

# M28876 Fiber Optic Connectors

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## M28876 Connector Series

Amphenol Fiber Systems International (AFSI) is a leading producer and supplier of M28876 connectors to the US Navy and allied navies around the world. Our stringently toleranced and precision machined connectors, manufactured at our state-of-the-art, ISO 9001:2000 certified factory in Allen, Texas, U.S.A., are designed to provide superior optical performance in the harshest of environments.

## Features & Benefits

- Qualified to MIL-PRF-28876 specifications
- Low insertion loss (-0.35dB typ MM, -0.35dB typ SM)
- Compatible with single mode or multimode termini
- Full environmental sealing
- Available in 3 shell sizes
  - ◆ Shell 13 – 4 channels
  - ◆ Shell 15 – 6 channels or 8 channels
  - ◆ Shell 23 – 18 channels or 31 channels
- Available in 6 keying options (1 through 6)
- Backshells, featuring AFSI's exclusive Quickloc cable captivation system, available in straight, 45 degree and 90 degree versions
- Hybrid (COTS only) versions available
- Fully field maintainable in accordance with MIL-STD-2042

## Quickloc Backshells

Our exclusive Quickloc cable captivation system can be quickly installed on virtually any military or tactical cable. Quickloc allows individual termini to be serviced, repositioned or cleaned without complete backshell disassembly. Additionally, all Quickloc components are reusable, so cable repairs are speedy and cost-effective. Quickloc is standard on all AFSI M28876 backshells.



# Cable Assemblies

Amphenol Fiber Systems International (AFSI) is one of the world's leading manufacturers of harsh environment fiber optic connectors that are rugged, reliable and cost-effective. Among our valued customers are virtually every major defense company in the United States, the U.S. Army and Navy and many international defense organizations.

All AFSI cable assemblies are manufactured by expert technicians in our state-of-the-art, ISO 9001:2000 certified facility. This ensures that our processes and practices are optimized for the unique requirements of fiber optic cable assemblies rather than one-size-fits-all electrical assemblies.

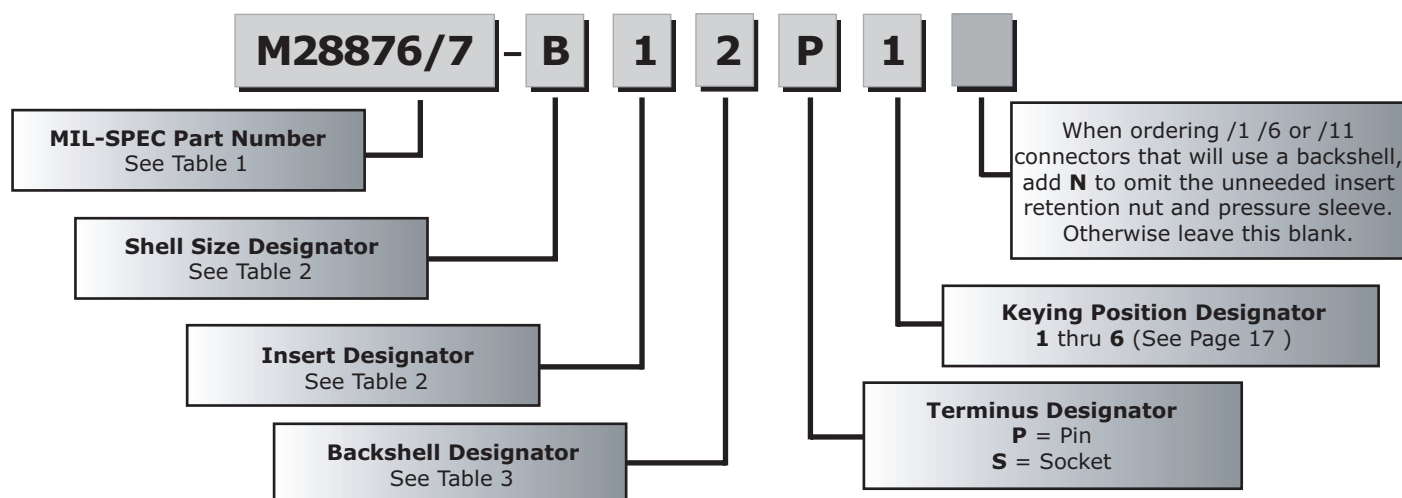
Our goal is to exceed customer requirements with every cable assembly. AFSI is able to assist in designing and building custom cable assemblies or building to a customer print. Our technicians are trained to MIL-STD-2042B and a variety of other procedures critical to manufacturing harsh environment fiber optic cable assemblies. An optical test report is included with every cable built. If other tests are required, AFSI is capable of testing either in-house or contracting with one of our test laboratory partners.



# MIL-PRF-28876 Product Specifications

| Specification                 | Measurement/Detail                                                                             |
|-------------------------------|------------------------------------------------------------------------------------------------|
| Mating Durability             | 500 cycles per EIA/TIA-455-21                                                                  |
| Vibration                     | EIA/TIA-455-11, Test Condition II & VII, 30 minutes / Axis                                     |
| Mechanical Shock              | MIL-STD-901, Grade A, Class I                                                                  |
| Thermal Shock                 | -40°C to +70°C, EIA/TIA-455-11, Test Condition II & VII, 30 minutes / Axis                     |
| Thermal Cycling               | -5°C to +25°C, 5 cycles per EIA/TIA-455-3                                                      |
| Corrosion Resistance          | 500 hour salt spray per EIA/TIA-455-16, Test Condition I                                       |
| Ozone Exposure                | 150 ppm for 2 hours per EIA/TIA-455-189                                                        |
| Humidity                      | 240 hours @ 98% RH per EIA/TIA-455-5, Method B                                                 |
| Fluid Immersion               | EIA/TIA-455-12                                                                                 |
| Crush Resistance              | 7 tests @ 1250 Newtons per EIA/TIA-455-26                                                      |
| Maintenance Aging             | Terminus insertion and removal, 10 times                                                       |
| Terminus Retention Force      | 22 lbs for 5 seconds                                                                           |
| Insert Retention Axial        | 100 psi torque for 1 minute                                                                    |
| Cable Pull Out Force          | 162 lbs for 10 minutes per EIA/TIA-455-6                                                       |
| Cable Sealing Flexing         | 200 cycles at 180° flex per EIA/TIA-455-1                                                      |
| Impact                        | 8 drops @ 7 feet rotated each time per EIA/TIA-455-2, Method B                                 |
| Flammability                  | 0.75 inch flame for 10 seconds mated, 1.5 inch flame for 60 seconds unmated per EIA/TIA-364-81 |
| Operating Temperature         | -28°C to +65°C                                                                                 |
| Storage Temperature           | -40°C to +70°C                                                                                 |
| Insertion Loss (Multimode)    | -0.35 dB typ (62.5/125)                                                                        |
| Insertion Loss (Single Mode)  | -0.35 dB typ (9/125)                                                                           |
| Back Reflection (Single Mode) | -50 dB typ                                                                                     |
| Connector Insert              | Aluminum Alloy, Anodized                                                                       |
| Connector & Backshells        | Aluminum Alloy, CAD Plate                                                                      |
| Cable Sealing, Strain Relief  | Polyolefin, Self-Encapsulating                                                                 |

