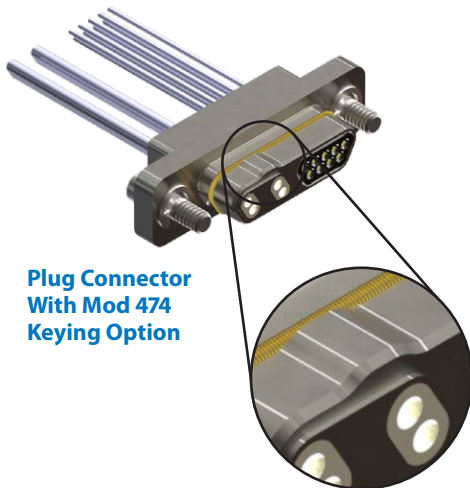


## Mod Code 474 Keying Option



**Plug Connector With Mod 474 Keying Option**

## Prevent Mis-Mating with Mod Code 474 Keying Option

Keyed GMMD connectors for “fail-safe” circuits feature specially modified shells to prevent mis-mating. The plug shell has a raised key, and the receptacle shell has a keyway.

The shell size nine connector accommodates three key positions. All other sizes have five positions available. The letter code following Mod Code 474 specifies the key position. “474A” plugs mate to “474A” receptacles.

**Keyed plugs will not mate to unkeyed receptacles, but keyed receptacles will plug into standard unkeyed plugs.**

GMMD MOD CODES

### HOW TO ORDER GMMD CONNECTORS WITH MOD 474

**Step 1: Find a Standard GMMD Part Number**

Mod 474 keying is available on all standard metal shell GMMD connectors, including solder cup, pre-wired and printed circuit board versions. This feature is not available on plastic GMMD or M83513 connectors.

**Example:** GMMD-HR4T9-2PM

**Step 2: Pick a Keying Position**

A letter code identifies the key position. The table on the following page shows the keying options for each shell size. Mod Code 474A mates to 474A receptacles, and so on.

**Example:** 474B

**Step 3: Add the Mod Code to the Part Number**

A letter code identifies the key position. The table on the following page shows the keying options for each shell size. Mod 474A plugs mate to 474A receptacles, and so on.

**Example:** GMMD-HR4T9-2PM-474B

### GMMD KEY POSITIONS: MODIFICATION CODE 474

|   |                      |                       |                       |  |
|---|----------------------|-----------------------|-----------------------|--|
| <p><b>Fig. 1</b></p>  | <p><b>Fig. 2</b></p> | <p><b>Fig. 3</b></p>  | <p><b>Fig. 4</b></p>  | <p><b>Fig. 5</b></p>                   |
| <p><b>Fig. 6</b></p>  | <p><b>Fig. 7</b></p> | <p><b>Fig. 8</b></p>  | <p><b>Fig. 9</b></p>  | <p><b>Fig. 10</b></p>                  |
| <p>Figure 1 plug connector mates to Figure 6 receptacle, figure 2 mates to figure 7, and so on. Figure 11 mates to figure 12.</p> |                      | <p><b>Fig. 11</b></p> | <p><b>Fig. 12</b></p> | <p>Mating face of connector shown.</p> |

