



RJF EZ



USB-A Field  
Spring Release



RJF 544



RJ Field



Self-closing cap



RJF RB (RJ Fast)



USBBF TV



RJFTV



Rugged USB  
memory key



RJ Switch



USB-A Field



Atex Zone 2  
Field Bus Range

## FIELD Series - catalog

Reinforced Infocom Connectors for Harsh Environment

RJ45 Field - RJ11 Field - RJ Switch - USB Field - FireWire Field - LC Field - MTRJ field



# Amphenol

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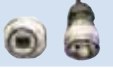
## ATEX

|                                                                                                                                                                                                                                                      |    |
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## RUGGED RJ 45 SOLUTION SELECTION GUIDE

| Connectors                                                                          | Series                                                       | Indust. Ethernet Spec. | Coupling Mechanism   | Shape       | Material | Specification                                  | Prime Market                 | Page |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------|----------------------|-------------|----------|------------------------------------------------|------------------------------|------|
|    | RJF RB                                                       |                        | Reverse Bayonet      | Circular    | Plastic  | N/A                                            | Industrial & Telecom         | 3    |
|    | RJF544                                                       | IEC 60603-7 variant 12 | Push Pull            | Circular    | Plastic  | N/A                                            | Industrial & Telecom         | 6    |
|    | RJF EZ                                                       | IEC 60603-7 variant 13 | Lever                | Rectangular | Plastic  | N/A                                            | Industrial & Telecom         | 8    |
|    | RJF                                                          | IEC 60603-7 variant 11 | Bayonet              | Circular    | Metal    | MIL-DTL-26482                                  | Industrial Mil/Aero          | 10   |
|    | RJF Special                                                  | IEC 60603-7 variant 11 | Bayonet              | Circular    | Metal    | MIL-DTL-26482                                  | Industrial Mil/Aero          | 13   |
|    | RJF TV                                                       |                        | Thread               | Circular    | Metal    | MIL-DTL-38999 (Series III)                     | Mil/Aero & Rail Mass Transit | 14   |
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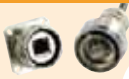
## RUGGED USB SOLUTION SELECTION GUIDE

| Connectors                                                                          | Series                                        | Coupling Mechanism | Shape    | Material | Specification              | Prime Market                             | Page |
|-------------------------------------------------------------------------------------|-----------------------------------------------|--------------------|----------|----------|----------------------------|------------------------------------------|------|
|  | USBFTV (USB-A)                                | Thread             | Circular | Metal    | MIL-DTL-38999 (Series III) | Mil/Aero, Rail Mass Transit & industrial | 25   |
|  | USBFTV<br>Self Closing Cap (SCC Series)       | N/A                | N/A      | N/A      | N/A                        | Mil/Aero, Rail Mass Transit & industrial | 28   |
|  | USBFTV<br>Transversally Sealed Receptacles    | Thread             | Circular | Metal    | MIL-DTL-38999 (Series III) | Mil/Aero, Rail Mass Transit & industrial | 29   |
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|  | USBF SC                                       | Spring release     | Circular | Metal    | N/A                        | Mil/Aero & industrial                    | 34   |
|  | USBFTV Special<br>360° EMI,<br>PCB Stand-Off, | Thread             | Circular | Metal    | MIL-DTL-38999 (Series III) | Mil/Aero, Rail Mass Transit & industrial | 36   |
|  | USBBFTV (USB-B)                               | Thread             | Circular | Metal    | MIL-DTL-38999 (Series III) | Mil/Aero, Rail Mass Transit & industrial | 37   |
|  | USBBFTV<br>Transversally Sealed Receptacles   | Thread             | Circular | Metal    | MIL-DTL-38999 (Series III) | Mil/Aero, Rail Mass Transit & industrial | 39   |
|  | USB B Field                                   | Thread             | Circular | Plastic  | N/A                        | Industrial & Telecom                     | 40   |