# MIL-SPEC Ordering Nomenclature



| Table 1                |               |                      |
|------------------------|---------------|----------------------|
| Connector Type         | Strain Relief | MIL-SPEC Part Number |
| Receptacle, Wall Mount | None          | M28876/1             |
|                        | Straight      | M28876/2             |
|                        | 45°           | M28876/3             |
|                        | 90°           | M28876/4             |
| Plug                   | None          | M28876/6             |
|                        | Straight      | M28876/7             |
|                        | 45°           | M28876/8             |
|                        | 90°           | M28876/9             |
| Receptacle, Jam Nut    | None          | M28876/11            |
|                        | Straight      | M28876/12            |
|                        | 45°           | M28876/13            |
|                        | 90°           | M28876/14            |

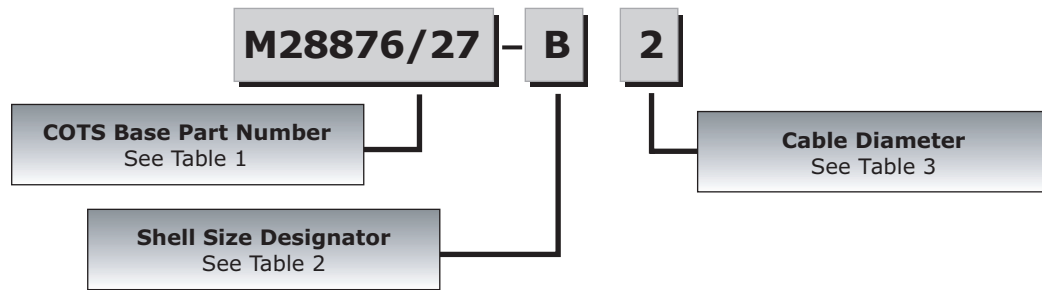
## Example Part Number - M28876/7-B12P1

**M28876/7 - Plug with Straight Backshell**  
**B - Shell Size 13**  
**1 - 4 Cavities**  
**2 - 0.305-0.346 Inch Cable Diameter**  
**P - Pin**  
**1 - Key 1**

| Table 2    |                       |                   |                    |
|------------|-----------------------|-------------------|--------------------|
| Shell Size | Shell Size Designator | Insert Designator | Number of Cavities |
| 13         | B                     | 1                 | 4                  |
| 15         | C                     | 1                 | 8                  |
|            |                       | 2                 | 6                  |
| 23         | F                     | 1                 | 31                 |
|            |                       | 2                 | 18                 |

| Table 3              |                                                             |                  |                  |
|----------------------|-------------------------------------------------------------|------------------|------------------|
| Backshell Designator | Maximum Allowable Cable Diameter by Shell Size, Inches (mm) |                  |                  |
|                      | Shell Size 13                                               | Shell Size 15    | Shell Size 23    |
| 1                    | 0.285<br>(7.24)                                             | 0.500<br>(12.70) | 0.866<br>(22.00) |
| 2                    | 0.346<br>(8.79)                                             | 0.250<br>(6.35)  | 1.000<br>(25.40) |
| 3                    | 0.453<br>(11.50)                                            | 0.375<br>(9.53)  | .600<br>(15.24)  |

# Backshells Ordering Nomenclature



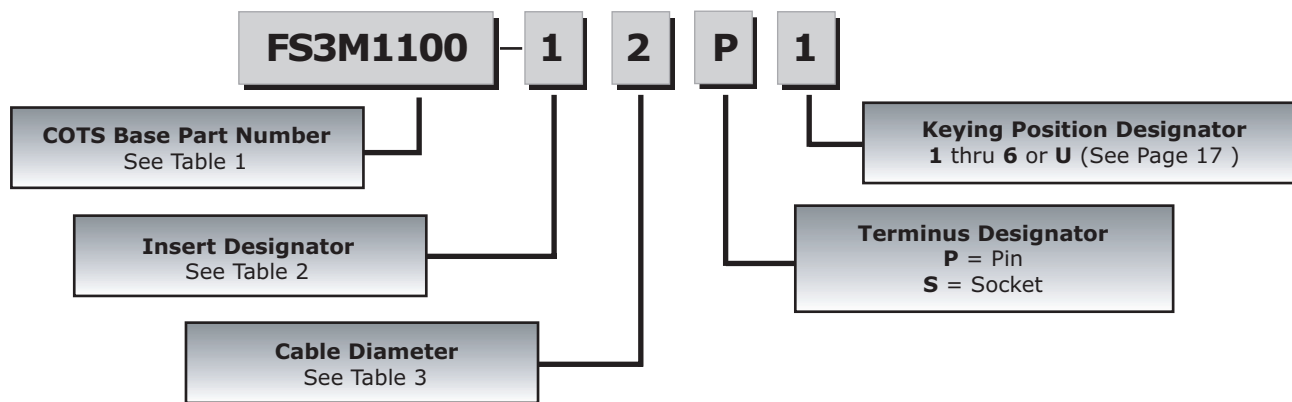
| Table 1                          |                      |                       |          |          |
|----------------------------------|----------------------|-----------------------|----------|----------|
| Backshell Type                   | MIL-SPEC Part Number | COTS Base Part Number |          |          |
|                                  |                      | Shell 13              | Shell 15 | Shell 23 |
| Straight Backshell Assembly Only | M28876/27            | FS3A1000              | FS3A4000 | FS3F4000 |
| 45° Backshell Assembly Only      | M28876/28            | FS3A2000              | FS3A5000 | FS3F5000 |
| 90° Backshell Assembly Only      | M28876/29            | FS3B3000              | FS3A6000 | FS3F6000 |

| Table 2    |                       |
|------------|-----------------------|
| Shell Size | Shell Size Designator |
| 13         | B                     |
| 15         | C                     |
| 23         | F                     |

| Table 3              |                                                             |                              |                              |
|----------------------|-------------------------------------------------------------|------------------------------|------------------------------|
| Backshell Designator | Maximum Allowable Cable Diameter by Shell Size, Inches (mm) |                              |                              |
|                      | Shell Size 13                                               | Shell Size 15                | Shell Size 23                |
| 1                    | 0.280-0.315<br>(7.11-8.00)                                  | 0.495-0.515<br>(12.57-13.08) | 0.768-0.866<br>(19.50-22.00) |
| 2                    | 0.305-0.346<br>(7.75-8.79)                                  | 0.380-0.423<br>(9.65-10.74)  | 0.900-1.000<br>(22.86-25.40) |
| 3                    |                                                             | 0.423-0.465<br>(10.74-11.81) |                              |
| 4                    |                                                             | 0.305-0.346<br>(7.75-8.78)   |                              |

# COTS Ordering Nomenclature

## Plugs & Receptacles With Backshells



**Example Part Number - FS3M1100-12P1**

**FS3M1100 - Plug with Straight Backshell, Shell Size 13**  
**1 - 4 Cavities**  
**2 - 0.305-0.346 Inch Cable Diameter**  
**P - Pin**  
**1 - Key 1**

**Table 1**

| Connector Type         | Strain Relief | COTS Base Part Number |          |          | MIL-SPEC Equivalent |
|------------------------|---------------|-----------------------|----------|----------|---------------------|
|                        |               | Shell 13              | Shell 15 | Shell 23 |                     |
| Receptacle, Wall Mount | Straight      | FS3M6100              | FS3M7400 | FS3M4400 | M28876/2            |
|                        | 45°           | FS3M6200              | FS3M7500 | FS3M4500 | M28876/3            |
|                        | 90°           | FS3M6300              | FS3M7600 | FS3M4600 | M28876/4            |
| Plug                   | Straight      | FS3M1100              | FS3M2400 | FS3M3400 | M28876/7            |
|                        | 45°           | FS3M1200              | FS3M2500 | FS3M3500 | M28876/8            |
|                        | 90°           | FS3M1300              | FS3M2600 | FS3M3600 | M28876/9            |
| Receptacle, Jam Nut    | Straight      | FS3M8100              | FS3M9400 | FS3M5400 | M28876/12           |
|                        | 45°           | FS3M8200              | FS3M9500 | FS3M5500 | M28876/13           |
|                        | 90°           | FS3M8300              | FS3M9600 | FS3M5600 | M28876/14           |

