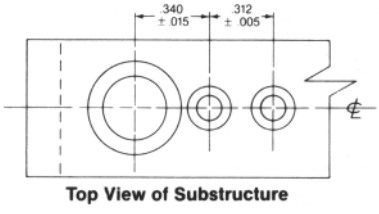
**Notes:**

1. Refer to table on Page 16.
2. Locate and drill $\frac{.255}{.250}$ Dia. hole through substructure.

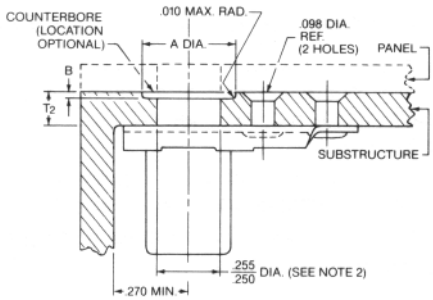
   a. To allow for misalignment, open through hole to .250 plus min. receptacle float. In addition, if counterbore is located in substrcture, open "A" Dia. min. plus min. receptacle float.
3. If required, counterbore to "A" Dia. by "B" depth (see panel preparation for flush or protruding head, Note 3, Page 16).
4. Locate, drill and countersink two holes for flush mount rivets (not supplied). Holes must be symmetrical to $\frac{.255}{.250}$ Dia. hole.
5. Rivet receptacle in place.

### Substructure:

#### 1-Lug Receptacle




Top View of Substructure




**Notes:**

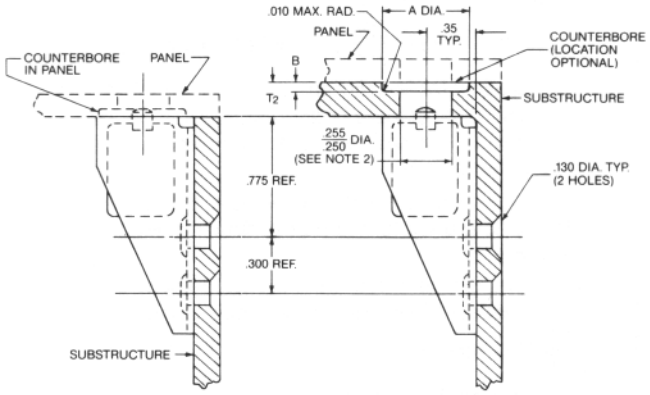
1. Refer to table on Page 16.
2. Locate and drill $\frac{.255}{.250}$ Dia. hole through substructure.

   a. To allow for misalignment, open through hole to .250 plus min. receptacle float. In addition, if counterbore is located in substructure, open "A" Dia. min. plus min. receptacle float.
3. If required, counterbore to "A" Dia. by "B" depth (see panel preparation for flush or protruding head, Note 3, Page 16).
4. Locate, drill and countersink two holes for flush mount rivets (not supplied). Holes must be symmetrical to $\frac{.255}{.250}$ Dia. hole.
5. Rivet receptacle in place.

# Live Lock
# CA1800/CA18000 Series.

## Panel/Substructure Preparation and Installation Data (cont'd.).

### Substructure:
**Right Angle Receptacle**

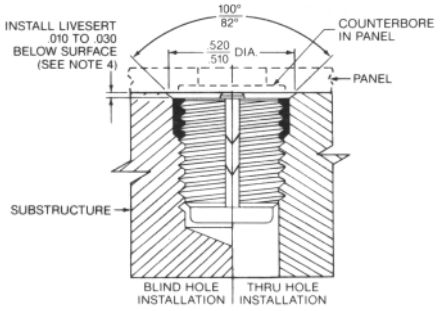



**Option I Installation:**
1. Requires retaining ring counterbore recess to be in panel.
2. Locate and drill two holes for rivets (not supplied).
3. Rivet receptacle in place.

**Option II Installation:**
1. Refer to table on Page 16.
2. Locate and drill $\frac{.255}{.250}$ Dia. hole through substructure.

   a. To allow for misalignment, open through hole to .250 plus min. receptacle float. In addition, if counterbore is located in substructure, open "A" Dia. min. plus min. receptacle float.
3. If required, counterbore to "A" Dia. by "B" depth (see flush or protruding head, Note 3, Page 16).
4. Locate and drill two holes for rivets (not supplied).
5. Rivet receptacle in place.

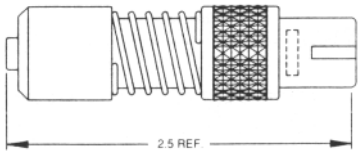
### Substructure:
**LiveSert Receptacle**




**Shown With Locking KEES Installed**

**Notes:**
1. Locate and drill $\frac{.457}{.452}$ Dia. to .590 min. depth.
2. Countersink $\frac{100^{\circ}}{82^{\circ}}$ to $\frac{.520}{.510}$ Dia.
3. Tap .5000-13 UNC-2B thread to .533 min. depth.
4. Refer to LiveSert installation, steps I and II, Page 8.
   a. Install insert with part number CA18062-T10 installation tool (step I). Live Sert is designed to stop at the correct depth below the surface of the substructure.
   b. Invert tool and drive in the KEES (step II).
5. Retaining ring counterbore recess must be in panel "$T_1$."
6. **CAUTION:** Always wear eye protection when striking tool with hammer.

**Note:** Installation tool CA18062-T10 is required to install CA18062 LiveSert receptacle.




**Material:** Alloy Steel
**Finish:** Black Oxide

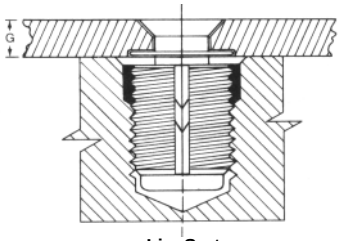
# Live Lock
# CA1800/CA18000 Series.

## Ordering Information.

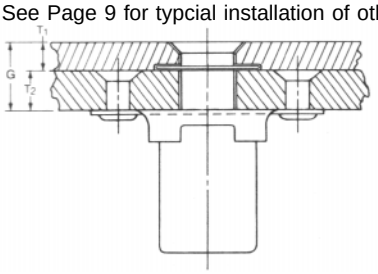
### To Select Stud Nut Dash Number:

1. Determine “G” thickness.
   a. **All receptacles except LiveSert:** “G”=“$T_1$”+“$T_2$,” plus shim, any compressed gasketing material, pain or other finishes.
   b. **LiveSert receptacle:**”G”=grip range, plus any other material.
2. Locate “G” grip range in the table.

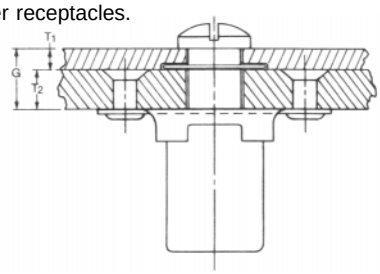
See Page 9 for typcial installation of other receptacles.



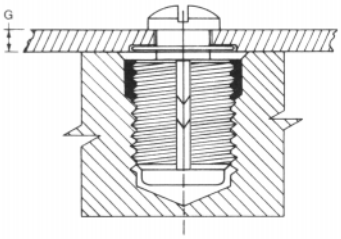

**LiveSert Receptacle Flush Head Stud Nut**




**2-Lug Receptacle Flush Head Stud Nut Shown**




**2-Lug Receptacle Protruding Head Stud Nut Shown**




**LiveSert Receptacle Protruding Head Stud Nut Shown**

| Stud Nut Dash Number Selection*** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L | "G" Grip Range | CA1820** | | CA1832** | | CA1821** | | CA1824** | | CA1828** | |
| | | Dash No. | Weight lbs./100 | Dash No. | Weight lbs./100 | Dash No. | Weight lbs./100 | Dash No. | Weight lbs./100 | Dash No. | Weight lbs./100 |
| .375* | .098-.155 | -0 | .20 | -0 | .20 | -0* | .40 | -0* | .40 | -0* | 1.10 |
| .437 | .156-.250 | -1 | .33 | -1 | .33 | -1 | .48 | -1 | .48 | -1 | 1.20 |
| .531 | .251-.343 | -2 | .46 | -2 | .46 | -2 | .56 | -2 | .56 | -2 | 1.30 |
| .625 | .344-.437 | -3 | .52 | -3 | .52 | -3 | .64 | -3 | .64 | -3 | 1.40 |
| .781 | .438-.531 | -4 | .63 | -4 | .63 | -4 | .72 | -4 | .72 | -4 | 1.50 |
| .812 | .532-.625 | -5 | .74 | -5 | .74 | -5 | .80 | -5 | .80 | -5 | 1.60 |
| .906 | .626-.718 | -6 | .85 | -6 | .85 | -6 | .88 | -6 | .88 | -6 | 1.70 |
| 1.000 | .719-.812 | -7 | .96 | -7 | .96 | -7 | .96 | -7 | .96 | -7 | 1.80 |

*(-0) “L” dimension is .343 for part numbers CA1821, CA1824 and CA1828.
**If “G” is .097 or less shim is required (see Page 5 for typical shim installation).

| Stud Nut Dash Number Selection*** | | | | | |
|---|---|---|---|---|---|
| L | "G" Grip Range | CA18121 | | CA18161 | |
| | | Dash No. | Weight lbs./100 (approx.) | Dash No. | Weight lbs./100 (approx.) |
| .430 | .150-.220 | -1HS | .35 | -1HS | .51 |
| .500 | .221-.290 | -2HS | .43 | -2HS | .56 |
| .570 | .291-.360 | -3HS | .51 | -3HS | .61 |
| .640 | .361-.430 | -4HS | .59 | -4HS | .66 |
| .710 | .431-.500 | -5HS | .67 | -5HS | .72 |
| .780 | .501-.570 | -6HS | .75 | -6HS | .77 |
| .850 | .571-.640 | -7HS | .83 | -7HS | .82 |
| .920 | .641-.710 | -8HS | .91 | -8HS | .87 |
| .990 | .711-.780 | -9HS | .99 | -9HS | .93 |
| 1.060 | .781-.850 | -10HS | 1.07 | -10HS | 1.46 |

***For “G” greater of lesser than grip shown, contact Technical Sales.

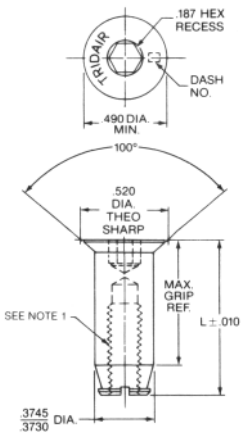
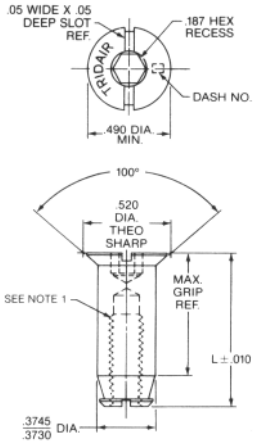
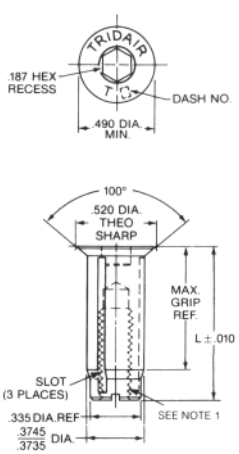
# Live Lock
# CA1700/CA17000 Series.

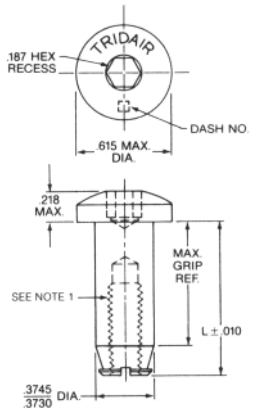
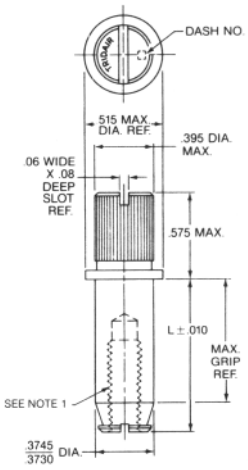
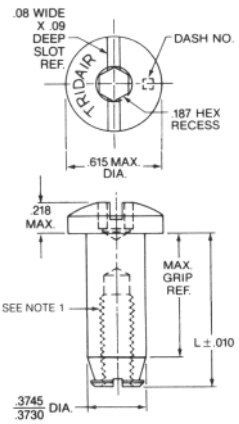
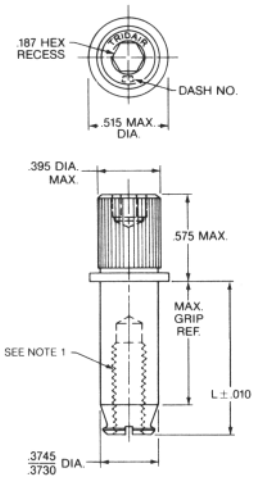
## Stud Nuts.

**Thread Size: .1900-32, 4 Lead**

**Notes:**

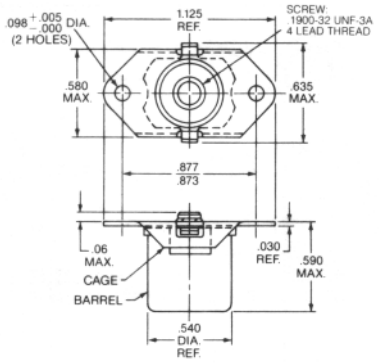
1. Thread size:.1900-32 UNF-3B, modified minor diameter, 4 lead thread.
2. Recommended tightening torque:40 inch pounds.
3. Part numbers shown are basic part numbers only. See Ordering Information on page 26 for required dash number, weight information and “L” dimension.

| | Flush Head | | |
|---|---|---|---|
| |  **100° C'Sink Hex Recess** |  **100 C'Sink Hex Recess Slotted** |  **100° C'Sink Hex Recess Slotted Shank** |
| Material | Part No. | Part No. | Part No. |
| Material: Alloy Steel<br>Heat Treat: Per MIL-H-6875<br>Finish: Cadmium Plated per QQ-P-416,<br>Type II, Class 2 | CA1721HS-( ) | -- | -- |
| Material: 300 Series CRES<br>Finish: Black Oxide per MIL-C-13924, Class 4 | CA1721HS-( )B | -- | -- |
| Material: 300 Series CRES<br>Finish: Cadmium Plated per QQ-P-416<br>Type II, Class 2 | CA1721HS-( )C | -- | -- |
| Material: 300 Series CRES<br>Finish: Passivated per QQ-P-35 | CA1721HS-( )S | CA1765-( ) | -- |
| Material: A-286 CRES<br>Heat Treat: Per MIL-H-6875<br>Finish: Passivated per QQ-P-35 | -- | -- | CA1755T-( ) |
| Material: A-286 CRES<br>Heat Treat: Per MIL-H-6875<br>Finish: Cadmium Plated per QQ-P-416,<br>Type II, Class 2 | -- | -- | CA1755TC-( ) |

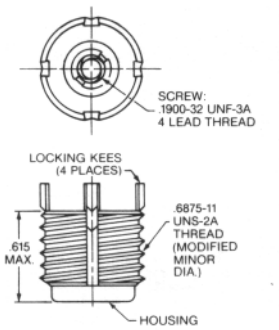
| Protruding Head | | | |
|---|---|---|---|
|  |  |  |  |
| **Pan Head Hex Recess** | **Knurled Head Slotted** | **Pan Head Hex Recess Slotted** | **Knurled Head Hex Recess** |
| Part No. | Part No. | Part No. | Part No. |
| -- | -- | -- | -- |
| CA1733-( )B | CA1728-( )B | CA1762-( )B | -- |
| -- | -- | -- | -- |
| CA1733-( ) | CA1728-( ) | CA1762-( ) | CA17034-( ) |
| -- | -- | -- | -- |
| -- | -- | -- | -- |

# Live Lock
# CA1700/CA17000 Series.

**Receptacles.**
**Thread Size: .1900-32, 4 Lead**



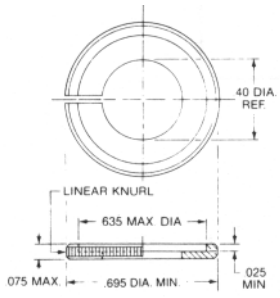

**2-Lug**
**.030 Radial Float**




**Heavy Duty**
**LiverSert**

| Material | Part No. | Approx. Weight lbs./100 | Part No. | Approx. Weight lbs./100 |
|---|---|---|---|---|
| Cage: 17-7PH CRES<br>Barrel: 300 Series CRES<br>Screw: A-286 CRES<br>Heat Treat:<br>Cage: Per MIL-H-6875<br>Screw: Per MIL-H-6875<br>Finish: Cage: Passivated per QQ-P-35 | CA1711 | 2.53 | -- | -- |
| Same as Part No. CA 1711 Except Cage Cadmium Plated per QQ-P-416, Type II, Class 2 | CA1711C | | -- | -- |
| Housing: 300 Series CRES<br>Screw: A286 CRES<br>Heat Treat:<br>Screw: Per MIL-H-6875<br>Finish: Passivated per QQ-P-35 | -- | -- | CA17088 | 3.73 |

### Stud Hold-Out Cage.
**CA1777**



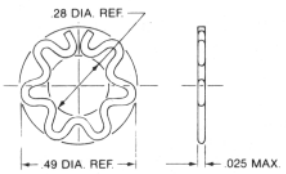

**Material:**
300 Series CRES
**Finish:**
Passivated per QQ-P-35
**Weight:**
.344 lbs./100 approx.
**Note:**
Stud nut hold-out grommets are available; contact Technical Sales.

### Shim:
See Page 27, part number CA17189-( ) series or CA1769-( ) series for shim information for CA1711 receptacle.

# Live Lock
# CA1700/CA17000 Series.

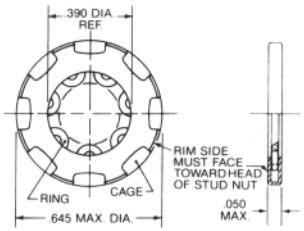
**Retaining Rings.**
**Thread Size: .1900-32, 4 Lead**

### CA1727 Wire Form




**Material:**
17-7PH CRES
**Heat Treat:**
Per MIL-H-6875
**Finish:**
Passivated per QQ-P-35
**Weight:**
.024 lbs./100 approx.

### CA17230 Wire Form Caged

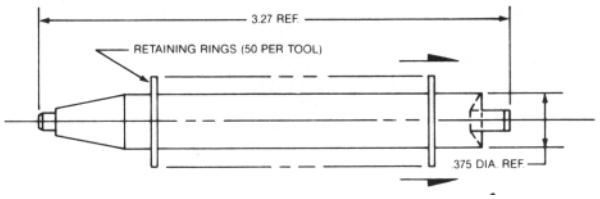



**Weight:**
.094 lbs./100 approx.

**IMPORTANT:** Rim Side must face toward head of stud nut.

| Material | Part No. |
|---|---|
| Ring: 17-7PH CRES<br>Cage: 300 Series CRES<br>Heat Treat:<br>Ring: Per MIL-H-6875<br>Finish: Passivated per QQ-P-35 | CA17230 |

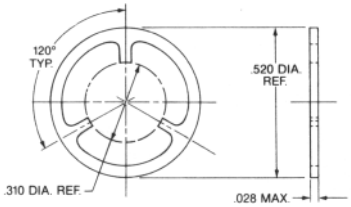
### Installation Tool for CA1727 or CA17230 Retaining Rings




**Notes:**
Fifty (50) retaining rings are sold mounted on an installation tool to insure proper installation.

### CA1753 Solid, 3-Table

Use with CA1755 stud nut only.

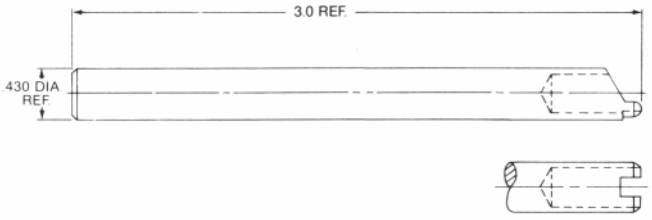



**Weight:**
.046lbs. per hundred (approx.)

| Material | Part No. |
|---|---|
| Material: 17-7PH CRES<br>Heat Treat: Per MIL-H-6875<br>Finish: Passivated per QQ-P-35 | CA1753 |
| Same as Part No. CA1753 Except Finish:<br>Cadmium Plated per QQ-P-416, type II, Class 2 | CA1753C |

### CA1753-T11 Installation Tool

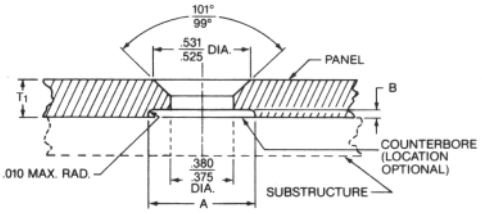
Use to install CA1753 retaining ring.



# Live Lock
# CA1700/CA17000 Series.

### Panel/Substructure Preparation and Installation Data.
### Thread Size: .1900-32, 4 Lead

## Panel:
## Flush Head Stud Nuts




| Type of Retaining Ring | Stud Nut Ref. Part No. | A Dia. Min. | B C'Bore Depth Min. |
|---|---|---|---|
| Wire Form | CA1721HS-( )<br>CA1728-( )<br>CA1733-( )<br>CA1762-( )<br>CA1765-( )<br>CA17034-( ) | .625 | .030 |
| Wire Form Caged | | .656 | .055 |
| Solid, 3-Tabs | CA1755T-( ) | .531 | .030 |

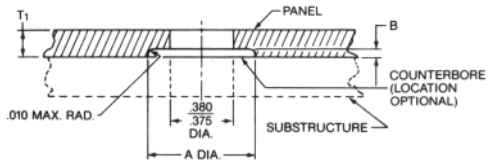
Notes:
1. Locate and drill $\frac{.380}{.375}$ Dia. hole through panel.

2. Countersink $\frac{101°}{99°}$ to $\frac{.531}{.525}$ Dia.

3. If "$T_1$" is .135 or greater, counterbore panel "A" Dia. by "B" depth. Preferred location for counterbore retaining ring recess is in panel "$T_1$."

4. Panel "$T_1$" = .108 minimum when counterbore is located in substructure.

## Panel:
## Protruding Head Stud Nuts

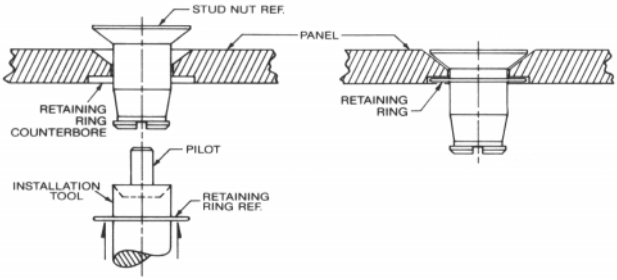



1. Locate and drill .380 Dia. hole through panel.
3. If "$T_1$" is .135 or greater, counterbore panel "A" Dia. by "B" depth. Preferred location for counterbore retaining ring recess is in panel "$T_1$."

4. Panel "$T_1$" = .108 minimum when counterbore is located in substructure.

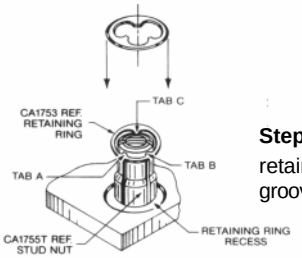
## Retaining Ring Installation:
## Wire Form and Wire Form Caged Retaining Rings

To install CA 1727 wire form or CA17230 wire for caged retaining rings on stud nuts, insert pilot of tool completely into stud nut threads and slide the retaining ring onto the stud nut.

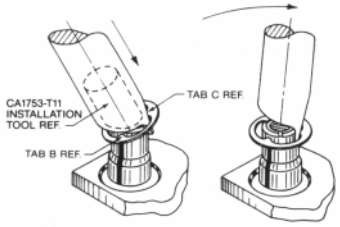



## Solid 3-Tabs Retaining Ring

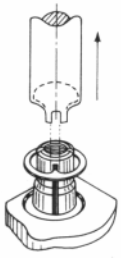
To install CA1753 solid, 3-tab retaining ring on CA1755 stud nuts, follow steps I through III




**Step I:** Install Tab "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 snap tab "C" into third groove of stud nut.



**Step III:** Remove tool from assembly.

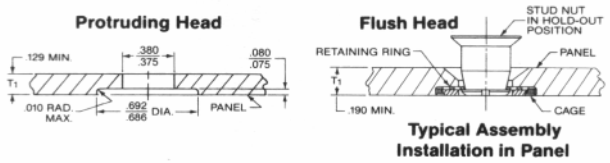
# Live Lock
# CA1700/CA17000 Series.

**Panel/Substructure Preparation and Installation Data (cont'd.).**

Thread Size:1900-32, 4 Lead

## Panel:

**Stud Nut Hold-out Cage (optional):**

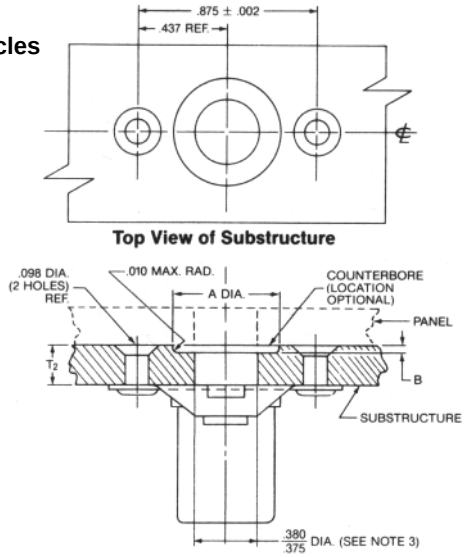



**Notes:**

1. Use with retaining ring part number CA1727.
2. Follow panel preparation instructions as noted above.
3. Install stud nut through .375 Dia. hole.
4. Install CA1727 retaining ring on stud.
5. Press cage into counterbore until flush with panel.

## Substructure:

**2-Lug Receptacles**

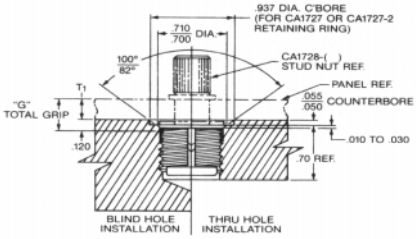



**Notes:**

1. Refer to table on Page 24.
2. Locate and drill $\frac{.380}{.375}$ Dia. hole through substructure.
3. To allow for misalignment, open through hole to .375 plus minimum receptacle float. In addition, if counterbore is in substructure, open counterbore to "A" diameter minimum plus minimum receptacle float.
4. If "$T_2$" = .072 or greater, counterbore to "A" diameter to "B" depth (see panel preparation for flush or protruding head, Note 3, Page 24).
5. Substructure "$T_2$" = .040 minimum when counterbore is located in panel.
6. Locate, drill and countersink two (2) holes for flush mount rivets (not supplied). Holes must be symmetrical to $\frac{.380}{.375}$ Dia. hole.
7. Rivet receptacle in place.

## Substructure:

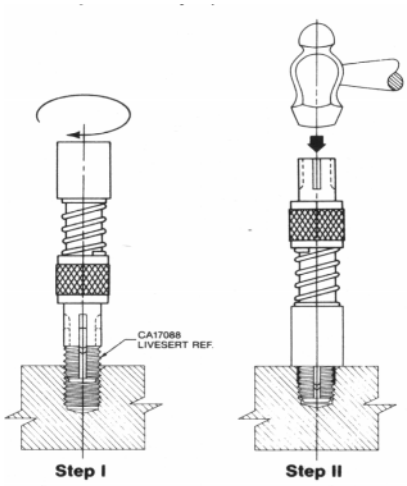
**LiveSert Receptacle**




**Notes:**

1. Locate and drill $\frac{.646}{.640}$ Dia. to .70 depth min.
2. Countersink $\frac{100°}{82°}$ to $\frac{.710}{.700}$ Dia.
3. Tap .6875-11UNS-2B thread .500 minimum depth.
4. Counterbore .937 Dia. Ref. to $\frac{.055}{.050}$ depth in substructure.
5. Install LiveSert with CA1782-T10 installation tool (Step I). LiveSert is designed to stop at the correct depth below the surface of the substructure.
6. Invert tool and drive KEES into parent material (Step II).

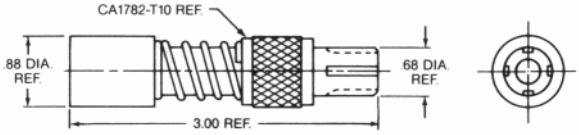
**CAUTION:** Always wear eye protection when striking tool.




## Installation Tool
## CA1782-T10.

Use to install CA17088 LiveSert receptacle.

**Material:** Alloy Steel
**Finish:** Black Oxide

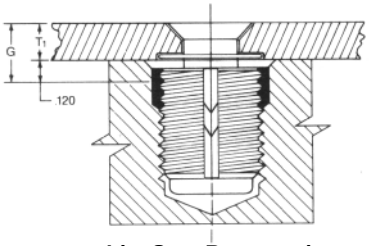


# Live Lock
# CA1700/CA17000 Series.

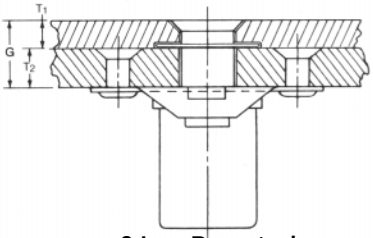
**Ordering Information:**
**Thread Size: .1900-32, 4 Lead**

**To Select Stud Dash Number**

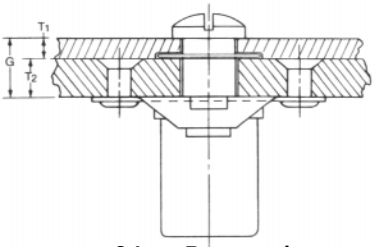
1. Determine "G" thickness:
   a. **2-Lug receptacle:** "G" = "$T_1$" + "$T_2$," plus shim, any compressed gasketing material, paint or other finishes.
   b. **LiveSert receptacle:** "G" = "$T_1$" + .120, plus any compressed gasketing material, paint or other finishes.
2. Locate "G" grip range in the table.
3. Find the corresponding stud nut dash number in the column designated for the selected stud nut.



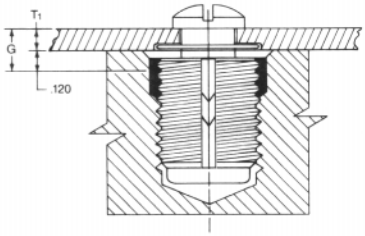

**LiveSert Receptacle**
**Flush Head**
**Stud Nut Shown**




**2-Lug Receptacle**
**Flush Head**
**Stud Nut Shown**




**2-Lug Receptacle**
**Protruding Head**
**Stud Nut Shown**




**LiveSert Receptacle**
**Protruding Head**
**Stud Nut Shown**

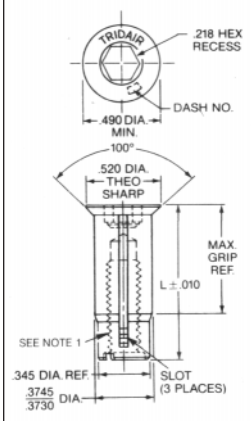
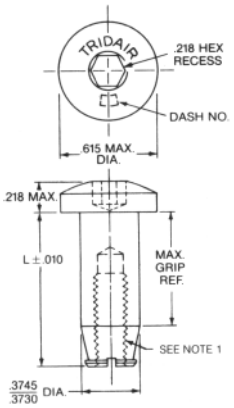
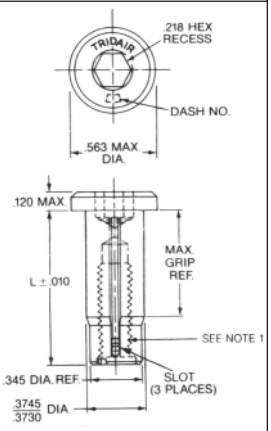
| Stud Nut Dash Number Selection *** | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | "G" Grip Range** | CA1721HS | | CA1728 | | CA1733 | | CA17034 | | CA1755T | | CA1762 | | CA1765 | |
| | | Dash No. | Approx. Weight lbs./100 | Dash No. | Approx. Weight lbs./100 | Dash No. | Approx. Weight lbs./100 | Dash No. | Approx. Weight lbs./100 | Dash No. | Approx. Weight lbs/.100 | Dash No. | Approx. Weight lbs./100 | Dash No. | Approx. Weight lbs./100 |
| .343 | .093-.156 | N/A | - | -0 | 2.22 | -0 | 1.80 | -0 | 2.22 | N/A | - | -0 | 1.80 | N/A | - |
| .437 | .157-.250 | -1* | 1.24 | -1 | 2.55 | -1 | 2.10 | -1 | 2.55 | -1* | .70 | -1 | 2.10 | -1* | 1.24 |
| .531 | .251-.343 | -2 | 1.38 | -2 | 2.88 | -2 | 2.37 | -2 | 2.88 | -2 | .90 | -2 | 2.37 | -2 | 1.38 |
| .625 | .344-.437 | -3 | 1.52 | -3 | 3.21 | -3 | 2.60 | -3 | 3.21 | -3 | 1.10 | -3 | 2.60 | -3 | 1.52 |
| .718 | .438-.531 | -4 | 1.66 | -4 | 3.54 | -4 | 2.91 | -4 | 3.54 | -4 | 1.30 | -4 | 2.91 | -4 | 1.66 |
| .812 | .532-.625 | -5 | 1.95 | -5 | 3.87 | -5 | 3.15 | -5 | 3.87 | -5 | 1.60 | -5 | 3.15 | -5 | 1.95 |
| .906 | .626-.718 | -6 | 2.35 | -6 | 4.20 | -6 | 3.39 | -6 | 4.20 | -6 | 1.80 | -6 | 3.39 | -6 | 2.35 |
| 1.000 | .719-.812 | -7 | 2.75 | -7 | 4.53 | -7 | 3.63 | -7 | 4.53 | -7 | 2.00 | -7 | 3.63 | -7 | 2.75 |
| 1.093 | .813-.906 | -8 | 3.15 | -8 | 4.86 | -8 | 3.77 | -8 | 4.86 | -8 | 2.20 | -8 | 3.77 | -8 | 3.15 |
| 1.187 | .907-1.000 | -9 | 3.55 | -9 | 5.19 | -9 | 3.91 | -9 | 5.19 | N/A | - | -9 | 3.91 | -9 | 3.55 |
| 1.281 | 1.001-1.093 | -10 | 3.95 | -10 | 5.52 | -10 | 4.05 | -10 | 5.52 | N/A | - | -10 | 4.05 | -10 | 3.95 |
| 1.375 | 1.094-1.187 | -11 | 4.35 | -11 | 5.85 | -11 | 4.19 | -11 | 5.85 | N/A | - | -11 | 4.19 | -11 | 4.35 |
| 1.468 | 1.188-1.281 | -12 | 4.75 | -12 | 6.18 | -12 | 4.33 | -12 | 6.18 | N/A | - | -12 | 4.33 | -12 | 4.75 |
| 1.562 | 1.282-1.375 | -13 | 5.15 | -13 | 6.51 | -13 | 4.47 | -13 | 6.31 | N/A | - | -13 | 4.47 | -13 | 5.15 |

*"G" grip range = .180-.250.
**For "G" thickness greater than grip shown, contact Technical Sales.
***If "G" is less than grip shawn and CA1711(C) receptacle is used, shim CA17189-( ) or CA1769-( ) is required, see Page 27.