## Mod Code 474 Keying Option

GMMD MOD CODES

| KEY POSITION OFFSETS |                |        |       |                |        |      |                |        |       |                |        |       |                |        |       |
|----------------------|----------------|--------|-------|----------------|--------|------|----------------|--------|-------|----------------|--------|-------|----------------|--------|-------|
| Layout               | Key Position A |        |       | Key Position B |        |      | Key Position C |        |       | Key Position D |        |       | Key Position E |        |       |
|                      | Figure         | Offset |       | Figure         | Offset |      | Figure         | Offset |       | Figure         | Offset |       | Figure         | Offset |       |
|                      |                | In.    | mm.   |                | In.    | mm.  |                | In.    | mm.   |                | In.    | mm.   |                | In.    | mm.   |
| 9P                   | 1              | .025   | 0.64  | 3              | .025   | 0.64 | 11             | .000   | 0.00  | NA             | —      | —     | NA             | —      | —     |
| 9S                   | 6              | .025   | 0.64  | 8              | .025   | 0.64 | 12             | .000   | 0.00  | NA             | —      | —     | NA             | —      | —     |
| 15P                  | 1              | .090   | 2.29  | 2              | .000   | 0.00 | 3              | .090   | 2.29  | 4              | .050   | 1.25  | 5              | .050   | 1.25  |
| 15S                  | 6              | .090   | 2.29  | 7              | .000   | 0.00 | 8              | .090   | 2.29  | 9              | .050   | 1.27  | 10             | .050   | 1.27  |
| 21P                  | 1              | .130   | 3.30  | 2              | .000   | 0.00 | 3              | .130   | 3.30  | 4              | .100   | 2.54  | 5              | .100   | 2.54  |
| 21S                  | 6              | .130   | 3.30  | 7              | .000   | 0.00 | 8              | .130   | 3.30  | 9              | .100   | 2.54  | 10             | .100   | 2.54  |
| 25P                  | 1              | .180   | 4.57  | 2              | .000   | 0.00 | 3              | .180   | 4.57  | 4              | .125   | 3.18  | 5              | .125   | 3.18  |
| 25S                  | 6              | .180   | 4.57  | 7              | .000   | 0.00 | 8              | .180   | 4.57  | 9              | .125   | 3.18  | 10             | .125   | 3.18  |
| 31P                  | 1              | .200   | 5.08  | 2              | .000   | 0.00 | 3              | .200   | 5.08  | 4              | .150   | 3.81  | 5              | .150   | 3.81  |
| 31S                  | 6              | .200   | 5.08  | 7              | .000   | 0.00 | 8              | .200   | 5.08  | 9              | .150   | 3.81  | 10             | .150   | 3.81  |
| 37P                  | 1              | .300   | 7.62  | 2              | .000   | 0.00 | 3              | .300   | 7.62  | 4              | .250   | 6.35  | 5              | .250   | 6.35  |
| 37S                  | 6              | .300   | 7.62  | 7              | .000   | 0.00 | 8              | .300   | 7.62  | 9              | .250   | 6.35  | 10             | .250   | 6.35  |
| 51-2P                | 1              | .400   | 10.16 | 2              | .000   | 0.00 | 3              | .400   | 10.16 | 4              | .350   | 8.89  | 5              | .350   | 8.89  |
| 51-2S                | 6              | .400   | 10.16 | 7              | .000   | 0.00 | 8              | .400   | 10.16 | 9              | .350   | 8.89  | 10             | .350   | 8.89  |
| 67P                  | 1              | .600   | 15.24 | 2              | .000   | 0.00 | 3              | .600   | 15.24 | 4              | .500   | 12.70 | 5              | .500   | 12.70 |
| 67S                  | 6              | .600   | 15.24 | 7              | .000   | 0.00 | 8              | .600   | 15.24 | 9              | .500   | 12.70 | 10             | .500   | 12.70 |

| MOD CODE 474 REAR PANEL MOUNT PANEL CUTOUTS |        |                       |       |                       |       |                                |       |                        |    |
|---|--------|-----------------------|-------|-----------------------|-------|--------------------------------|-------|------------------------|----|
|   | Layout | A                     |       | B                     |       | C                              |       | ØD                     |    |
|   |        | +.004 (0.10)<br>-.000 |       | +.004 (0.10)<br>-.000 |       | +.003 (0.076)<br>-.003 (0.076) |       | +.002 (0.051)<br>-.000 |    |
|   |        | In                    | mm    | In                    | mm    | In                             | mm    | In                     | mm |
| 9   | 0.408  | 10.36                 | 0.301 | 7.65                  | 0.565 | 14.35                          | 0.126 | 3.20                   |    |
| 15  | 0.558  | 14.17                 | 0.301 | 7.65                  | 0.715 | 18.16                          | 0.126 | 3.20                   |    |
| 21  | 0.708  | 17.98                 | 0.301 | 7.65                  | 0.865 | 21.97                          | 0.126 | 3.20                   |    |
| 25  | 0.808  | 20.52                 | 0.301 | 7.65                  | 0.965 | 24.51                          | 0.126 | 3.20                   |    |
| 31  | 0.958  | 24.33                 | 0.301 | 7.65                  | 1.115 | 28.32                          | 0.126 | 3.20                   |    |
| 37  | 1.108  | 28.14                 | 0.301 | 7.65                  | 1.265 | 32.13                          | 0.126 | 3.20                   |    |
| 51-2  | 1.458  | 37.03                 | 0.301 | 7.65                  | 1.615 | 41.02                          | 0.126 | 3.20                   |    |
| 67  | 4.858  | 123.39                | 0.301 | 7.65                  | 2.015 | 51.18                          | 0.126 | 3.20                   |    |