**Table 2**

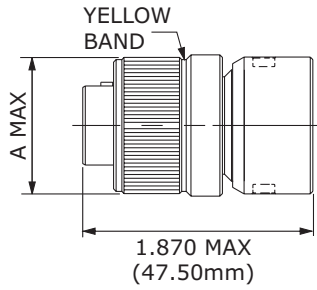
| Shell Size | Shell Size Designator | Insert Designator | Number of Cavities |
|------------|-----------------------|-------------------|--------------------|
| 13         | B                     | 1                 | 4                  |
| 15         | C                     | 1                 | 8                  |
|            |                       | 2                 | 6                  |
| 23         | F                     | 1                 | 31                 |
|            |                       | 2                 | 18                 |

**Table 3**

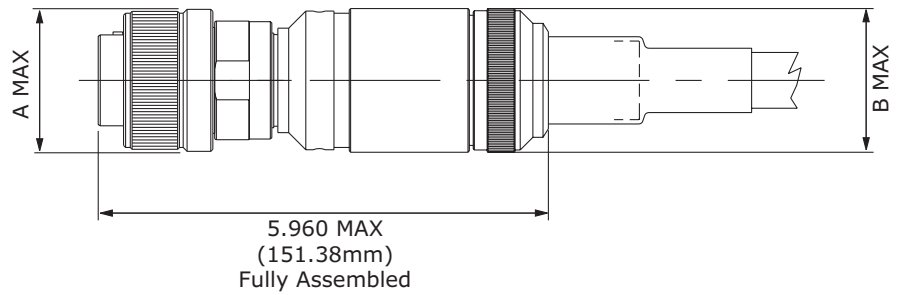
| Backshell Designator | Maximum Allowable Cable Diameter by Shell Size, Inches (mm) |                              |                              |
|----------------------|-------------------------------------------------------------|------------------------------|------------------------------|
|                      | Shell Size 13                                               | Shell Size 15                | Shell Size 23                |
| <b>1</b>             | 0.280-0.315<br>(7.11-8.00)                                  | 0.495-0.515<br>(12.57-13.08) | 0.768-0.866<br>(19.50-22.00) |
| <b>2</b>             | 0.305-0.346<br>(7.75-8.80)                                  | 0.380-0.423<br>(9.65-10.74)  | 0.900-1.000<br>(22.86-25.40) |
| <b>3</b>             |                                                             | 0.423-0.465<br>(10.75-11.81) | 0.550-0.660<br>(13.97-16.76) |
| <b>4</b>             |                                                             | 0.305-0.346<br>(7.75-8.80)   | 0.660-0.768<br>(16.76-19.50) |
| <b>5</b>             |                                                             | 0.347-0.379<br>(8.813-9.626) |                              |
| <b>6</b>             |                                                             | 0.250-0.304<br>(6.350-7.721) |                              |

# Plug Connectors

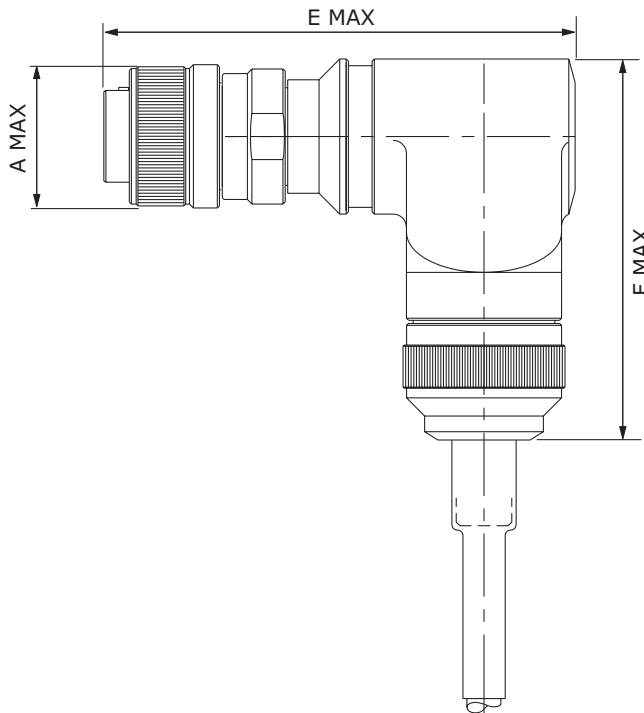
**M28876/6  
Plug**



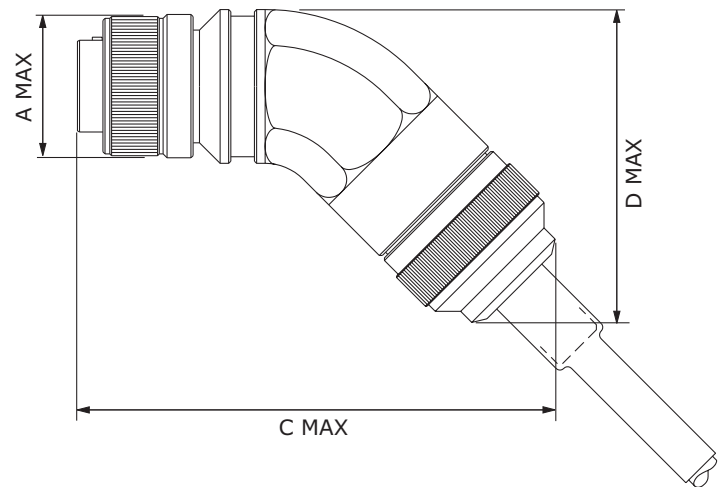
**M28876/7  
Plug with Straight Backshell**



**M28876/9  
Plug with 90° Backshell**



**M28876/8  
Plug with 45° Backshell**

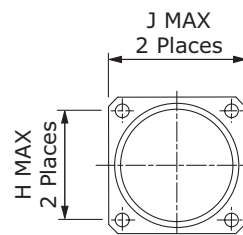
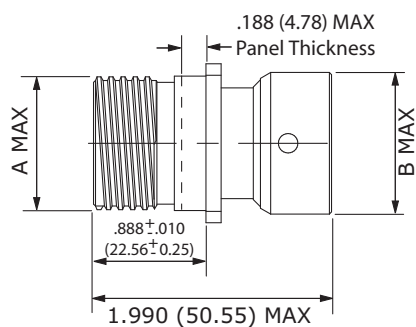


Dimension Table for Plugs

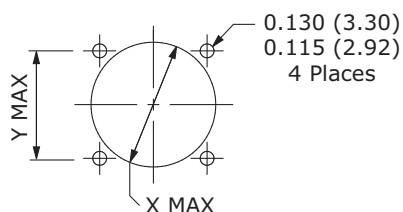
| Shell Size | A MAX            | B MAX            | C MAX             | D MAX             | E MAX             | F MAX             |
|------------|------------------|------------------|-------------------|-------------------|-------------------|-------------------|
| 13         | 1.141<br>(28.98) | 1.085<br>(27.56) | 6.160<br>(156.46) | 3.580<br>(90.93)  | 4.190<br>(106.43) | 4.250<br>(107.95) |
| 15         | 1.263<br>(32.08) | 1.255<br>(31.88) | 6.440<br>(163.58) | 3.850<br>(97.79)  | 4.440<br>(112.78) | 4.500<br>(114.30) |
| 23         | 1.705<br>(43.31) | 1.763<br>(44.78) | 7.350<br>(186.69) | 5.000<br>(127.00) | 4.850<br>(123.19) | 5.000<br>(127.00) |