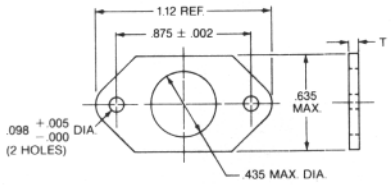
# Live Lock
# CA1700/CA17000 Series.

**Stud Nuts.**
**Thread Size: .2800-28, 4 Lead**

**Notes:**
1. Thread size: .2500-28 UNF-3B, modified minor diameter, 4 lead thread.
2. Recommended tightening torque: 40 inch pounds.
3. Part numbers shown are basic part numbers only. See Ordering Information on page 32 for required dash number and weight information.

| | Flush Head | Protruding Head | |
|---|---|---|---|
| |  |  |  |
| | **100° C'Sink Hex Recess** | **Pan Head Hex Recess** | **Flat Head Hex Recess** |
| Material | Part No. | Part No. | Part No. |
| Material: Alloy Steel<br>Heath Treat: Per MIL-H-6875<br>Finish: Cadmium Plated per QQ-P-416<br>Type II,Class 2 | CA17031-( )HS | CA17036-( )HS | CA17089-( )HS |

**Shims.***
**CA17189-( ) Series**

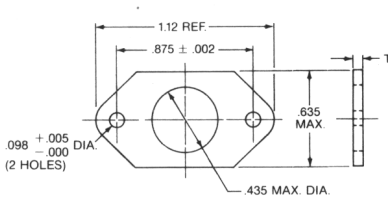



**Material:**
300 Series CRES
**Finish:**
Passivated per QQ-P-35

| Part No. | T | Weight lbs./100 (Approx.) |
|---|---|---|
| CA17189-1 | .035<br>.029 | .335 |
| CA17189-2 | .066<br>.060 | .665 |
| CA17189-3 | .093<br>.087 | .943 |
| CA17189-4 | .053<br>.047 | .503 |

*See Page 5 for typical shim installation.

**CA1769-( ) Series**



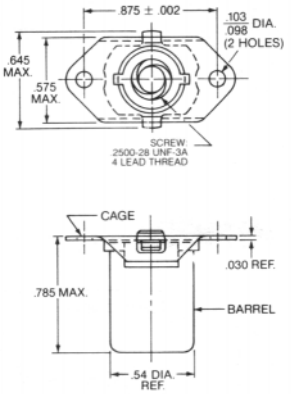

**Material:**
Aluminum Alloy per QQ-A-250
**Finish:**
Clear Iridite or Alodine Finish per MIL-C-5541

| Part No. | T | Weight lbs./100 (Approx.) |
|---|---|---|
| CA17169-1 | .035<br>.029 | .133 |
| CA17169-2 | .066<br>.060 | .250 |
| CA17169-3 | .093<br>.087 | .360 |
| CA17169-4 | .053<br>.047 | .190 |

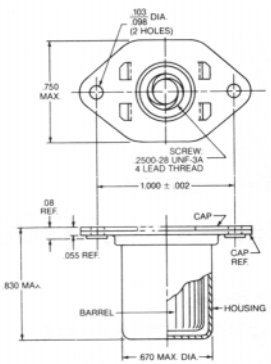
*See Page 5 for typical shim installation.

# Live Lock
# CA1700/CA17000 Series.

**Receptacles.**
**Thread Size: .2500-28, 4 Lead**



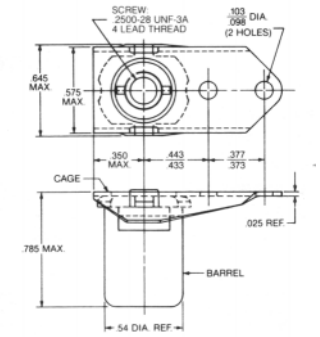

**2-Lug***
**.030 Radial Float**



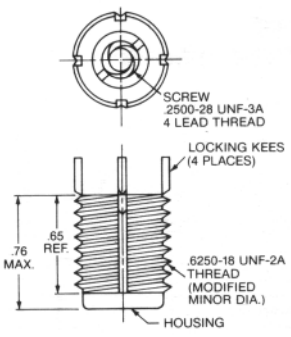

**2-Lug**
**Encapsulated**
**.025 Radial Float**

| Material | Part No. | Approx. Weight lbs./ea. | Part No. | Approx. Weight lbs./ea. |
|---|---|---|---|---|
| Cage: Carbon Steel<br>Barrel: Aluminum Alloy per QQ-A-225<br>Screw: Alloy Steel<br>Heat Treat:<br>Cage: Per MIL-H-6875<br>Screw: Per-H-6875<br>Finish:<br>Cage and Screw: Cadmium Plated per QQ-P-416,<br>Type II, Class 2<br>Barrel: Blue Anodized per MIL-A-8625 | CA1787 | .0256 | - | - |
| Cap: 17-7PH CRES<br>Screw: Alloy Steel<br>Barrel: Aluminum Alloy<br>Housing: Carbon Steel<br>Heat Treat:<br>Cap and Screw: Per Mil-H-6875<br>Finish:<br>Cap: Passivated per QQ-P-35<br>Screw and Housing Cadmium Plated per QQ-P-416,<br>Type II, Class 2<br>Barrel: Blue Anodized per MIL-A-8625 | - | - | CA17058 | .0460 |

*Components may be ordered separately;
contact Technical Sales.




**1-Lug***
**.030 Radial Float**




**LiveSert**

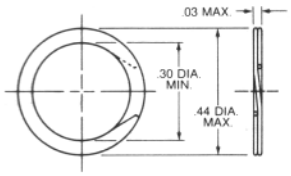
| Material | Part No. | Approx. Weight lbs./ea | Part No. | Approx. Weight lbs./ea |
|---|---|---|---|---|
| Cage: 17-7PH CRES<br>Screw: Alloy Steel<br>Barrel: Aluminum Alloy<br>Heat Treat:<br>Cage and Screw: Per MIL-H-6875<br>Finish:<br>Cage and Screw:: Cadmium Plated per QQ-P-416<br>Type II, Class 2<br>Barrel Blue Anodized per MIL-A-8625 | CA17026 | .0256 | - | - |
| Same as Part No. CA17026 except Cage<br>Finish: Passivated per QQ-P-35 | CA17026P | | - | - |
| Housing: 300 Series CRES<br>Screw: Alloy Steel<br>Heat Treat:<br>Screw: Per MIL-H-6875<br>Finish:<br>Housing: Passivated per QQ-P-35<br>Screw: Cadmium Plated per QQ-P-416, Type II Class 2 | - | - | CA17037 | .0377 |

*Components may be ordered separately; contact Technical Sales.

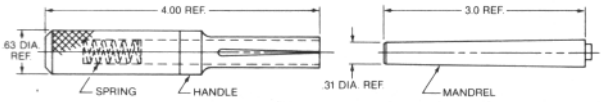
# Live Lock
# CA1700/CA17000 Series.

**Retaining Rings.**
**Thread Size: .2500-28, 4 Lead**

**FX10-1525 Retaining Ring**
Use with CA17036 stud nut.

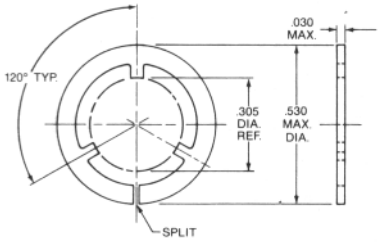



**Material:**
300 Series CRES
**Heat Treat:**
Stress Relieved
**Finish:**
Passivated per QQ-P-35
**Weight:**
.033 lbs./100 approx.




**Material:** Alloy Steel
**Finish:** Black Oxide

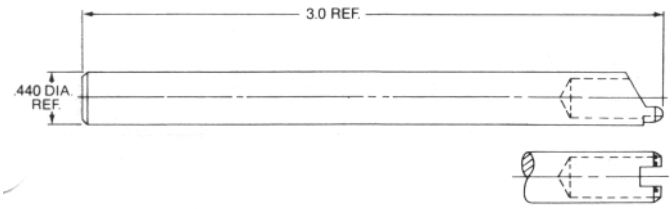
**CA1786 Series Split Ring, 3-Tabs**
Use with CA17031 stud nut.



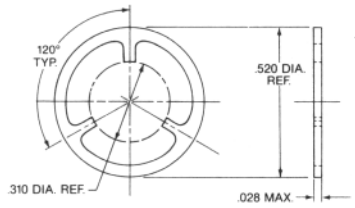

**Weight:**
.045 lbs. per hundred (approx.)

| Material | Part No. |
|---|---|
| Material: 17-7PH CRES<br>Heat Treat: Per MIL-H-6875<br>Finish: Passivated per QQ-P-35 | CA1786 |
| Same as Part No. CA1786 Except Finish:<br>Cadmium Plated per QQ-P-416, Type II, Class 2 | CA1786C |

**CA1786-T11 Installation Tool**



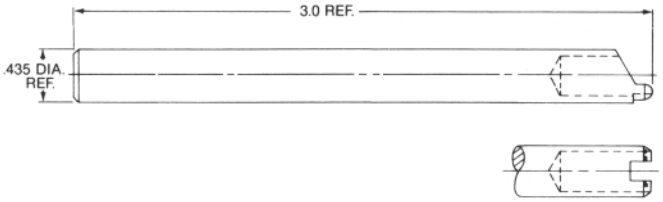

**CA1753 Series, Solid, 3-Tabs**
Use with CA17089 stud nut.




**Weight:**
.046 lbs. per hundred (approx.)
QQ-P-35

| Material | Part No. |
|---|---|
| Material: 17-7PH CRES<br>Heat Treat: Per MIL-H-6875<br>Finish: Passivated per QQ-P-35 | CA1753 |
| Same as Part No. CA1753 Except Finish:<br>Cadmium Plated per QQ-P-416, Type II, Class 2 | CA1753C |

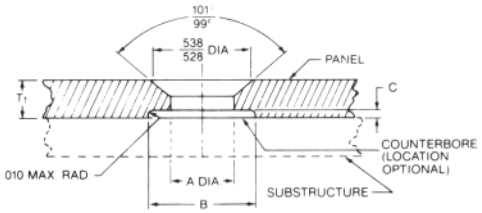
**CA1753-T11 Installation Tool**



# Live Lock
# CA1700/CA17000 Series.

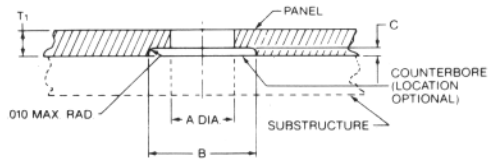
**Panel/Substructure Preparation and Installation Data.**
**Thread Size: .2500-28, 4 Lead**

## Panel:
**Flush Head Stud Nut**



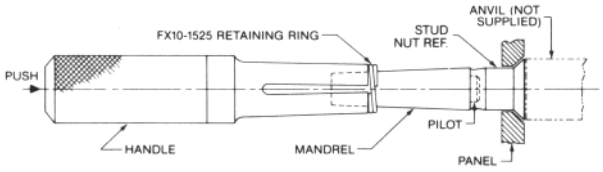

**Notes:**
1. Refer to Table I, this page.
2. Locate and drill "A" Dia. hole through panel.
3. Countersink $\frac{101°}{99°}$ to $\frac{.538}{.528}$ Dia.
4. If "$T_1$" is .135 or greater, counterbore panel to "B" Dia. Minimum by "C" depth. Preferred location for counterbored retaining ring recess is in panel "$T_1$."
5. Panel "$T_1$" = .108 minimum when counterbore is located in substructure.

## Panel:
**Protruding Head Stud Nuts**




**Notes:**
1. Refer to Table I, this page.
2. Locate and drill "A" Dia. hole through panel.
3. If "$T_1$" is .088 or greater, counterbore panel to "B" diameter minimum by "C" minimum depth. Preferred location for counterbored retaining ring recess is in panel "$T_1$."
4. Panel "$T_1$" = .021 minimum when counterbore is located in substructure.

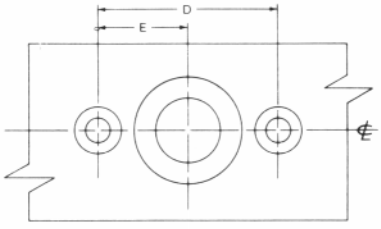
**Retaining Ring Installation:**
**FX10-1525 Retaining Ring and CA17036-( )HS Stud Nut.**



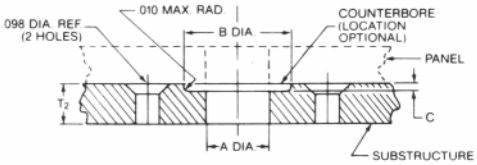

1. Place retaining ring on mandrel.
2. Slide handle onto mandrel.
3. Insert stud nut into panel and back with anvil.
4. Insert pilot of tool assembly completely into stud nut threads and slide the retaining ring onto the stud nut with the handle.
5. Remove tool assembly.

**CA1786 and CA1753 Series Retaining Rings**
See page 24, Steps I-III, for installation of CA1786 Retaining Ring and CA17031-( )HS Stud Nut, and CA1753 Retaining Ring and CA17089-( )HS Stud Nut.

## Substructure:
**2-Lug Receptacle**




**Top View of Substructure**




**Standard Installation**
**Table I**

| Retaining Ring Part No. | Stud Nut Basic Part No. | A Dia. | B Dia. Min. | C C'Bore Depth Min. |
|---|---|---|---|---|
| CA1786 | CA17031-( )HS | .380 .375 | .562 .531 | .032 |
| FX10-1525 | CA17036-( )HS | | | .030 |
| CA1753 | CA17089-( )HS | | | |

**Table II**

| Receptacle Part No. | D ± .002 | E Ref. |
|---|---|---|
| CA1787 | .875 | .437 |
| CA17058 | 1.000 | .500 |

# Live Lock
# CA1700/CA17000 Series.

**Panel/Substructure Preparation and Installation Data. (cont'd.).**

**Thread Size: .2500-28, 4 Lead**

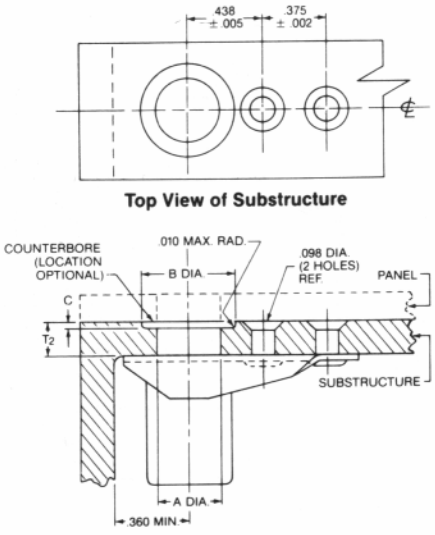
**Notes:**
1. Refer to Tables I and II, Page30.
2. Locate and drill "A" diameter hole through substructure.
3. If "$T_2$" = .072 or greater, counterbore to "B" diameter minimum by "C" depth. Preferred location for counterbore is in panel.
4. For CA17031-( )HS "$T_2$" = .045 minimum when counterbore is located in panel. For CA17036-( )HS and CA17089-( )HS "$T_2$" = .040 minimum when counterbore is located in panel.
5. Locate, drill and countersink two (2) holes for flush mount rivets (not supplied, see Table II). Holes must be symmetrical to "A" diameter hole.
6. Rivet receptacle in place.

**To allow for Substructure misalignment only:**
Refer to Tables II and III, Pages 30 and 31, and Notes 2 through 6 above.

**Table III**

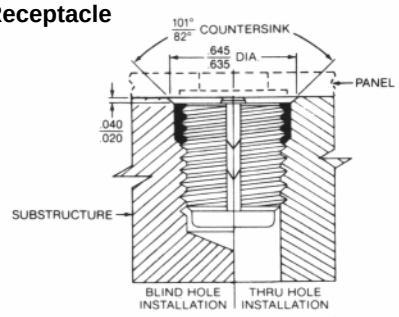
| Retaining Ring Part No. | Stud Nut Basic Part No. | A Dia. Max | B Dia. Min. | C C'Bore Depth Min. |
|---|---|---|---|---|
| CA1786 | CA17031-( )HS | .437 | .619 | .032 |
| FX10-1525 | CA17036-( )HS | .390 | .572 | .030 |
| CA1753 | CA17089-( )HS | .437 | .619 | |

## Substructure:
**1-Lug Receptacle**




**Notes:**
1. Refer to Notes 2 through 6 above, and Tables I or III, Pages 30 and 31.
2. Locate and drill "A" diameter hole through substructure.
3. Prepare retaining ring recess as required.
4. Rivet receptacle in place.

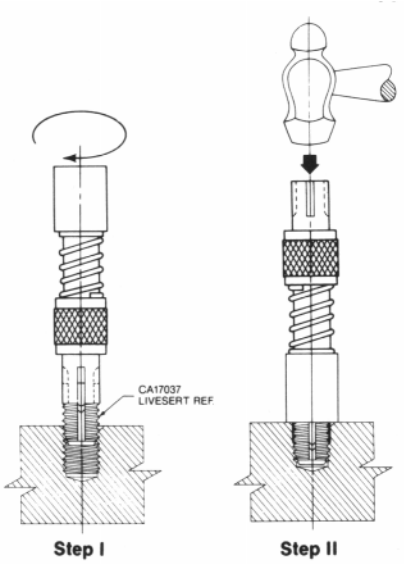
## Substructure:
**LiveSert Receptacle**




1. Locate and drill $\frac{.583}{.577}$ Dia. to .76 min. depth.
2. Countersink $\frac{100°}{82°}$ to $\frac{.645}{.635}$ Dia.
3. Tap .6250-18 UNF-2B thread, .65min. perfect thread depth.
4. Install LiveSert with CA17037-T10 installation tool (Step I). LiveSert is designed to stop at the correct depth below the surface of the substructure.
5. Invert CA17037-T10 tool and drive in the KEES (Step II).

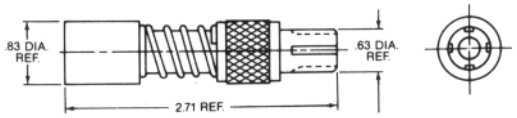
**CAUTION:** Always wear eye protection when striking tool.

6. Counterbore recess for retaining ring must be in panel.




**Installation Tool CA17037-T10**
Use to install CA17037 LiveSert Receptacle.

**Material:** Alloy Steel
**Finish:** Black Oxide



# Live Lock
# CA1700/CA17000 Series.

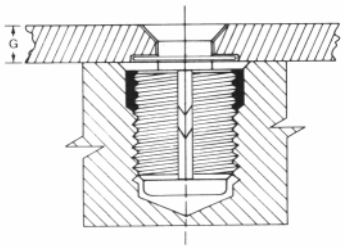
**Ordering Information.**

**Thread Size: .2500-28, 4 Lead**

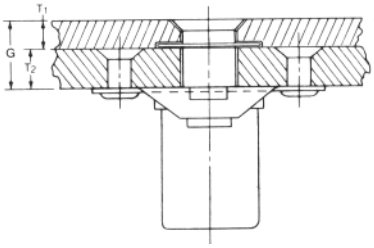
**To Select Stud Nut Dash Number**

1. Determine "G" thickness:
   a. **2-Lug receptacle:** "G" = "$T_1$" + "$T_2$," plus shim, any compressed gasketing material, paint or other finishes.
   b. **LiveSert receptacles:** "G" = "$T_1$," plus any other material.
2. Locate "G" grip range in table.
3. Find the corresponding stud nut dash number in the column designated for the selected stud nut.

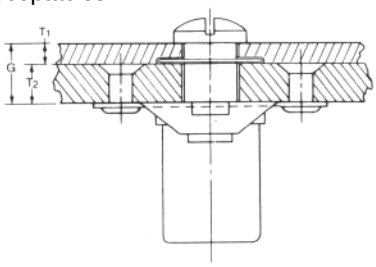
See Page 9 for typical installations of other receptacles.



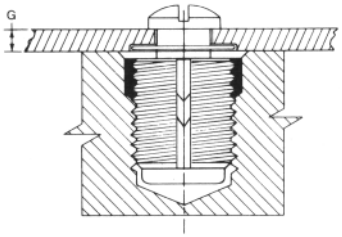

**LiveSert Receptacle Flush Head Stud Nut Shown**




**2-Lug Receptacle Flush Head Stud Nut Shown**




**2-Lug Receptacle Protruding Head Stud Nut Shown**




**LiveSert Receptacle Protruding Head Stud Nut Shown**

| Stud Nut Dash Number Selection | | | | | | | |
|---|---|---|---|---|---|---|---|
| L Ref. | "G"* Grip Range | CA17031 | | CA17036 | | CA17089 | |
| | | Dash No. | Approx. Weight lbs./100 | Dash No. | Approx. Weight lbs./100 | Dash No. | Approx. Weight lbs./100 |
| .520 | .150 - .220 | -1HS | .921 | -1HS | 2.13 | -1HS | .927 |
| .590 | .221 - .290 | -2HS | 1.043 | -2HS | 2.35 | -2HS | 1.049 |
| .660 | .291 - .360 | -3HS | 1.165 | -3HS | 2.57 | -3HS | 1.171 |
| .730 | .361 - .430 | -4HS | 1.287 | -4HS | 2.79 | -4HS | 1.293 |
| .800 | .431 - .500 | -5HS | 1.409 | -5HS | 3.01 | -5HS | 1.415 |
| .870 | .501 - .570 | -6HS | 1.531 | -6HS | 3.23 | -6HS | 1.537 |
| .940 | .571 - .640 | -7HS | 1.653 | -7HS | 3.45 | -7HS | 1.659 |
| 1.010 | .641 - .710 | -8HS | 1.775 | -8HS | 3.67 | -8HS | 1.781 |
| 1.080 | .711 - .780 | -9HS | 1.897 | -9HS | 3.89 | -9HS | 1.903 |
| 1.150 | .781 - .850 | -10HS | 2.019 | -10HS | 4.11 | -10HS | 2.025 |
| 1.220 | .851 - .920 | -11HS | 2.141 | -11HS | 4.33 | -11HS | 2.147 |
| 1.290 | .921 - .990 | -12HS | 2.263 | -12HS | 4.55 | -12HS | 2.269 |

* For "G" grip range greater or lesser than grip shown, contact Technical Sales.

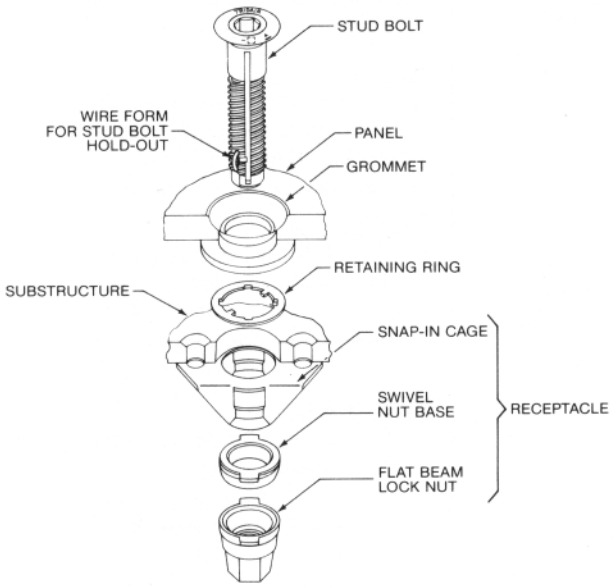
# Mark IV
# Structional Panel Fasteners

**Design and Features**

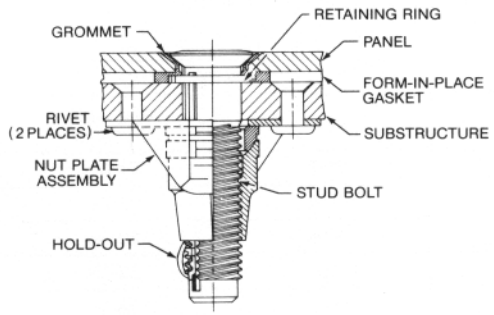
The patented Flat Beam Lock design provides excellent resistance to vibration-induced loosening, and has a cycle life of up to 1,500 seated cycles. The stud bolts featured are available in .250 and .375 inch nominal diameters. Positive stud bolt retention and hold-outs are available. The receptacle provides .020 inch minimum radial float and versions allow for angular engagement of nut plate to ease installation of curved panels. Receptacle can be replaced without removing rivets. Optional grommet provides hard seat surface, good load transfer, counterbore for retaining ring and is excellent for gasketed applications.

There are other types, styles and sizes available which are not featured in this catalog. Contact Fairchild Fasteners for more details.

**Typical Mark IV Fastening System:**
(Stud hold-out version shown with angular misalignment capabilities.)

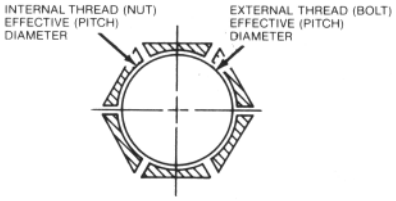



**Exploded View**

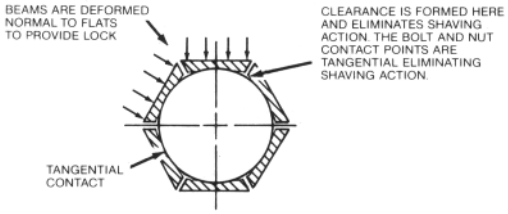



**Complete Installation**

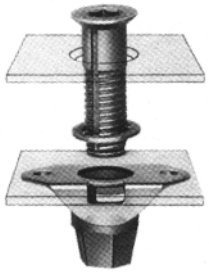
**Flat Beam Lock Nut Eliminates Shaving Action of Bolt.**




**Top View (Sectioned)**



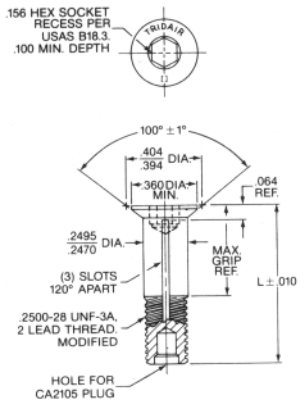
# Mark IV
# Plug Version.



**Features:**
- Flat Beam Lock design for excellent vibration resistance.
- Multiple lead thread for quick operation.
- .250 and .375 inch nominal stud bolt diameters featured.
- Receptacles allow for radial float.
- Up to 1,500 seated cycle life locking feature meets and exceeds MIL-N-25027.
- Accommodates large variations in grip (.140 inch).

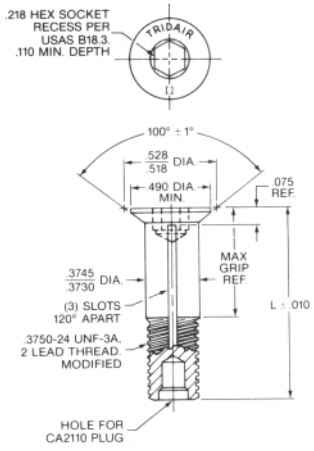
## Stud Bolts

**CA2104-( )HS.** (1/4 size)
Ultimate tensile strength:
2,800 pounds min. UTS.
Ultimate single shear strength:
4,000 pounds min. through solid shank.
1,700 pounds min. through hex socket.




**Note:** This fastener is covered by U.S. patent number 3,995,675 and is to be used with a CA2105 plug, CA2106 retaining ring and CA2103 flat beam nut.

**CA2109-( )HS.** (3/8 size)
Ultimate tensile strength:
4,700 pounds min. UTS.
Ultimate single shear strength:
7,500 pounds min. through solid shank.
4,350 pounds min. through hex socket.




**Note:** This fastener is covered by U.S. paten number 3,995,675 and is to be used with a CA2110 plug, CA2111 retaining ring and CA2108 flat beam nut.

**Material:** 8740 or 4140 Alloy Steel per MIL-S-6049 or MIL-S-5626. Other materials available, contact Rexnord.
Heat Treat: 160-180 KSI tensile strength per MIL-H-6875.
Finish: Cadmium Plated per QQ-P-416, Type II, Class 2.

Notes:
1. Surface texture per USAS B46.1: unthreaded shank, conical surface of head 32, other surfaces 125.
2. Part number callout examples:

CA2104-4 HS
- Hex Socket Recess
- L = .917;
- max. grip = .430
- Basic Part Number
- 1/4 size

CA2109-4 HS
- Hex Socket Recess
- L = 1.075;
- max. grip = .430
- Basic Part Number
- 3/8 size

3. Contact Rexnord Specialty Fastener Division for assistance in selecting correct dash number.

| Dash Number | Grip Range | | CA2104-( )HS | | CA2109-( )HS | |
|---|---|---|---|---|---|---|
| | Min. | Max. | Length | Weight per 1000 pcs. (lbs.) | Length | Weight per 1000 pcs. (lbs.) |
| -2 | .150 | .290 | .777 | 7.91 | 9.35 | 21.61 |
| -4 | .291 | .430 | .917 | 9.71 | 1.075 | 25.75 |
| -6 | .431 | .570 | 1.057 | 11.01 | 1.215 | 29.89 |
| -8 | .571 | .710 | 1.197 | 12.21 | 1.355 | 34.03 |
| -10 | .711 | .850 | 1.337 | 13.51 | 1.495 | 38.17 |

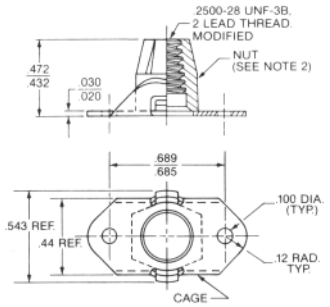
# Mark IV
# Plug Version

**Flat Beam Nut Receptacles.**

**CA2103.** (1/4 size)

**Specifications:**
Flat Beam Nut Locking Element: Capable of 1,500 seated useable cycles within the prevailing torque limits of 30 in. lbs. max. to 3.5 in. lbs. min. when tested at ambient room temperature with CA2104-( )HS stud bolt (Ref.: MIL-N-25027).
Vibration: Per MIL-STD-1312, Test 7 except vibration life shall be 90,000 cycles min. with no rotation greater than 90°.

**Mechanical:**
Ultimate Tensile Strength: 2,800 lbs. min. ultimate.
Nut Push-Out: 400 lbs. min. ultimate.
Nut Torque-Out: 100 in. lbs. min. ultimate.
Weight: 9.4 pounds/1000.




**Material:**
Nut: 4140 or 8740 Alloy Steel per MIL-S-5626 or MIL-S-6049.
Cage: 17-7 PH CRES per AMS 5528.

**Heat Treat:**
Nut: 180-200 KSI tensile strength per MIL-H-6875.
Cage: Condition TH1050

**Finish:**
Nut: Cadmium Plated per QQ-P-416, Type I, Class 2 and dry film lubed per MIL-L-8937/MIL-L-46010.
Cage: Passivated per QQ-P-35 or optional finish of Cadmium Plate per QQ-P-416, Type II, Class 2 if desired.

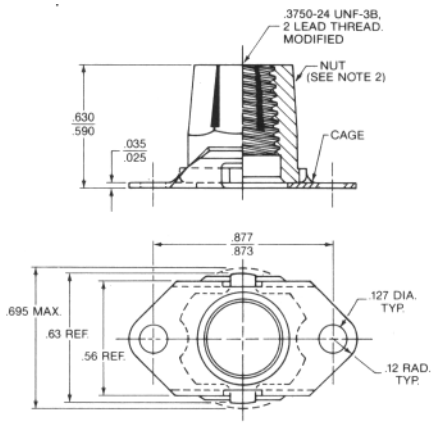
| Part No. | Cage Finish |
|---|---|
| CA2103 | Passivated |
| CA2103C | Cadmium Plated |

**Notes:**
1. Nut floats .020 minimum radially from cage centerline within a .615 maximum envelope.
2. The nut is removable and replaceable: for replacement, order nut P/N CA2103-1, order tool P/N CA18157-T10.
3. This receptacle is covered by U.S. patent number 3,702,628 and is to be used with a CA2104-( )HS stud bolt.
4. Contact Rexnord Specialty Fastener Division for optional receptacles, including encapsulated types.

**CA2103.** (3/8 size)

**Specifications:**
Flat Beam Nut Locking Element: Capable of 1,500 seated useable cycles within the prevailing torque limits of 80 in. lbs. max. to 9.5 in. lbs. min. when tested at ambient room temperature with CA2109-( )HS stud bolt (Ref.: MIL-N-25027).
Vibration: Per MIL-STD-1312, Test 7 except vibration life shall be 90,000 cycles min. with no rotation greater than 90°.

**Mechanical:**
Ultimate Tensile Strength: 6,000 lbs. min. ultimate.
Nut Push-Out: 400 lbs. min. ultimate.
Nut Torque-Out: 240 in. lbs. min. ultimate.
Weight: 18.8 pounds/1000.




**Material:**
Nut: 4140 or 8740 Alloy Steel per MIL-S-5626 or MIL-S-6049.
Cage: Steel per QQ-S-635.

**Heat Treat:**
Nut: 180-200 KSI tensile strength per MIL-H-6875.
Cage: Rc38-42 per MIL-H-6875

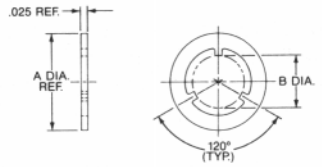
**Finish:**
Nut Cadmium Plated per QQ-P-416, Type I, Class 2 and dry film lubed per MIL-L-8937/MIL-L-46010.
Cage: Cadmium Plated per QQ-P-416, Type II, Class 2.

**Notes:**
1. Nut floats .025 minimum radially from cage centerline within a .695 maximum envelope.
2. The nut is removable and replaceable: for replacement, order nut P/N CA2108-1, order tool P/N CA1221-T10.
3. This receptacle is covered by U.S. patent number 3,702,628 and is to be used with a CA2109-( )HS stud bolt.