## RUGGED FIREWIRE, RJ11, MTRJ & LC SOLUTION SELECTION GUIDE

| Connectors                                                                        | Series           | Coupling Mechanism                                      | Shape    | Material | Specification              | Prime Market                 | Page      |
|-----------------------------------------------------------------------------------|------------------|---------------------------------------------------------|----------|----------|----------------------------|------------------------------|-----------|
|  | FWFTV (FireWire) | Thread                                                  | Circular | Metal    | MIL-DTL-38999 (Series III) | Mil/Aero & Video             | <b>41</b> |
|  | Self Closing Cap | Bayonet (for RJ45)<br>N/A (for USB-A, USB-B & IEEE1394) | Circular | Metal    | N/A                        | Industrial & Telecom         | <b>44</b> |
|  | RJ11F (RJ11)     | Bayonet                                                 | Circular | Metal    | MIL-C-26482                | MIL/Aero & Industrial        | <b>46</b> |
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## RUGGED ATEX ZONE 2 SOLUTION SELECTION GUIDE

| Connectors                                                                                                                                                          | Series      | Coupling Mechanism | Shape    | Material | Specification              | Prime Market | Page      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------------|----------|----------|----------------------------|--------------|-----------|
|   | ATEX ZONE 2 | Thread             | Circular | Metal    | MIL-DTL-38999 (Series III) | Oil & Gas    | <b>52</b> |

## RUGGED ETHERNET SWITCH SOLUTION SELECTION GUIDE

| Ethernet Switches                                                                                                                                                       | Series       | Sealing | Material        | Number of ports | Unmanaged | Ring | Managed | Prime Market                         | Page      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------|-----------------|-----------------|-----------|------|---------|--------------------------------------|-----------|
|   | RJS          | IP30    | Metal & Plastic | 5 or 9          | x         | x    | x       | Factory Automation, Video, Oil & Gas | <b>56</b> |
|   | RJSPCEX      | IP68    | Plastic         | 5               | x         | x    |         | Oil & Gas                            | <b>59</b> |
|                                                                                      | RJSPC        | IP68    | Plastic         | 5               | x         | x    |         | Factory Automation                   | <b>60</b> |
|                                                                                      | RJ5ML/RJSBKN | IP68    | Metal           | 9               | x         | x    | x       | Mil/Aero                             | <b>64</b> |

## SPECIAL CABLE SOLUTION SELECTION GUIDE

| Cable & cordset                                                                     | Description                            | Availability                                                        | Prime Market                             | Page      |
|-------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------|------------------------------------------|-----------|
|  | High Reliability Ethernet Cable Cat 5e | <b>In cordset</b><br>100 m (around 328 ft)<br>300 m (around 984 ft) | Mil/Aero & Rail Mass Transit             | <b>24</b> |
|  | High Reliability USB 2.0 Cable         | <b>USB-A Cordset</b><br>300 m (around 984 ft)                       | Mil/Aero, Rail Mass Transit & Industrial | <b>33</b> |

# RJF RB

Ethernet Connection System for Harsh Environment – Industrial Ethernet



IDC Receptacle



PCB Receptacle

RJFRB allows you to use an Ethernet Class D / Cat. 5e and Class E/Cat 6 connection for 10 BaseT, 100 BaseTX or 1000 BaseT networks in harsh environments.

With the patented RJStop® system you can use a standard RJ45 cordset in a protective composite plug which will protect it from shocks, dust and fluids.

**No hazardous on-field cabling and grounding!**

## MAIN CHARACTERISTICS

- Sealed against fluids and dust (IP68)
- Shock, Vibration and Traction resistant
- No cabling operation in field, no tools required
- **Reverse bayonet coupling**
- RJ45 cordset retention in the plug: 70 N in the axis
- Mating cycles: 500 min
- Compatible with cable diameter from 5,5 mm [0.216 in] to 7 mm [0.275 in]

## Applications

- Telecom Equipments
- Video Control
- Robotics
- Industrial Process Control
- CNC Machines
- Special Machines
- Motion Control

## Environmental Protection

- Sealing: IP68
- Salt Spray > 1000 h
- Fire Retardant / Low Smoke: UL94 V0 and NFF 16102, DIN 5510-2
- Thermal Shock: 5 cycles at - 40°C / +100°C
- Operating Temperature: - 40°C / +85°C

## Data Transmission

10 BaseT, 100 BaseTX and 1000 BaseT networks  
Cat 5e per TIA/EIA 568B and ClassD per ISO/IEC 11801  
Cat6 per TIA/EIA 568B and ClassE per ISO/IEC 11801