# Wall Mount Receptacles

## M28876/1 Wall Mount Receptacle



## Wall Mount Panel Cutout



Dimension Table for Wall Mount Receptacles  
Panel Cutout

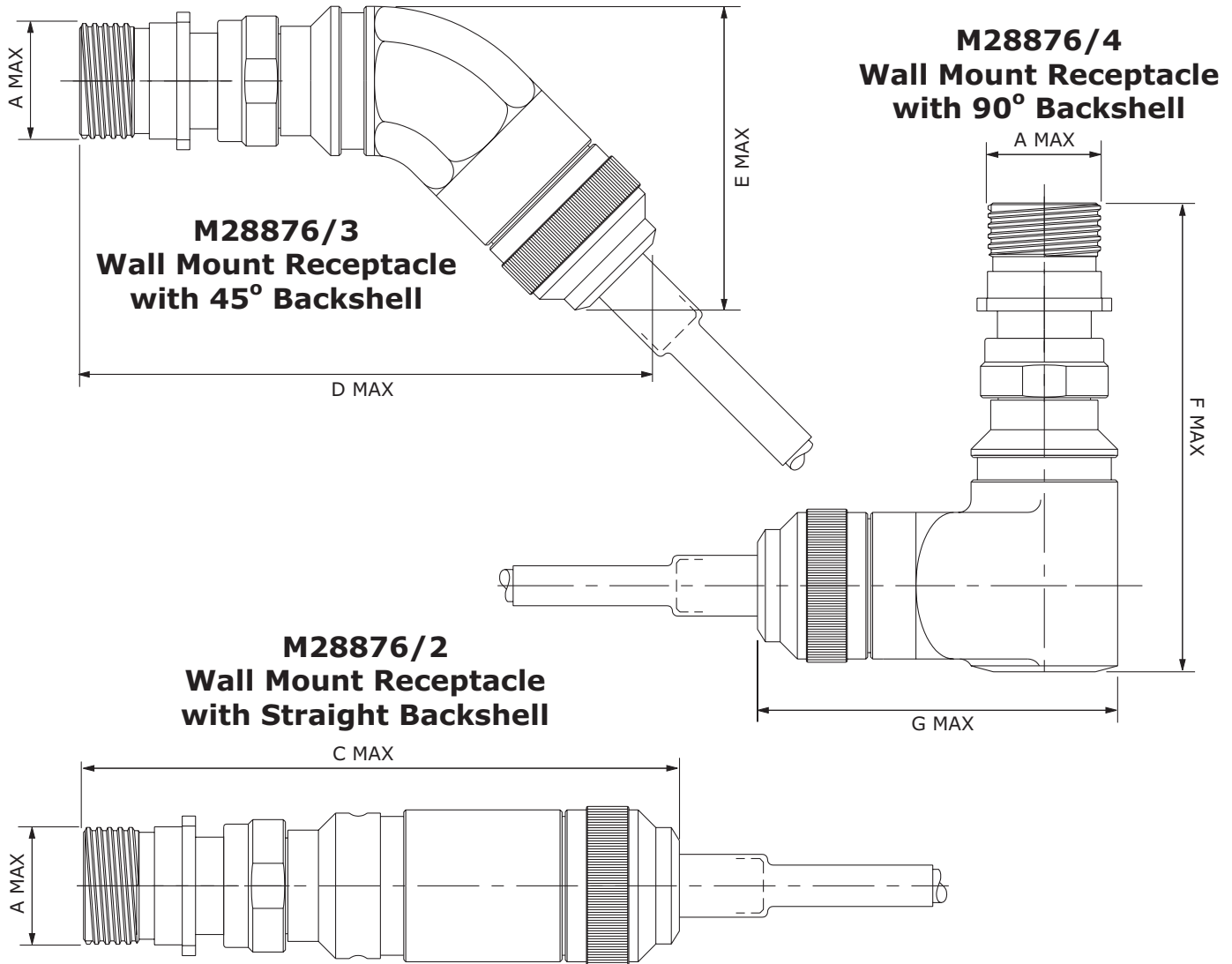
| Shell Size | X ±.005 (0.13) | Y ±.005 (0.13) |
|------------|----------------|----------------|
| 13         | 0.937 (23.80)  | 0.843 (21.41)  |
| 15         | 1.124 (28.55)  | 0.968 (24.59)  |
| 23         | 1.562 (39.67)  | 1.281 (32.54)  |

Dimension Table for Wall Mount Receptacles

| Shell Size | A MAX         | B MAX         | C MAX          | D MAX          | E MAX          | F MAX          | G MAX          | H MAX         | J MAX                          |
|------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|---------------|--------------------------------|
| 13         | 0.875 (22.23) | 1.085 (27.56) | 6.150 (156.21) | 6.220 (157.99) | 3.580 (90.93)  | 4.250 (107.95) | 4.250 (107.95) | 0.843 (21.41) | 1.158 (29.41)<br>1.116 (28.35) |
| 15         | 1.062 (26.97) | 1.257 (31.93) | 6.150 (156.21) | 6.500 (165.10) | 3.850 (97.79)  | 4.500 (114.30) | 4.500 (114.30) | 0.968 (24.59) | 1.278 (32.46)<br>1.236 (31.39) |
| 23         | 1.500 (38.10) | 1.965 (43.05) | 6.150 (156.21) | 7.500 (190.50) | 5.000 (127.00) | 5.000 (127.00) | 5.000 (127.00) | 1.281 (32.54) | 1.738 (44.15)<br>1.698 (43.13) |

Dimensions are for reference only. Dimensions are in inches & (mm).

# Wall Mount Receptacles



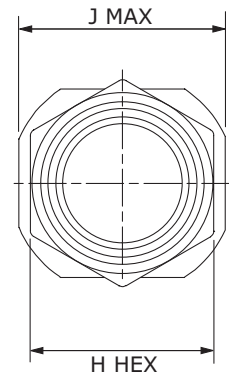
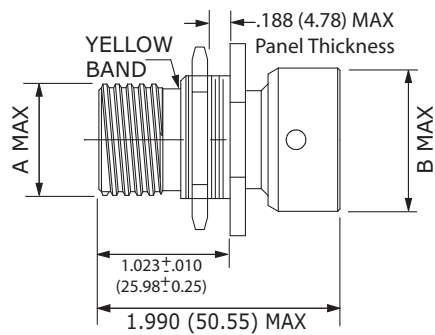
Dimension Table for Wall Mount Receptacles

| Shell Size | A MAX            | B MAX            | C MAX             | D MAX             | E MAX             | F MAX             | G MAX             | H MAX            | J MAX                                |
|------------|------------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|--------------------------------------|
| 13         | 0.875<br>(22.23) | 1.085<br>(27.56) | 6.150<br>(156.21) | 6.220<br>(157.99) | 3.580<br>(90.93)  | 4.250<br>(107.95) | 4.250<br>(107.95) | 0.843<br>(21.41) | 1.158<br>(29.41)<br>1.116<br>(28.35) |
| 15         | 1.062<br>(26.97) | 1.257<br>(31.93) | 6.150<br>(156.21) | 6.500<br>(165.10) | 3.850<br>(97.79)  | 4.500<br>(114.30) | 4.500<br>(114.30) | 0.968<br>(24.59) | 1.278<br>(32.46)<br>1.236<br>(31.39) |
| 23         | 1.500<br>(38.10) | 1.965<br>(43.05) | 6.150<br>(156.21) | 7.500<br>(190.50) | 5.000<br>(127.00) | 5.000<br>(127.00) | 5.000<br>(127.00) | 1.281<br>(32.54) | 1.738<br>(44.15)<br>1.698<br>(43.13) |