# Mark IV
# Plug Version.

## Retaining Rings.

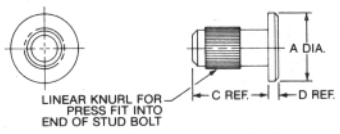
### CA2106 and CA2111.




| Normal Size | Part No. | A Dia. Ref. | B Dia. | Weight per 1000 pcs. (lbs.) | Material | Heat Treat | Finish |
|---|---|---|---|---|---|---|---|
| 1/4 | CA2106 | .375 | .190 Min. | .43 | 17-7 CRES per MIL-S-25043 | Condition RH 950 per MIL-H-6875 | Passivated per QQ-P-35 |
| | CA2106C | | | | | | Cadmium Plated per QQ-P-416, Type II, Class 2 |
| 3/8 | CA2111 | .515 | .295 Min. | .75 | Carbon Steel per QQ-S-777 | 180-200 KSI per MIL-H-6875 | Cadmium Plated per QQ-P-416, Type II, Class 2 |

## Plugs.

### CA2105 and CA2110.

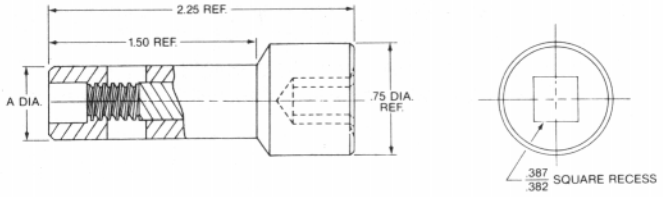



**Material:**
17-4 PH CRES per AMS 5643.
**Heat Treat:**
Condition H900 per MIL-H-6875.
**Finish:**
Passivated per QQ-P-35.

| Nominal Size | Part No. | A Dia. | C Ref. | D Ref. | Weight per 1000 pcs. (lbs.) | Installation Tool Part No. |
|---|---|---|---|---|---|---|
| 1/4 | CA2105 | $\frac{.217}{.212}$ | .182 | .030 | 0.75 | CA2104-T12 |
| 3/8 | CA2110 | $\frac{.339}{.329}$ | .272 | .045 | 2.80 | CA2109-T12 |

## Plug Installation Tools.

### CA2104-T12 and CA2109-T12.
(For field repair.)

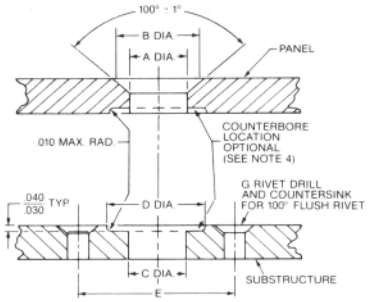



**Note:** Power tooling is also available for plug installation; contact Fairchild Fasteners.

| Part No. | A Dia. Ref. |
|---|---|
| CA2104-T12 | .50 |
| CA2109-T12 | .63 |

# Mark IV
# Plug Version

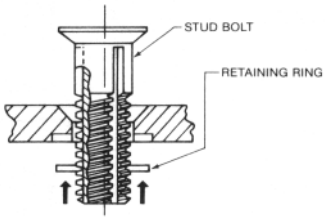
**Panel/Substructure Preparation and Installation Data.**



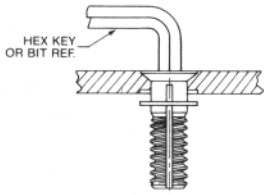

| Stud Bolt Basic Part Number | A Dia. | B Dia. | C Dia. | D Dia. Min. | E | G Rivet Size |
|---|---|---|---|---|---|---|
| CA2104-( )HS | .255<br>.250 | .409<br>.403 | .255<br>.250 | .406 | .689<br>.685 | 3/32 |
| CA2109-( )HS | .380<br>.375 | .533<br>.527 | .385<br>.375 | .547 | .877<br>.873 | 1/8 |

**Notes:**

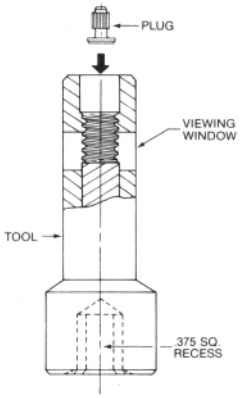
1. Locate and drill “A” Dia. hole through panel.
2. Countersink panel $\frac{101}{99}°$ to “B” Dia.
3. Locate and drill “C” Dia. hole through substructure.
4. Counterbore to “D” Dia. in back side of panel or front side of substructure (location optional if panel thickness meets minimum requirements); otherwise counterbore substructure.
5. Locate, drill and countersink two holes for rivets (not supplied).
6. Place stud bolt in panel.
7. Orient tabs on retaining ring to align slots in stud bolt and slide retaining ring onto stud bolt.



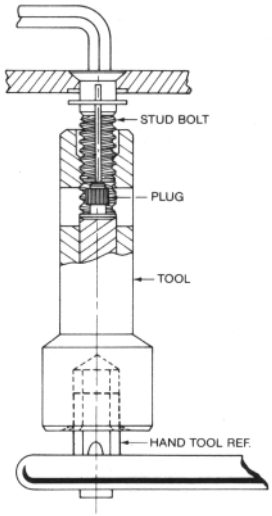

8. Place hex key or bit in hex socket of stud bolt.



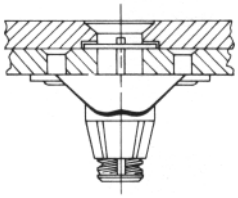

9. Place plug in installation tool. Power installation tool is available; contact Rexnord Specialty Fastener Division.



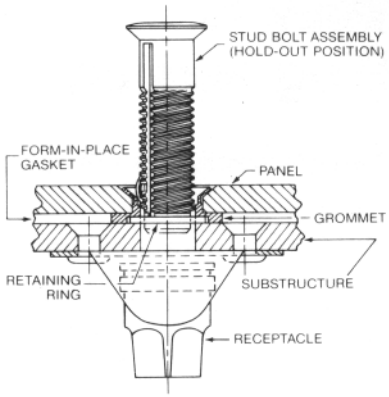

10. Thread installation tool onto stud bolt using ratchet-type hand tool
11. Turn until plug is fully seated (observe through viewing window). Do not over tighten.




12. Remove tool. Retaining ring is captivated.
13. Rivet receptacle in place, and installation is complete.
14. Contact Fairchild Fasteners for replacement retaining rings



# Mark IV
# Positive Stud Hold-out Version.

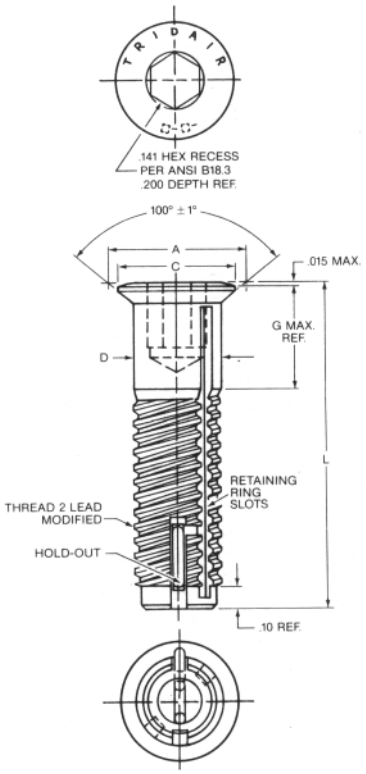


Typical Installation

**Features:**
Has all the features of the Mark IV plug version, plus:
- Superior strength.
- Positive stud bolt hold-out.
- Grommet design for composite material.
- Grommet is excellent for gasketed applications, provides hard seat surface,
- Superior load transfer and counterbore for retaining ring.
- Retaining ring is replaceable and no installation tool is necessary.
- Unthreaded lead on stud bolt offers probing ability.
- Accommodates large variations in grip (.140 inch).

## Stud Bolt Assemblies

**CA21037-4-( )HS.** (1/4 size)
**CA21037-6-( )HS.** (3/8 size)




| First Dash Number | Thread Size | A Dia. | C Dia. Min. | D Dia. | Ultimate Tensile Strength | Ultimate Single Shear Strength |
|---|---|---|---|---|---|---|
| -4 | .2500-28 UNF-3A, 2 Lead | .440<br>.430 | .375 | .2495<br>.2470 | 2600 lbs. min. | 2500 lbs. |
| -6 | .3750-24 UNF-3A, 2 Lead | .564<br>.554 | .505 | .3745<br>.3730 | 6000 lbs. min. | 5000 lbs. |

**Material:**
Stud Bolt: 4140 or 8740 or 8740 Alloy Steel per MIL-S-5626 or MIL-S-6049.
Hold-out: 17-7 PH CRES per AMS 5673. Other materials available, contact Rexnord Specialty Fastener Division.

**Heat Treat:**
Stud Bolt: 180-200 KSI per MIL-H-6875.
Hold-out: Condition CH900 per MIL-H-6875.

**Finish:**
Stud Bolt: Cadmium Plated per QQ-P-416, Type II, Class 2.
Hold-out: Passivated per QQ-P-35.

**Notes:**
1. Part number callout examples:

CA21037-4-10 HS
- HS — Hex Socket Recess
- 10 — L = 1.532; max. grip = .850
- 4 — 1/4 size nominal
- CA21037 — Basic Part Number

CA21037-6-10 HS
- HS — Hex Socket Recess
- 10 — L = 1.630; max. grip = .850
- 6 — 3/8 size nominal
- CA21037 — Basic Part Number

2. Contact Fairchild Fasteners for assistance in selecting correct dash number.

| Second Dash Number | G Grip Range | | -4 Size | | -6 Size | |
|---|---|---|---|---|---|---|
| | Minimum | Maximum | Length | Weight Oz. Ea. Maximum | Length | Weight Oz. Ea. Maximum |
| -2 | .150 | .290 | .972 | .13 | 1.170 | .41 |
| -4 | .291 | .430 | 1.112 | .16 | 1.210 | .43 |
| -6 | .431 | .570 | 1.252 | .19 | 1.350 | .48 |
| -8 | .571 | .710 | 1.392 | .22 | 1.490 | .53 |
| -10 | .711 | .850 | 1.532 | .25 | 1.630 | .58 |

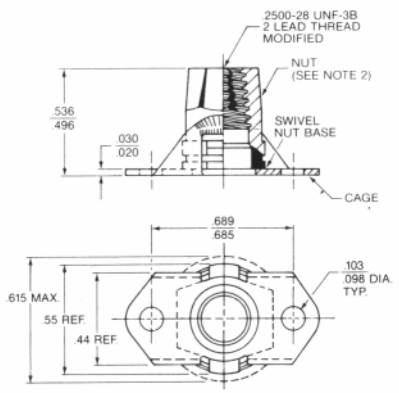
# Mark IV
# Positive Stud Hold-out Version.

**Flat Beam Nut Receptacles.**

**CA21021.** (1/4 size)

**Specifications:**
Flat Beam Nut Locking Element: Capable of 1,500 seated useable cycles within the prevailing torque limits of 30 in. lbs. max. to 3.5 in. lbs. min. when tested at ambient room temperature with CA21037-4-( )HS stud bolt (Ref.: MIL-N-25027).
Vibration: Per MIL-STD-1312, Test 7 except vibration life shall be 90,000 cycles min. with no rotation greater than 90°.

**Mechanical:**
Ultimate Tensile Strength: 2,600 lbs. min. ultimate.
Nut Push-Out: 400 lbs. min. ultimate.
Nut Torque-Out: 100 in. lbs. min. ultimate.
Weight: 10.6 pounds per 1000 pieces.




**Material:**
Nut: 4140 per MIL-S-5626 or 8740 per MIL-S-6049.
Cage: 17-7 PH CRES per AMS 5528.
Base: 4140 per MIL-S-5626 or C1050 per AMS 5085.

**Heat Treat:**
Nut and Base: 180-200 KSI per MIL-H-6875.
Cage: Cond. TH1050 per MIL-H-6875.

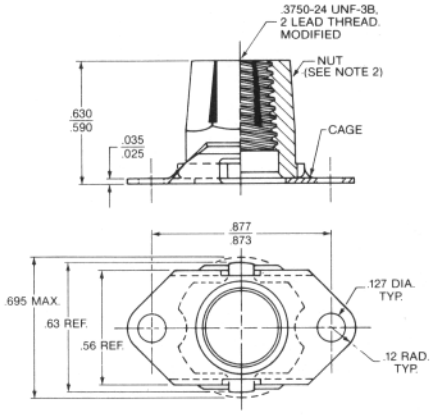
**Finish:**
Nut and Base: Cadmium Plated per QQ-P-416, Type I, Class 2 and dry lubed per MIL-L-8937/MIL-L-46010.
Cage: Passivated per QQ-P-35.

**Notes:**
1. The nut shall tilt 4° minimum from the vertical centerline in all directions to accommodate angular misalignment and shall float .025 min. radially from cage centerline within a .615 maximum envelope.
2. The nut is removable and replaceable: for replacement, order nut P/N CA21021-1, nut base P/N CA21021-3, cage P/N CA21021-2 or tool P/N CA18157-T10.
3. This receptacle is covered by U.S. patent number 3,702628 and is to be used with CA21037-4-( )HS stud bolt.

**CA21024.** (3/8 size)

**Specifications:**
Flat Beam Nut Locking Element: Capable of 1,500 seated useable cycles within the prevailing torque limits of 80 in. lbs. max. to 9.5 in. lbs. min. when tested at ambient room temperature with CA21037-4-( )HS stud bolt (Ref.: MIL-N-25027).
Vibration: Per MIL-STD-1312, Test 7 except vibration life shall be 90,000 cycles min. with no rotation greater than 90°.

**Mechanical:**
Tensile Strength: 6,000 lbs. min. ultimate.
Nut Push-Out: 400 lbs. min. ultimate.
Nut Torque-Out: 240 in. lbs. min.
Weight: 18.8 lbs. per 1000 pieces.




**Material:**
Nut: 4140 per MIL-S-5626 or 8740 MIL-S-6049.
Cage: 17-7 PH CRES per AMS 5528.

**Heat Treat:**
Nut: 180-200 KSI per MIL-H-6875.
Cage: Condition TH1050 per MIL-H-6875.

**Finish:**
Nut Cadmium Plated per QQ-P-416, Type I, Class 2 and dry lube per MIL-L-8937/MIL-L-46010.
Cage: Passivated per QQ-P-35, or optional Cadmium Plated per QQ-P-416, Type II, Class 2.

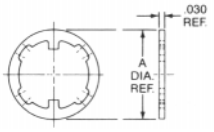
| Part No. | Cage Finish |
|---|---|
| CA21024 | Passivated |
| CA21024C | Cadmium Plated |

**Notes:**
1. Nut floats .025 minimum radially from cage centerline within a .695 maximum envelope.
2. The nut is replaceable: For replacement, order nut P/N CA21024-1, order tool P/N CA1221-T10 or cage CA21024-2.
3. This receptacle is covered by U.S. patent number 3,702,628 and is to be used with a CA21037-6-( )HS stud bolt.

# Mark IV
# Positive Stud Hold-out Version.

**Retaining Rings.**

**CA21037-( )R Series.**

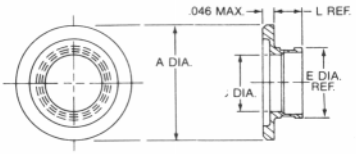



| Nominal Size | Part No. | A Dia. Ref. | Material | Heat Treat | Finish | Weight per 1000 pcs. (lbs.) approx. |
|---|---|---|---|---|---|---|
| 1/4 | CA21037-4R | .355 | 17-7 PH CRES per MIL-S-25043 | Condition RH 950 per MIL-H-6875 | Passivated per QQ-P-35 | .35 Max. |
| | CA21037C-4R | | | | Cadmium Plated, Type II, Class 2 per QQ-P-416 | |
| | CA21037CL-4R | | | | Dry Film Lube per MIL-L-8937/MIL-L-46010 Over Cadmium Plated, Type I, Class 2 per QQ-P-416 | |
| 3/8 | CA21037-6R | .480 | | | Passivated per QQ-P-35 | |
| | CA21037C-6R | | | | Cadmium Plated, Type II, Class 2 per QQ-P-416 | |
| | CA21037CL-6R | | | | Dry Film Lube per MIL-L-8937/MIL-L-46010 Over Cadmium Plated, Type I, Class 2 per QQ-P-416 | |

**Note:** All dimensions apply before plate.

**Grommet.**

**CA21038-( )-( ) Series.**
Note: Grommet can be used for composite material applications. Optional grommets are also available; contact Rexnord Specialty Fastener Division.



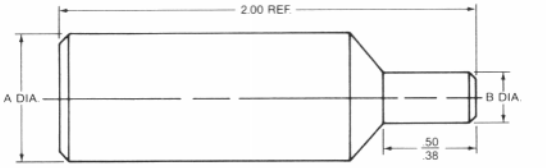

| Nom. Size | Part No. | L | Grip Range Min. | Grip Range Max. | A | C | E Ref. | Material | Heat Treat | Finish | Weight per 1000 pcs. (lbs.) approx. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/4 | CA21038-4-1 | .115 | .075 | .095 | .505 Max. | .255 / .250 | .310 | 304 CRES | Condition A per QQ-S-763 or equivalent | Passivated per QQ-P-35 | 1.65 |
| | CA21038-4-2 | .135 | .096 | .115 | | | | | | | 1.92 |
| | CA21038-4-3 | .155 | .116 | .135 | | | | | | | 2.19 |
| | CA21038C-4-1 | .115 | .075 | .095 | | | | | | Cadmium Plated, Type II, Class 2 per QQ-P-416 | 1.65 |
| | CA21038C-4-2 | .135 | .096 | .115 | | | | | | | 1.92 |
| | CA21038C-4-3 | .155 | .116 | .135 | | | | | | | 2.19 |
| 3/8 | CA21038-6-1 | .105 | .075 | .095 | .630 Max. | .395 / .390 | .465 | | | Passivated, per QQ-P-35 | 2.41 |
| | CA21038-6-2 | .125 | .096 | .115 | | | | | | | 2.81 |
| | CA21038-6-3 | .145 | .116 | .135 | | | | | | | 3.21 |
| | CA21038C-6-1 | .105 | .075 | .095 | | | | | | Cadmium Plated, Type II, Class 2per QQ-P-416 | 2.41 |
| | CA21038C-6-2 | .125 | .096 | .115 | | | | | | | 2.81 |
| | CA21038C-6-3 | .145 | .116 | .135 | | | | | | | 3.21 |

**Note:** All dimensions apply before plate.

# Mark IV
# Positive Stud Hold-out Version.

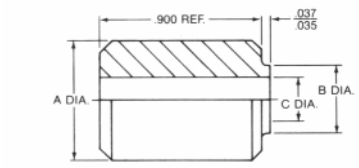
**Installation Tools.**

**Swage Tool CA21038-( )-T11**
Use to install CA21038-( )-( ) series grommet.



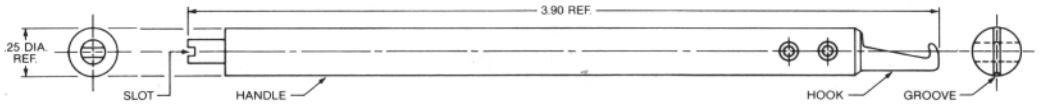

| Nominal Size | Part No. | A Dia. | B Dia. Ref. |
|---|---|---|---|
| 1/4 | CA21038-4-T11 | .635<br>.615 | .249 |
| 3/8 | CA21038-6-T11 | .760<br>.740 | .389 |

**Anvil CA21038-( )-T10**
Use to install CA21038-( )-( ) series grommet.




| Nominal Size | Part No. | A Dia. | B Dia. | c Dia. |
|---|---|---|---|---|
| 1/4 | CA21038-4-T10 | .635<br>.615 | .365<br>.355 | .260<br>.252 |
| 3/8 | CA21038-6-T10 | .760<br>.740 | .488<br>.478 | .396<br>.391 |

**Hold-out Tool CA21037-T12**
Use with both 1/4 and 3/8 size CA21037-( )-( )HS stud bolts.




## To Remove Hold-out:

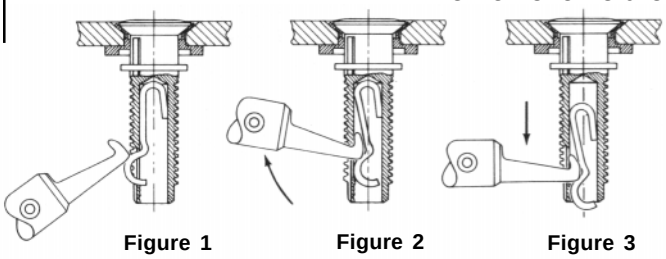


**Figure 1**

Place groove in hook on hold-out.

**Figure 2**

Turn and push tool into stud bolt.

**Figure 3**

Slide tool down.

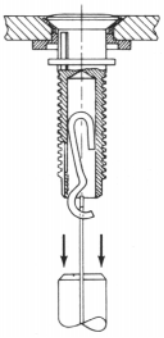


**Figure 4**

Place hook on hold-out and pull out.

## To Install Hold-out:

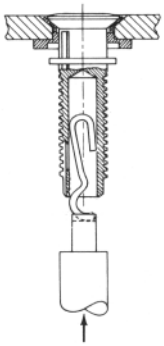
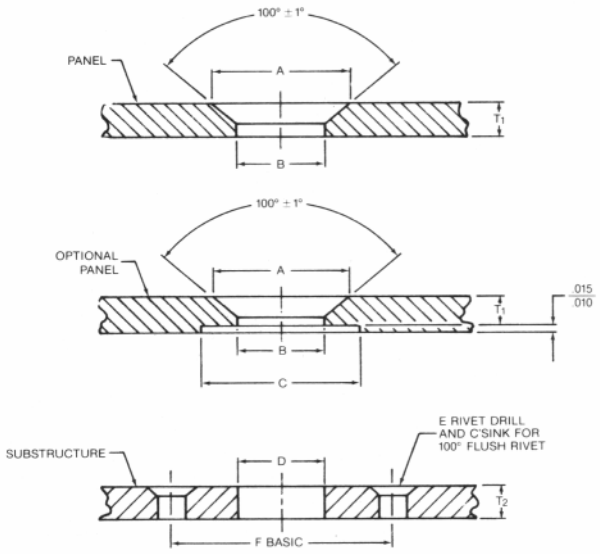


**Figure 5**

Place hold-out in stud bolt. Align slot of tool with hold-out and push in. Turn tool to orientate hold-out with slot in stud bolt.

# Mark IV
# Positive Stud Hold-out Version.

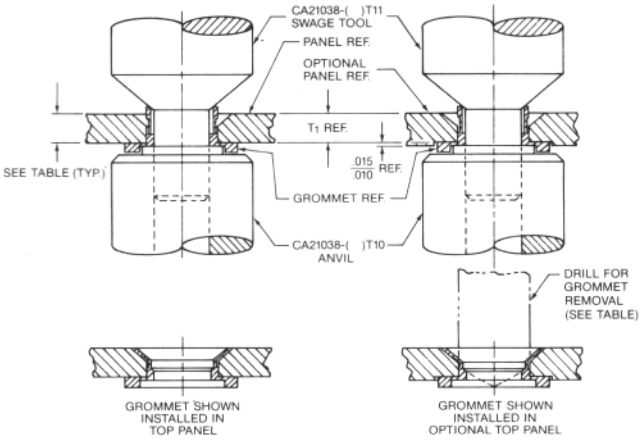
**Panel/Substructure Preparation and Installation Data.**




| Nominal Size | A C'Sink Dia. | B Hole Dia. | C C'Bore Dia. | D Min. Dia. | E Rivet Dia. | F Basic |
|---|---|---|---|---|---|---|
| 1/4 | .450<br>.445 | .315<br>.312 | .531 | .250 | 3/32 | .688 |
| 3/8 | .575<br>.570 | .472<br>.468 | .656 | .375 | 1/8 | .875 |

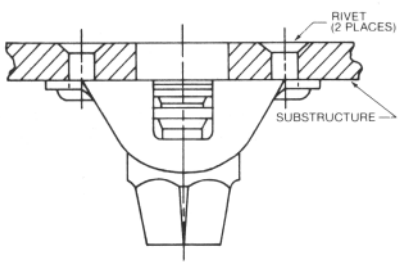
**Notes:**

1. "$T_1$" must correspond to panel grip range for CA21038-( )-( ) or CA2103C-( )-( ) grommets.
2. Locate and drill "B" Dia. hole through panel.
3. Countersink panel $\frac{101°}{99°}$ to "A" Dia.
4. Counterbore back side of panel $\frac{.015}{.010}$ deep to "C" Dia. (optional) to provide lower grommet profile
5. Locate and drill "D" Dia. hole through substructure.
6. Locate, drill and countersink two holes for rivets (not supplied).

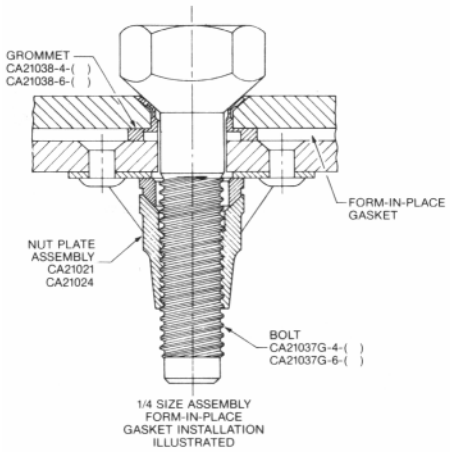



| Nominal Size | Drill Size |
|---|---|
| 1/4 | .312 |
| 3/8 | .469 |

7. Install grommet using referenced tools as illustrated above.
8. Note proper grommet removal procedure above (if required).




9. Rivet nut plate receptacle in place.

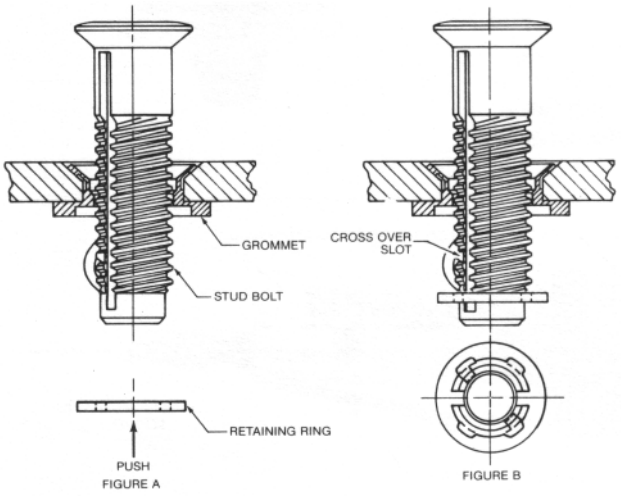



10. Procedure to install form-in-place gasket material. a) Apply form-in-place gasket material. b) Install bolt. c) Torque to 100 in. lbs. d) After cure, remove bolt. Bolt is reuseable.

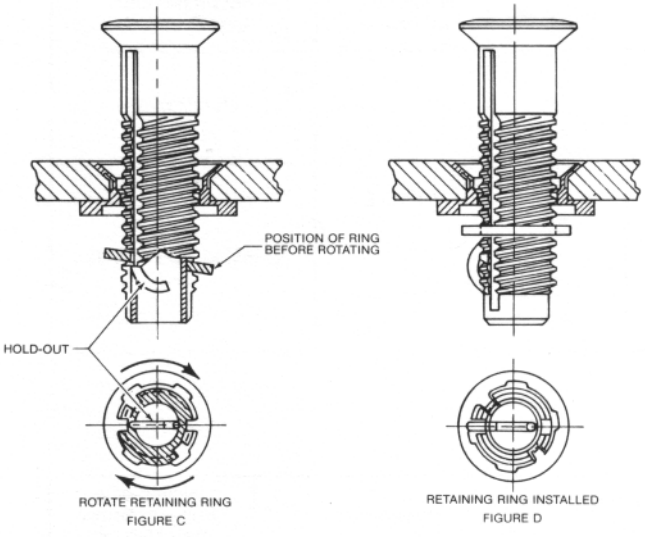
# Mark IV
# Positive Stud Hold-out Version.

## Panel/Substructure Preparation and Installation Data (continued).

**Retaining Ring Installation.**

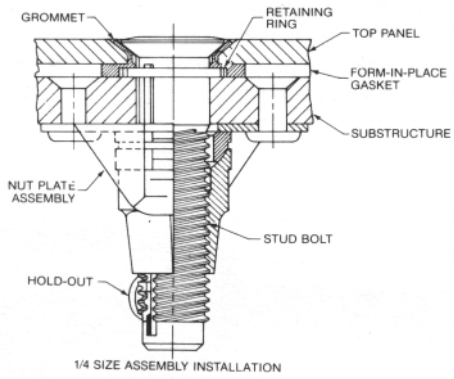



11. Place stud bolt assembly through grommet (Figure A).
12. Push retaining ring onto installation slots (Figure B).

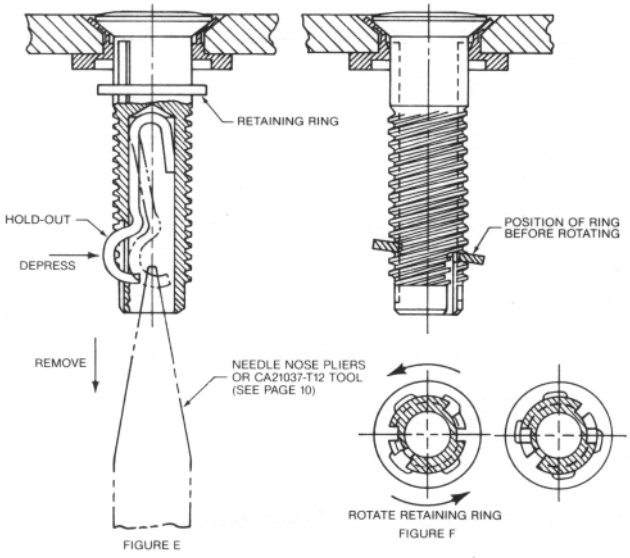



13. Continue to push retaining ring until hold-out feature is delflected as shown in Figure C.
14. Rotate retaining ring clockwise to longitudinal slots.
15. Retaining ring is installed (Figure D).

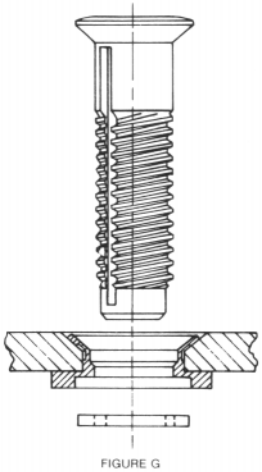
16. Installation is complete.



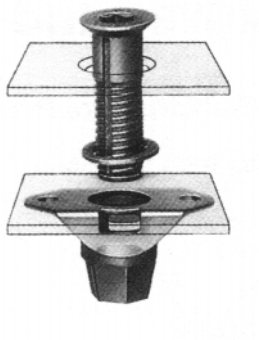

cleaning and/or replacement.




a) Use needlenose pliers or CA2103 T12 tool to depress and remove wire form (Figure E).
b) Rotate retaining ring counter-clockwise (Figure F).
c) At this time all components can be cleaned or replaced (Figure G).
d) To reassemble reverse removal prodcedure.

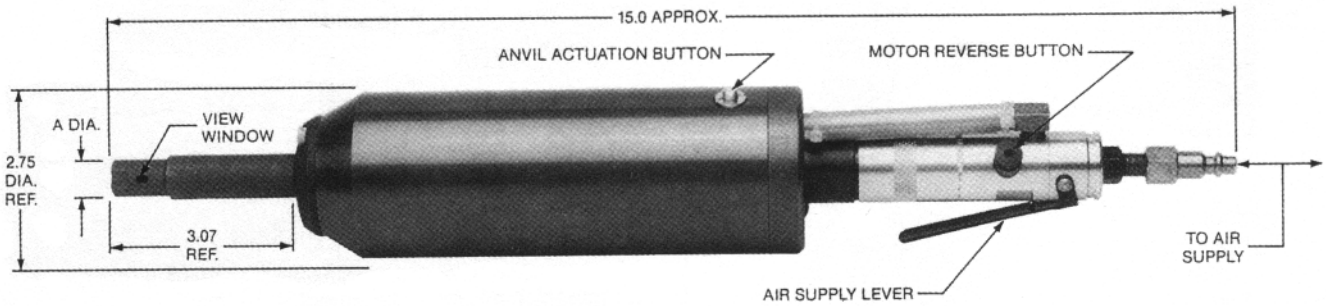


# Mark IV™ Pneumatic Plug Installation Tool. For Captivating Ring on Plug Version Mark IV Studs.



**Features:**

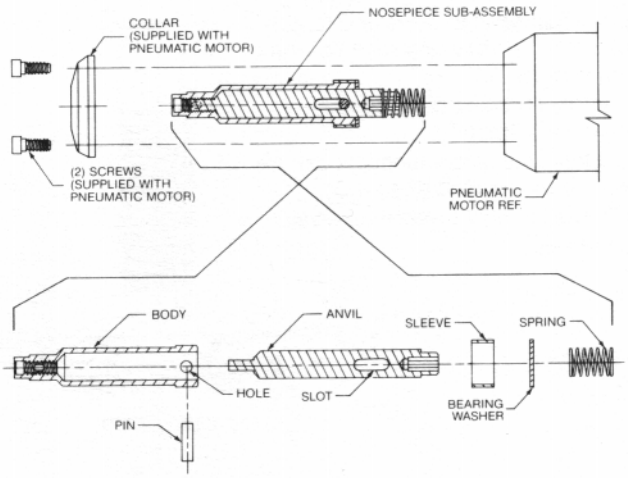
- Forward and reverse pneumatic motor.
- Quick disconnect air coupling.
- Interchangeable nosepieces for all plug versions of Mark IV studs.
- Reduces installer's fatigue during moderate to long production runs.
- View window for proper installation verification before tool disengagement.




**Installation Tool (Pneumatic Motor with Nosepiece Sub-Assembly)**

| Mark IV Stud (Ref.) | Thread Size | Installation Tool Part Number | A Diameter Ref. | Motor Only Part Number | Recommended Line Pressure |
|---|---|---|---|---|---|
| CA2193-3-( )<br>CA2194-3-( )<br>CA21017-3-( ) | .1900-32UNJF | CA2100-T13-31L | .38 | 70950-6 | 40 PSI Max. |
| CA21094-3-( ) | .1900-32UNF, 2 Lead, Mod. | CA2100-T13-32L | | | |
| CA2193-4-( )<br>CA2194-4-( )<br>CA21017-4-( ) | .2500-28UNJF | CA2100-T13-41L | .50 | | 80 PSI to 110 PSI Max. |
| CA2104-( )HS<br>CA21070-4-( )HS | .2500-28UNF, 2 Lead, Mod. | CA2100-T13-42L | | | |
| CA2109-( )HS<br>CA21070-6-( )HS | .3750-24UNF, 2 Lead, Mod. | CA2100-T13-62L | .63 | | |

**Separate Nosepiece Sub-Assemblies**




| Mark IV Stud (Ref.) | Thread Size | Nosepiece Sub-Assembly Part Number |
|---|---|---|
| CA2193-3-( )<br>CA2194-3-( )<br>CA21017-3-( ) | .1900-32UNJF | CA2100-T13-31SL |
| CA21094-3-( ) | .1900-32UNF, 2 Lead, Mod. | CA2100-T13-32SL |
| CA2193-4-( )<br>CA2194-4-( )<br>CA21017-4-( ) | .2500-28UNJF | CA2100-T13-41SL |
| CA2104-( )HS<br>CA21070-4-( )HS | .2500-28UNF, 2 Lead, Mod. | CA2100-T13-42SL |
| CA2109-( )HS<br>CA21070-6-( )HS | .3750-24UNF, 2 Lead, Mod. | CA2100-T13-62SL |

**Note:**
Pneumatic motor part number 70950-6 can utilize any of the nosepiece sub-assembly part numbers listed. To install more than one size plug, order only one pneumatic motor with as many nosepiece sub-assemblies as required.