## Part Number Code

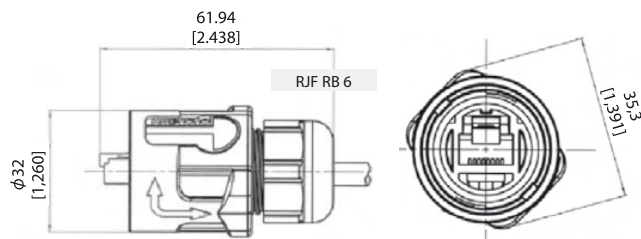
| Series                                                                 | RJF RB                                        | 7 | 1RA |
|------------------------------------------------------------------------|-----------------------------------------------|---|-----|
| <b>RJF RB</b>                                                          |                                               |   |     |
| <b>Shell Type</b>                                                      |                                               |   |     |
| 6:                                                                     | Composite reverse bayonet Plug, Plastic Gland |   |     |
| 7:                                                                     | Composite jam nut Receptacle                  |   |     |
| <b>Back Terminations (For Receptacles only)</b>                        |                                               |   |     |
| 1:                                                                     | Female RJ45                                   |   |     |
| 1RA:                                                                   | Right angle female RJ45                       |   |     |
| 2:                                                                     | RJ45 Cordset                                  |   |     |
| 3U:                                                                    | IDC cat6 - unshielded                         |   |     |
| 3F:                                                                    | IDC cat6 - partial shielding                  |   |     |
| 3S:                                                                    | IDC cat6 - 100% shielded                      |   |     |
| 5:                                                                     | Straight PCB                                  |   |     |
| <b>Cordset Length (For Receptacles with "2" back termination only)</b> |                                               |   |     |
| 03 100BTX:                                                             | 0.3m [11.81 inches]                           |   |     |
| 05 100BTX:                                                             | 0.5m [19.68 inches]                           |   |     |
| 10 100BTX:                                                             | 1m [39.37 inches]                             |   |     |
| 15 100BTX:                                                             | 1.5m [59.05 inches]                           |   |     |

**Remark: Cabling configuration:** 100 BTX = 568B (Ethernet specification)

- Examples:
- Plug: RJF RB 6
  - Receptacle, female RJ45 Back termination: RJF RB 71
  - Receptacle, right angle female RJ45 Back termination: RJF RB 71RA
  - Receptacle, 1,5m [59.05"] RJ45 cordset termination: RJF RB 72 15 100BTX