## Mod Code 428 High-Temperature Epoxy



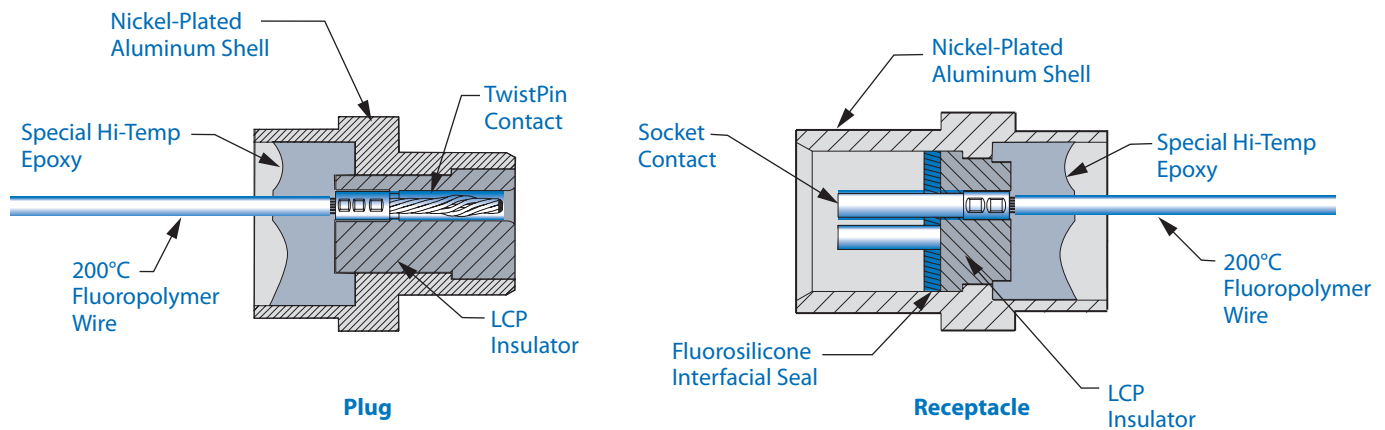
**Potting a Micro-D with Epoxy-Filled Syringe**

## Upgrade to 200° Celsius with Mod Code 428 High-Temperature Epoxy

The search for oil and gas has led to deeper reservoirs where extreme temperatures and pressures test the limits of electronics design. Oil well logging instruments must be able to withstand temperatures beyond the limits of standard connectors.

Micro-D connectors are made from temperature-resistant materials. The Liquid Crystal Polymer (LCP) glass-filled thermoplastic insulators easily withstand 400° F. The Fluorosilicone seals, TwistPin contacts and aluminum shells also are rated for continuous exposure to 400° F. The epoxy potting compound is the only component not rated for high temperature. Mod Code 428 upgrades the standard epoxy with a special 600° F. epoxy.

GMMD MOD CODES



### HOW TO ORDER MICRO-D CONNECTORS WITH MOD 428 HI TEMP

**Step 1: Find a Standard Micro-D part Number**

Mod 428 is available on all standard metal shell Micro-D connectors, including solder cup, pre-wired and printed circuit board versions. Not available on plastic Micro-D or M83513 connectors.

**Example: GMMD-HR4T9-2SM**

- 1. Metal shell only
- 2. Nickel-plated aluminum or stainless steel shells only.

**Step 2: Add the Mod Code to the Part Number**

**Example: GMMD-HR4T9-2SM-428**

### APPLICATION NOTES

- 1. Shell Material & Finish: Electroless nickel plated aluminum is commonly used for high temperature connectors. Cadmium plated aluminum is not recommended for temperatures exceeding 175° C. because of discoloration and breakdown of the chromate seal applied to the cadmium. Stainless steel shells provide the best resistance to temperature and corrosive environments, but at the expense of weight and cost.
- 2. Potting Compound: 200° C Rated Epoxy

## Mod Code 429 for Space-Grade Applications

GMMD MOD CODES



**Detail of the Atmospheric Infrared Sounder Instrument (AIRS) with Glenair Micro-D Cables and Connectors**  
*Photo courtesy JPL*

## Save Time and Cost with Modification Codes for Space Grade GMMD connectors

GMMD connectors are a good choice for all types of orbital and deep space projects. Glenair Modification Codes provide special processing for GMMDs to meet NASA requirements without the need for a customer 'Statement of Work' or 'Specification Control Drawing'. This section explains Glenair Modification Code ordering, and provides valuable information on outgassing and other space flight topics.

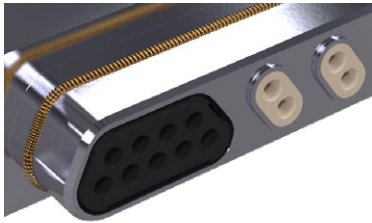
| HOW TO ORDER SPACE GRADE GMMD CONNECTORS             |  |
|--|--|
| <b>Step 1: Find a Standard GMMD Part Number</b>      | Electroless nickel plated shells and Tefzel® wire are preferred for space flight. Cadmium plating is prohibited.   |
| <b>Step 2: Select a NASA Screening Level</b>         | The term "Screening Level" refers to the final inspection procedure and does not include outgassing.<br>Level 1 for mission-critical highest reliability<br>Level 2 for high reliability<br>Level 3 for standard reliability               |
| <b>Step 3: Outgassing Processing</b>                 | Specify bakeout or thermal vacuum outgassing. Both bakeout and thermal vacuum outgas processes incur additional cost.  |
| <b>Step 4: Select Appropriate Modification Code.</b> | Match the desired level of screening, outgassing or a combination of both. Select from the table below to choose the right modification code. Add the modification code to the connector part number. Example: GMMD-HR2T9-2SM- <b>429C</b> |