*Unless otherwise noted, all dimensions are in inches.*

# Mark IV™ Pneumatic Plug Installation Tool.

## Installation Instructions (see Mark IV Catalog #3400 for specific panel preparation information):

1. Locate and drill hole in panel with drill size specified.
2. Countersink and counterbore panel as specified.

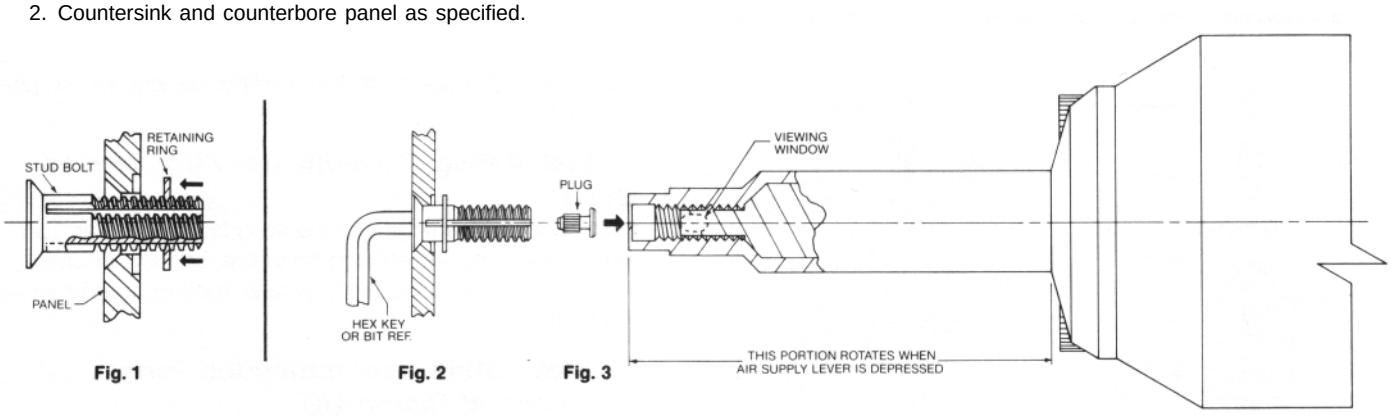



Fig. 1 Fig. 2 Fig. 3

3. Place stud bolt in panel (Fig. 1).
4. Orient tabs on retaining ring to align slots in stud bolt and slide retaining ring onto stud bolt. (Fig. 1).
5. Place recess tool in recess of stud bolt (fig. 2).
6. Place pug in installation tool (Fig. 3).
7. Thread installation tool on to stud bolt by depressing Air Supply Lever, at rear of tool (Fig. 4).
8. Press Button 1 to actuate anvil and press plug into stud bolt (Fig. 5).
9. Rmove tool by depressing Button 2 along with the Air Supply Lever. Tool motor reverses and will unthread from stud bolt (Fig. 6).
10. Retaining ring is captivated.
11. Contact Fairchild Fasteners should replacement retaining rings be required.
12. **CAUTION**: Damage to stud bolt may occur if user exceeds recommended line pressure.

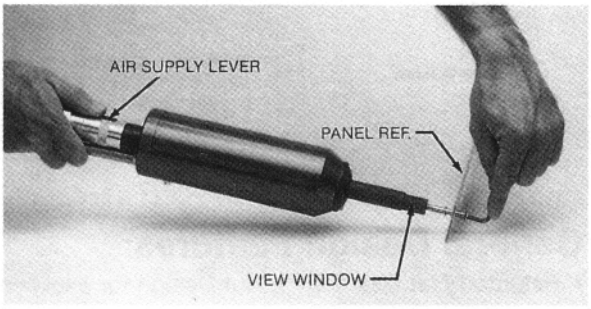



Fig. 4

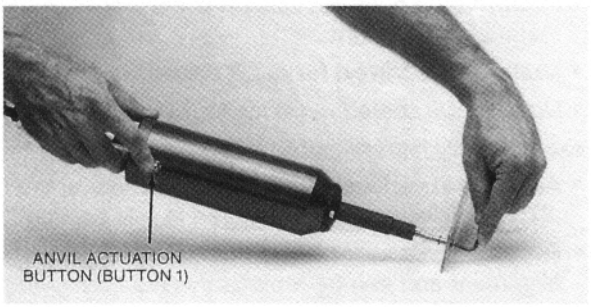



Fig. 5

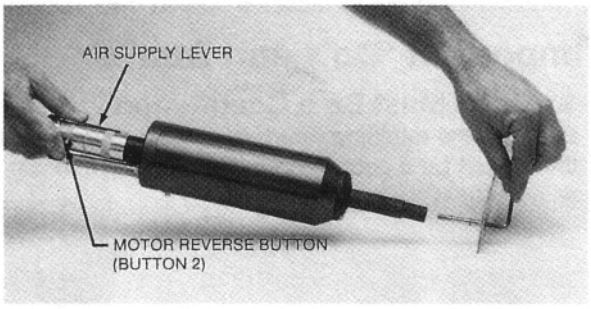


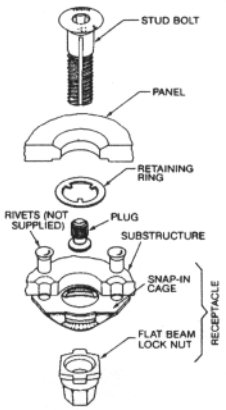

Fig. 6

*Specifications subject to change without notice.*

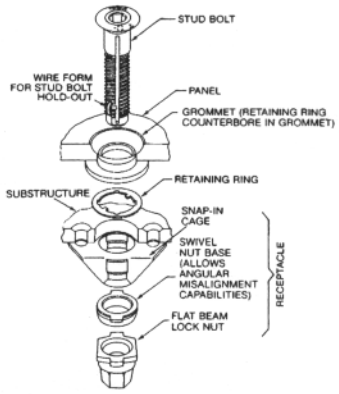
# Mark IV Structural Panel Fasteners

The Mark IV fastener assures the ultimate in reliability for high performance aircraft. Two versions are discussed in this book, the Plug Version and the Positive Stud Hold-out Version.

## Typical Mark IV Fastening System:




**Plug Version**




**Positive Stud Hold-out Version**
(Stud hold-out version shown with angular misalignment capabilities.)

## General Design Features:

- Patented Flat Beam Lock Nut Design for excellent resistance to vibration-induced loosening.
- Positive stud hold-out version is excellent for composite material applications.
- Multiple lead thread for quick operation.
- Up to 1,500 seated cycle life locking feature for exceptionally high reusability.
- Availabe in various nominal stud diameters, the .250 and .375 inch diameters are featured in this catalog.
- Receptacle provides radial float to accomodate misalignment and can be replaced without removing rivets.
- Positive stud bolt retention; versions also available with postive hold-out to facilitate curved door handling.

## Important 'Do's and Don'ts'.

**1. There Must Be a Counterbore.**
Because the retaining ring turns as the stud bolt turns, there must be a counterbore to allow the retaining ring to spin freely.

**2. Prepare Counterbore Per Specifications.**
Make sure the retaining ring counterbore is drilled to the correct depth and diameter to allow the retaining ring to spin freely. When using a grommet or spacer, the counterbore is provided.

**3. Remove Any Foreign Material from Counterbore.**
Remove any gasket material, metal chips or other foreign debris from counterbore which could keep the retaining ring from spinning freely.

**4. Use Apprived Installation Tools.**
Use only approved installation tools. Use of "homemade" tools could damage both the fastener as well as the parent material.

**5. Install Plug Correctly (for Plug Version Only).**
Installation of the plug into the stud bolt is critical. Too much pressure, not enough pressure, striking of plug, installation at an angle, or improper tooling could damage the fastener.

**6. Stay Within Recommended Torque Tolerance at Clamp-Up.**
Over-torquing of the stud bolt at clamp-up could deform both fastener and the parent material. Under- torquing would not provide adequate pre-load to joint. Consult your engineering departmenet of Fairchild Fasteners Tridair Products.

**7. Prepare Countersink Per Specifications.**
Countersinks prepared too shallow or too deep could damage parent material and fastener.

**8. Rivet Holes.**
Drill rivet holes in line with center hole otherwise stud bolt may not engage threads in receptacle. All receptacles do have a built-in float feature that allow some misalignment of the rivet holes with the center hole. Do not exceed float limit, however.

**9. Rivet Installation.**
Install rivets flush to surface of substructure. Panel and substructure must be flush at clamp-up unless spacer of grommet is used.

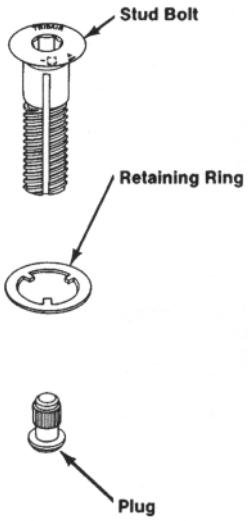
**10. Through Hole Alignment.**
Be sure to align through holes in both panel and substructure for proper fit of stud bolt and receptacle.

**11. Hexagon Key.**
- Select quality hexagon key. Pay special attention to "across the corners" dimension. (See Page 16).
- Insert tool to full depth of hexagon recess.
- Do not apply side load to hexagon key.

# Mark IV, Plug Version

## Stud Bolt:

Stud bolt is held in panel by a retiaining ring. Care must be taken to choose the proper length stud bolt to suit specific grip ranges. Stud bolts should be torqued with the correct hexagon key as shown on Page 16.




1. 2-lead thread for quick installa tion and operation.
2. Hexagon socket for relaible, high torque transfer capability without cam-out.
3. Carries high shear and tension load at joint.

1. Non-stressed.
2. Captivates stud bolt to panel to prevent:
   - Loss of stud bolt.
   - Installation of incorrect bolts into wrong holes.
   - Foriegn object damage from stud bolt.

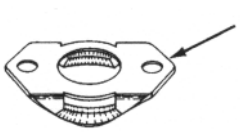
**Note:** Care should be taken not to damage tangs in these rings. The retaining ring counterbore should always be checked to make sure it is clear of all debris. If a ring is ever damaged, it should be replaced immediately using the tools shown on Page 9 (requires engineering approval).

1. Positively captivates retaining ring to stud bolt.

## Receptacle:

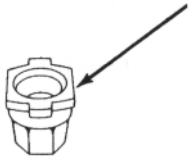
Allows radial float. Lock nut is held in place behind mounting hole by the cage which is riveted to substructure.

The nut provides radial float and some versions allow for angular engate to ease installation of curved panels. The nut is removable and replaceabe.



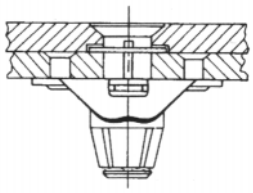
**Cage**

1. Snap-in design allows nut to be replaced without removing cage.



**Flat Beam Lock Nut**

1. Flexible flat beams provide high cycle life (up to 1500 seated cycles), and vibration resistance.
2. Nut can be replaced without removing cage.



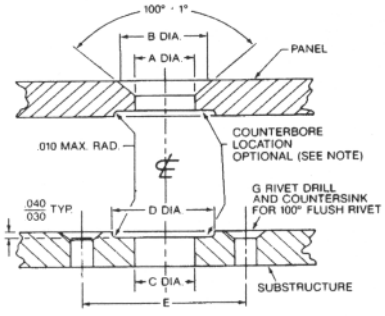
## Complete Installation:

Receptacle is riveted in place and retiaining ring is captivated.

# Panel/Substructure Preparation and Installation Data.

### Basic hole preparation

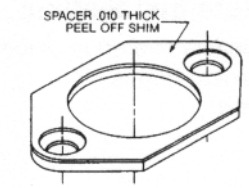
(Counterbore and rivet countersink not required if spacer or grommet is used.)



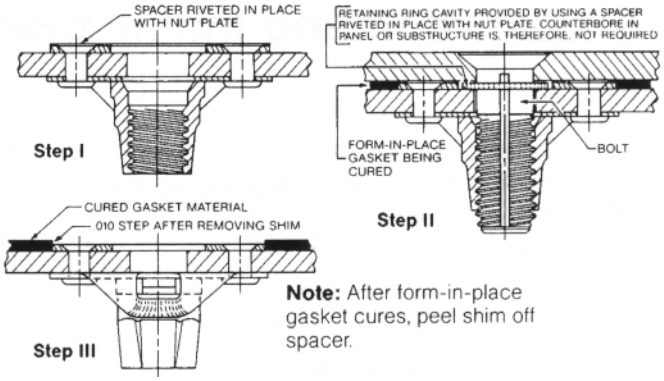

| Stud Bolt Thread Size Ref. | A Dia. | B Dia. | C Dia. | D Dia. Min. | E | G Rivet Size |
|---|---|---|---|---|---|---|
| .2500-28 UNF-3A 2 Lead | .255 .250 | .409 .403 | .255 .250 | .406 | .689 .685 | 3/32 |
| .3750-24 UNF-3A 2 Lead | .380 .375 | .533 .527 | .380 .375 | .547 | .877 .873 | 1/8 |

**Note:** Counterbore location optional if panel thickness meets minimum requirements. Contact Fairchild Fasteners Tridair Products, or your engineering department.

### Installation using optional spacer and form-in-place gasket.




### Installation of form-in-place gasket using mating bolt.




**Note:** After form-in-place gasket cures, peel shim off spacer.

# Selecting Proper Grip Range For Stud Bolt:

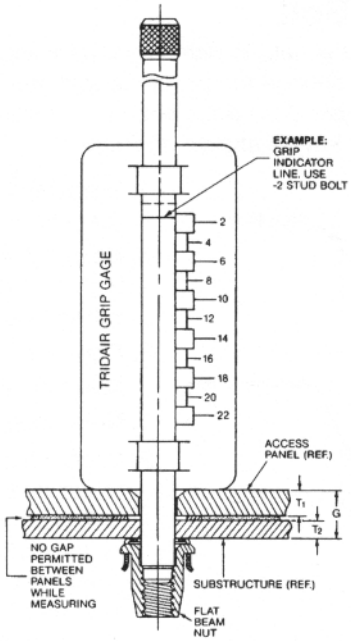
Different grip ranges are sometimes used in the same panel, or stud bolts sometimes need to be replaced. It is important that stud bolts be selected with the proper grip range. This range may be selected using a reading from one of the grip gages shown here. These gages may be obtained from Fairchild Fasteners Tridair Products.

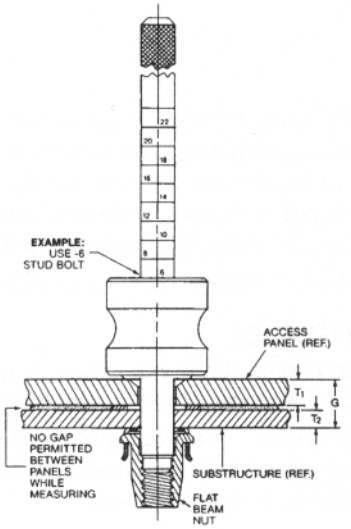
### To Use Grip Gages:

1. Place gage in through hole of both panel and substructure and seat in receptacle.
2. No gap is permitted between panel and substructure while measuring, unless “Form-In-Place” gasket is used.
3. Grip gages measure total grip ($T_1$ + $T_2$ + “ Form-In-Place” gasket if used).
4. Grip indicator number indicates correct stud bolt dash number to be used.
5. If borderline grip condition, use lower dash number.

### Typical Grip Gages:

**Typical Grip Gages:**

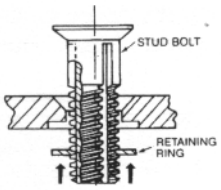


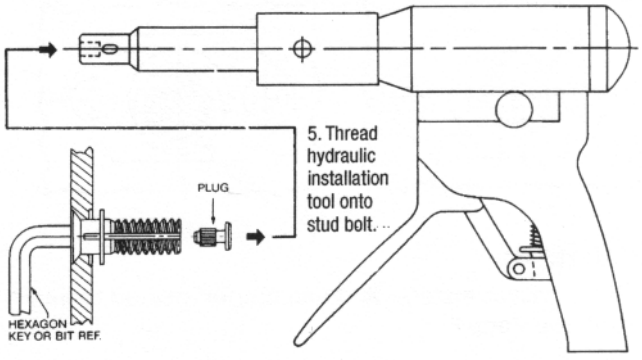



## When Proper Grip Range Is Determined, Installation Of Plug Is As Follows:

### Manual tool for small quantities

1. Place stud bolt in panel.
2. Orient tabs on retaining ring to align slots in stud bolt and slide retaining ring onto stud bolt.
3. Place hexagon key or bit in hex socket of stud bolt.
4. Place plug in installation tool.

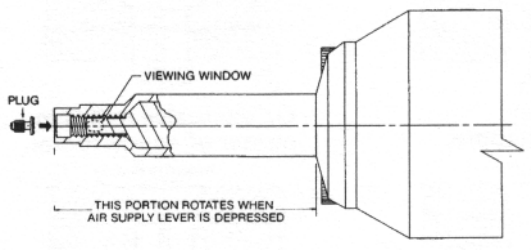



6. Pump handle squeeze to actuate hydraulic cylinder to press Plug into stud bolt. Plug must be fully seated (observe through viewing window).
7. To remove stud bolt, release button and press to release hydraulic cylinder.

### Power tool for large quantities

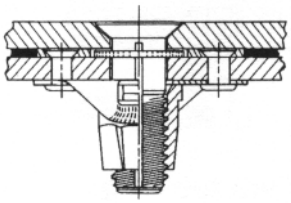
(For more information see Tridair Catalog No. 3700.) Follow procedures No. 1 through 4 above, then follow steps outlined below:




5. Thread installation tool onto stud bolt by depressing Air Supply Lever, at rear of tool.
6. Press button on cylinder to actuate anvil and press plug into stud bolt.
7. Remove tool by depressing reverse button at rear of cylinder along with the Air Supply Lever. Tool motor reverses and will unthread from stud bolt.
8. Retaining ring is captivated.
9. See Page 9 should replacement retaining rings be required.

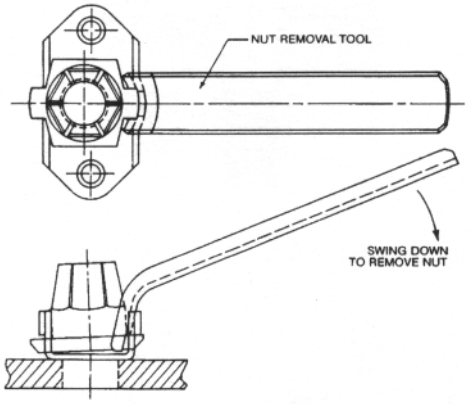
10. **CAUTION:** Damage to stud bolt may occur if user ex ceeds recommended line pressure. Recommended line pressure for .1900-32 thread size is 40 PSI Max. Recommended line pressure for .2500-28 and .375-24 sizes is 80 PSI to 110 PSI.

## Proper Installation



## Flat Beam Nut Removal:

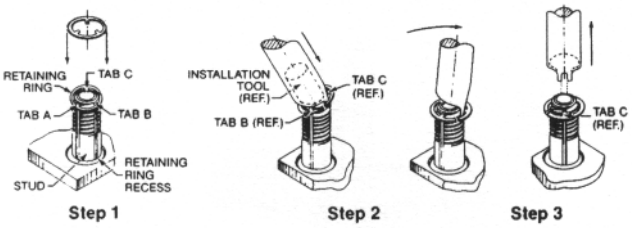
Use Tridair tools to remove nut.




## Retaining Rings Used For Repair:

**Note:** Please contact Fairchild Fasteners, Tridair Products, or consult your engineering department before using split retaining rings.

When the original retaining ring becomes disassembled from a stud bolt with the plug already installed, split retaining rings (correct size) may be installed as shown. These split retaining rings are not to be used other than for repair. Use Tridair installation tools.

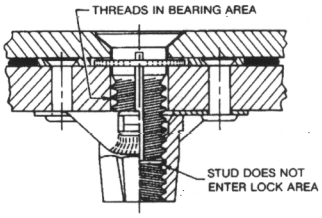



Install tabs A and B of the retaining ring into two of the stud bolt grooves as shown in Step 1. Lower the installation tool, straddling tab C as shown, then swing tool in the direction shown in Step 2 to snap tab C into third groove of stud bolts. Remove tool from assembly as shown in Step 3.

## Improper Fastener Installation

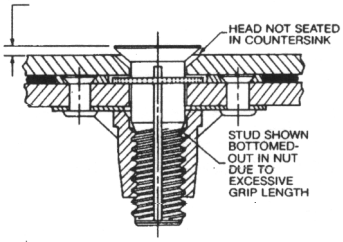
(Also see Problems/Solutions starting this page.)

**. . . When studs are too short**




**. . . When studs are too long**

1. Stud protrudes from panel.
2. No preload is applied to joint.




# Problems/Causes/Solutions

### 1. Problem:

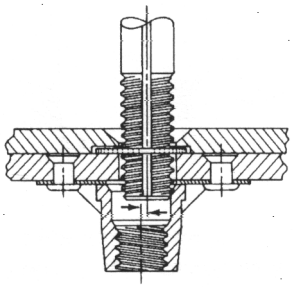
Stud will not engage threads in nut.

**Cause:**

Rivet holes in substructure not in line with center hole. Nut not able to float far enough to compensate for error.

**Solution:**

Relocate rivet holes in proper alignment with center line.

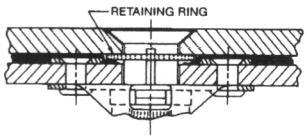


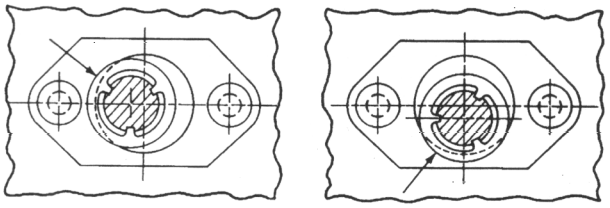
### 2. Problem:

Retaining ring breaks and stud bolt falls free from panel.

### Cause:

Gasket Material in ring counterbore, cavity or spacer, or grommet, if used. Or, holes in substructure not in line causing ring to be pinched between panel and substructure or spacer, if used, during clamp-up.



### Solution:

Remove gasket material and use proper method to install gasket. See Page 6.

### Solution:

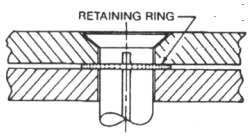
Drill new rivet holes in line with center hole.

### 3. Problem:

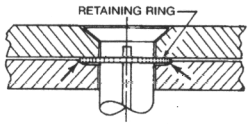
Retaining ring breaks and stud bolt falls free from panel.

### Cause:

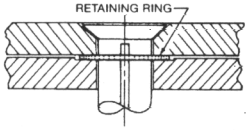
Ring becomes captive between panel and substructure and will not turn with stud, retaining ring tabs shear off.



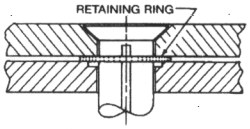

**Caused by: no counterbore.**




**Or, excessive radius in corner of counterbore.**




**Or, shallow counterbore.**



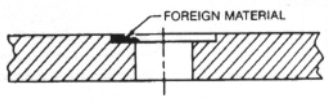

**Or, counterbore diameter undersize.**

### Solution:

Rework counterbore as show on Page 6.

**Note:** Counterbores on curved surfaces must meet minimum depth requirments at all points around circumference of counterbore.

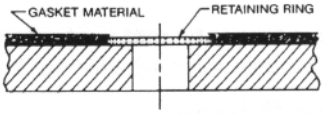
## 4. Problem:
Retaining ring breakage.




## Cause:
Metal chips or gasket material in counterbore.

## Solution:
Clean out all foreign material from counterbore.

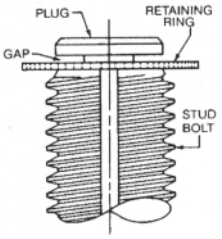
## 5. Problem:
Retaining ring breakage.




## Cause:
Not using spacer or grommet with form-in-place gasket to provide retaining ring cavity. Gasket material migrates under compressive load and captures retaining ring.

## Solution:
Use spacer or grommet with form-in-place gasket. See Page 6.

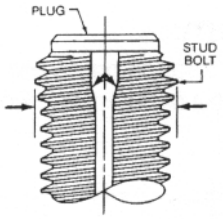
## 6. Problem:
Retaining ring rotates on end of stud bolt.




## Cause:
Plug not fully seated in end of stud bolt.

## Solution:
Install plug completely into end of stud bolt. See page 8.

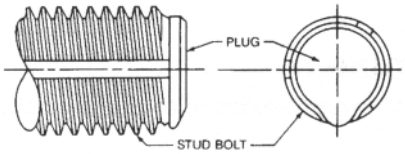
## 7. Problem:
End of stud bolt expands.




## Cause:
Excessive installation pressure when installing plug.

## Solution:
Reduce installation pressure. See Page 8 for proper installation.

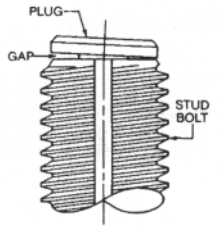
## 8. Problem
Plug edge peened over resulting in thread interference.




## Cause:
Striking plug instead of using proper tools.

## Solution:
Use correct installation tool and follow installation procedure. See Page 8.

## 9. Problem:
Gap between plug and stud bolt at one point only.

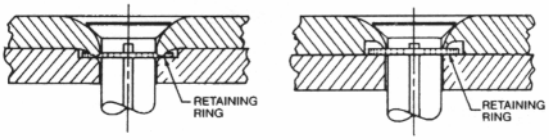



## Cause:
Plug installed at an angle.

## Solution:

Use proper tool to seat plug.

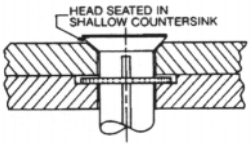
## 10. Problem:
Head breaking through panel and top panel being dimpled into retaining ring counterbore. Possible retaining ring breakage.




## Cause:
Excessive torque being applied to stud bolt during clamp-up. Or, deep counterbore in $T_1$ weakens panel and allows panel to deform under torque.

## Solution:
Use proper installation torque. Consult your engineering department or contact Fairchild Fasteners, Trodair Products.

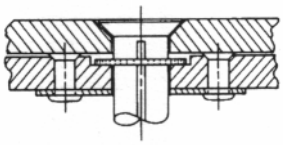
## 11. Problem
Stud bolt head protrudes above surface of panel.




## Cause:
Shallow contersink.

## Solution:
Rework counterwink to proper dimension. See page 6.

## 12.Problem:
Panels do not mate correctly.

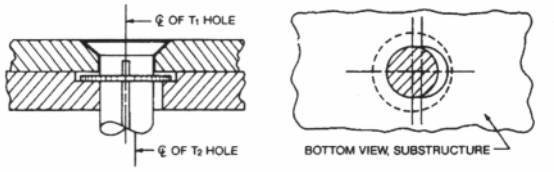


## Cause:
Head of rivet protrudes above surface of $T_2$.

## Solution:
Rework rivet countersinks to proper dimension as shown on Page 6.

## 13. Problem:
Elongated hole in substructure.

## Cause:
Hole in panel not alligned to hole in substructure and stud bolt rubs against side of hole.



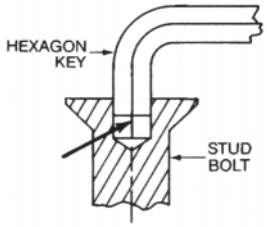

## Solution:
Correct hole alignement.

## 14.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 below for selector guide.

## Or another Cause:
Excessive torque applied during clamp-up.

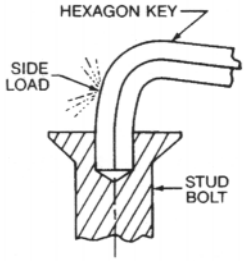



## This Solution:
Control maximum installation torque.

## 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.

## 15.Problem:
Hexagon key breaks off in recess.



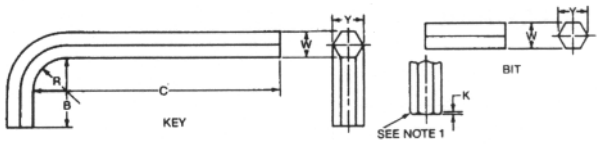

## Cause:
Side load applied to hexagon key in addition to torque.

## Solution:

Take care not to apply side load.

## Selector Guide For Hexagon Key or Bit

The following chart shows correct dimension for hexagon key or bit.




| Nominal Key or Bit and Socket Size | | W | | Y | | B | |
|---|---|---|---|---|---|---|---|
| | | Hexagon Width Across Flats | | Hexagon Width Across Corners | | Length of Short Arm | |
| | | Max. | Min. | Max. | Min. | Max. | Min. |
| 1/8 | 0.125 | 0.1250 | 0.1235 | 0.1418 | 0.1390 | 0.844 | 0.656 |
| 9/64 | 0.141 | 0.1406 | 0.1391 | 0.1593 | 0.1566 | 0.891 | 0.703 |
| 5/32 | 0.156 | 0.1562 | 0.1547 | 0.1774 | 0.1745 | 0.938 | 0.750 |
| 3/16 | 0.188 | 0.1875 | 0.1860 | 0.2135 | 0.2105 | 1.031 | 0.844 |
| 7/32 | 0.219 | 0.2187 | 0.2172 | 0.2490 | 0.2460 | 1.125 | 0.938 |
| See Note | | | | 2 | | | |

| Nominal Key or Bit and Socket Size | | C | | | | R | K |
|---|---|---|---|---|---|---|---|
| | | Length of Long Arm | | | | Radius of Bend | Chamfer |
| | | Short Series | | Long Series | | | |
| | | Max. | Min. | Max. | Min. | Min. | Max. |
| 1/8 | 0.125 | 2.344 | 2.156 | 3.844 | 3.656 | 0.125 | 0.015 |
| 9/64 | 0.141 | 2.469 | 2.281 | 4.031 | 3.844 | 0.141 | 0.016 |
| 5/32 | 0.156 | 2.594 | 2.406 | 4.219 | 4.031 | 0.156 | 0.016 |
| 3/16 | 0.188 | 2.844 | 2.656 | 4.594 | 4.406 | 0.188 | 0.022 |
| 7/32 | 0.219 | 3.094 | 2.906 | 4.969 | 4.781 | 0.219 | 0.024 |
| See Note | | | | | | 1 | |

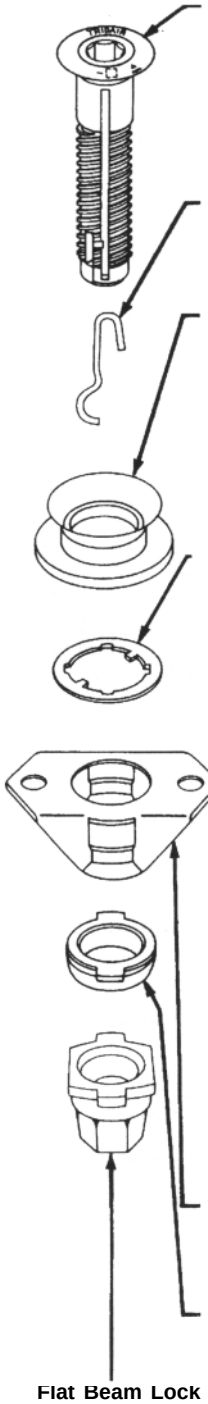
**Notes:**

1. Each end shall be square with the axis of each arm wIthin 4° and edges may be sharp or chamfered at the option of the manufacturer, the chamfer not to exceed the values listed.
2. Any truncation or rounding of hexagon corners within the specified across corners dimensions shall be evident on all corners.

# Mark IV, Positive Stud Bolt Holdout Version

## Stud bolt

Stud bolt is held in panel by a retaining ring. Care must be taken to choose the proper length stud bolt to suit specific grip ranges. Stud bolts should be torqued with the correct hexagon key as shown on Page 16.



**Stud Bolt**
1. 2-lead thread for quick installation.
2. Hexagon socket for reliable, high torque transfer capability without cam out.
3. Carries high, shear and tension loads at joint.

**Stud Bolt Hold-Out**
1. Retains stud bold in holdout position to ease installation of curved panel.

**Grommet (shown in flared condition)**
1. Provides hard seat surface.
2. Superior load transfer.
3. Provides counterbore for retaining ring.
4. Excellent for gasketed or composite applica tions.

**Retaining Ring**
1. Non-stressed.
2. Captivates stud bolt to panel to prevent:
   - Loss of stud bolt.
   - Installation of incorrect stud bolts into wrong holes.
   - Foreign object damage from stud bolt.

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

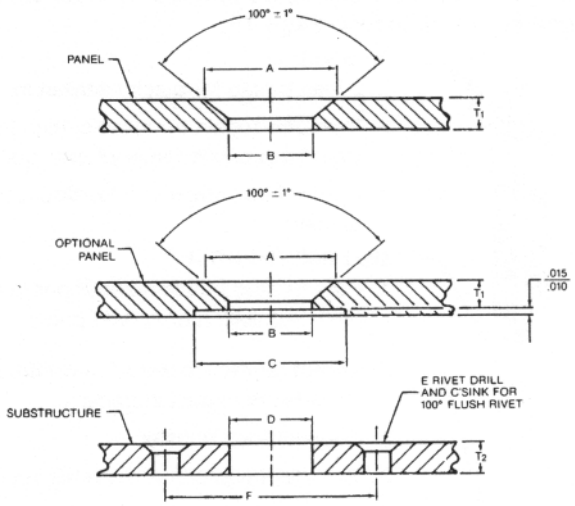
**Receptacle: Allows Radial Float.**
Some version provide angular alignment. The lock nut is held in place behind mounting hole by cage which is riveted to substructure.

**Cage**
1. Snap-In design allows nut to be replaced without replacing rivet.

**Swivel Nut Base (Optional)**
1. Allows angular misalignement capability.
2. Can be replaced without removing cage.

**Flat Beam Lock Nut**
1. Flexible flat beam provides high cycle life (up to 1,500 seated cycles), and vibration resistance.
2. Nut can be replaced without removing cage.

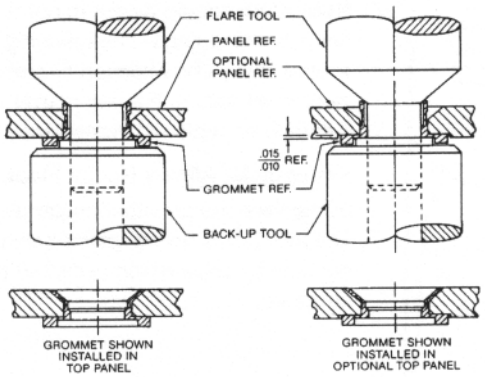
# Panel/Substructure Preparation and Installation Data.




| Stud Bolt Thread Size Ref. | A C'Sink Dia. | B Hole Dia. | C C'Bore Dia. | D Dia. | E Rivet Dia. | F |
|---|---|---|---|---|---|---|
| .2500-28 UNF-3A, 2 Lead | .450<br>.445 | .315<br>.312 | .531 | .255<br>.250 | 3/32 | .689<br>.685 |
| .3750-24 UNF-3A, 2 Lead | .575<br>.570 | .472<br>.468 | .656 | .380<br>.375 | 1/8 | .877<br>.873 |

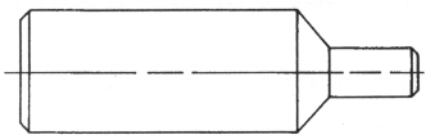
Note: Counterbore in panel provides lower grommet profile.

## Grommet Installation:

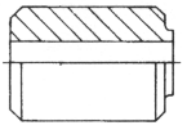



## Tridair Tools For Installing Stud Bolt Hold-Out Version.

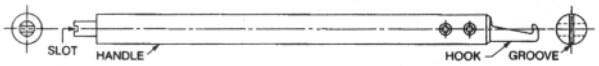
### Flare Tool



### Back-Up Tool

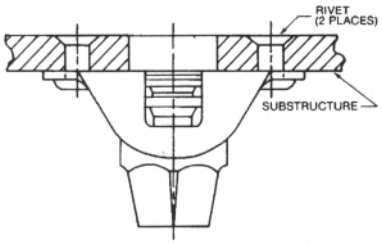


### Hold-out Tool




## Receptacle:

Nut plate is riveted in place.