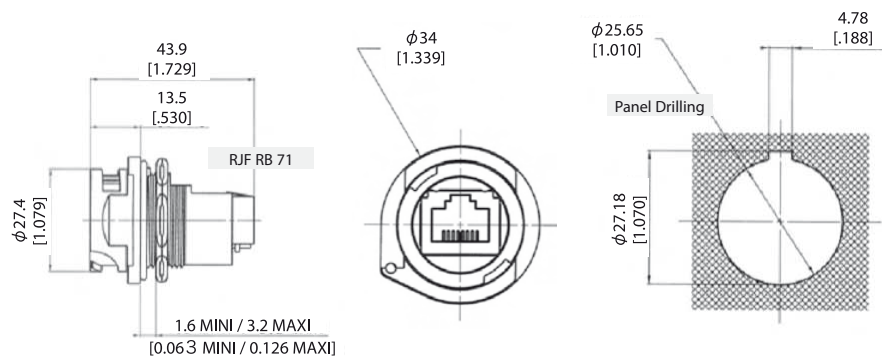
## Plug

- Type 6 Shell with Plastic Gland

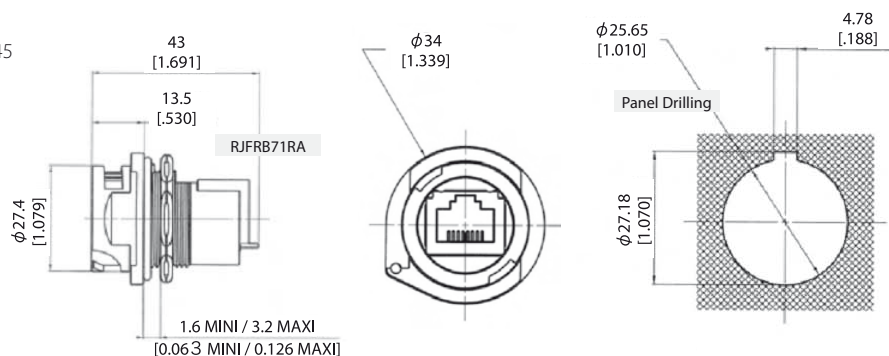


## Receptacle

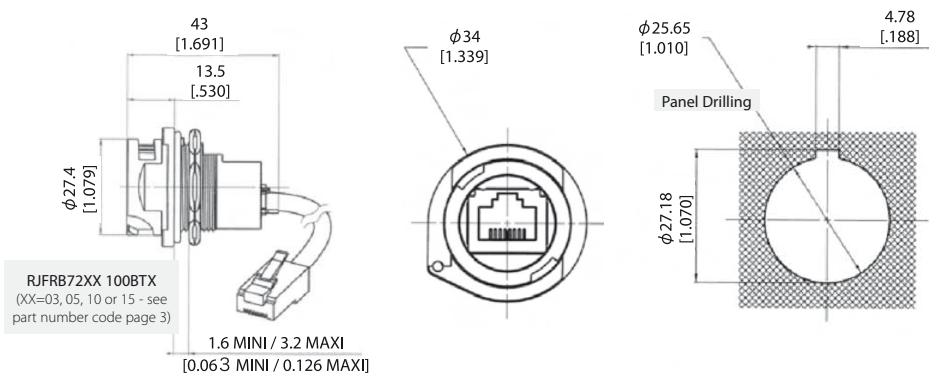
- Type 1: Female RJ45  
(front mounting)



- Type 1RA: Right Angle Female RJ45  
(front mounting)



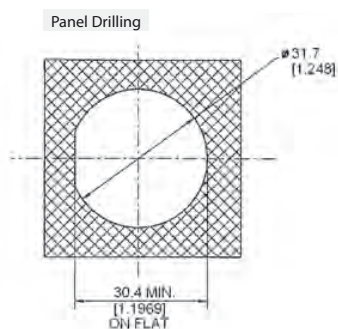
- Type 2: RJ45 Cordset  
(front mounting)



- Type 3: IDC Cat6 termination  
(rear mounting)

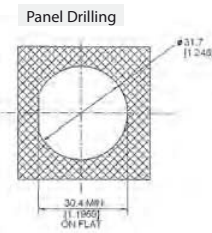
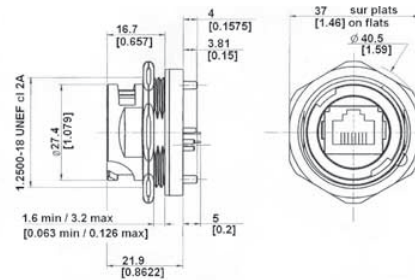


Unshielded: **RJFRB73U**  
Partial shielding **RJFRB73F**



Shielded: **RJFRB73S**

■ Straight PCB termination receptacle:  
(rear mounting)

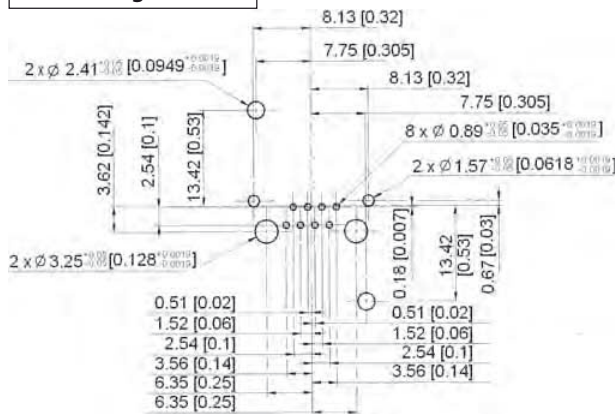


Part number: RJF RB 75

**IMPORTANT NOTE**

The customer's PCB design will determine the receptacle category.