| NASA EEE-INST-02, Table 2A Screening Levels |         |         |         |
|---|---------|---------|---------|
| Inspection                                  | Level 1 | Level 2 | Level 3 |
| Visual                                      | 100%    | 100%    | 100%    |
| Mechanical                                  | 2(0)    | 2(0)    |         |
| Dielectric Withstanding Voltage             | 2(0)    | 2(0)    |         |
| Insulation Resistance                       | 2(0)    | 2(0)    |         |
| Contact Engagement & Separation Force       | 2(0)    |         |         |
| Hermeticity (Sealed Receptacles Only)       | 100%    | 100%    |         |
| Coupling Force                              | 2(0)    |         |         |

Required inspection quantity shown. Number in parenthesis indicates acceptance of failures allowed for all quantities inspected.

| Screening Level and Available Outgassing Modification Codes |                        |  |   |
|---|------------------------|--|---|
| NASA Screening Level  | Special Screening Only | Special Screening Plus Outgassing Processing |   |
|   |                        | 48 Hour Oven Bake 175° C.                    | Thermal Vacuum Outgassing 24 hrs. 125° C. |
| Level 1 Highest Reliability                                 | Mod Code 429F          | Mod Code 429J                                | Mod Code 429C                             |
| Level 2 High Reliability                                    | Mod Code 429D          | Mod Code 429K                                | Mod Code 429A                             |
| Level 3 Standard Reliability                                | Mod Code 432           | Mod Code 186                                 | Mod Code 186M                             |

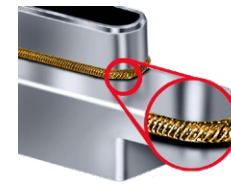
## Mod Code 497 Ground Springs for Plugs



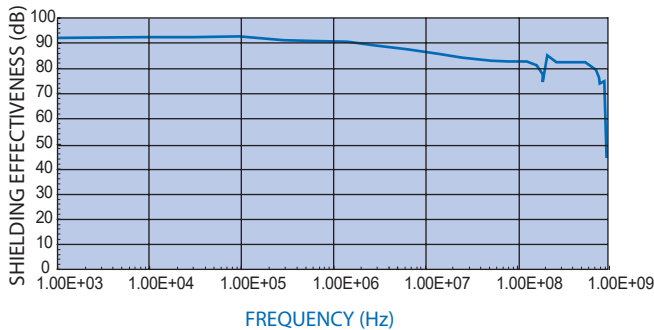
### Improve EMI Performance with Mod Code 497 Ground Springs

GMMD Twinax connectors are all equipped as standard with a ground spring to ensure excellent shell to shell conductivity and low EMI. GMMD Coax connectors do not have this as standard but for those plugs that contain solely coax contacts the Mod Code 497 can be added. For combo coax connectors (those with coax and #24 discrete contacts) the Mod Code 497 can not be used. For such an arrangement, if improved EMI is needed use the GMMD-FPE plug style which includes a gasket seal, opting for one of the two conductive gasket materials.

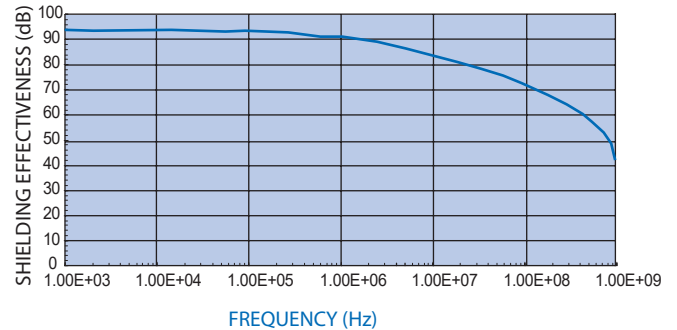
**Ground Spring and EMI Shielding Effectiveness** – A gold-plated stainless steel ground spring on the pin connector mating face offers substantial improvement in EMI protection. The graphs compare identical connectors tested with and without ground springs.



EMI Performance with Ground Spring



EMI Performance without Ground Spring



#### HOW TO ORDER GMMD CONNECTORS WITH MOD 497 SPRINGS

**Step 1: Find a Standard GMMD Part Number**

Ground springs are available on all standard GMMD plug connectors.

**Example:** GMMD-FP4C-CNN0L105-100

1. Plugs only (pin connectors)
2. Nickel and gold plated aluminum shells only

**Step 2: Add the Mod Code to the Part Number**

**Example:** GMMD-FP4C-CNN0L105-100-497