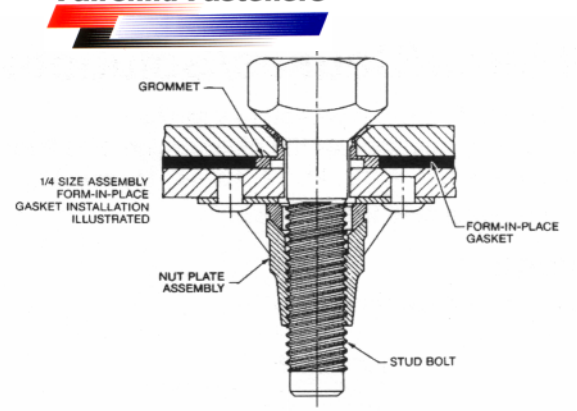

## Procedure to install from-in-place gasket material.

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

## Or another Cause:

1. Apply form-in place gasket material.
2. Install bolt.
3. Torque to 100 in-lbs.
4. After cure, remove bolt. Bolt is reusable.

Fairchild Fasteners




## To Install Hold-Out:

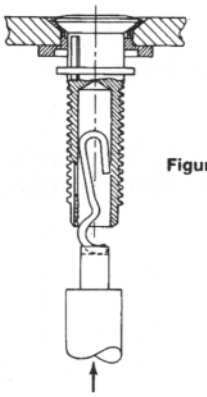


Figure 1

Place hold-out in stud bolt. Align slot of tool with hold-out and push in. Turn tool to orientate hold-out with slot in stud bolt.

## To Remove Hold-Out:

**To Remove Hold-Out:**

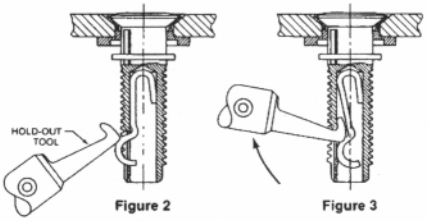



**Figure 2**
Place groove in hook on hold-out.



**Figure 3**
Turn and push tool into stud bolt.

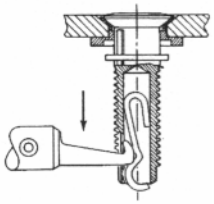


**Figure 4**
Slide tool down.

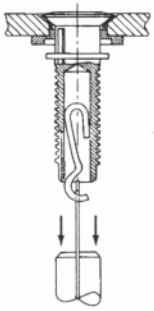
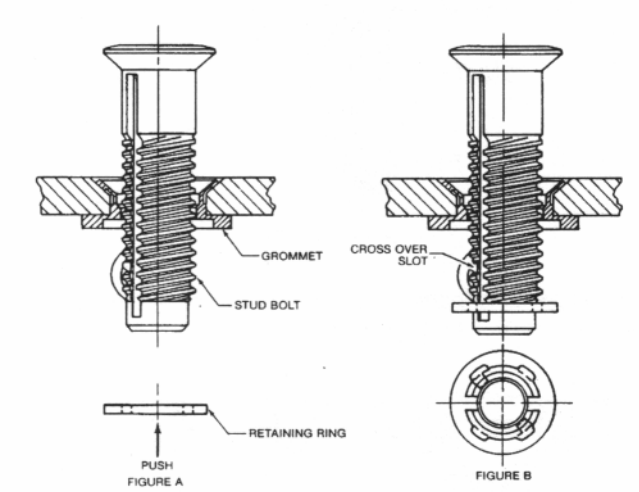
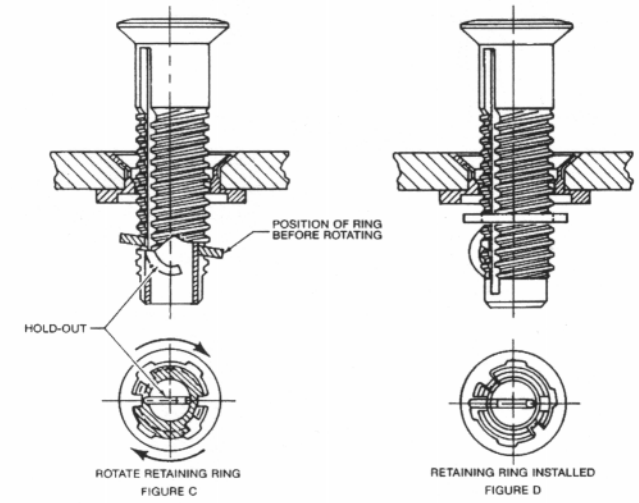


**Figure 5**
Place hook on hold-out and pull out.

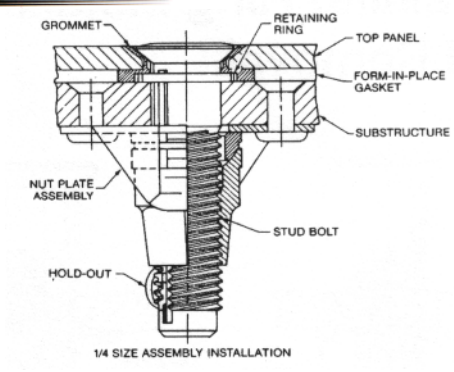
# Retaining Ring Installation and Removal.




1. Place stud bolt assembly through grommet (Figure A).
2. Push retaining ring onto installation slots (Figure B).




3. Continue to push retaining ring until hold-out feature is deflected as shown in Figure C.
4. Rotate retaining ring clockwise to longitudinal slots.
5. Retaining ring is installed (Figure D).
6. Installation is complete.



1/4 SIZE ASSEMBLY INSTALLATION

7. Procedure to remove hold-out and retaining ring for cleaning and/or replacement.

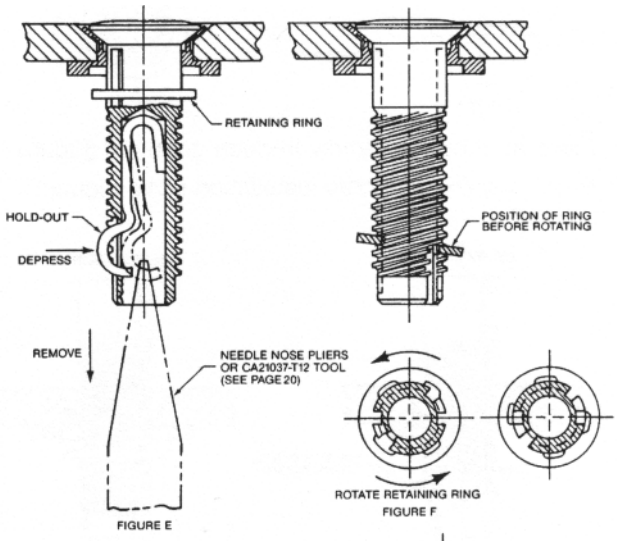
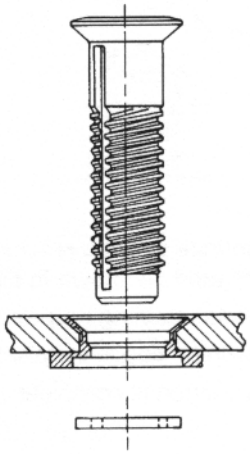


FIGURE E

FIGURE F



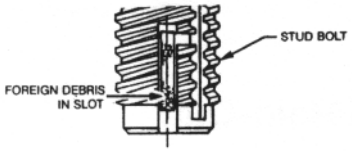
a) Use needle nose pliers or CA21037-T12 tool to depress and remove wire form (Figure E).
b) Rotate retaining ring counterclockwise (Figure F).
c) At this time all componenets can be cleaned or replaced (Figure G).
d) To reassemble reverse removal procedure.

# Problems/Causes/ Solutions

The positive stud hold-put version has similar problems/ causes/solutions as the plug version. See Pages 10-16, Numbers 1,2,4,10,11,12,13,14,15, and 16.

## Problem:

Hold-out feature does not work.




## Cause:

Foreign debris in slot of stud bolt.

## Solutions:

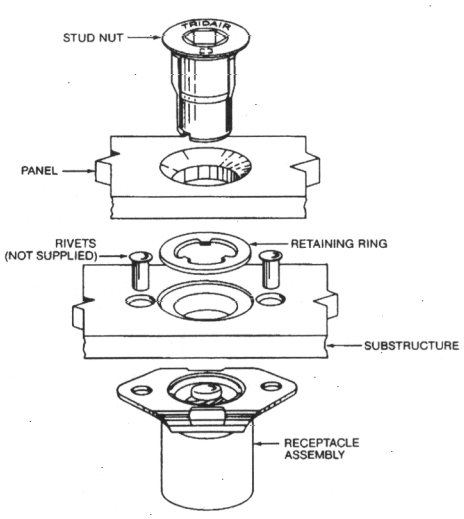
Remove hold-out wire form. Clean slot and wire form. Replace clean wire form back into stud bolt.

# NOTES:

# 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 combersome 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 accomodate misalingment 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 departmenet 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 substrucutre 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.

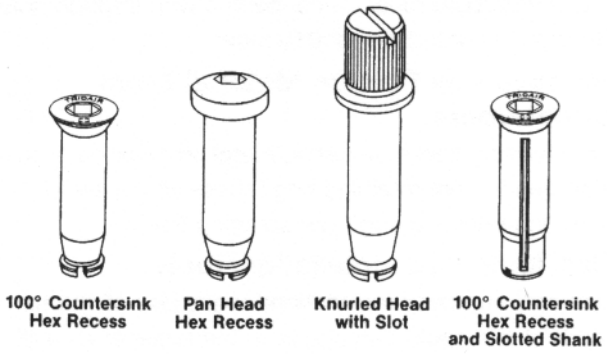
**11. Keep Receptacle Free Of Dirt Or Other Foreign Material.**

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

## Stud Nut

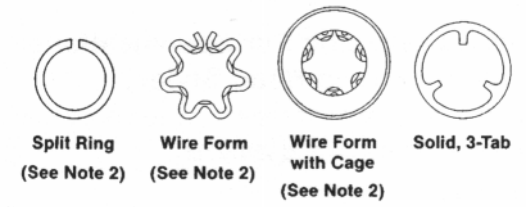
Stud nut is held in the panel by a retaining ring. Care must be taken to choose the proper length stud nut to suit specific grip range.

## 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:



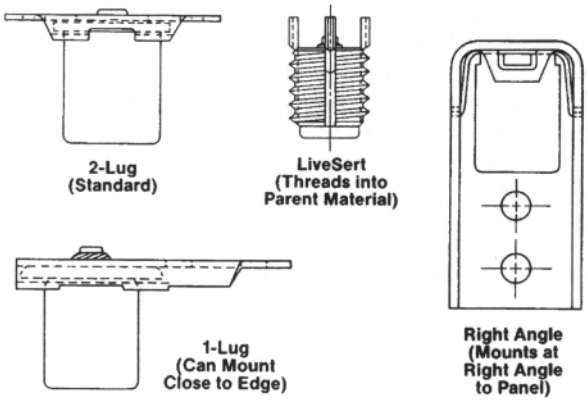

1. Captivates stud nut to panel to prevent:
   - Loss of stud nut
   - Installation of incorrect stud nuts into wrong hole.
   - Foreign objects damage from stud nut.

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):

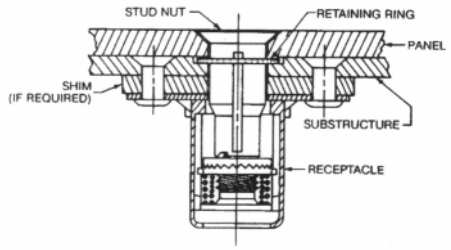
**Typcial Receptacles (Side Views):**




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.

## Comptele Installation:

Receptacle is riveted in place and retaining ring is captivated.

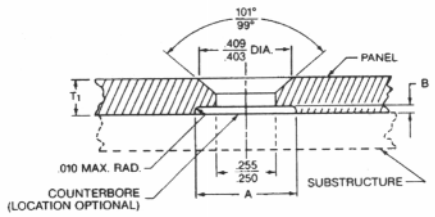


# Panel/Substructure Preparation and Installation Data.

Because the size, ranges and scope of the Live Lock Strucutral Panel Fastener is so vaired, 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:**

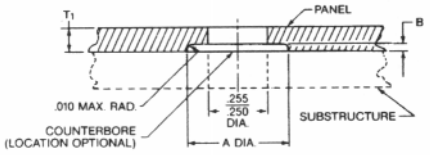
1. Locate and drill $\frac{.255}{.250}$ Dia. hole through panel.
2. Countersink $\frac{101^\circ}{99^\circ}$ to $\frac{.409}{.403}$ Dia.

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 substrucutre.

## Panel:

**Protruding Head Stud Nuts**

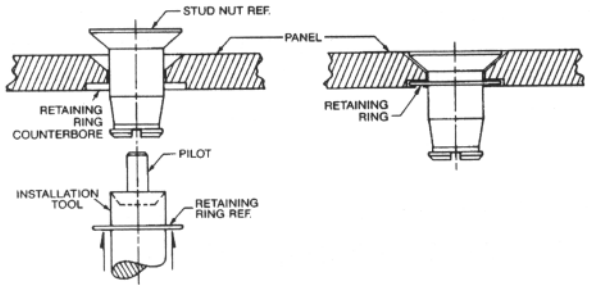



**Notes:**

1. Refer to table on Page 29.
2. Locate and drill $\frac{.255}{.250}$ 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:

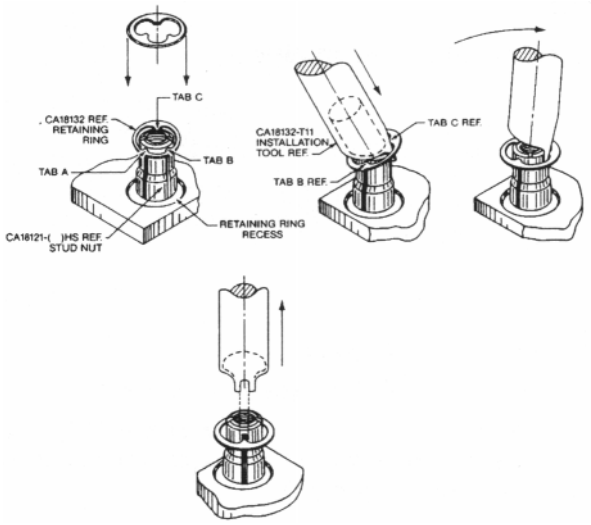



**Wire Form and Wire Form Caged Retaining Rings**

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.

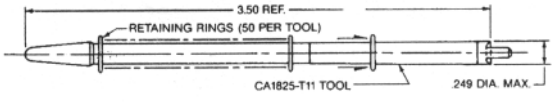
**Solid, 3-Tabs Retaining Ring**

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



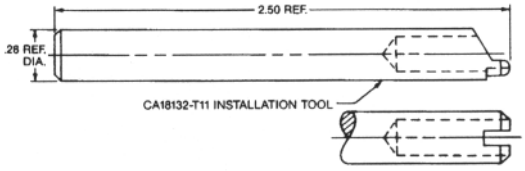

**Step I**: Install Tabs “A” and “B” retaining ring into two of the stud nut grooves.
**Step II**: Lower tool straddling tab “C” as shown, then swing tool to an upright position to strap tab “C” into third groove of stud nut.
**Step III**: Remove tool from assembly.

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

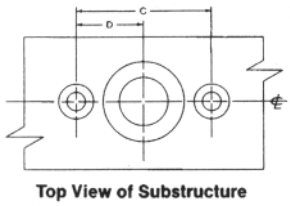



**Notes:**
1. Above retaining rings can be used with CA1800 series studs nuts only.
2. Fifty (50) retaining rings are sold mounted on an installation tool to insure proper installation.

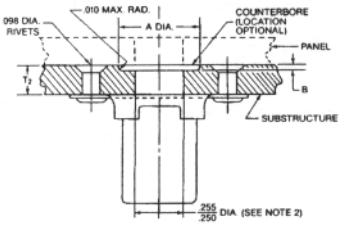
### Installation Tool for CA18132 Retaining Ring.




## Substructure: 2-Lug Receptacles



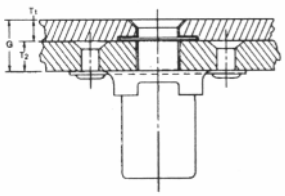

Top View of Substructure



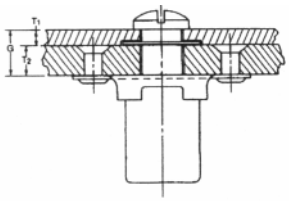

| Receptacle Part No. | C | D Ref. |
|---|---|---|
| CA1810<br>CA1810C | .689<br>.685 | .343 |
| CA18157<br>CA18157C | | |
| CA18193 | .752<br>.748 | .375 |

**Notes:**
1. Refer to table on Page 29.
2. Locate and drill $\frac{.255}{.250}$ Dia. hole through substrucutre.
   a. 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.
3. If required, counterbore to “A” Dia. by “B” depth (see panel preparation for flush or protruding head, Note 3, Pages 29 or 30).
4. Locate, drill and countersink two holes for flush mount rivets (not supplied). Holes must be symmetrical to $\frac{.255}{.250}$ Dia. hole.
5. Rivet recetacle in place.

**Complete Installation:**



**2-Lug Receptacle**
**Flush Head Stud Nut Shown**



**2-Lug Receptacle**
**Protruding Head Stud Nut Shown**

## To Select Stud Nut Dash Number:

1. Determine "G" Thickness:
   **2-Lug Receptacle:** "G" = "T1 + "T2," plus shim, any compressed gasketing material, paint or other finishes.
2. 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 |

*(-0) "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. |
| .430 | .150-.220 | -1HS | -1HS |
| .500 | .221-.290 | -2HS | -2HS |
| .570 | .291-.360 | -3HS | -3HS |
| .640 | .361-.430 | -4HS | -4HS |
| .710 | .431-.500 | -5HS | -5HS |
| .780 | .501-.570 | -6HS | -6HS |
| .850 | .571-.640 | -7HS | -7HS |
| .920 | .641-.710 | -8HS | -8HS |
| .990 | .711-.780 | -9HS | -9HS |
| 1.060 | .781-.850 | -10HS | -10HS |

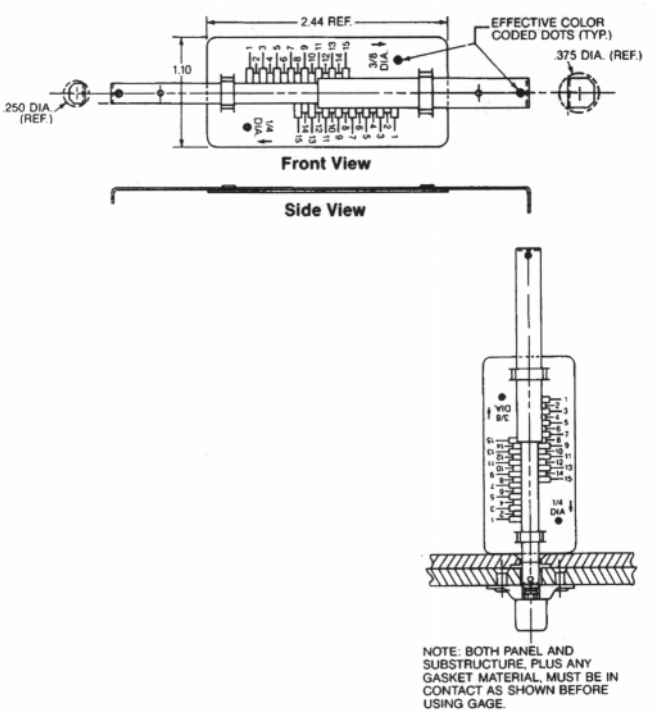
***** For "G" greater or lesser than grip shown, contact your engineering department or Fairchild Fasteners Tridair Products.**

# 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 improtant 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:

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

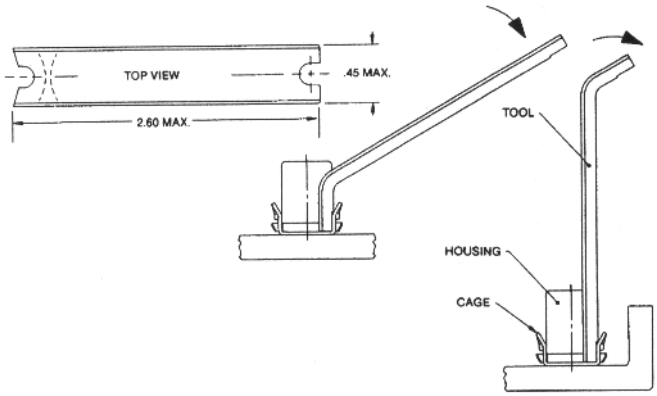



## To Use Grip Gage:

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

## Receptacle Removal:

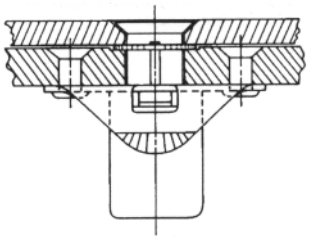
Use Tridair tools to remove receptacle.




1. Insert tool between cage and housing or nut straddling one lug as shown.
2. 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.

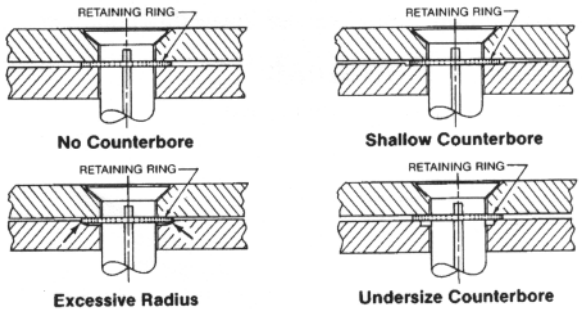


### Cause:
Counterbore is too shallow or excessive radius in corner of counterbore; or counterbore diameter is undersize; or counterbore is out of alignment with through hole.

### Solution:
Rework counterbore as shown on Page 29.

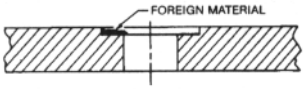
## 2. Problem:
Retaining ring breaks and stud falls free from panel.

### 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.

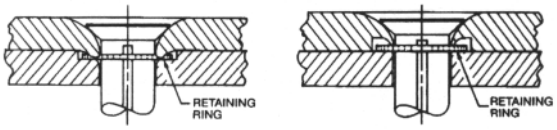
### Solution:
Clean out all foreign material from counterbore.

## 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.



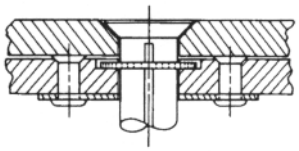

### Solution:
Repair panel using a dimpled washer or grommet. Contact your engineering department of Fairchild Fasteners Tridair Products, for recommended torque values.

## 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 departmenet 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.

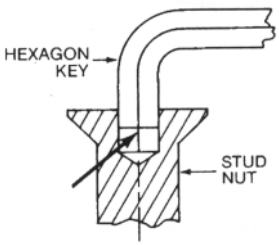
## 7. Problem:
Hexagon recess in stud bolt damaged.

### 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.

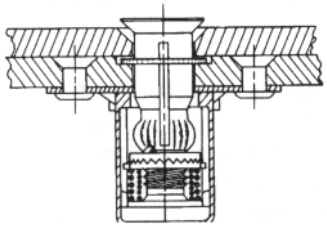
### This Solution:
Control Maximum installation torque.




### 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.

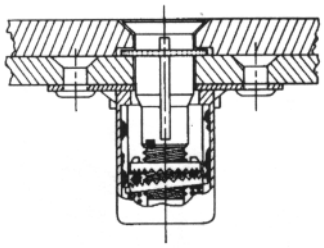
## 8. Problem:
End of stud nut deforms during clamp-up.



### 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.



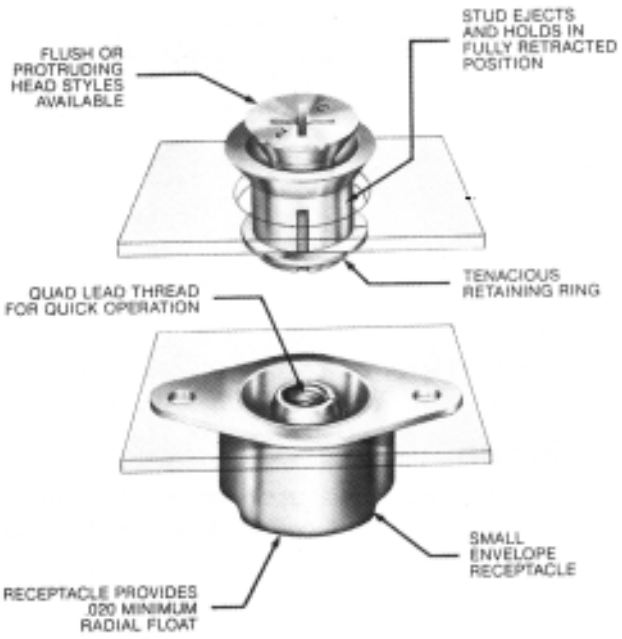
### Cause:
Excessive dirt or other foreign material hindering locking mechanism.

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

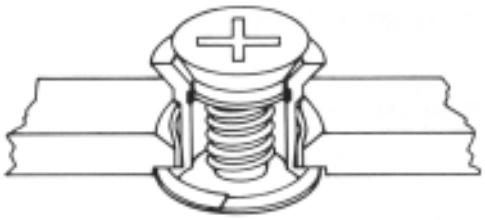
# QR
# Structural Panel Fasteners

The QR Strucutral Panel Fastener qualifies to MIL-F-22978 and meets MS17731 and MS17732. The QR fastening system is lightweight, has a small envelope and is fast operating. Most versions lock and unlock in less than two turns. Positive stud retention is featured. Flush or protruding head styles and various recess configurations are available. Optional stud hold-out grommet is available which provides bottom flush condition. Receptacle provides .020 inch minimum radial float. There are other QR Panel Fastener styles and types which are not featured in this catalog; contact Fairchild Fasteners for details.

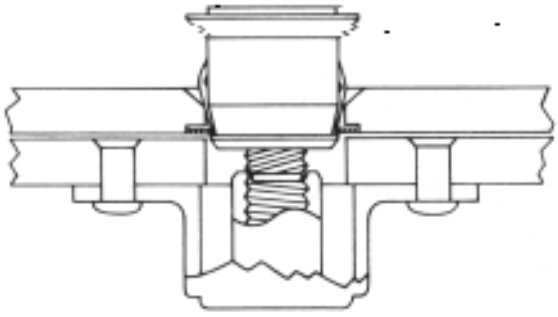
## Typical QR Fastening System:




The QR Fastening System has a high-strength-to-weight ratio. Quick operating, it locks and unlocks in less than two turns. Optional stud hold-out grommet is available which provides bottom flush condition.



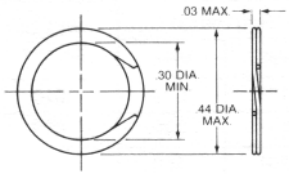
Stud assembly is retained in retracted position by sprint-loaded grommet and retaining ring.



Stud assembly is automatically ejeted free from sub-structure during unlocking cycle.

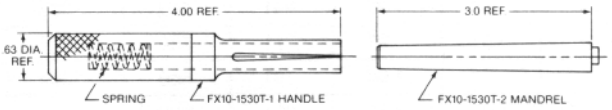
# QR
# 'MS' Version

## Retaining Ring
**Standard Version**
**FX10-1525**




**Material:**
18-8 Type 300 Series CRES per AMS 7245 or QQ-W-423.
**Heat Treat:**
Stressed relieved.
**Finish:**
Passivated per QQ-P-35.
**Weight:**
.033 lbs./100, approximate.

**Installation Tool for FX10-1525 Retaining Ring:**
**FX10-1530T**




**Material:** Alloy Steel
**Finish:** Black Oxide per MIL-C-13924

**To Install FX10-1525 Retaining Ring:**

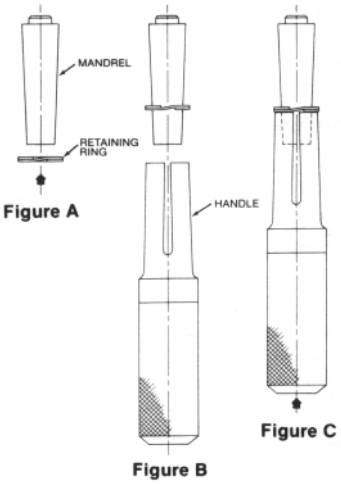


Figure A
Figure B
Figure C

1. Slide retaining ring onto mandrel (Figures A and B).
2. Slide handle onto mandrel (Figure C).
3. Place anvil on top side of panel to brace stud assembly.

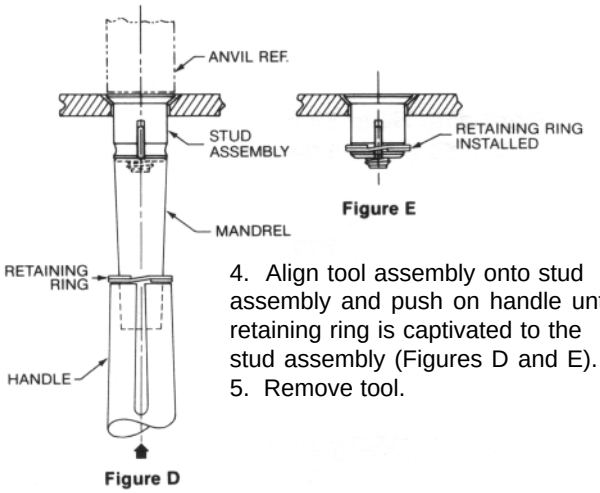
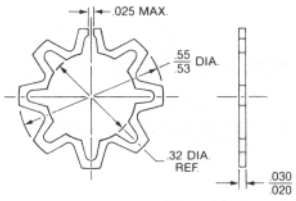


Figure D
Figure E

4. Align tool assembly onto stud assembly and push on handle until retaining ring is captivated to the stud assembly (Figures D and E).
5. Remove tool.

**Retaining Ring**
**Oversize Version.**
**FX10-1576**



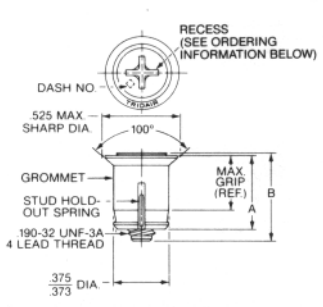

**Material:** 17-7Ph CRES per AMS 5528.
**Heat Treat:** Rc 44-48.
**Finish:** Passivated per QQ-P-35.
**Weight:** .043 lbs./100, approximate.

**Notes:**
1. Ring is designed to be used when hole in substructure is .391 or greater. See hole preparation on Page 69.
2. FX10-1576 retaining ring is hand installed.

# QR
# Standard Version

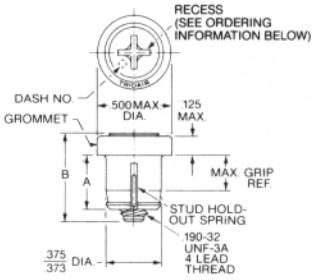
## Stud Assemblies

### Flush Head Style.
### FX10-1558-( )( ) Series




| Basic Stud Assembly Part No. | A Ref. | B Ref. | Grip Range | | Weight lbs./ea. |
|---|---|---|---|---|---|
| | | | Min. | Max. | |
| FX10-1558-1( ) | .35 | .41 | .150 | .220 | .010 |
| FX10-1558-2( ) | .42 | .48 | .221 | .290 | .013 |
| FX10-1558-3( ) | .49 | .55 | .291 | .360 | .015 |
| FX10-1558-4( ) | .56 | .62 | .361 | .430 | .017 |
| FX10-1558-5( ) | .63 | .69 | .431 | .500 | .019 |
| FX10-1558-6( ) | .70 | .76 | .501 | .570 | .021 |
| FX10-1558-7( ) | .77 | .83 | .571 | .640 | .023 |
| FX10-1558-8( ) | .84 | .90 | .641 | .710 | .025 |
| FX10-1558-9( ) | .91 | .97 | .711 | .780 | .027 |
| FX10-1558-10( ) | .98 | 1.04 | .781 | .850 | .029 |
| FX10-1558-11( ) | 1.05 | 1.11 | .851 | .920 | .031 |

### Protruding Head Style.
### FX10-1559-( )( ) Series




| Basic Stud Assembly Part No. | A Ref. | B Ref. | Grip Range | | Weight lbs./ea. |
|---|---|---|---|---|---|
| | | | Min. | Max. | |
| FX10-1559-1( ) | .35 | .53 | .116 | .185 | .015 |
| FX10-1559-2( ) | .42 | .60 | .186 | .255 | .017 |
| FX10-1559-3( ) | .49 | .67 | .256 | .325 | .019 |
| FX10-1559-4( ) | .56 | .74 | .326 | .395 | .021 |
| FX10-1559-5( ) | .63 | .81 | .396 | .465 | .023 |
| FX10-1559-6( ) | .70 | .88 | .466 | .535 | .025 |
| FX10-1559-7( ) | .77 | .95 | .536 | .605 | .027 |
| FX10-1559-8( ) | .84 | 1.02 | .606 | .675 | .029 |
| FX10-1559-9( ) | .91 | 1.10 | .676 | .745 | .031 |

**Material:**
Screw: 8740 Alloy Steel per MIL-S-6049.
Grommet: 4140 Alloy Steel per MIL-S-5626.
Spring: 17-7PH CRES per AMS 5673.

**Heat Treat:**
Screw and Grommet: 160 K.S.I. minimum ultimate tensile strength per MIL-H-6875.
Spring: Condition CH900 per MIL-H-6875.

**Finish:**
Screw and Grommet: Cadmium Plated per QQ-P-416, Type II, Class 3.
Spring: Passivated per QQ-P-35.

**Specifications:** See Page 2.

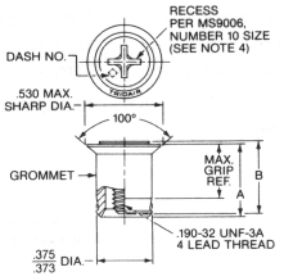
**Notes:**
1. Anti-seize compound per MIL-A-907 applied to thread.
2. For retaining ring information see Page 65.

**How to Order:**
**FX10 — 1558 — 4 P**

- Recess options:
  p = recess per MS9006, No. 10 size
  TS = recess per NAS1078, No. 10 size
- Grip range: (see stud part number selection Page 8 for grip range requirements)
  FX10-1558-4 = .361 to .430
  FX10-1559-4 = .326 to .395
- Head style:
  FX10-1558 = Flush head style
  FX10-1559 = Protruding head style

# QR
# Standard Version

## Stud Assembly
**Fully Retractable Flush Head Style.**
**FX10-15010-( )P Series**




| Stud Assembly Part No. | A Ref. | B Ref. | Grip Range | | Weight lbs./ea. |
|---|---|---|---|---|---|
| | | | Min. | Max. | |
| FX10-15010-1P | .42 | .41 | .230 | .290 | .013 |
| FX10-15010-2P | .49 | .48 | .291 | .360 | .015 |
| FX10-15010-3P | .56 | .55 | .361 | .430 | .017 |
| FX10-15010-4P | .63 | .62 | .431 | .500 | .019 |
| FX10-15010-5P | .70 | .69 | .501 | .570 | .021 |

**Material:**
Screw: 8740 Alloy Steel per MIL-S-6049.
Grommet: 4140 Alloy Steel per MIL-S-5626.

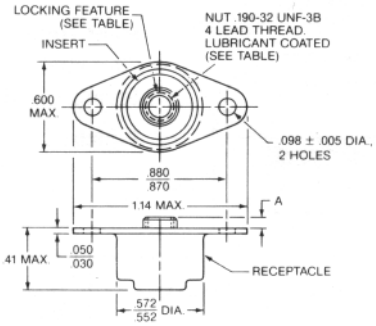
**Heat Treat:**
Screw and Grommet: 160 K.S.I. minimum ultimate tensile strength per MIL-H-6875.