**PCB Drilling RJFRB**

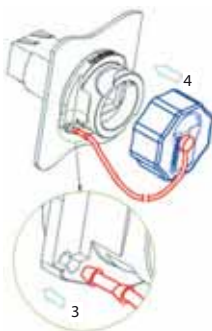


**Assembly Instructions**



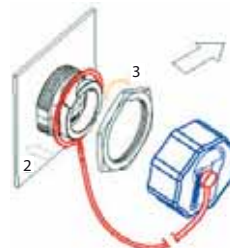
**Accessories**

■ IP68 Dust Caps



**RJF RB C7**

Cap for receptacles RJFRB71 / 71RA / 72xxx



**RJF RB C75**

Cap for receptacles RJFRB75 and RJFRB73x

# RJF 544

Ethernet Connection System for Harsh Environment – Industrial Ethernet



## Applications

- Telecom Equipment
- Video Control
- Robotics
- Industrial Process Control
- CNC Machines
- Special Machines
- Motion Control
- Tele-maintenance

RJF544 allows you to use an Ethernet Class D / Cat. 5e connection for 10 BaseT, 100 BaseTX or 1000 BaseT networks in harsh environments:

With the patented RJStop® system you can use a standard RJ45 cordset in a protective composite plug which will protect it from shocks, dust and fluids.

**No hazardous on-field cabling and grounding!**

## MAIN CHARACTERISTICS

- **Compliant with IEC 60603-7 variant 12**
- Shock, Vibration and Traction resistant
- No cabling operation in field and no tools required
- Sealed against fluids and dust (IP68)
- **Quick Push Pull coupling**
- RJ45 cordset retention in the plug: 100 N in the axis
- Mating cycles: 500 min
- Improved EMI Protection
- Compatible with cable diameter from 5,5 mm [0.216 in] to 13 mm [0.512 in]

## Environmental Protection

- Sealing: IP68
- Salt Spray > 1000 h
- Fire Retardant / Low Smoke: UL94 V0 and NFF 16102, DIN 5510-2
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 10 nano s.
- Thermal Shock: 5 cycles at - 40°C / +100°C
- Operating Temperature: - 40°C / +85°C

## Data Transmission

10 BaseT, 100 BaseTX and 1000 BaseT networks  
Cat 5e per TIA/EIA 568B and ClassD per ISO/IEC 11801

## Part Number Code

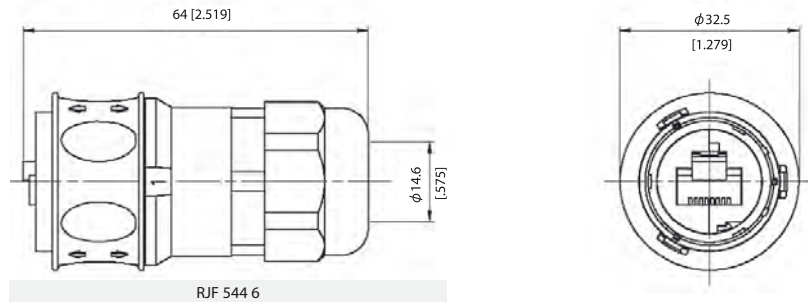
|                                                                 |                                                           |   |   |           |
|-----------------------------------------------------------------|-----------------------------------------------------------|---|---|-----------|
| Series                                                          | RJF 544                                                   | 2 | 2 | 03 100BTX |
| RJField 544 - Push Pull                                         |                                                           |   |   |           |
| Shell Type                                                      |                                                           |   |   |           |
| 6:                                                              | Composite Push Pull Plug, Plastic Gland                   |   |   |           |
| 2:                                                              | Composite Square Flange Receptacle                        |   |   |           |
| 2M:                                                             | Metallized (Ni) Composite Square Flange Receptacle        |   |   |           |
| Back Terminations (For Receptacles only)                        |                                                           |   |   |           |
| 1:                                                              | Female RJ45                                               |   |   |           |
| 1RA:                                                            | Right Angle Female RJ45                                   |   |   |           |
| 2:                                                              | RJ45 Cordset                                              |   |   |           |
| Cordset Length (For Receptacles with "2" Back Termination only) |                                                           |   |   |           |
| 03 100BTX:                                                      | 0.3 meters [11.81 inches]                                 |   |   |           |
| 05 100BTX:                                                      | 0.5 meters [19.68 inches]                                 |   |   |           |
| 10 100BTX:                                                      | 1 meter [39.37 inches]                                    |   |   |           |
| 15 100BTX:                                                      | 1.5 meters [59.05 inches]                                 |   |   |           |
| 00:                                                             | 8 tinned holes at the rear of the PCB to solder the cable |   |   |           |