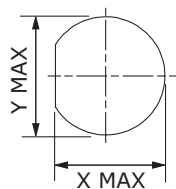
*Dimensions are for reference only. Dimensions are in inches & (mm).*

# Jam Nut Receptacles

## M28876/11 Jam Nut Receptacle



## Jam Nut Panel Cutout



Dimension Table for Jam Nut Receptacles  
Panel Cutout

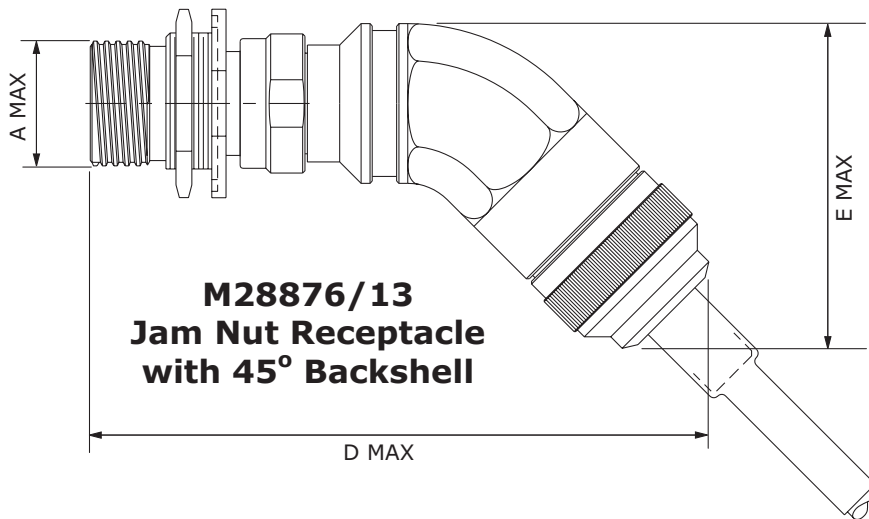
| Shell Size | X ±.005<br>(0.13) | Y ±.005<br>(0.13) |
|------------|-------------------|-------------------|
| 13         | 0.973<br>(24.71)  | 1.010<br>(25.65)  |
| 15         | 1.160<br>(29.46)  | 1.198<br>(30.43)  |
| 23         | 1.593<br>(40.46)  | 1.630<br>(41.40)  |

Dimension Table for Jam Nut Receptacles

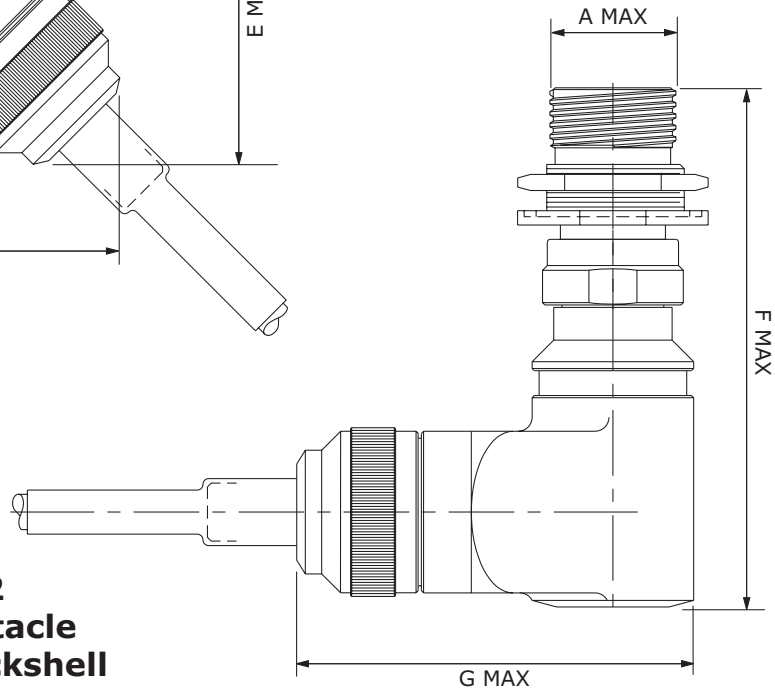
| Shell Size | A MAX            | B MAX            | C MAX             | D MAX             | E MAX             | F MAX             | G MAX             | H HEX            | J MAX            |
|------------|------------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|
| 13         | 0.875<br>(22.23) | 1.085<br>(27.56) | 6.150<br>(156.21) | 6.220<br>(157.99) | 3.580<br>(90.93)  | 4.250<br>(107.95) | 4.250<br>(107.95) | 1.205<br>(30.61) | 1.399<br>(35.53) |
|            |                  |                  |                   |                   |                   |                   |                   | 1.171<br>(29.74) | 1.379<br>(35.02) |
| 15         | 1.062<br>(26.97) | 1.255<br>(31.88) | 6.150<br>(156.21) | 6.500<br>(165.10) | 3.850<br>(97.79)  | 4.500<br>(114.30) | 4.500<br>(114.30) | 1.392<br>(35.36) | 1.587<br>(40.31) |
|            |                  |                  |                   |                   |                   |                   |                   | 1.358<br>(34.49) | 1.567<br>(39.80) |
| 23         | 1.500<br>(38.10) | 1.703<br>(43.26) | 6.150<br>(156.21) | 7.500<br>(190.50) | 5.000<br>(127.00) | 7.500<br>(190.50) | 5.000<br>(127.00) | 1.812<br>(46.02) | 2.014<br>(51.66) |
|            |                  |                  |                   |                   |                   |                   |                   | 1.778<br>(45.16) | 1.994<br>(50.65) |

Dimensions are for reference only. Dimensions are in inches & (mm).