**Finish:**
Screw and Grommet: Cadmium Plated per QQ-P-416, Type II, Class 3.

**Specifications:** See Page 2.

**Notes:**
1. Use with FX10-15009 hold-out grommet (see Page 6) to provide flush condition on bottom side of panel in retracted position, and with FX10-1502( ) Series or FX10-1510( ) Series receptacle. Retaining ring is not required.
2. Anti-seize compound per MIL-A-907 applied to thread.
3. For stud part number selection see Page 8.
4. For other head styles and recesses, contact Fairchild Fasteners.

## Receptacle Assemblies
**FX10-1502( ) Series**
**FX10-1510( ) Series**




| Locking Feature | Part No. | A* Ref. | Lubricant Coating |
|---|---|---|---|
| High** Prevailing Torque | FX10-1502 | None | Per MIL-L-25681 |
| | FX10-1502-05 | .03 | |
| | FX10-1502-08 | .08 | |
| Eliptical | FX10-1510 | None | Per MIL-A-907 |
| | FX10-1510-05 | .03 | |
| | FX10-1510-08 | .08 | |

*"A" dimension, when .03 or .08, provides extra jackout to allow stud hold-out spring to engage panel.
**Locking feature maintains 5 inch pounds minimum running torque-out after 200 complete cycles.

**Material:**
Receptacle: 1050 Steel per ASI C1050.
Nut: 8740 Alloy Steel per MIL-S-6049.
Insert: 4140 Alloy Steel per MIL-S-5626.

**Heat Treat:**
Receptacle: Ftu 150 K.S.I. minimum per MIL-H-6875.
Nut: Ftu 180 K.S.I. minimum per MIL-H-6875.
Insert: Ftu 160 K.S.I. minimum MIL-H-6875.

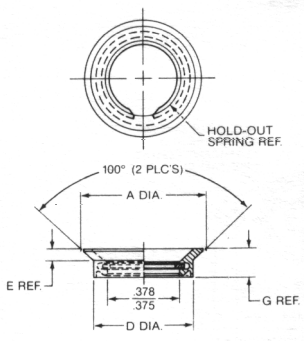
**Finish:**
Receptacle, Nut, and Insert: Cadmium Plated per QQ-P-416, Type II, Class 3.

**Weight:** .016 lbs. each, approximate.

# QR
# Structural Panel Fasteners

## Hold-Out Grommet

### FX10-15009-( ) Series




**Material:**
Grommet: 18-8 Type 300 Series CRES per ASTM-A-582.
Spring: 17-7PH CRES per AMS 5673.

**Heat Treat:**
Grommet: None.
Spring: Condition CH900.

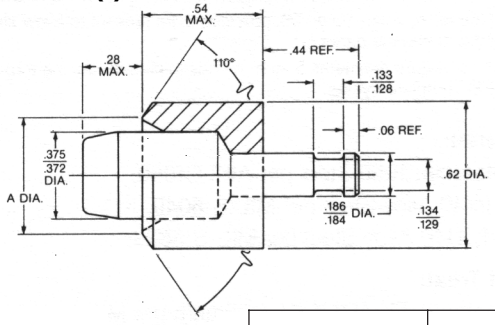
**Finish:**
Grommet and Spring: Passivated per QQ-P-35.

**Notes:**
1. Use grommet with FX10-15010-( )P Series stud assembly and FX10-1502 Series or FX10-1510 Series receptacles.
2. First and second oversize styles are designed to provide greater strength or replacement of basic style due to panel damage.
3. See Page 71 for hole preparation and installation information.

| Description | Part No. | A Theo. Sharp | D Dia. | E Ref. | G Ref. | Installation Tools (see below) | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Flaring Tool | Back-up Tool | Stud Installation Tool |
| Basic | FX10-15009-1 | .630 Max. | .500 Ref. | .050 | .128 | FX10-15009-T10 | FX10-15009-T12 | FX10-15009-T11 |
| | FX10-15009-2 | | | | .159 | | | |
| 1st Oversize | FX10-15009-3 | .655 Max. | .515 Ref. | .056 | .128 | FX10-15009-T13 | FX10-15009-T14 | |
| | FX10-15009-4 | | | | .159 | | | |
| 2nd Oversize | FX10-15009-5 | .692 Max. | .530 Ref. | .066 | .128 | FX10-15009-T15 | FX10-15009-T16 | |
| | FX10-15009-6 | | | | .159 | | | |

## Flaring Tool

### FX10-15009-T( ) Series

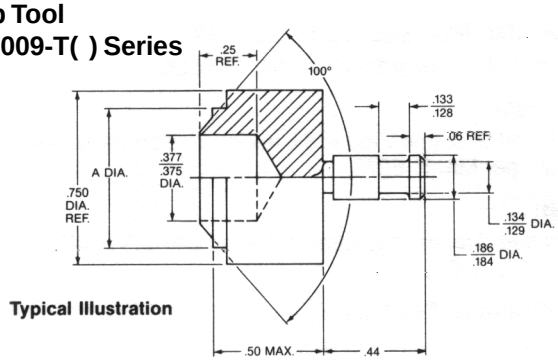



**Material:**
Tool Steel
**Heat Treat:**
Rc45 min. per MIL-H-6875
**Finish:**
Black Oxide per MIL-C-13924

| Part No. | A Dia. |
|---|---|
| FX10-15009-T10 | .469 .467 |
| FX10-15009-T13 | .484 .482 |
| FX10-15009-T15 | .500 .498 |

## Back-Up Tool

### FX10-15009-T( ) Series




Typical Illustration

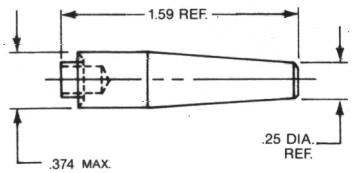
**Material:**
Tool Steel
**Heat Treat:**
Rc45 min. per MIL-H-6875
**Finish:**
Black Oxide per MIL-C-13924

| Part No. | A Dia. Ref. |
|---|---|
| FX10-15009-T12 | .610 .590 |
| FX10-15009-T14 | .640 .620 |
| FX10-15009-T16 | .665 .645 |

## Stud Assembly Installation Tool

### FX10-15009-T11

Used to install FX10-15010-( )P Series stud assembly into FX10-15009-( ) grommet assembly.

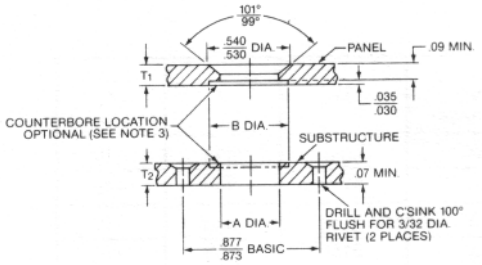



**Material:**
Tool Steel
**Heat Treat:**
Rc45 min. per MIL-H-6875
**Finish:**
Black Oxide per MIL-C-13924

# QR
# Structural Panel Fasteners

## Panel/Substructure Preparation and Installation Data.

### Flush Head Styles.




| Application | A Dia. | B Dia. | Retaining Ring Part No. |
|---|---|---|---|
| Basic Installation | .378<br>.375 | .536<br>.526 | FX10-1525 |
| When curvature of panel is 18 inches or less* | .395<br>.391 | .630<br>.620 | FX10-1576 |

*Subject to approval of structures group.

**Notes:**
1. Locate and drill “A” diameter hole through panel and substructure.

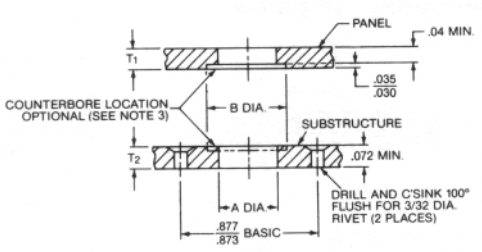
2. Countersink panel $\frac{101^{\circ}}{99^{\circ}}$ to $\frac{.540}{.530}$ diameter.

3. Counterbore to “B” diameter backside of panel or frontside of substructure to $\frac{.035}{.030}$ deep. Location is optional when “$T_1$” = .125 or greater. Otherwise counterbore substructure (panel is preferred location).

4. Locate, drill and countersink two holes for rivets (not supplied).

5. Shim is required when total thickness (“$T_1$” + “$T_2$” plus any compressed gasketing material, paint or other finishes) equals .155 or less. Contact Fairchild Fasteners for details.

### Protruding Head Styles.




**Notes:**
1. Refer to table at left.

2. Locate and drill “A” diameter hole through panel and substructure.

3. Counterbore to “B” diameter backside of panel or frontside of substructure to $\frac{.035}{.030}$ deep. Location is optional when “T1” = .065 or greater. Otherwise counterbore substructure (Panel is preferred location).

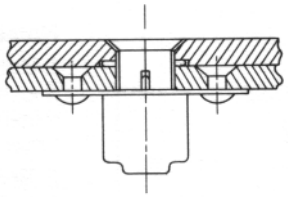
4. Locate, drill and countersink two holes for rivets (not supplied).

5. Shim is required when total thickness (“$T_1$”+”$T_2$” plus any compressed gasketing material, paint or other finishes) equals .155 or less. Contact Fairchild Fasteners for details.

---

### Basic Installation.

**Notes:**
1. Place stud assembly into panel.
2. Install retaining ring (see Page 3).
3. Rivet receptacle in place.

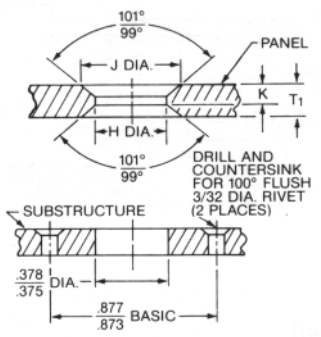


**Complete Installation**
**(Flush Head Style Shown)**

# QR
# Structural Panel Fasteners

## Panel/Substructure Preparation and Installation Data (cont'd.).

**Grommet**
**FX10-15010-( )P Series.**

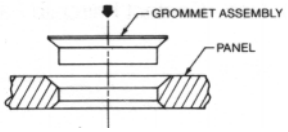



| Grommet Assembly Part No. Ref. | $T_1$ Panel Thickness | H | J | K |
|---|---|---|---|---|
| FX10-15009-1 | .125 | .5020 .4995 | .635 .630 | .110 |
| FX10-15009-2 | .156 | | | .146 |
| FX10-15009-3 | .125 | .5175 .5150 | .660 .655 | .110 |
| FX10-15009-4 | .156 | | | .146 |
| FX10-15009-5 | .125 | .5335 .5310 | .697 .692 | .110 |
| FX10-15009-6 | .156 | | | .146 |

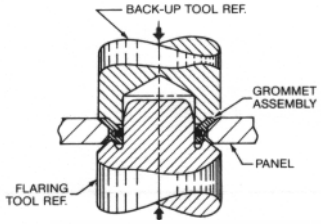
**Notes:**
1. Select grommet dash number to panel "T1" thickness.
2. Locate and drill "H" diameter hole through panel.
3. Countersink top of panel $\frac{101°}{99°}$ to "J" diameter.
4. Counersink bottom of panel $\frac{101°}{99°}$ to "K" depth.
5. Locate and drill $\frac{.378}{.375}$ diameter hole through substructure.
6. Locate and drill two holes for rivets (not supplied).

---

### Stud Assembly and Grommet Assembly Installation




**Notes:**
1. Place correct size grommet assembly in panel.




2. Place correct size flaring tool and back-up tool in place and apply sufficient pressure to flare grommet.

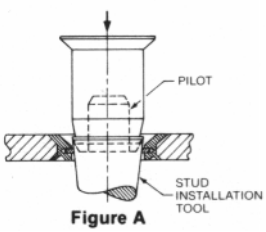



Figure A

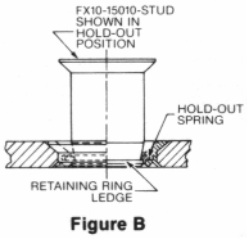
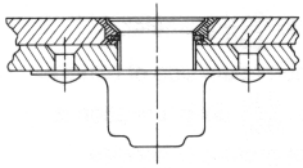



Figure B

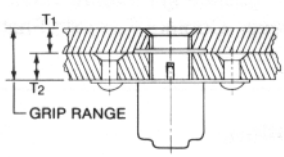
3. Insert pilot of stud installation tool into thread end of stud assembly.
4. Push tool and stud assembly through grommet until stud is captivated by hold-out spring.
5. Remove tool.



Complete Installation

6. Rivet receptacle in place.
7. Installation is complete.

### Stud Part Number Selection

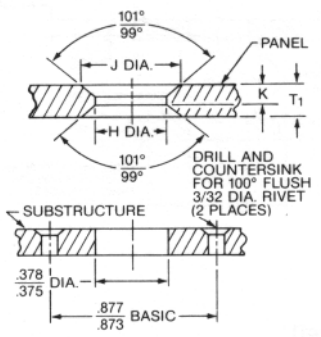



**Notes:**
1. Determine grip range thickness. Note: Grip range thickness equals "T1" + "T2" plus the compressed thickness of any gasket (if used). Also allow for paint or other finish thickness.
2. Refer to appropriate table for stud type and style (see Pages 2, 4 or 5).
3. Locate grip range in table and find the corresponding part no.

# QR
# Structural Panel Fasteners

## Panel/Substructure Preparation and Installation Data (cont'd.).

**Grommet**
**FX10-15009-( )P Series.**




| Grommet Assembly Part No. Ref. | $T_1$ Panel Thickness | H | J | K |
|---|---|---|---|---|
| FX10-15009-1 | .125 | .5020 .4995 | .635 .630 | .110 |
| FX10-15009-2 | .156 | | | .146 |
| FX10-15009-3 | .125 | .5175 .5150 | .660 .655 | .110 |
| FX10-15009-4 | .156 | | | .146 |
| FX10-15009-5 | .125 | .5335 .5310 | .697 .692 | .110 |
| FX10-15009-6 | .156 | | | .146 |

**Notes:**
1. Select grommet dash number to panel "$T_1$" thickness.
2. Locate and drill "H" diameter hole through panel.
3. Countersink top of panel $\frac{101°}{99°}$ to "J" diameter.
4. Counersink bottom of panel $\frac{101°}{99°}$ to "K" depth.
5. Locate and drill $\frac{.378}{.375}$ diameter hole through substructure.
6. Locate and drill two holes for rivets (not supplied).

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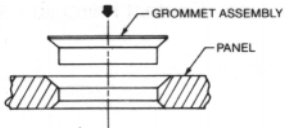
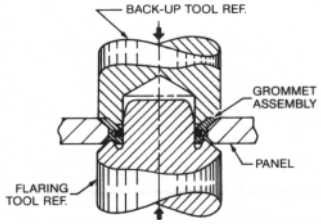
### Stud Assembly and Grommet Assembly Installation




**Notes:**
1. Place correct size gromet assembly in panel.




2. Place correct size flaring tool and back-up tool in place and apply sufficient pressure to flare grommet.

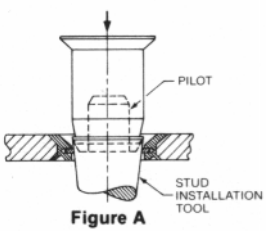



Figure A

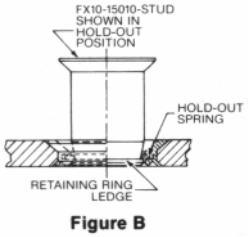
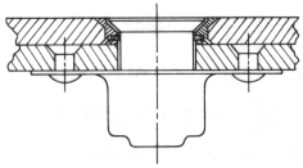



Figure B

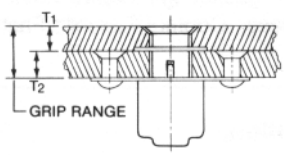
3. Insert pilot of stud installation tool into thread end of stud assembly.
4. Push tool and stud assembly through grommet until stud is captivated by hold-out spring.
5. Remove tool.



Complete Installation

6. Rivet receptacle in place.
7. Installation is complete.

### Stud Part Number Selection




**Notes:**
1. Determine grip range thickness. Note: Grip range thickness equals "$T_1$" + "$T_2$" plus the compressed thickness of any gasket (if used). Also allow for paint or other finish thickness.
2. Refer to appropriate table for stud type and style (see Pages 2, 4 or 5).
3. Locate grip range on stud assembly drawing and find the corresponding part dash no.

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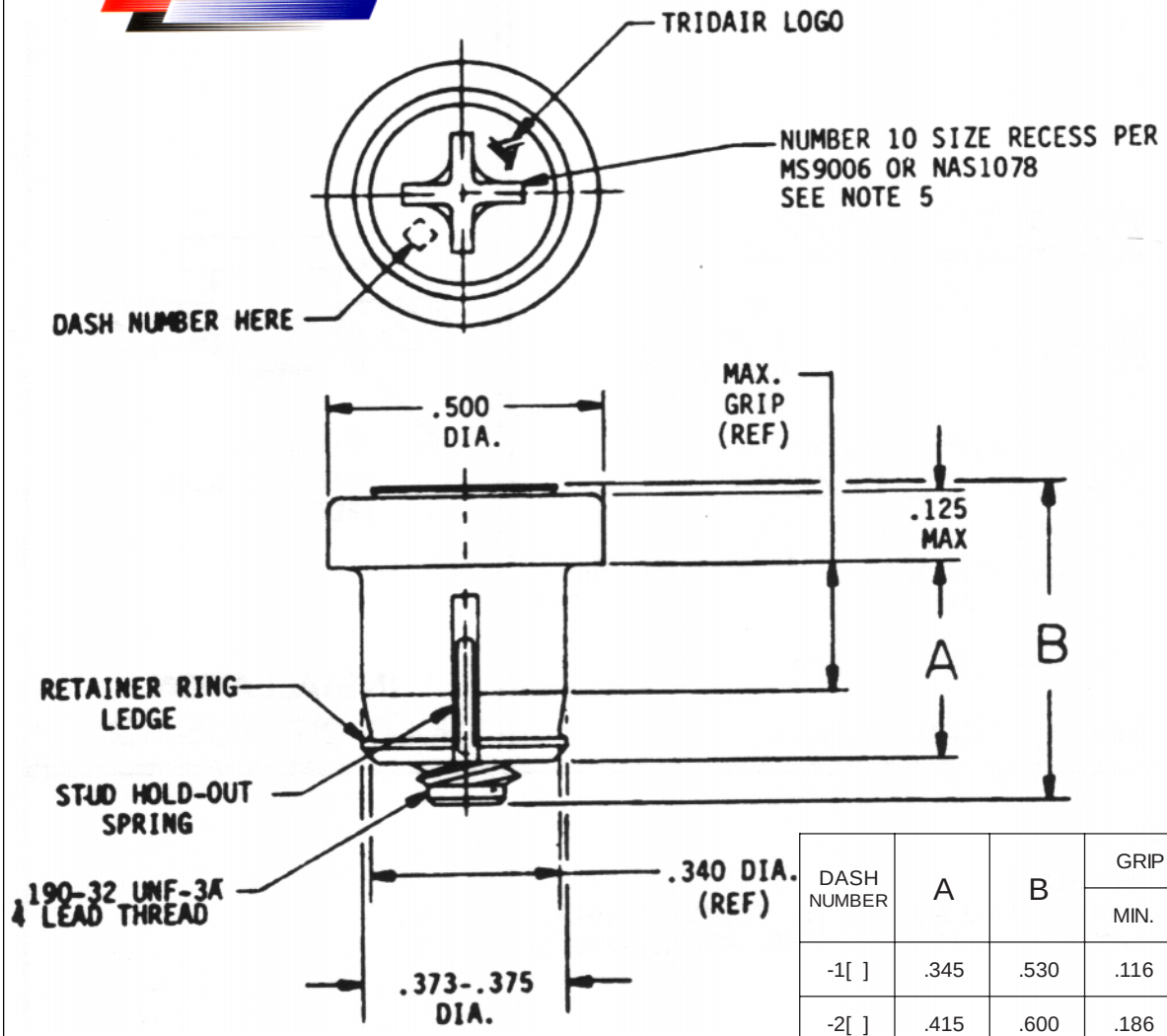
Fairchild Fasteners



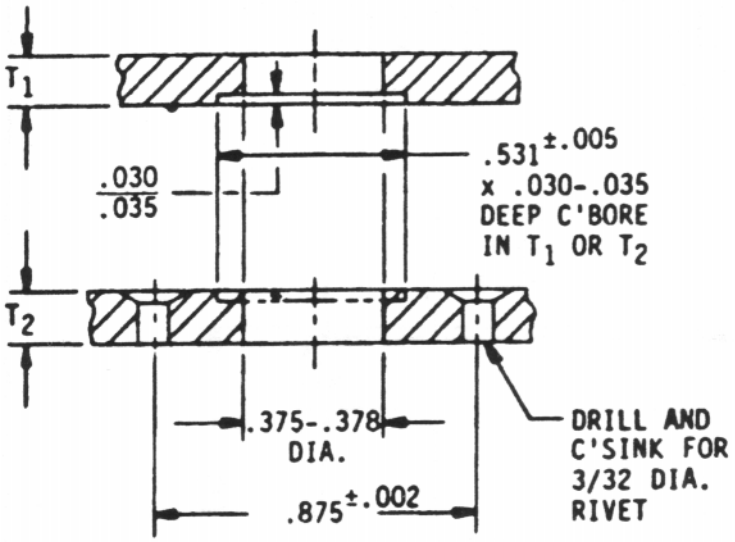

| DASH NUMBER | A | B | GRIP RANGE | | WEIGHT LBS/EA |
|---|---|---|---|---|---|
| | | | MIN. | MAX. | |
| -1[ ] | .345 | .530 | .116 | .185 | .015 |
| -2[ ] | .415 | .600 | .186 | .255 | .017 |
| -3[ ] | .485 | .670 | .256 | .325 | .019 |
| -4[ ] | .555 | .740 | .326 | .395 | .021 |
| -5[ ] | .625 | .810 | .396 | .465 | .023 |
| -6[ ] | .695 | .880 | .466 | .535 | .025 |
| -7[ ] | .765 | .950 | .536 | .605 | .027 |
| -8[ ] | .835 | 1.020 | .606 | .675 | .029 |
| -9[ ] | .905 | 1.100 | .676 | .745 | .031 |
| | | | | | |
| | | | | | |
| | | | | | |

| REVISION | R | REDRAWN | 2-4-80 JWN | E | ECO 11-258 | 11/18/80 |
|---|---|---|---|---|---|---|

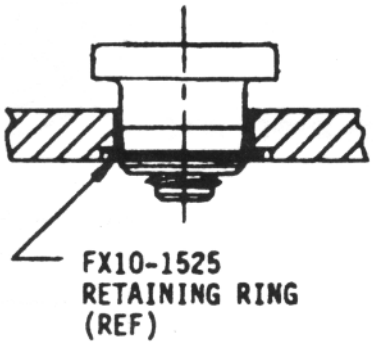
| | | | |
|---|---|---|---|
| DRAWING BY LTWH | DATE: 3-4-80 | TITLE | |
| APPROVED BY | DATE: 3-31-80 | SCREW ASSY, QR | |
| APPROVED BY | DATE: 4-1-80 | | |
| APPROVED BY: | DATE: | UNLESS OFHER RANGE SPECIFIED TOLERANCES DECIMALS XX = .02 XXX = .020 ANGLES = 2° MILLIMETERS .050 .025 SURFACE FINISH 125 MICROINCHES | FX10-1559-00 |
| PROJECT NUMBER | | | FSC: 29372 SHEET 1 OF 2 |

Tridair

3016 West Lomit Boulevard
Torrance, CA 90505 USA
909-947-3366




PANEL PREPARATION




INSTALLATION
HOLD-OUT POSITION

NOTES:

1. MATERIAL:
1.1 SCREW: 8740 ALLOY STEEL PER MIL-S-6049.
1.2 GROMMET: 4140 ALLOY STEEL PER MIL-S-5626
1.3 SPRING: 17-7 PH CRES PER AMS 5673.

2. HEAT TREAT:
2.1 SCREW AND GROMMET: 160 K.S.I. MINIMUM ULTIMATE TENSILE STRENGTH PER MIL-H-6875.
2.2 SPRING: CONDITION CH900 PER MIL-H-6875.

3. FINISH:
3.1 SCREW AND GROMMET: CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 3.
3.2 SPRING: PASSIVATE PER QQ-P-35.

4. .375 DIAMETER HOLE IN T2 MAY BE ENLARGED TO .390 DIAMETER (MAXIMUM) TO ALLOW FOR HOLE MISALIGNMENT.

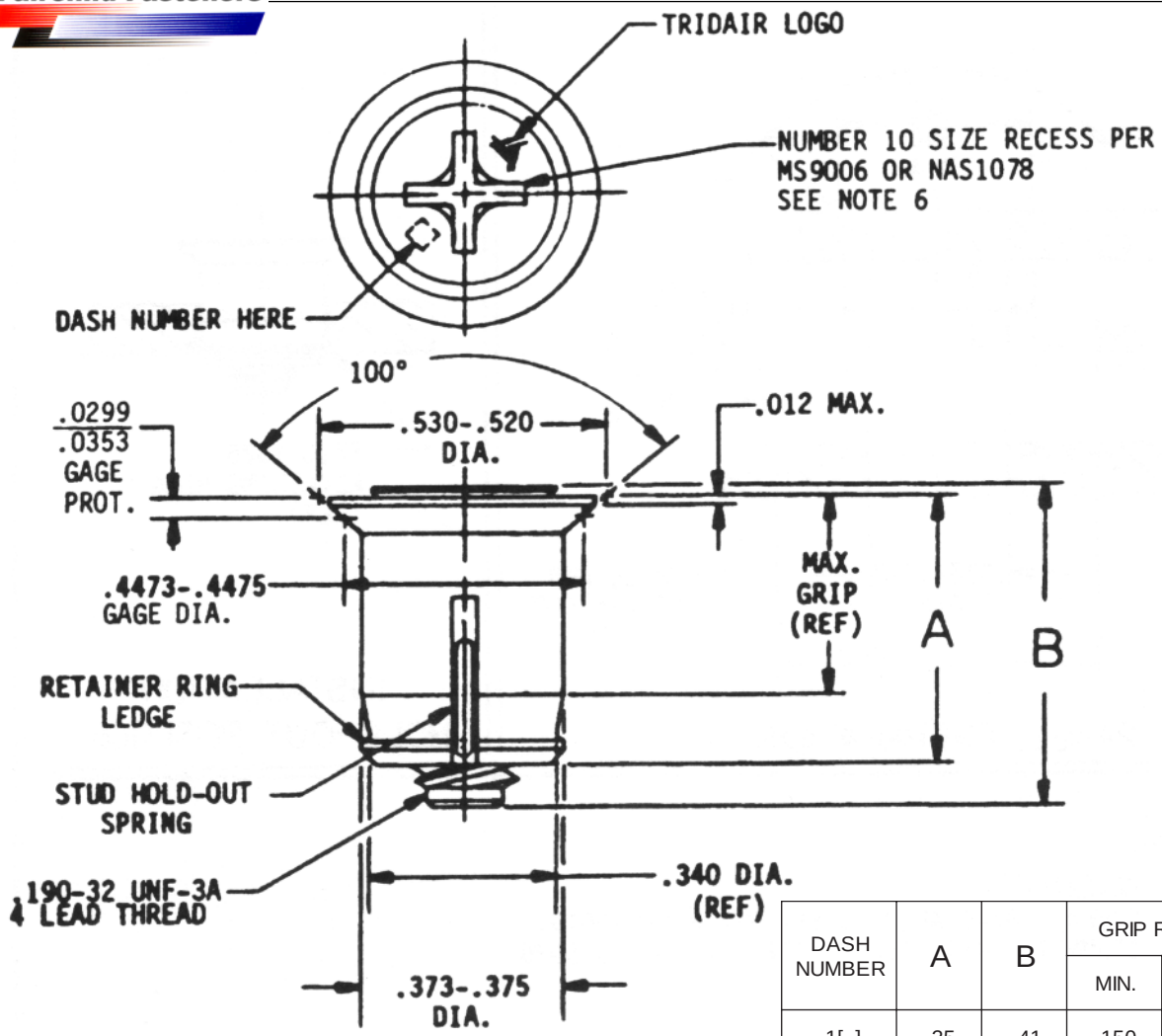
5. RECESS OPTIONS AND CALLOUTS:
5.1 MS9006 RECESS: ADD "P" AFTER DASH NUMBER. EXAMBLE: FX10-1559-2P
5.2 NAS1078 RECESS: ADD "TS" AFTER DASH NUMBER. EXAMPLE: FX10-1559-2TS.

6. ANTI-SEIZE COMPOUND PER MIL-A-907 APPLIED TO THREAD.

DRAWING PROVIDES FORM, FIT AND FUNTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

| REVISION | D | REDRAWN | 3-4-80 JWH | E | ECO 16258 | 11/18/86 |
|---|---|---|---|---|---|---|

| | | | |
|---|---|---|---|
| DRAWING BY JWH | DATE: 3-4-80 | TITLE: SCREW ASSY, QR | Tridair<br>3016 West Lomit Boulevard<br>Torrance, CA 90505 USA<br>909-947-3366 |
| APPROVED BY | DATE: 3-31-80 | | |
| APPROVED BY | DATE: 4-1-80 | | |
| APPROVED BY: | DATE: | UNLESS OFTHER RANGE SPECIFIED<br>TOLERANCES<br>DECIMALS XX = .02 / XXX = .020<br>ANGLES = 2°<br>MILLIMETERS .050 / .025<br>SURFACE FINISH 125 MICROINCHES | FX10-1559-00 |
| PROJECT NUMBER | | | FSC: 29372 — SHEET 2 OF 2 |




| DASH NUMBER | A | B | GRIP RANGE | | WEIGHT LBS/EA |
|---|---|---|---|---|---|
| | | | MIN. | MAX. | |
| -1[ ] | .35 | .41 | .150 | .220 | .010 |
| -2[ ] | .42 | .48 | .221 | .290 | .013 |
| -3[ ] | .49 | .55 | .291 | .360 | .015 |
| -4[ ] | .56 | .62 | .361 | .430 | .017 |
| -5[ ] | .63 | .69 | .431 | .500 | .019 |
| -6[ ] | .70 | .76 | .501 | .570 | .021 |
| -7[ ] | .77 | .83 | .571 | .640 | .023 |
| -8[ ] | .84 | .90 | .641 | .710 | .025 |
| -9[ ] | .91 | .97 | .711 | .780 | .027 |
| -10[ ] | .98 | 1.04 | .781 | .850 | .029 |
| -11[ ] | 1.05 | 1.11 | .851 | .920 | .031 |
| | | | | | |

| REVISION | | | |
|---|---|---|---|
| G | REDRAWN | 2-28-80 JWH | |
| E | ECO 16614 | 11/18/86 | |

DRAWING PROVIDES FORM, FIT AND FUNTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

| | | | |
|---|---|---|---|
| DRAWING BY JWH | DATE: 2-28-80 | TITLE | |
| APPROVED BY | DATE: 3-31-80 | SCREW ASSY, QR | |
| APPROVED BY | DATE: 4-1-80 | | |
| APPROVED BY: | DATE: | UNLESS OTHER RANGE SPECIFIED<br>TOLERANCES MILLIMETERS SURFACE FINISH<br>DECIMALS XX = .02 .050 125 MICROINCHES<br>XXX = .020 .025<br>ANGLES = 2° | FX10-1558-00 |
| PROJECT NUMBER | | | FSC: 29372 SHEET 1 OF 2 |

Tridair

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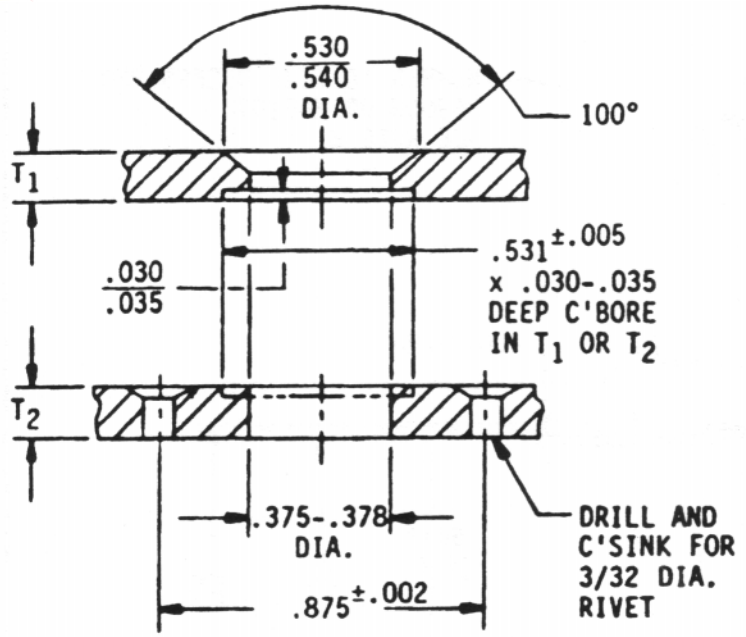
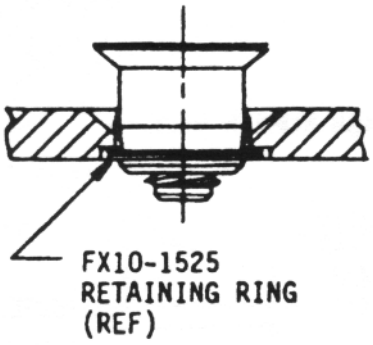
Torrance, CA 90505 USA
909-947-3366




PANEL PREPARATION




INSTALLATION
HOLD-OUT POSITION

NOTES:

1. MATERIAL:
1.1 SCREW: 8740 ALLOY STEEL PER MIL-S-6049.
1.2 GROMMET: 4140 ALLOY STEEL PER MIL-S-5626
1.3 SPRING: 17-7 PH CRES PER AMS 5673

2. HEAT TREAT:
2.1 SCREW AND GROMMET: 160 K.S.I. MINIMUM ULTIMATE TENSILE STRENGTH PER MIL-H-6875.
2.2 SPRING: CONDITION CH900 PER MIL-H-6875.

3. FINISH:
3.1 SCREW AND GROMMET: CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 3.
3.2 SPRING: PASSIVATE PER QQ-P-35.