**Remark: Cabling configuration: 100 BTX = 568B (Ethernet specification)**

- Examples:
- Plug: RJF 544 6
  - Square flange receptacle, Female RJ45 Back termination: RJF 544 21
  - Metallized Square flange receptacle, Female RJ45 Back termination: RJF 544 2M 1
  - Square flange receptacle, 1,5m [59.05"] 100 BTX cordset termination: RJF 544 22 15 100BTX
  - Square flange receptacle, solder termination: RJF 544 22 00

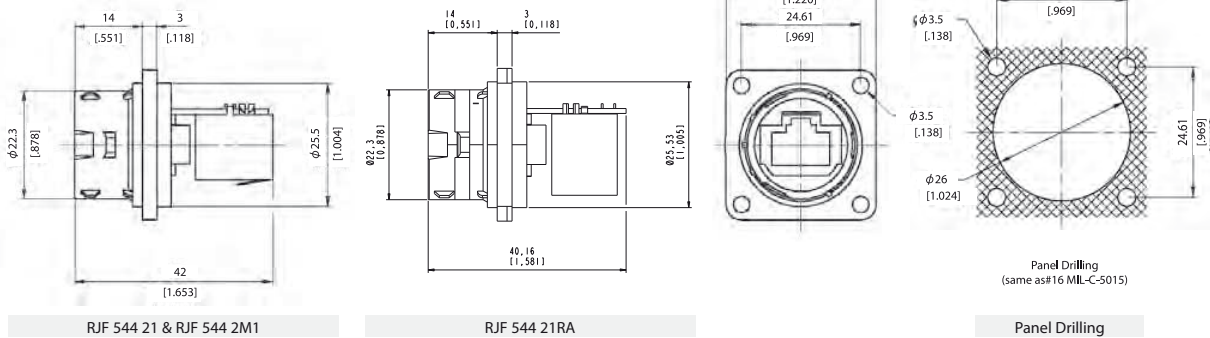
## Plug

- Type 6 Shell with Plastic Gland

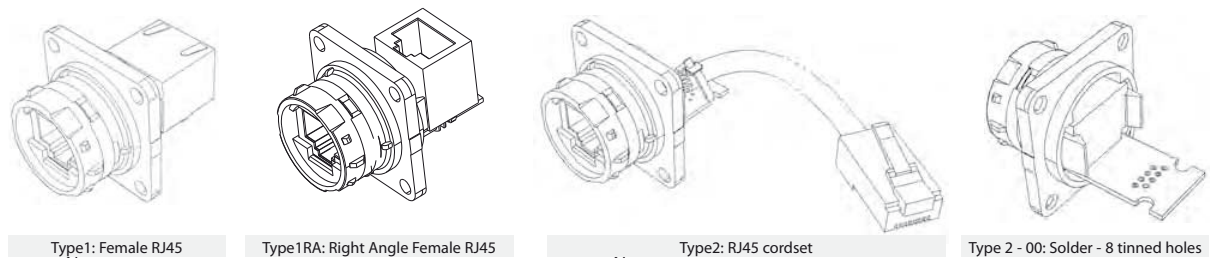


## Receptacle

- Type 2 Shell: Square flange receptacle with 4 mounting holes



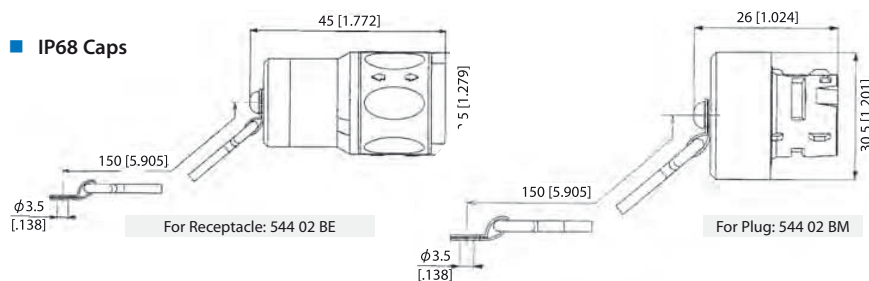
## Back Terminations



**Notes:** - Type 2 without RJ45 plug at the end of the cable is also available: consult factory

## Accessories

- IP68 Caps



- Panel gasket  
RJF 544 02JE



- Panel Gasket (Thickness: 0.6mm [0.039]): Part No. 544 02 JE
- Plug Insert removal tool: Part No. 5440 OT 02

# RJF EZ

Ethernet Connection System for Harsh Environment – Industrial Ethernet



## Applications

- Telecom Equipment
- Video Control
- Robotics
- Industrial Process Control
- CNC Machines
- Special Machines
- Motion Control
- Tele-maintenance

RJFEZ allows you to use an Ethernet Class D / Cat. 5e connection for 10 BaseT, 100 BaseTX or 1000 BaseT networks in harsh environments.

With the patented RJStop® system you can use a standard RJ45 cordset in a protective composite plug which will protect it from shocks, dust and fluids.

**No hazardous on-field cabling and grounding!**

## MAIN CHARACTERISTICS

- **Compliant with IEC 60603-7 variant 13**
- Sealed against fluids and dust (IP68)
- Shock, Vibration and Traction resistant
- No cabling operation in field and no tools required
- **Quick lever coupling**
- RJ45 cordset retention in the plug: 70 N in the axis
- Mating cycles: 500 min
- Compatible with cable diameter from 5,5 mm [0.216 in] to 7 mm [0.275 in]

## Environmental Protection

- Sealing: IP68
- Salt Spray > 1000 h
- Fire Retardant / Low Smoke: UL94 V0 and NFF 16102, DIN 5510-2