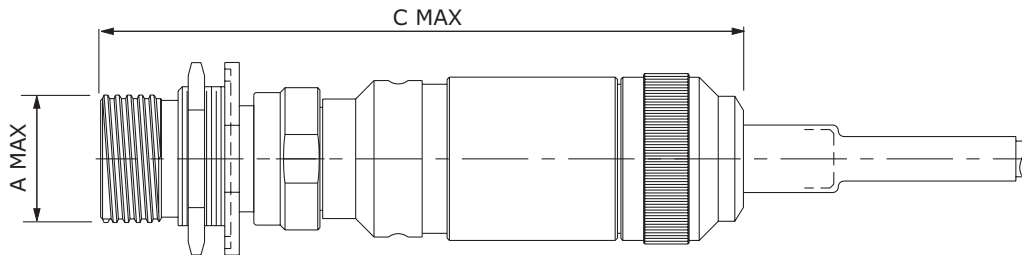
# Jam Nut Receptacles



**M28876/14**  
**Jam Nut Receptacle**  
**with 90° Backshell**



**M28876/12**  
**Jam Nut Receptacle**  
**with Straight Backshell**



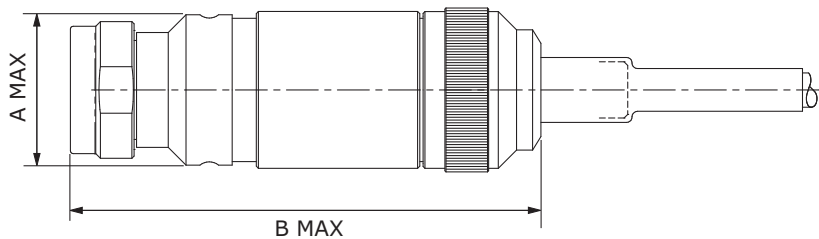
Dimension Table for Jam Nut Receptacles

| Shell Size | A MAX            | B MAX            | C MAX             | D MAX             | E MAX             | F MAX             | G MAX             | H HEX            | J MAX                                |
|------------|------------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|--------------------------------------|
| 13         | 0.875<br>(22.23) | 1.085<br>(27.56) | 6.150<br>(156.21) | 6.220<br>(157.99) | 3.580<br>(90.93)  | 4.250<br>(107.95) | 4.250<br>(107.95) | 0.843<br>(21.41) | 1.158<br>(29.41)<br>1.116<br>(28.35) |
| 15         | 1.062<br>(26.97) | 1.257<br>(31.93) | 6.150<br>(156.21) | 6.500<br>(165.10) | 3.850<br>(97.79)  | 4.500<br>(114.30) | 4.500<br>(114.30) | 0.968<br>(24.59) | 1.278<br>(32.46)<br>1.236<br>(31.39) |
| 23         | 1.500<br>(38.10) | 1.965<br>(43.05) | 6.150<br>(156.21) | 7.500<br>(190.50) | 5.000<br>(127.00) | 5.000<br>(127.00) | 5.000<br>(127.00) | 1.281<br>(32.54) | 1.738<br>(44.15)<br>1.698<br>(43.13) |

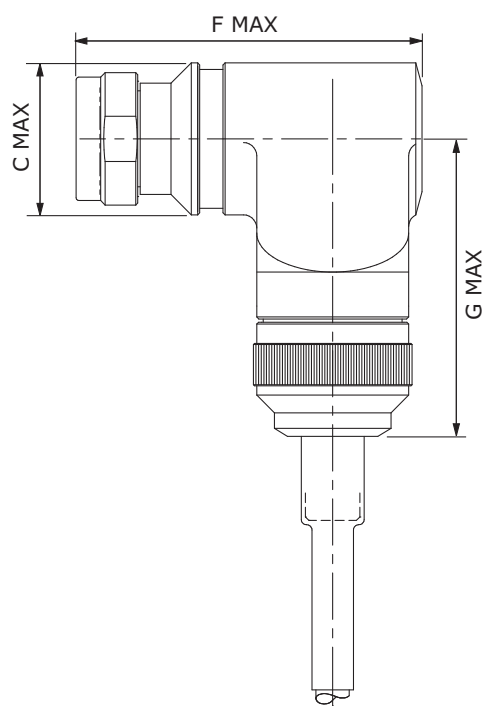
*Dimensions are for reference only. Dimensions are in inches & (mm).*

# Backshells

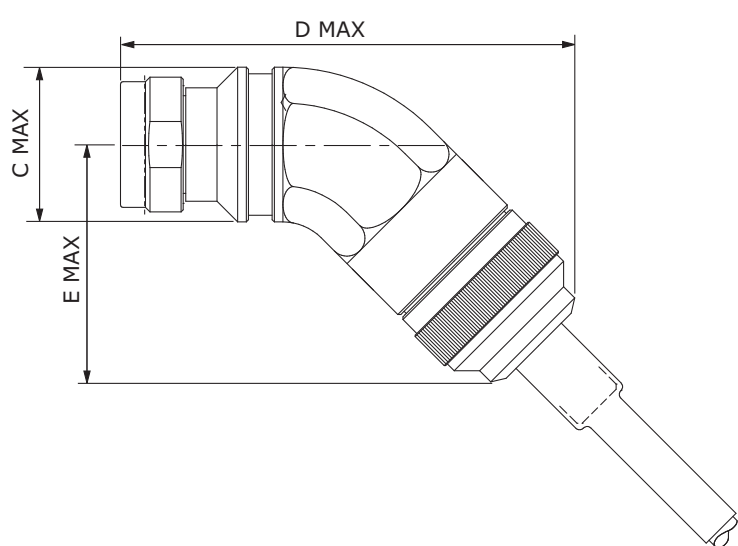
M28876/27  
Straight Backshell



M28876/29  
90° Backshell



M28876/28  
45° Backshell



Dimension Table for Backshells

| Shell Size | A MAX            | B MAX            | C MAX           | D MAX            | E MAX            | F MAX             | G MAX            |
|------------|------------------|------------------|-----------------|------------------|------------------|-------------------|------------------|
| 13         | 1.20<br>(30.50)  | 4.00<br>(101.60) | 1.20<br>(30.50) | 3.20<br>(81.28)  | 3.20<br>(81.28)  | 3.20<br>(81.28)   | 3.10<br>(78.74)  |
| 15         | 1.50<br>(38.00)  | 4.70<br>(119.38) | 1.30<br>(33.00) | 3.20<br>(81.28)  | 3.20<br>(81.28)  | 3.20<br>(81.28)   | 3.10<br>(78.74)  |
| 23         | 2.250<br>(57.15) | 6.50<br>(165.10) | 2.25<br>(57.15) | 6.50<br>(165.10) | 4.20<br>(106.68) | 5.000<br>(127.00) | 4.20<br>(106.68) |

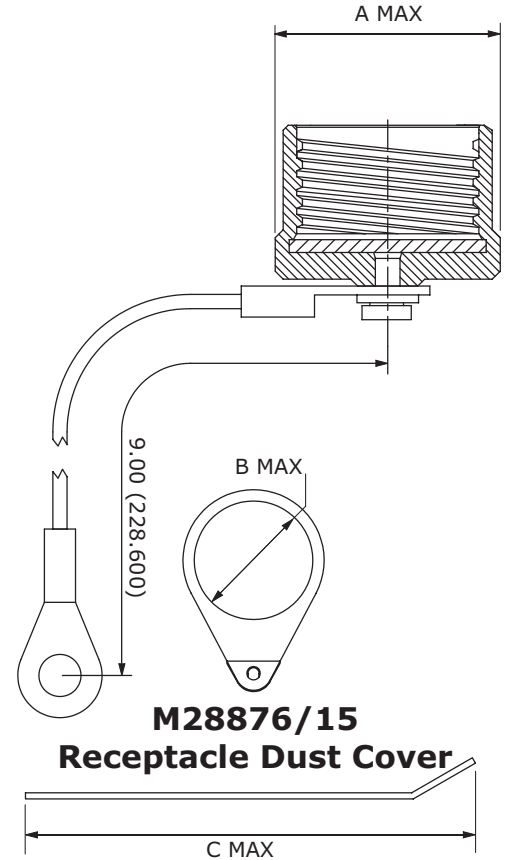
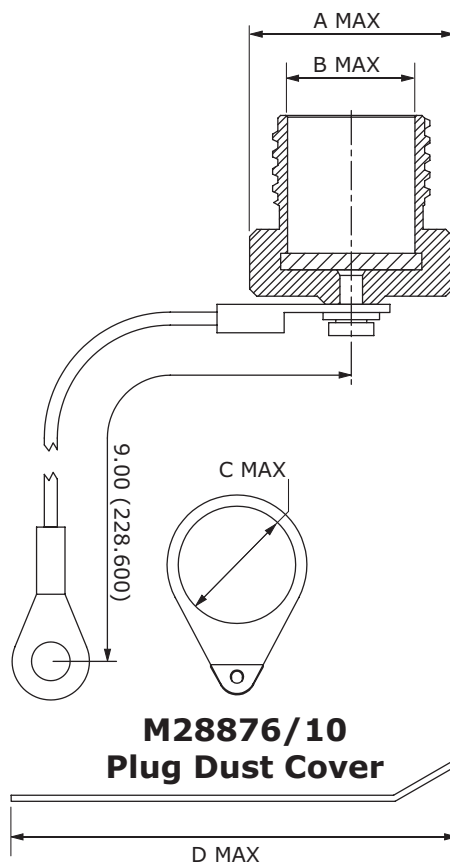
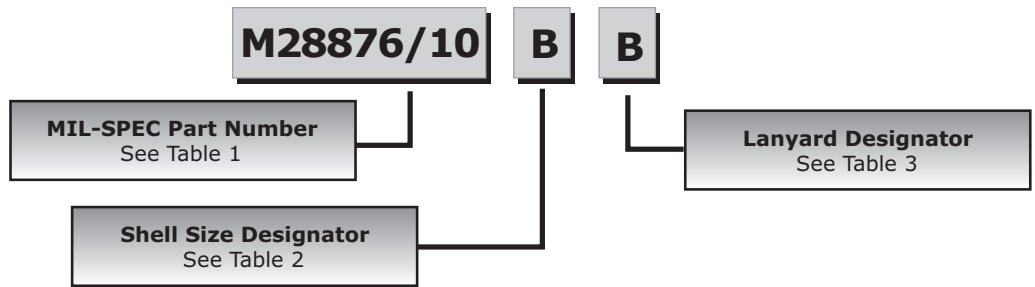
Dimensions are for reference only. Dimensions are in inches & (mm).