4. USE WITH FX10-1510 OR FX10-1502 RECEPTACLE AND FX10-1525 RETAINING RING.

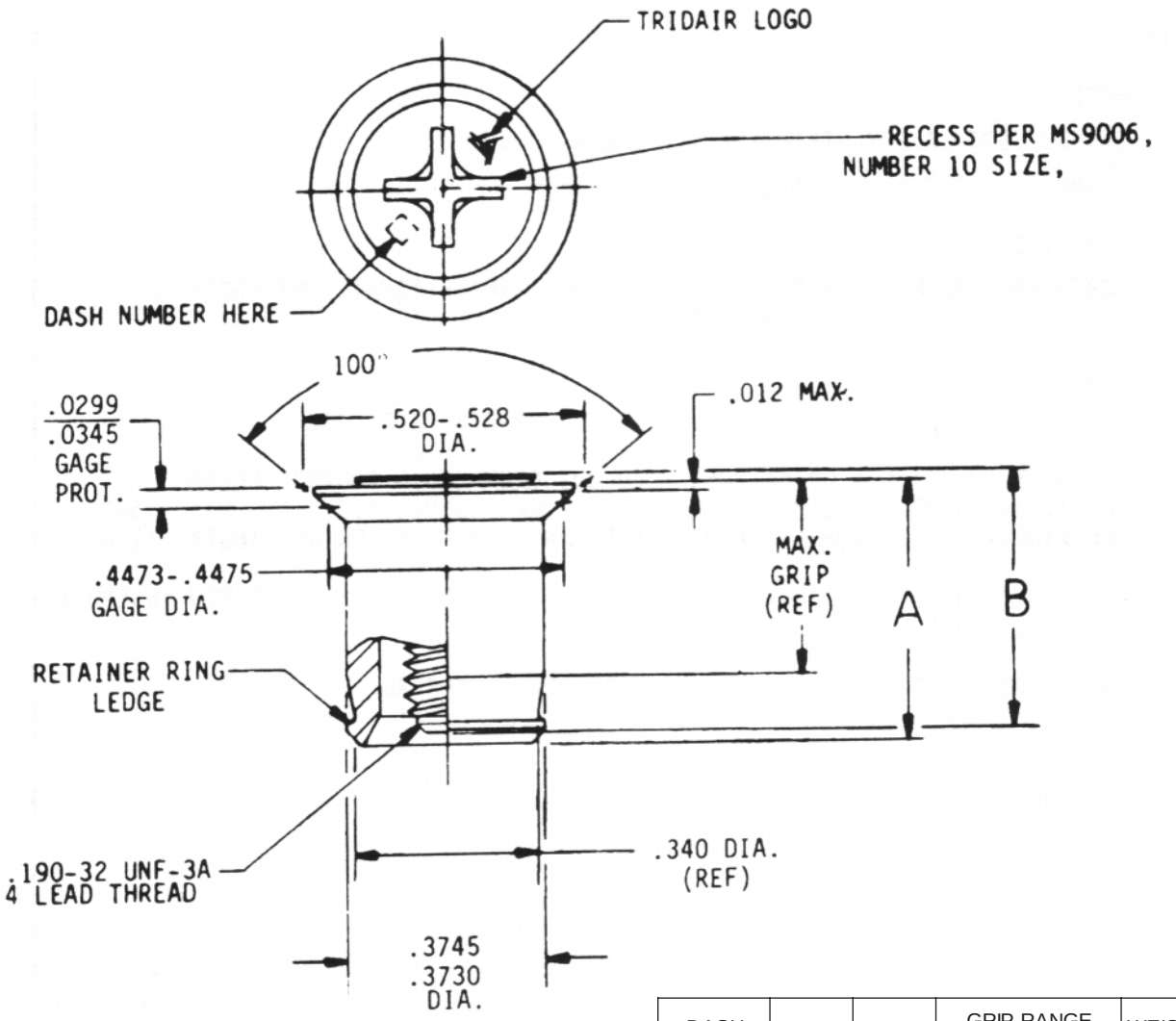
5. .375 DIAMETER HOLE IN T2 MAY BE ENLARGED TO .390 DIAMETER (MAXIMUM) TO ALLOW FOR HOLE MISALIGNMENT.

6. RECESS OPTIONS AND CALLOUTS:
6.1 MS9006 RECESS: ADD “P” AFTER DASH NUMBER. EXAMBLE: FX10-1558-2P.
6.2 NAS1078 RECESS: ADD “TS” AFTER DASH NUMBER. EXAMPLE: FX10-1558-2TS.

7. ANTI-SEIZE COMPOUND PER MIL-A-907 APPLIED TO THREAD.

| REVISION | G | REDRAWN | 2-28-80 JWH | H | ECO 16614 | 11-18-86 |
|---|---|---|---|---|---|---|

| | | | |
|---|---|---|---|
| DRAWING BY JWH | DATE: 2-28-80 | TITLE: SCREW ASSY, QR | Tridair<br>3016 West Lomit Boulevard<br>Torrance, CA 90505 USA<br>909-947-3366 |
| APPROVED BY | DATE: 3-31-80 | | |
| APPROVED BY | DATE: 4-1-80 | | |
| APPROVED BY: | DATE: | UNLESS OTHER RANGE SPECIFIED<br>TOLERANCES MILLIMETERS SURFACE FINISH<br>DECIMALS XX = .02 .050 125 MICROINCHES<br>XXX = .020 .025<br>ANGLES = 2° | FX10-1558-00 |
| PROJECT NUMBER | | | FSC: 29372 SHEET 2 OF 2 |




| DASH NUMBER | A | B | GRIP RANGE | | WEIGHT LBS/EA |
|---|---|---|---|---|---|
| | | | MIN. | MAX. | |
| -1P | .42 | .41 | .230 | .290 | .013 |
| -2P | .49 | .48 | .291 | .360 | .015 |
| -3P | .56 | .55 | .361 | .430 | .017 |
| -4P | .63 | .62 | .431 | .500 | .019 |
| -5P | .70 | .69 | .501 | .579 | .021 |
| | | | | | |
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| | | | | | |
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| | | | | | |
| | | | | | |

| REVISION | D | REDRAWN | 3-6-80 JWH | E | ECO 16100 | OMJ 11/18/86 |
|---|---|---|---|---|---|---|

DRAWING PROVIDES FORM, FIT AND FUNTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

| | | | |
|---|---|---|---|
| DRAWING BY JWH | DATE: 3-6-80 | TITLE | |
| APPROVED BY | DATE: 3-31-80 | SCREW ASSY, QR | |
| APPROVED BY | DATE: 4-1-80 | | |
| APPROVED BY: | DATE: | UNLESS OTHER RANGE SPECIFIED<br>TOLERANCES MILLIMETERS SURFACE FINISH<br>DECIMALS XX = .02 .050 125 MICROINCHES<br>XXX = .020 .025<br>ANGLES = 2° | FX10-15010-[]P |
| PROJECT NUMBER | | | FSC: 29372 SHEET 1 OF 2 |

Tridair
3016 West Lomit Boulevard
Torrance, CA 90505 USA
909-947-3366

NOTES:

1. MATERIAL:
1.1 SCREW: 8740 ALLOY STEEL PER MIL-S-6049.
1.2 GROMMET: 4140 ALLOY STEEL PER MIL-S-5626

2. HEAT TREAT:
2.1 SCREW AND GROMMET: 160 K.S.I. MINIMUM ULTIMATE TENSILE STRENGTH PER MIL-H-6875.

3. FINISH:
3.1 SCREW AND GROMMET: CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 3.

4. USE WITH FX10-15009 OR CA17064 HOLD-OUT GROMMET TO PROVIDE FLUSH CONDITION ON BOTTOM SIDE OF PANEL IN RETRACTED POSITION, AND FX10-1502 RECEPTACLE. SEE GROMMET DRAWING FOR PANEL PREPARATION AND INSTALLATION.

5. AN FX10-1579-T11 INSTALLATION TOOL MUST BE USED TO INSTALL SCREW ASSEMBLY INTO FX10-15009 GROMMET.

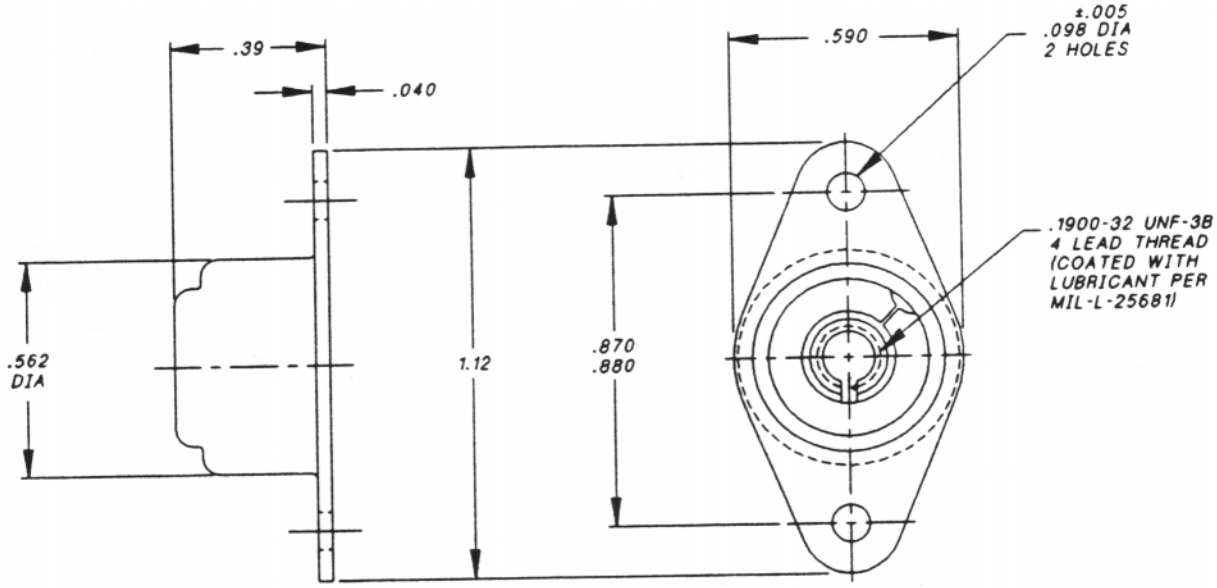
6. ANTI-SEIZE COMPOUND PER MIL-A-907 APPLIED TO THREAD.

| REVISION | D | REDRAWN | JWH 3-6-80 | E |
|---|---|---|---|---|

DRAWING PROVIDES FORM, FIT AND FUNTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

| | | | |
|---|---|---|---|
| DRAWING BY JWH | DATE: 3-6-80 | TITLE | |
| APPROVED BY | DATE: 3-31-80 | SCREW ASSY, QR | |
| APPROVED BY | DATE: 4-1-80 | | |
| APPROVED BY: | DATE: | UNLESS OTHER RANGE SPECIFIED<br>TOLERANCES MILLIMETERS SURFACE FINISH<br>DECIMALS XX = .02 .050 125 MICROINCHES<br>XXX = .020 .025<br>ANGLES = 2° | FX10-15010-[]P |
| PROJECT NUMBER | | | FSC: 29372 SHEET 2 OF 2 |

Tridair
3016 West Lomit Boulevard
Torrance, CA 90505 USA
909-947-3366




NOTES:

1. MATERIAL:
1.1 RECEPTACLE: 1050 STEEL PER AISI C1050 OR AMS 5085.
1.2 NUT: 4140 OR 8740 ALLOY STEEL PER MIL-S-5626 OR MIL-S-6049.
1.3 INSERT: 4140 ALLOY STEEL PER MIL-S-5626.

2. HEAT TREAT:
2.1 RECEPTACLE: FTU 150ksi MINIMUM PER MIL-H-6875.
2.2 NUT: FTU 180 KSI MINIMUM PER MIL-H-6875.
2.3 INSERT: FTU 160 KSI MINIMUM PER MIL-H-6875.

3. FINISH:
3.1 RECEPTACLE, NUT AND INSERT: CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 3.

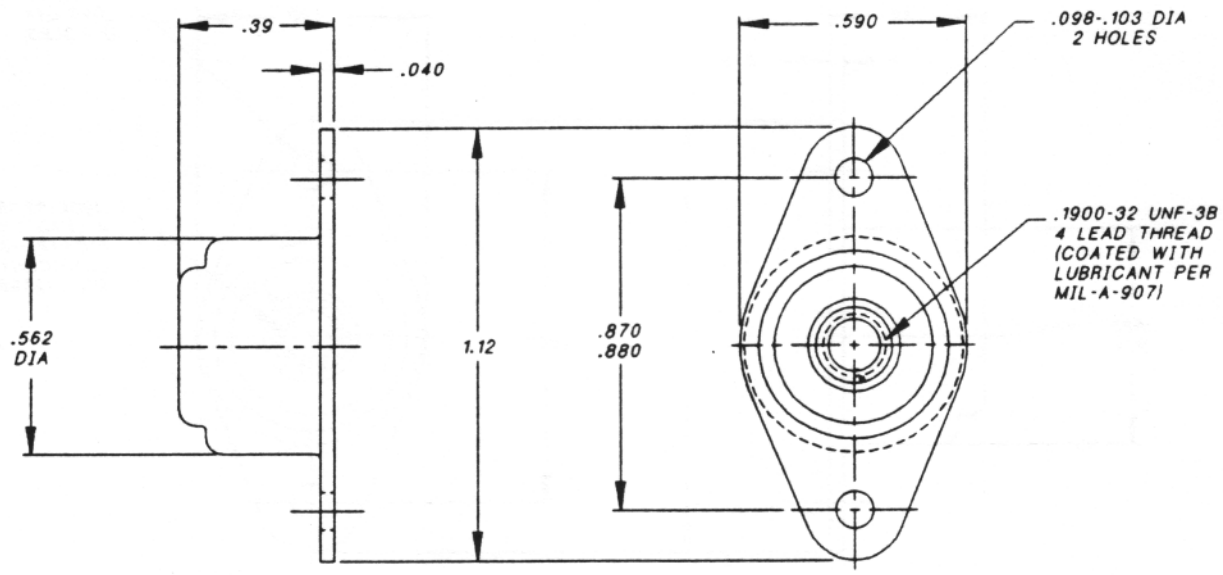
4. TO BE USED WITH FX10-1500 AND FX10-15000 SERIES, 4 LEAD SCREW ASSEMBLIES.

5. SHIMS FOR THIS RECEPTACLE: SEE FX10-1550 DRAWING.

6. RECEPTACLE MAINTAINS 5 IN-LBS (MINIMUM) RUNNING TORQUE-OUT AFTER 200 COMPLETE CYCLES.

| | | |
|---|---|---|
| ***UNLESS OTHERWISE SPECIFIED***<br>*TOLERANCE: .XX = .±.02*<br>*.XXX = .010*<br>*ANGLE = ±2°*<br>*SURFACE FINISH: 125 MICROINCHES* | | |
| APPROVED DATE | ***AEROSPACE FASTENER DIVISION***<br>***ENGINEERING R&D CENTER***<br>*I CIVIC PLAZA, SUITE 500*<br>*CARSON, CA 90745* | CAGE CODE ***92215*** |
| *31 MAR 80* | | |
| REV LETTER AND DATE | | ***FX10-1502*** |
| ***J*** *16 OCT 92* | *Q.R. RECEPTACLE ASSEMBLY*<br>*.190-32 UNF-3B, 4 LEAD* | |
| ECN NUMBER | | |
| *ECN 31574* | | SHEET 1 OF 1 |

S43022




NOTES:

1. MATERIAL:
1.1 RECEPTACLE: 1050 STEEL PER AISI C1050 OR AMS 5085.
1.2 NUT: 4140 OR 8740 ALLOY STEEL PER MIL-S-5626 OR MIL-S-6049.
1.3 INSERT: 4140 ALLOY STEEL PER MIL-S-5626.

2. HEAT TREAT:
2.1 RECEPTACLE: FTU 150 KSI MINIMUM PER MIL-H-6875.
2.2 NUT: FTU 180 KSI MINIMUM PER MIL-H-6875.
2.3 INSERT: FTU 160 KSI MINIMUM PER MIL-H-6875.

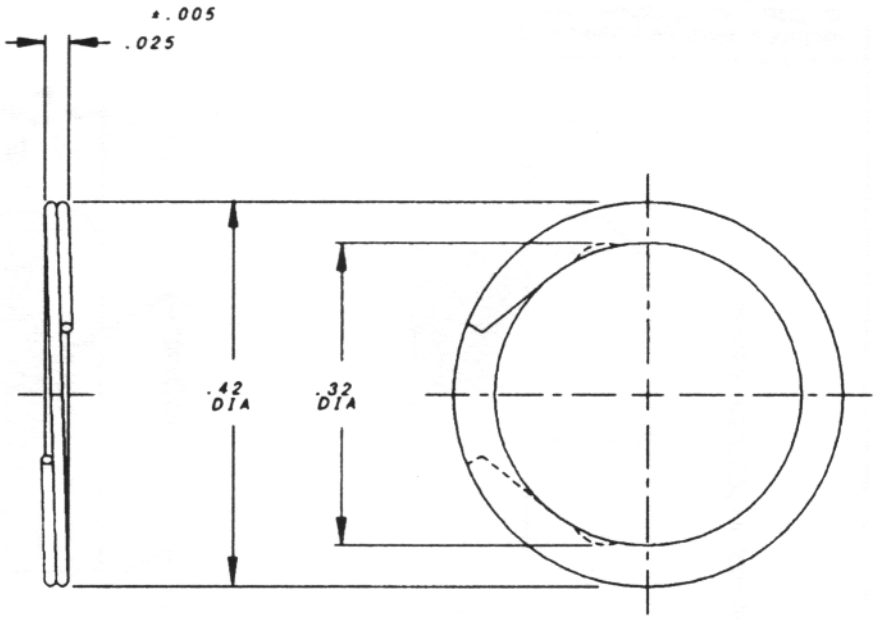
3. FINISH:
3.1 RECEPTACLE, NUT AND INSERT: CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 3.

4. TO BE USED WITH FX10-1500 AND FX10-15000 SERIES, 4 LEAD SCREW ASSEMBLIES.

5. SHIMS FOR THIS RECEPTACLE: SEE FX10-1550 DRAWING.

| | | |
|---|---|---|
| ***UNLESS OTHERWISE SPECIFIED***<br>*TOLERANCE: .XX = .±.02*<br>*.XXX = .±..010*<br>*ANGLE = ±2°*<br>*SURFACE FINISH: 125 MICROINCHES* | | |
| APPROVED DATE | ***AEROSPACE FASTENER DIVISION***<br>***ENGINEERING R&D CENTER***<br>*I CIVIC PLAZA, SUITE 500*<br>*CARSON, CA 90745* | CAGE CODE ***92215*** |
| *19 MAR 80* | | |
| REV LETTER AND DATE | | ***FX10-1510*** |
| ***T*** *16 OCT 92* | *Q.R. RECEPTACLE ASSEMBLY*<br>*.1900-32 UNF-3B, 4 LEAD* | |
| ECN NUMBER | | |
| *ECN 31573* | | SHEET 1 OF 1 |

S43023




NOTES:

1. THIS RING DESIGNED FOR USE ON FX10-1500 SERIES SCREW ASSEMBLIES AND CA1797 TYPE STUD NUTS.

2. INSTALLATION TOOL:
   A.) USE FX10-1530T TO INSTALL RINGS ON FX10-1500 SERIES SCREW ASSEMBLYS.
   B.) USE CA1797-T10 TO INSTALL RINGS ON CA1795-( ) AND CA17036-( ) STUD NUTS.

3. PANEL PREPARATION DATA:
   A.) RETAINING RING RECESS: C'BORE .531 DIA X .030-.035 DEEP.
   B.) MAX SUBSTRUCTURE HOLE: .390 DIA.

4. MATERIAL: 18-8 TYPE 300 SERIES CRES, PER MIL-S-5059 AND/OR QQ-S-766 (CHEMISTRY ONLY).

5. HEAT TREAT: STRESS RELIEVE.

6. FINISH: PASSIVATED PER QQ-P-35.

7. WEIGHT: .312 LBS/1000 PIECES (APPROXIMATE).

| | | |
|---|---|---|
| ***UNLESS OTHERWISE SPECIFIED***<br>*TOLERANCE:*<br>*DECIMALS*<br>*. XX = .±.02*<br>*XXX = .010*<br>*ANGLE = ±2°*<br>*SURFACE FINISH: 125 MICROINCHES* | | |
| APPROVED DATE | Fairchild ***AEROSPACE FASTENER DIVISION***<br>***ENGINEERING R&D CENTER***<br>*1 CIVIC PLAZA, SUITE 500*<br>*CARSON, CA 90745* | *TRIDAIR PRODUCT* |
| *29 MAY 73* | | |
| REV LETTER AND DATE | | |
| ***T*** *27 JUL 93* | *RETAINING RING OR FASTENER* | ***FX10-1525*** |
| ECN NUMBER | | SHEET 1 OF 1 |
| *ECN 33937* | | |

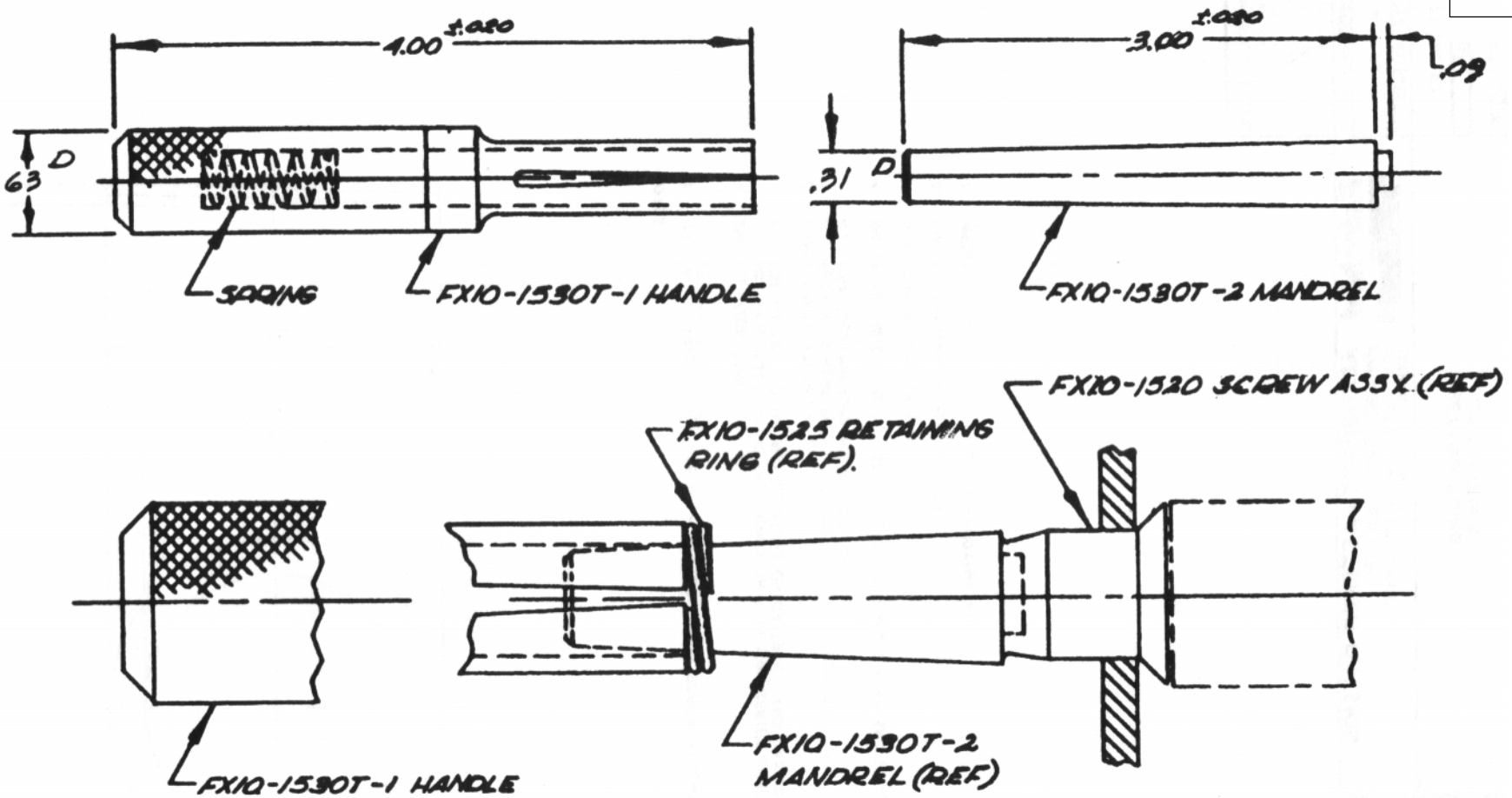
S42840

Fairchild Fasteners

| DATE | HEV | CHANGE |
|---|---|---|
| 10-10-68 | E | REDRAWN. |
| 5-6-69 | F | 3.00 3.12 |

# FX10-1530T

F




DRAWING PROVIDES FORM, FIT AND FUNCTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

| | | | | | |
|---|---|---|---|---|---|
| | | | ALLOY STEEL | | |
| | | | MATERIAL OR NAME | | SPECIFICATION |
| UNLESS OTHERWISE SPECIFIED | | | ENGN | E.E. | 10/9/68 |
| TOLERANCES: DECIMALS: .XX ± .015 .XXX ± .010 ANGLES ± | FINISH: BLACK OXIDE PER MIL-C-13924, CL I. | HEAT TREAT: | ENGN | | 10/25/68 |
| | | | APP'D | FJC | 10-31-68 |

INSTALLATION TOOL
- RETAINING RING -

Tridair

MFR'S OF NEWTON INSERTS AND CALFAX FASTENERS
3000 W. LOMITA BLVD., TORRANCE, CALIFORNIA, 90505, PHONES: 213-775-3636

FX10-1530T

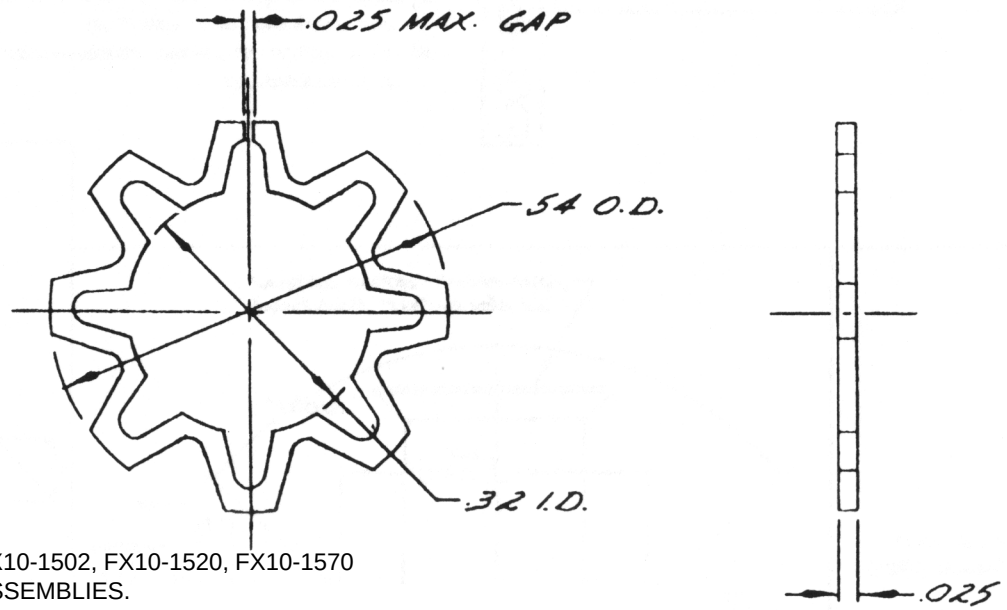
| FEDERAL SUPPLY CODE 29372 | WEIGHT: .23 LB/EA | SCALE | SHEET 1 OF 1 |
|---|---|---|---|

| DATE | REV | CHANGE |
|---|---|---|
| 9-30-70 | F | REVISED & REDRAWN |
| 12-11-70 | G | CORRECTED TOLERANCES |

DRAWING PROVIDES FORM, FIT AND FUNCTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

# FX10-1576

G




NOTES:

1. TO BE USED WITH FX10-1502, FX10-1520, FX10-1570 FX10-1540 SCREW ASSEMBLIES.
2. C'BORE .625 $^{+.010}_{-.000}$ DIA. x .031 DEEP IN OUTER PANEL, OR INNER STRUCTURE FOR RETAINING RING RECESS.

| | |
|---|---|
| 17-7 PH CRES | AMS 5528 |
| MATERIAL OR NAME | SPECIFICATION |

UNLESS OTHERWISE SPECIFIED

| | | |
|---|---|---|
| ENGN | | 9-30-70 |
| ENGN | | |
| APP'D | | 10-4-70 |

TOLERANCES:
DECIMALS:
.XX ± .010
.XXX ± .005
ANGLES ± 1°

FINISH:
PASSIVATED
PER QQ-P-35

HEAT TREAT:
Rc 44-48

FEDERAL SUPPLY CODE 29372

WEIGHT: .043 LBS/100

SCALE: **4:1**

# RETAINING RING

Tridair

MFR'S OF NEWTON INSERTS AND CALFAX FASTENERS
3000 W. LOMITA BLVD., TORRANCE, CALIFORNIA, 90908, PHONES: 213-775-3626

FX10-1576

SHEET 1 OF 1



Fairchild Fasteners

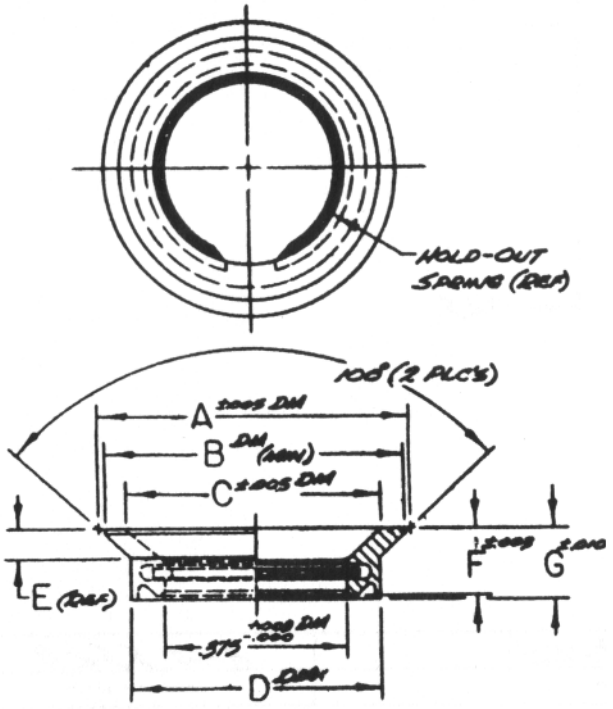
| DATE | REV | CHANGE |
|---|---|---|
| 1-20-70 | A | |
| 6-24-70 | B | |
| 10-16-70 | C | |
| 6-11-80 | D | ECO - 6480 |
| 12-15-80 | E | ECO - 7404 |
| 4-24-82 | F | ECO - 9390 |

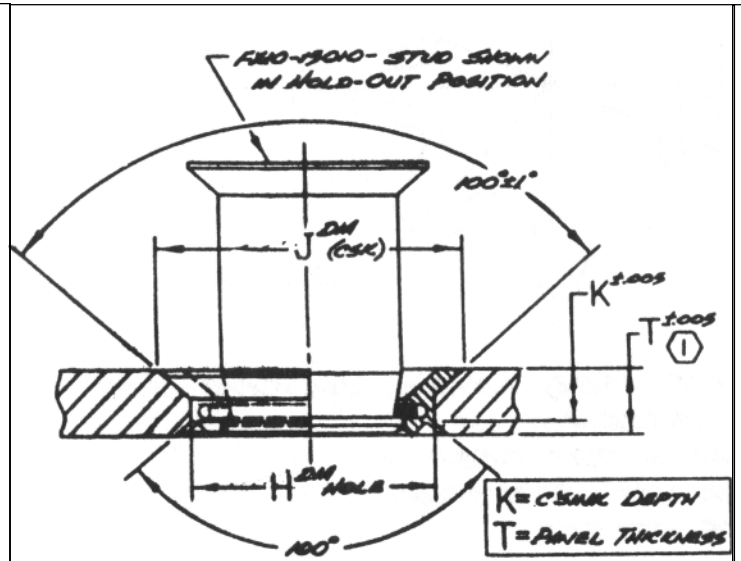
DRAWING PROVIDES FORM, FIT AND FUNCTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

FX10-5009

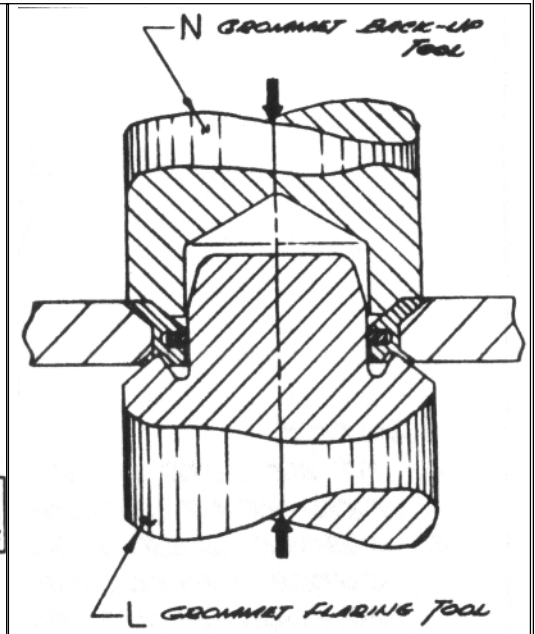
NOTES:

1. SELECT DASH NO. ACCORDING TO PANEL THICKNESS T
2. USE FX10-19009-T11 TOOL TO INSTALL STUD IN GROMMET AS SHOWN ON SHT 2
3. SEE SHT 2 FOR GROMMET & PANEL PREPARATION DIMENSIONS.