- Thermal Shock: 5 cycles at - 40°C / +100°C
- Operating Temperature: - 40°C / +85°C

## Data Transmission

10 BaseT, 100 BaseTX and 1000 BaseT networks  
Cat 5e per TIA/EIA 568B and ClassD per ISO/IEC 11801

## Part Number Code

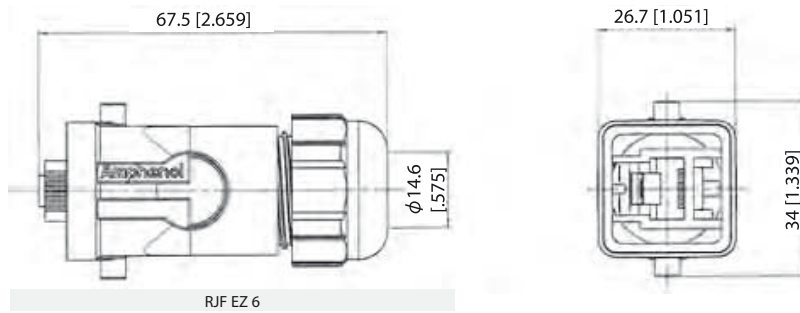
| Series                                                          | RJF EZ                              | 2 | 2 | 03 100BTX |
|-----------------------------------------------------------------|-------------------------------------|---|---|-----------|
| RJField EZ - Lever                                              |                                     |   |   |           |
| Shell Type                                                      |                                     |   |   |           |
| 6:                                                              | Composite Lever Plug, Plastic Gland |   |   |           |
| 2:                                                              | Composite Square Flange Receptacle  |   |   |           |
| Back Terminations (For Receptacles only)                        |                                     |   |   |           |
| 1:                                                              | Female RJ45                         |   |   |           |
| 2:                                                              | RJ45 Cordset                        |   |   |           |
| Cordset Length (For Receptacles with "2" Back Termination only) |                                     |   |   |           |
| 03 100BTX:                                                      | 0.3m [11.81 inches]                 |   |   |           |
| 05 100BTX:                                                      | 0.5m [19.68 inches]                 |   |   |           |
| 10 100BTX:                                                      | 1m [39.37 inches]                   |   |   |           |
| 15 100BTX:                                                      | 1.5m [59.05 inches]                 |   |   |           |