# Dust Cover Ordering Nomenclature

| Table 1              |                     |
|----------------------|---------------------|
| MIL-SPEC Part Number |                     |
| M28876/10            | Plug Dust Cap       |
| M28876/15            | Receptacle Dust Cap |

| Table 2    |                       |
|------------|-----------------------|
| Shell Size | Shell Size Designator |
| 13         | B                     |
| 15         | C                     |
| 23         | F                     |

| Table 3       |                  |
|---------------|------------------|
| Lanyard Style |                  |
| A             | Chain w/fastener |
| B             | Chain w/ring     |
| C             | Rope w/fastener  |
| D             | Rope w/ring      |
| E             | Dust Cap Only    |



Dimension Table for Plug Dust Caps

| Shell Size | A MAX            | B MAX            | C MAX            | D MAX            |
|------------|------------------|------------------|------------------|------------------|
| 13         | 1.141<br>(28.98) | 0.705<br>(17.90) | 0.900<br>(22.86) | 1.800<br>(45.72) |
|            |                  | 0.693<br>(17.60) | 0.880<br>(22.35) |                  |
| 15         | 1.263<br>(32.08) | 0.877<br>(22.27) | 1.025<br>(26.03) | 1.950<br>(49.53) |
|            |                  | 0.865<br>(21.97) | 1.005<br>(25.53) |                  |
| 23         | 1.703<br>(43.26) | 1.299<br>(32.99) | 1.463<br>(37.16) | 2.483<br>(63.07) |
|            |                  | 1.287<br>(32.69) | 1.443<br>(36.65) |                  |

COTS version available in stainless steel. Please call for information.

Dimension Table for Receptacle Dust Caps

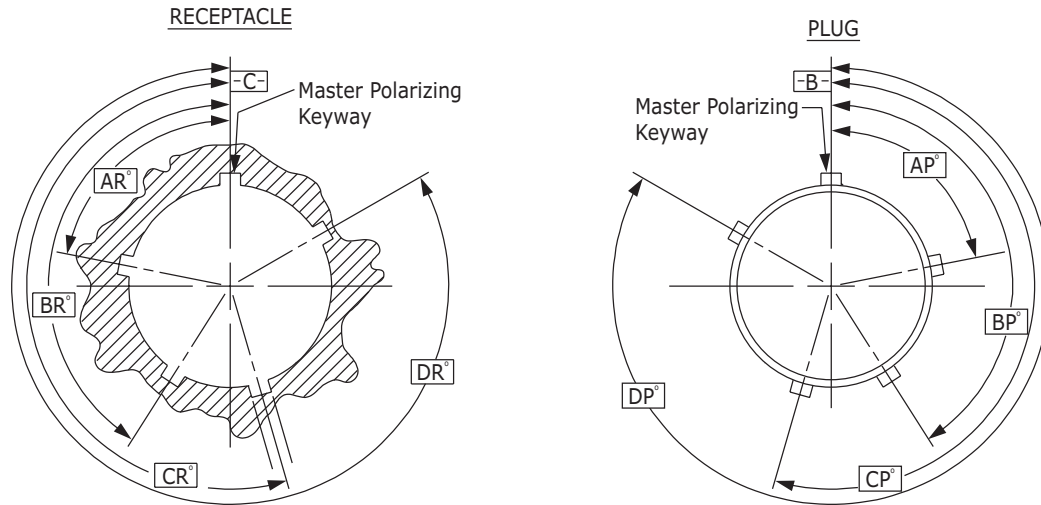
| Shell Size | A MAX            | B MAX            | C MAX            |
|------------|------------------|------------------|------------------|
| 13         | 1.141<br>(28.98) | 1.025<br>(26.03) | 1.950<br>(49.53) |
|            |                  | 1.005<br>(25.53) |                  |
| 15         | 1.263<br>(32.08) | 1.215<br>(30.86) | 2.050<br>(52.07) |
|            |                  | 1.195<br>(30.35) |                  |
| 23         | 1.703<br>(43.26) | 1.650<br>(41.91) | 2.690<br>(68.33) |
|            |                  | 1.630<br>(41.40) |                  |

Dimensions are for reference only. Dimensions are in inches & (mm).

# Insert Arrangements

|                                                                                                                  |  | Pin Face | Socket Face |
|------------------------------------------------------------------------------------------------------------------|--|----------|-------------|
| Shell Size: 13<br>Shell Size Designator: B<br>Arrangement Number: 1<br>Number of Termini: 4<br>Termini Size: 16  |  |          |             |
| Shell Size: 15<br>Shell Size Designator: C<br>Arrangement Number: 1<br>Number of Termini: 8<br>Termini Size: 16  |  |          |             |
| Shell Size: 15<br>Shell Size Designator: C<br>Arrangement Number: 2<br>Number of Termini: 6<br>Termini Size: 16  |  |          |             |
| Shell Size: 23<br>Shell Size Designator: F<br>Arrangement Number: 1<br>Number of Termini: 31<br>Termini Size: 16 |  |          |             |
| Shell Size: 23<br>Shell Size Designator: F<br>Arrangement Number: 2<br>Number of Termini: 18<br>Termini Size: 16 |  |          |             |

# Keying Arrangements



| Shell Sizes | Key & Keyway Arrangements | AR <sup>o</sup> or AP <sup>o</sup> BSC | BR <sup>o</sup> or BP <sup>o</sup> BSC | CR <sup>o</sup> or CP <sup>o</sup> BSC | DR <sup>o</sup> or DP <sup>o</sup> BSC |
|-------------|---------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| 13          | U*                        | —                                      | —                                      | —                                      | —                                      |
|             | 1                         | 95                                     | 141                                    | 208                                    | 236                                    |
|             | 2                         | 113                                    | 156                                    | 182                                    | 292                                    |
|             | 3                         | 90                                     | 145                                    | 195                                    | 252                                    |
|             | 4                         | 53                                     | 156                                    | 220                                    | 255                                    |
|             | 5                         | 119                                    | 146                                    | 176                                    | 298                                    |
|             | 6                         | 51                                     | 141                                    | 184                                    | 242                                    |
| 15          | U*                        | —                                      | —                                      | —                                      | —                                      |
|             | 1                         | 80                                     | 142                                    | 196                                    | 293                                    |
|             | 2                         | 135                                    | 170                                    | 200                                    | 310                                    |
|             | 3                         | 49                                     | 169                                    | 200                                    | 244                                    |
|             | 4                         | 66                                     | 140                                    | 200                                    | 257                                    |
|             | 5                         | 62                                     | 145                                    | 180                                    | 280                                    |
|             | 6                         | 79                                     | 153                                    | 197                                    | 272                                    |
| 23          | U*                        | —                                      | —                                      | —                                      | —                                      |
|             | 1                         | 80                                     | 142                                    | 196                                    | 293                                    |
|             | 2                         | 135                                    | 170                                    | 200                                    | 310                                    |
|             | 3                         | 49                                     | 169                                    | 200                                    | 244                                    |
|             | 4                         | 66                                     | 140                                    | 200                                    | 257                                    |
|             | 5                         | 62                                     | 145                                    | 180                                    | 280                                    |
|             | 6                         | 79                                     | 153                                    | 197                                    | 272                                    |

\*U indicates universal keying arrangement and is available on commercial equivalent connector only (COTS).