PANEL PREPARATION + APPLICATION




GROMMET INSTALLATION

| | | |
|---|---|---|
| GROMMET - 18-8 TYPE 300 SERIES CRES | | ASTM-A-582 |
| SPRING - 17-7 PN CRES | | AMS56T5 |
| MATERIAL OR NAME | | SPECIFICATION |

| | | | |
|---|---|---|---|
| UNLESS OTHERWISE SPECIFIED 75-292 | ENGN | 2-25-70 | GROMMET ASSY STUD HOLD-OUT |
| TOLERANCES: DECIMALS: .XX ± .015 .XXX ± .010 ANGLES ± 1° | ENGN | | |
| FINISH: PASSIVATED PER QQ-P-35 | APP'D FJC | 3-4-70 | |
| HEAT TREAT: SPRING: COND CN900 | | | |
| FEDERAL SUPPLY CODE 29372 | | | |
| WEIGHT: SCALE: 4:1 | | | |

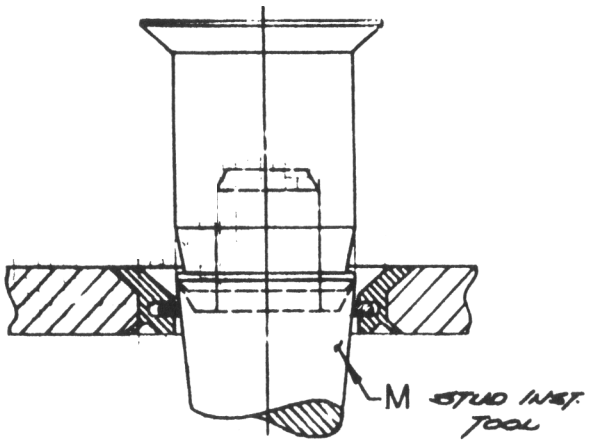
Tridair

MFR'S OF NEWTON INSERTS AND CALFAX FASTENERS
3000 W. LOMITA BLVD., TORRANCE, CALIFORNIA, 90908, PHONES: 213-775-3626

FX10-15009

SHEET 1 OF 2

| DATE | REV | CHANGE |
|---|---|---|
| | | SEE SHEET 1 |




STUD INSTALLATION

# FX10-15009

F

| SIZE | PART NO. | GROMMET DIMENSIONS | | | | | | | | PANEL AREA | | | | | INSTALLATION TOOLS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A THEO SHARP | B MIN DIA | C C'SMALL DIA | D GROM DIA | E HOLLST. (REF) | F GROMMET LENGTH | G GROMMET LENGTH | | T PANEL THIC | H HOLE SIZE | J C' SINC DIA | K C'SMIL DEPTH | | L FLARING TOOL | M STUD INST. TOOL | N BACK-UP TOOL |
| BASIC | FX10-15009-1 | .629 | .590 | .590 | .499 | .090 | .129 | .128 | | .125 | 14999 | .630 | .110 | | FX10-15009-T10 | FX10-15009-T11 | FX10-15009-T12 |
| | FX10-15009-2 | | | | .496 | | .154 | .199 | | .196 | .5020 | .633 | .146 | | | | |
| 1ST OVERSIZE | FX10-15009-3 | .650 | .625 | .590 | .514 | .096 | .129 | .128 | | .125 | .5150 | .695 | .110 | | FX10-15009-T19 | FX10-15009-T11 | FX10-15009-T14 |
| | FX10-15009-4 | | | | .511 | | .194 | .199 | | .196 | .5175 | .660 | .146 | | | | |
| 2ND OVERSIZE | FX10-15009-5 | .657 | .690 | .590 | .530 | .066 | .129 | .128 | | .125 | .5310 | .692 | .110 | | FX10-15009-T15 | FX10-15009-T11 | FX10-15009-T16 |
| | FX10-15009-6 | | | | .527 | | .156 | .199 | | .196 | .9999 | .697 | .146 | | | | |

DRAWING PROVIDES FORM, FIT AND FUNCTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

| UNLESS OTHERWISE SPECIFIED 75-292 | | |
|---|---|---|
| TOLERANCES: DECIMALS: .XX ± .015 .XXX ± .010 ANGLES ± 1° | FINISH: | HEAT TREAT: |
| FEDERAL SUPPLY CODE 29372 | WEIGHT: | SCALE: 4:1 |

| MATERIAL OR NAME | | SPECIFICATION |
|---|---|---|
| ENGN | | 2-25-70 |
| ENGN | | |
| APP'D | FJC | 3-4-70 |

GROMMET ASSY
STUD HOLD-OUT

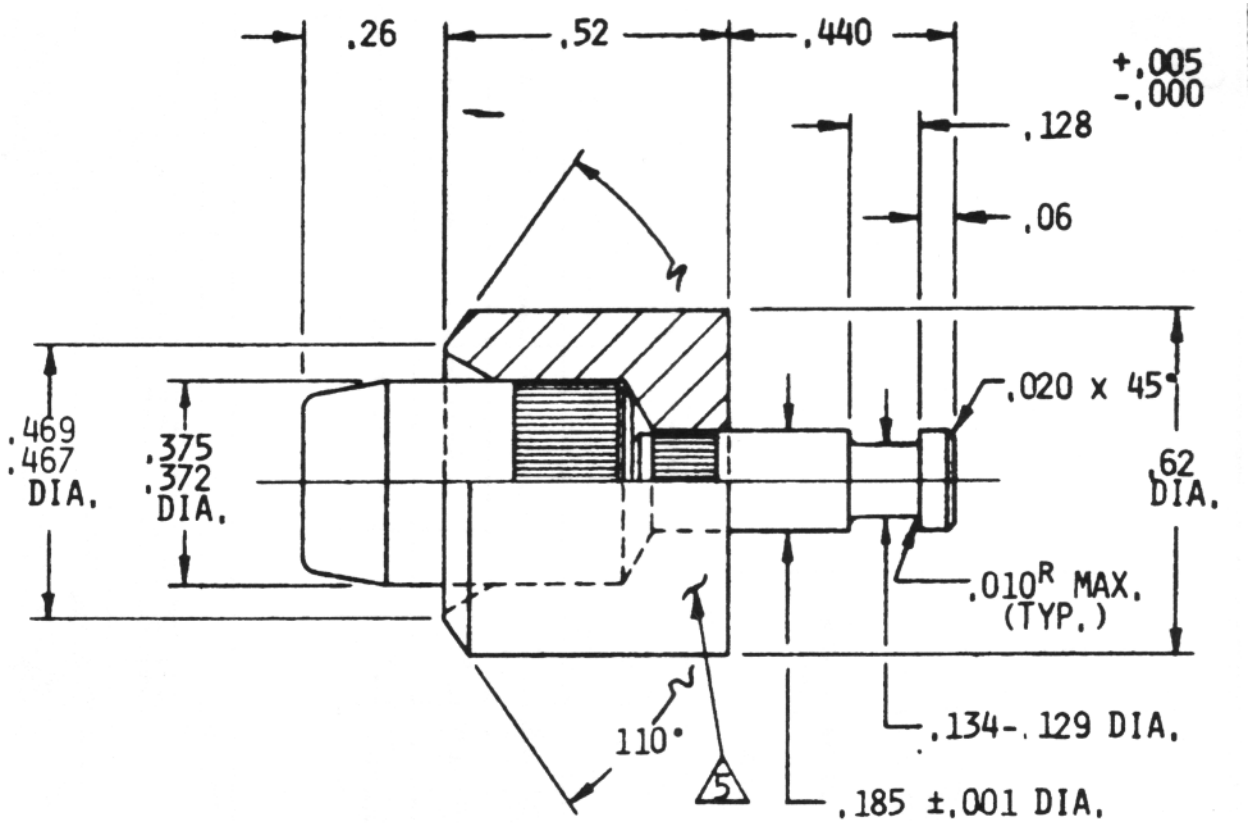
Tridair

MFR'S OF NEWTON INSERTS AND CALFAX FASTENERS
3000 W. LOMITA BLVD., TORRANCE, CALIFORNIA, 90908, PHONES: 213-775-3626

FX10-15009

SHEET 2 OF 2

Fairchild Fasteners




NOTES:

1. MATERIAL: TOOL STEEL, AISI TYPE06.

2. HEAT TREAT: Rc 45 MINIMUM PER MIL-H-6875.

3. FINISH: BLACK OXIDE PER MIL-C-13924A, CLASS I.

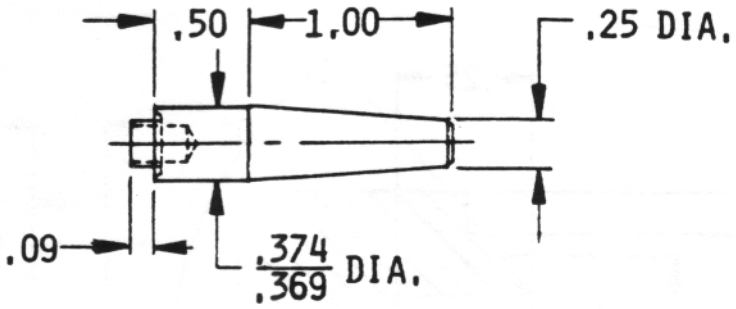
4. THIS TOOL IS TO BE USED WITH A FX10-15009-T12 BACK-UP TOOL TO INSTALL FX10-15009-1 AND FX10-15009-2 GROMMET.

5. TOOL SHALL HAVE PART NUMBER ETCHED OR STAMPED IN AREA SHOWN.

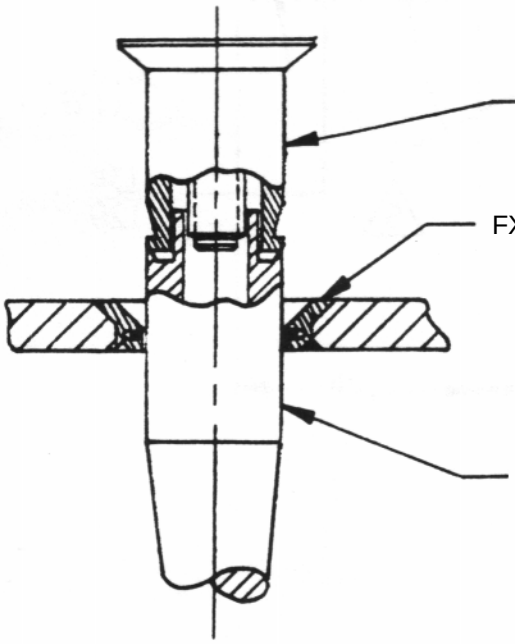
DRAWING PROVIDES FORM, FIT AND FUNTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

REVISION

| | | | |
|---|---|---|---|
| DRAWING BY | DATE: 11-28-79 | TITLE: FLARING TOOL | Tridair<br>3016 West Lomit Boulevard<br>Torrance, CA 90505 USA<br>909-947-3366 |
| APPROVED BY | DATE: 12-6-79 | | |
| APPROVED BY | DATE: 12-6-79 | | |
| APPROVED BY: | DATE: | UNLESS OFTHER RANGE SPECIFIED<br>TOLERANCES MILLIMETERS SURFACE FINISH<br>DECIMALS .XX = .02 .050 125 MICROINCHES<br>. XXX = .020 .025<br>ANGLES = 2° | FX10-15009-T10 |
| PROJECT NUMBER | | | FSC: 29372 SHEET 1 OF 1 |




FX10-15009-T11



FX10-15010-[ ] SCREW ASSEMBLY
(REF.)

FX10-15009-[ ] GROMMET ASSEMBLY
(REF.)

FX10-15009-T11 TOOL
(REF.)

NOTE:
INSERT TOOL AND SCREW ASSEMBLY AS SHOWN THROUGH TOP SIDE OF GROMMET.

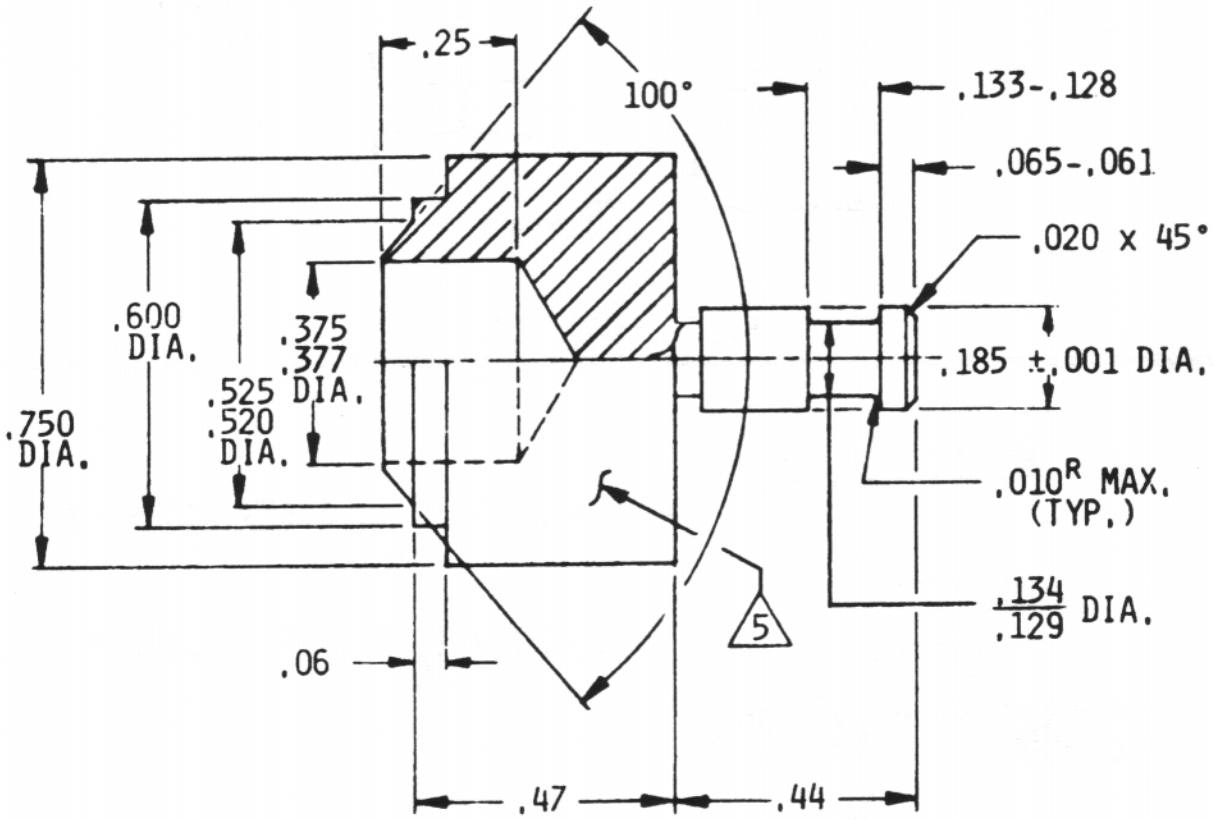
NOTES:

1. MATERIAL: TOOL STEEL.
2. HEAT TREAT: Rc 45 MINIMUM PER MIL-H-6875.
3. FINISH: BLACK OXIDE PER MIL-C-13924A, CLASS 1.
4. TOOL SHALL HAVE DASH NUMBER, (-T11) ETCHED OR STAMPED ON .374-.369 DIA.

DRAWING PROVIDES FORM, FIT AND FUNTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

| REVISION | ELO# | LTWH |
|---|---|---|
| A | 6156 | 12-30-79 |

| | | | |
|---|---|---|---|
| DRAWING BY RSR | DATE: 11-27-79 | TITLE: INSTALLATION TOOL SCREW ASSY. | Tridair<br>3016 West Lomit Boulevard<br>Torrance, CA 90505 USA<br>909-947-3366 |
| APPROVED BY | DATE: 12-3-79 | | |
| APPROVED BY RLW | DATE: 12-4-79 | | |
| APPROVED BY: | DATE: | UNLESS OFTHER RANGE SPECIFIED<br>TOLERANCES MILLIMETERS SURFACE FINISH<br>DECIMALS XX = .02 .050 125 MICROINCHES<br>XXX = .020 .025<br>ANGLES = 2° | FX10-15009-T11 |
| PROJECT NUMBER | | | FSC: 29372 / SHEET 1 OF 1 |




NOTES:

1. MATERIAL: TOOL STEEL.

2. HEAT TREAT: Rc 62-67 PER MIL-H-6875.

3. FINISH: BLACK OXIDE PER MIL-C-13924A, CLASS I.

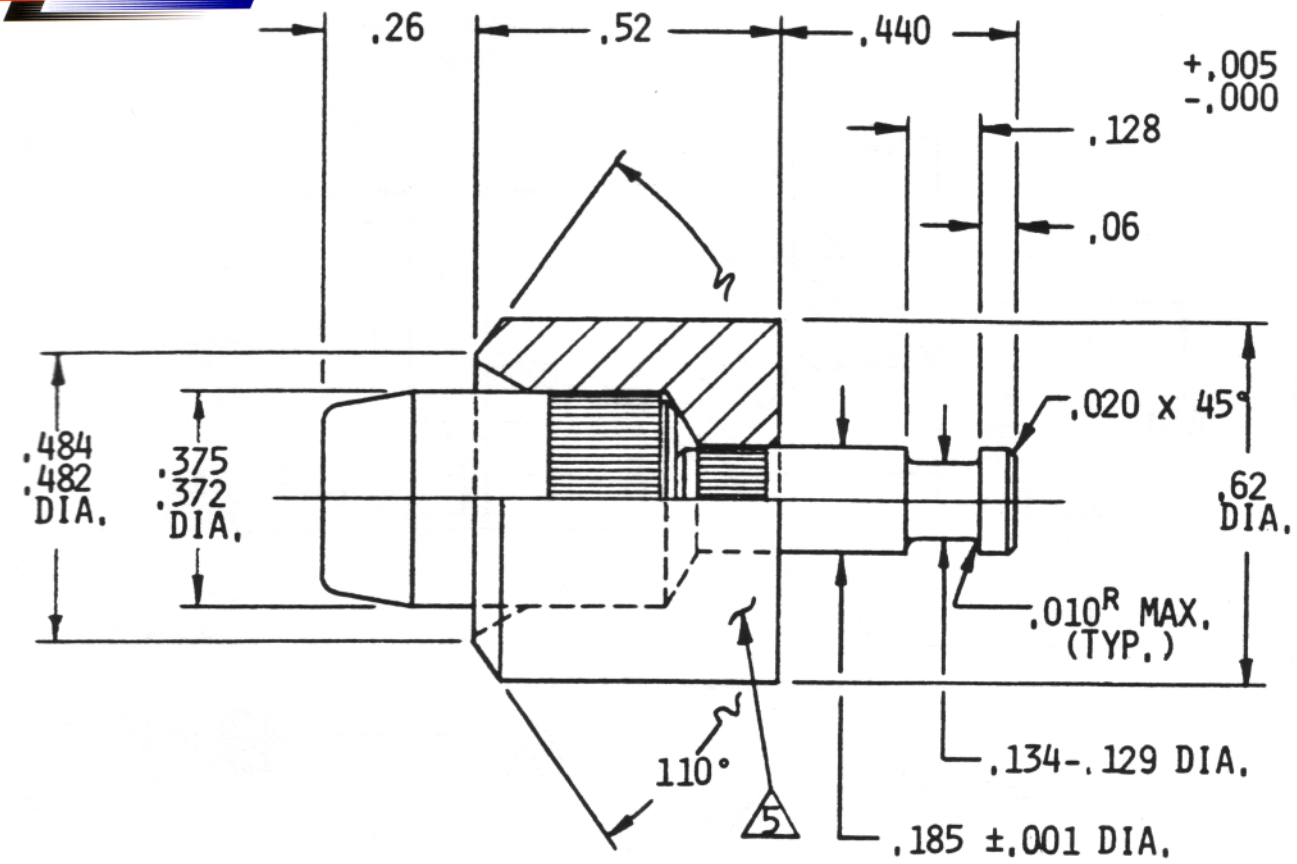
4. THIS TOOL IS TO BE USED WITH A FX10-15009-T10 FLARE TOOL TO INSTALL FX10-15009-1 AND FX10-15009-2 GROMMETS.

5. TOOL SHALL HAVE PART NUMBER ETCHED OR STAMPED IN AREA SHOWN.

| REVISION | A | JWH | 12-30-79 | B | ECO# 7924 | JWT 4-21-81 |
|---|---|---|---|---|---|---|

DRAWING PROVIDES FORM, FIT AND FUNTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

| | | | |
|---|---|---|---|
| DRAWING BY RSR | DATE: 11-27-79 | TITLE | |
| APPROVED BY | DATE: 12-3-79 | TOOL, BACKUP | Tridair<br>3016 West Lomit Boulevard<br>Torrance, CA 90505 USA<br>909-947-3366 |
| APPROVED BY RLW | DATE: 12-4-79 | | |
| APPROVED BY: | DATE: | UNLESS OTHER RANGE SPECIFIED<br>TOLERANCES MILLIMETERS SURFACE FINISH<br>DECIMALS XX = .02 .050 125 MICROINCHES<br>XXX = .020 .025<br>ANGLES = 2° | FX10-15009-T12 |
| PROJECT NUMBER | | | FSC: 29372 SHEET 1 OF 1 |




NOTES:

1. MATERIAL: TOOL STEEL.

2. HEAT TREAT: Rc 45 MINIMUM PER MIL-H-6875.

3. FINISH: BLACK OXIDE PER MIL-C-13924A, CLASS I.

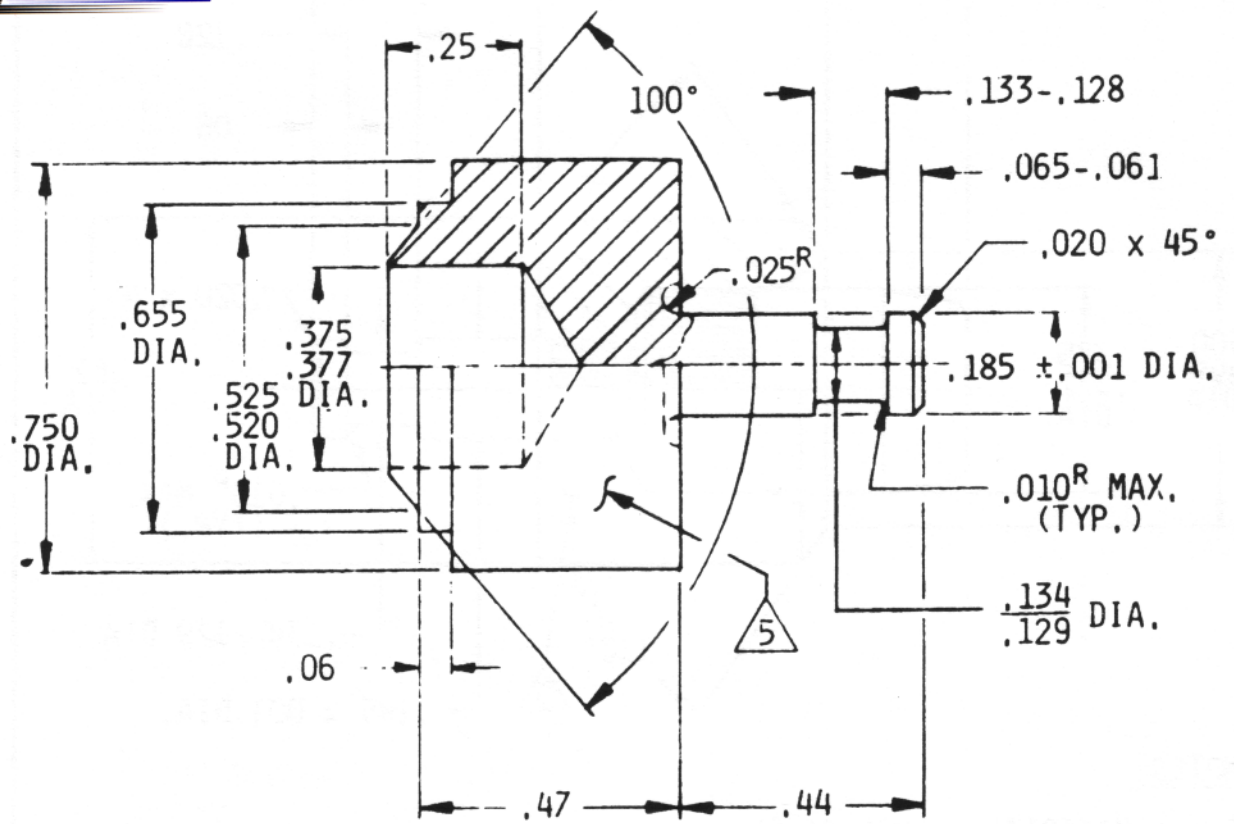
4. THIS TOOL IS TO BE USED WITH A FX10-15009-T14 BACK-UP TOOL TO INSTALL FX10-15009-3 AND FX10-15009-4 GROMMETS

5. TOOL SHALL HAVE PART NUMBER ETCHED OR STAMPED IN AREA SHOWN.

| REVISION | | JWH | 12-20-79 |
|---|---|---|---|
| A | | | |

DRAWING PROVIDES FORM, FIT AND FUNTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

| | | | |
|---|---|---|---|
| DRAWING BY | DATE: 11-28-79 | TITLE: FLARING TOOL | Tridair<br>3016 West Lomit Boulevard<br>Torrance, CA 90505 USA<br>909-947-3366 |
| APPROVED BY | DATE: 12-3-79 | | |
| APPROVED BY RLW | DATE: 12-4-79 | | |
| APPROVED BY: | DATE: | UNLESS OFTHER RANGE SPECIFIED<br>TOLERANCES MILLIMETERS SURFACE FINISH<br>DECIMALS XX = .02 .050 125 MICROINCHES<br>XXX = .020 .025<br>ANGLES = 2° | FX10-15009-T13 |
| PROJECT NUMBER | | | FSC: 29372 SHEET 1 OF 1 |




NOTES:

1. MATERIAL: TOOL STEEL.

2. HEAT TREAT: Rc 45 PER MIL-H-6875.

3. FINISH: BLACK OXIDE PER MIL-C-13924A, CLASS I.

4. THIS TOOL IS TO BE USED WITH A FX10-15009-T16 BACKUP TOOL TO INSTALL FX10-15009-5 AND FX10-15009-6 GROMMET.

5. TOOL SHALL HAVE PART NUMBER ETCHED OR STAMPED IN AREA SHOWN.

DRAWING PROVIDES FORM, FIT AND FUNTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

| REVISION | A |
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| | |
| 12-28-79 | |
| JWH | |

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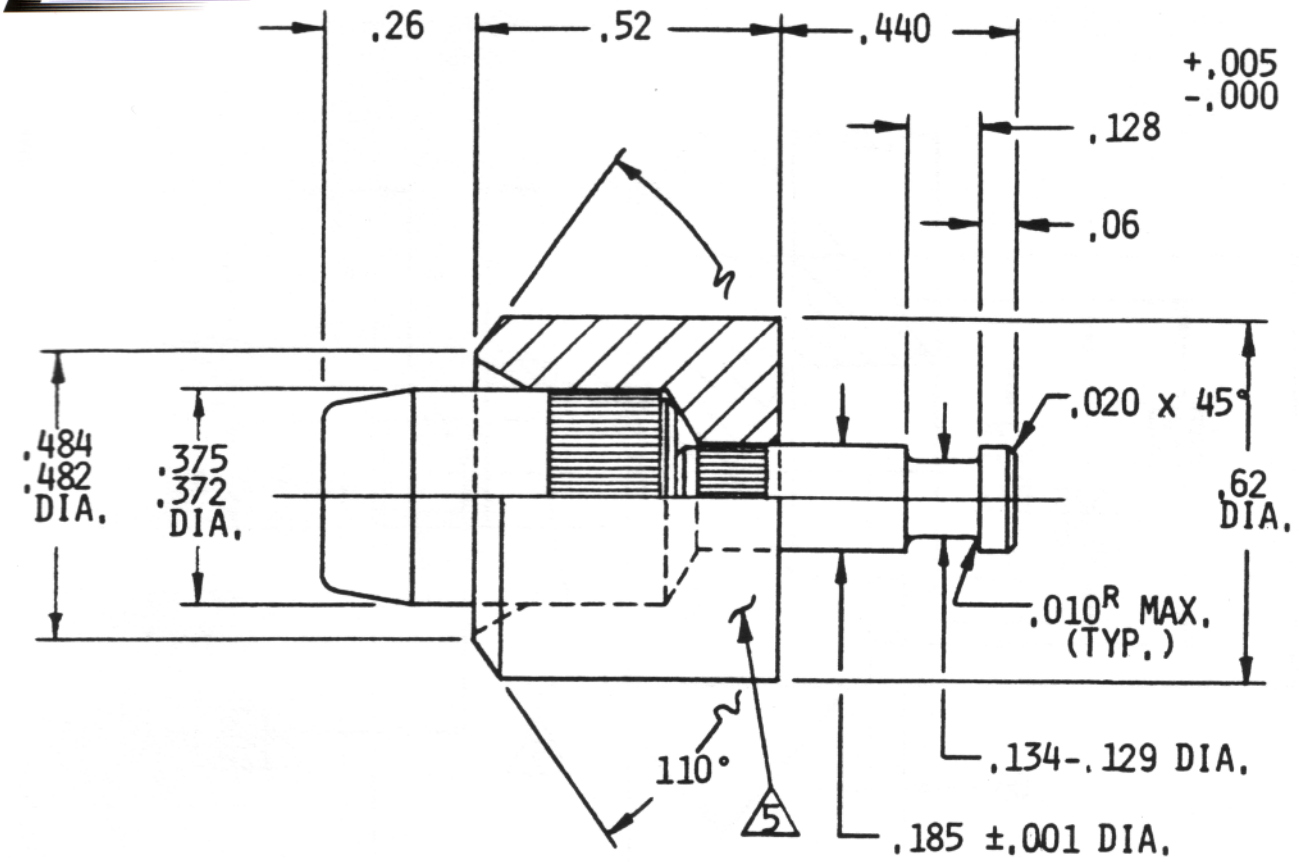
|---|---|---|---|
| DRAWING BY | DATE: 11-28-79 | TITLE: FLARING TOOL | Tridair<br>3016 West Lomit Boulevard<br>Torrance, CA 90505 USA<br>909-947-3366 |
| APPROVED BY | DATE: 12-3-79 | | |
| APPROVED BY RLW | DATE: 12-4-79 | | |
| APPROVED BY: | DATE: | UNLESS OFTHER RANGE SPECIFIED<br>TOLERANCES<br>DECIMALS XX = .02 XXX = .020<br>ANGLES = 2°<br>MILLIMETERS .050 .025<br>SURFACE FINISH 125 MICROINCHES | FX10-15009-T15 |
| PROJECT NUMBER | | | FSC: 29372 SHEET 1 OF 1 |




NOTES:

1. MATERIAL: TOOL STEEL.

2. HEAT TREAT: Rc 45 MINIMUM PER MIL-H-6875.

3. FINISH: BLACK OXIDE PER MIL-C-13924A, CLASS I.

4. THIS TOOL IS TO BE USED WITH A FX10-15009-T16 BACK-UP TO INSTALL FX10-15009-3 AND FX10-15009-4 GROMMETS.

5. TOOL SHALL HAVE PART NUMBER ETCHED OR STAMPED IN AREA SHOWN.

| REVISION | A |
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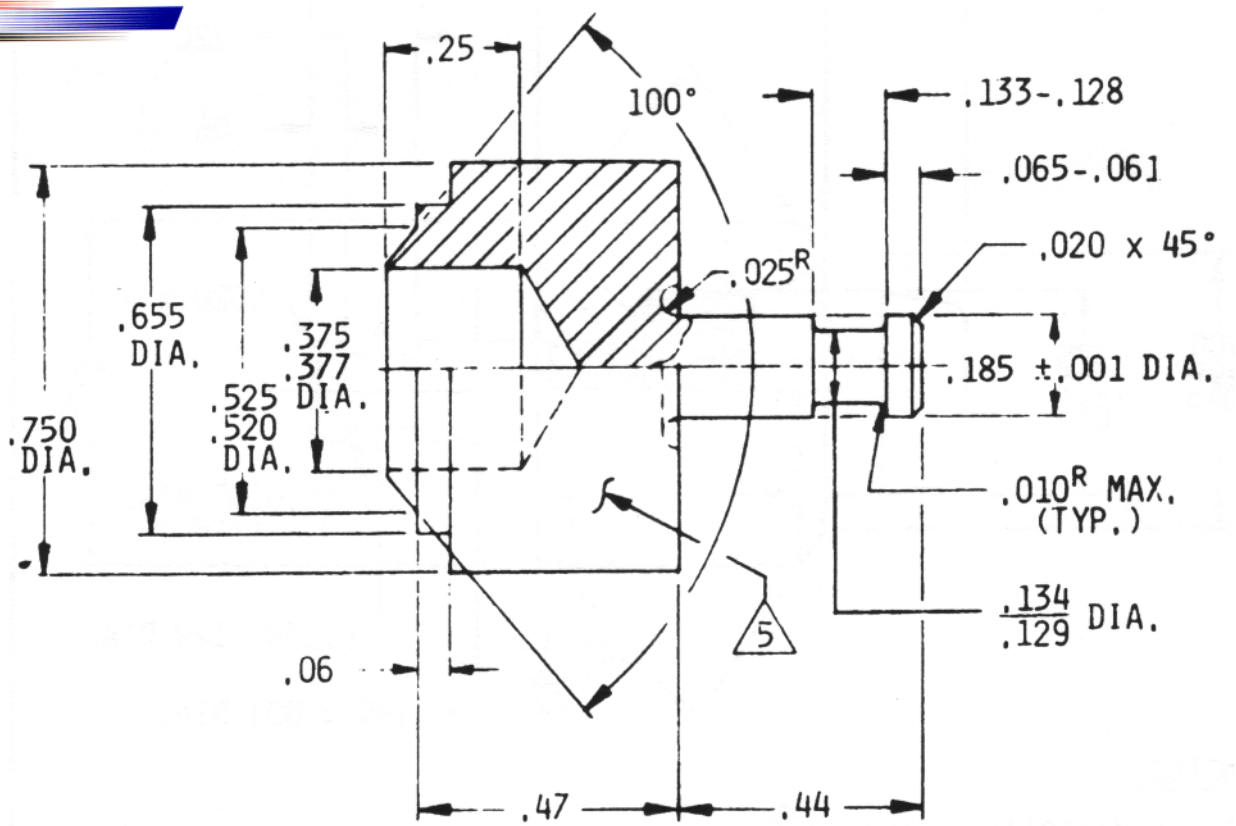
| | |
| 12-20-79 | |
| JWH | |

DRAWING PROVIDES FORM, FIT AND FUNTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

| | | | |
|---|---|---|---|
| DRAWING BY | DATE: 11-27-79 | TITLE: TOOL, BACK-UP | Tridair<br>3016 West Lomit Boulevard<br>Torrance, CA 90505 USA<br>909-947-3366 |
| APPROVED BY | DATE: 12-3-79 | | |
| APPROVED BY MSC | DATE: 12-4-79 | | |
| APPROVED BY: RLW | DATE: | UNLESS OFTHER RANGE SPECIFIED<br>TOLERANCES<br>DECIMALS XX = .02 XXX = .020<br>ANGLES = 2°<br>MILLIMETERS .050 .025<br>SURFACE FINISH 125 MICROINCHES | FX10-15009-T15 |
| PROJECT NUMBER | | | FSC: 29372 / SHEET 1 OF 1 |




NOTES:

1. MATERIAL: TOOL STEEL.

2. HEAT TREAT: Rc 62-67 PER MIL-H-6875.

3. FINISH: BLACK OXIDE PER MIL-C-13924A, CLASS I.

4. THIS TOOL IS TO BE USED WITH A FX10-15009-T15 FLARE TOOL TO INSTALL FX10-15009-5 AND FX10-15009-6 GROMMETS.

5. TOOL SHALL HAVE PART NUMBER ETCHED OR STAMPED IN AREA SHOWN.

DRAWING PROVIDES FORM, FIT AND FUNTION DATA. DO NOT ATTEMPT TO MANUFACTURE PRODUCT USING THIS DRAWING.

REVISION A | 12-28-79 | JWH

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|---|---|---|---|
| DRAWING BY RSR | DATE: 11-27-79 | TITLE: TOOL, BACK-UP | Tridair, 3016 West Lomit Boulevard, Torrance, CA 90505 USA, 909-947-3366 |
| APPROVED BY | DATE: 12-3-79 | | |
| APPROVED BY RLW | DATE: 12-4-79 | | |
| APPROVED BY: | DATE: | UNLESS OFTHER RANGE SPECIFIED TOLERANCES DECIMALS XX = .02 XXX = .020 ANGLES ± = 2° MILLIMETERS ±.050 ±.025 SURFACE FINISH 125 MICROINCHES | FX10-15009-T16 |
| PROJECT NUMBER | | | FSC: 29372 SHEET 1 OF 1 |