# Other Shipboard Products



## ***M29504 /14 & /15 Termini***

### **Features & Benefits**

- Pre-radius zirconia ferrule tip provides optimal insertion loss performance
- Laser marked TICC codes eliminate the need to decipher complex color code bands
- Precision ferrule alignment with captivated split zirconia sleeves
- Wide configuration selection
- Superior optical performance
- Custom sizes available (Commercial-off-the-Shelf only)
- Integrated environmental seal on each terminus
- Precision “press fit” terminus design
- Each terminus individually packaged and labeled for ease of identification, storage and use

### **Applications**

- US Navy shipboard, surface and submarine, mission critical combat and communication systems
- Mobile tactical shelters and electronic battlefield networks

### **Materials**

- Ferrule: zirconia ceramic
- Terminus body: stainless steel, passivated
- Retention clip: beryllium copper
- Alignment sleeve: ceramic
- Alignment sleeve hood: beryllium copper
- O-ring seal: fluorosilicone



## ***Military Grade ST Connectors (MIL-C-83522)***

### **Features & Benefits**

- Stainless steel body with zirconia ceramic ferrule and fungus-resistant self-extinguishing boot
- Superior optical performance in extreme environmental conditions
- Mil-qualified series: high spring force for shock and vibration resistant critical in military applications
- Navy approved COTS series: for moderate shock and vibration environments
- RoHS compliant

### **Applications**

- US Navy shipboard, surface and submarine, mission critical combat and communications systems
- Mobile tactical shelters
- Electronic battlefield networks
- Deployable outdoor, harsh environment

### **Materials**

- Ferrule: zirconia
- Body: stainless steel
- Boot: fungus resistant, self-extinguishing thermoplastic



## ***FS12 Pierside***

### **Features & Benefits**

- Hermaphroditic design
- Rugged design handles the rigors of deployment and harsh environment conditions
- Environmentally sealed connector
- Military qualified MIL-PRF-29504 /14 & /15 termini
- Removable insert cap
- Captive insert cap screw
- Sealed termini keep the optical path clear
- Field repairable using existing parts

### **Applications**

- Umbilical cables used to interface between shore and ship networks
- U.S. Army, Navy, Air Force and Marine Corps tactical and strategic deployments
- Oil, gas and geoscience industries
- Industrial
- Broadcast

### **Materials**

- Aluminum
- Other materials available

### **Finish**

- Grey anodize
- Olive cadmium
- Other finishes available



## ***Optron***

### **Features & Benefits**

- Designed IAW MIL-PRF-28876
- Available in 3 shell sizes: 13 (4 ch), 15 (6, 8 ch), 23 (18, 31 ch)
- Inserts are interchangeable from plug to receptacle. Either can be operated with pins or socket termini
- Operates with all qualified single mode or multimode M29504/14 and /15 termini
- Complete line of straight, 45 degree and 90 degree backshells

### **Applications**

- Shipboard/Pierside
- Land tactical
- Mining
- Oil, gas and geoscience industries
- Industrial
- Broadcast

### **Materials**

- Aluminum
- Stainless steel
- Brass
- Other materials available

### **Finish**

- Black anodize
- Other finishes available

# Termination Kits, Tools, MQJs & Training



## Termination Kits & Tools

Amphenol Fiber Systems International (AFSI) offers kits for terminating most optical connectors in several markets today. These termination kits include: M28876; MIL-ST; M28876/MIL-ST combination; TFOCA and TFOCA-II®. AFSI also offers customized kits. Additionally, we sell cleaning and consumable kits and individual tools to replace broken or misplaced tools.

## Measurement Test Cables (MTC)

This product series is designed to meet the highest industry and military standards for testing optical components. These products allow technicians to test and certify their work to the most exacting standards. Our unique fabrication and certification process ensures that only the highest quality, low loss and tight tolerance components are “Certified.” MTC product line includes TFOCA, TFOCA II®, TFOCA-III® and our MIL-STD-2042B “MQJ.”

## Measurement Quality Jumpers (MQJs)



Measurement Quality Jumpers (MQJs) are used to assess the performance parameters of standard fiber optic cables. MQJs, which are considered calibrated test equipment, are used as reference standards for fiber optic cables and components. AFSI's MQJs are built to the highest quality standards with the industry's most stringent end face geometry and high-precision polishing requirements. Each MQJ is subjected to extensive testing and verification in AFSI's in-house test facility prior to shipment to customers. AFSI's MQJs are manufactured and assembled in-house with our fully qualified M28876, M83522 and M29504 connectors and

termini.

## MIL-STD-2042B Training



AFSI's MIL-STD-2042B based shipboard training course is designed for persons involved in the installation, testing, troubleshooting or maintenance of shipboard fiber optic interconnect systems. Focusing on the M28876 and M83522, EIA/TIA 604-3 (SC) connectors, this class is ideal for all those responsible for the maintenance and installation of shipboard fiber optic networks and is a must-attend course for those who must follow the practices, procedures and specifications as outlined in the MIL-STD-2042B.

Successful completion of the five-day course and test qualifies the student to receive a certification from AFSI on the M28876 connector.

We are also certified by the Electronics Technicians Associations (ETA) to offer the Fiber Optics Installer (FOI) and the Fiber Optics Technician (FOT) certifications for an additional cost.



# About Amphenol

Amphenol Corporation is one of the world's leading producers of electronic and fiber optic connectors, cable and interconnect systems. Amphenol products are engineered and manufactured in the Americas, Europe and Asia and sold by a worldwide sales and marketing organization. The primary end markets for the company's products are communication systems for the converging technologies of voice, video and data communications, industrial, automotive, military and aerospace applications.

For more information about Amphenol, visit [www.amphenol.com](http://www.amphenol.com).

## About AFSI

Amphenol Fiber Systems International (AFSI) designs, manufactures, markets and supports reliable and innovative fiber optic interconnect solutions that withstand the harsh environments of military, oil & gas, mining and broadcast applications. After more than a decade in business, AFSI continues to uphold its position as a global leader in fiber optic interconnect components and systems such as M28876, MIL-ST, TFOCA and the TFOCA-II® connector, which AFSI developed and patented. Altogether, AFSI has delivered millions of fiber optic connectors in more than 22 countries. Whenever there is a need for superior cost-effective fiber optic systems and products that will stand up to demanding operating environments, you can rely on AFSI for engineering know-how, top-quality products and expert technical support.

For more information about AFSI, visit [www.fibersystems.com](http://www.fibersystems.com).

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