**Remark: Cabling configuration:** 100 BTX = 568B (Ethernet specification)

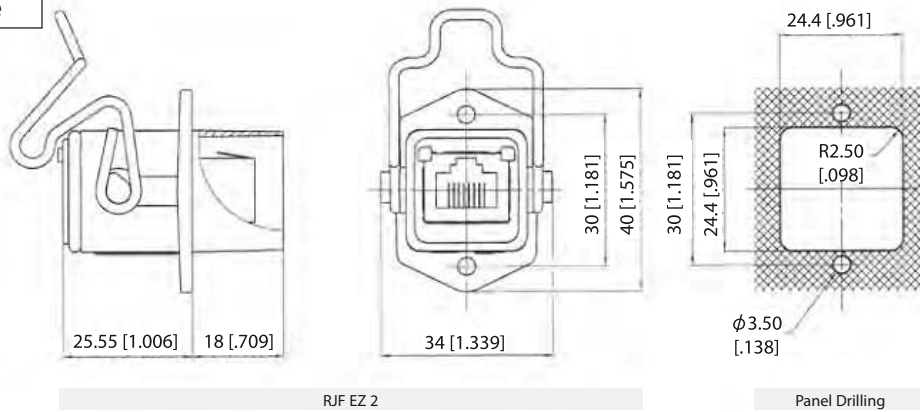
Examples:

- Plug: RJF EZ 6
- Receptacle, Female RJ45 Back termination: RJF EZ 21
- Receptacle, 1,5m [59.05"] 100 BTX cordset termination: RJF EZ 22 15 100BTX

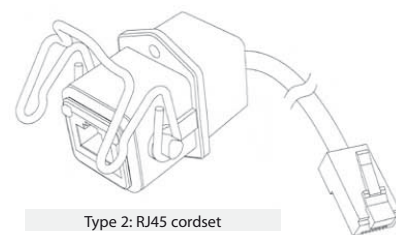
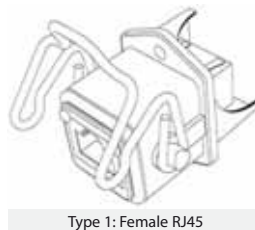
## Plug



## Receptacle

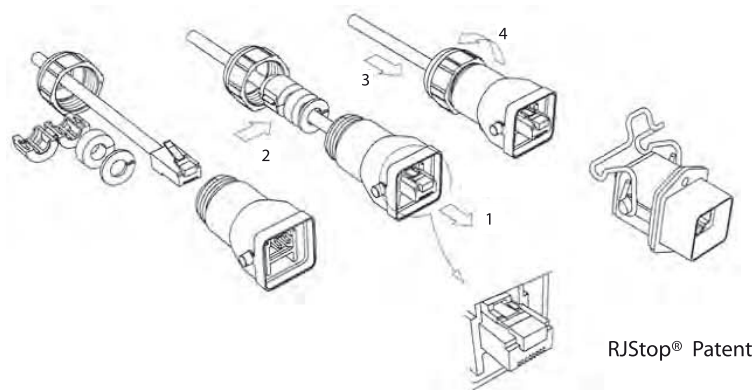


## Back Terminations



**Notes:** Type 2 without RJ45 plug at the end of the cable is also available: consult factory

## Assembly Instructions



## Accessories

- **IP68 Dust Caps**  
For Plugs: **Not available**  
For Receptacles: **RJF EZ BE**



- **Panel Gasket**  
Thickness: 1 mm [0.039]  
Part No. RJF EZ JE



**RJF**

Ethernet Connection System for Harsh Environment – Industrial Ethernet



#### Applications

- Robotics
- Industrial Process Control
- CNC Machines
- Special Machines
- Oil & Gas
- Motion Control
- Data Acquisition and Transmission in Harsh Environment
- Tele-maintenance

#### Data Transmission

10 BaseT, 100 BaseTX and 1000 BaseT networks  
Cat 5e per TIA/EIA 568B and ClassD per ISO/IEC 11801

RJF allows you to use an Ethernet Class D / Cat. 5e connection for 10 BaseT, 100 BaseTX or 1000 BaseT networks in harsh environments:

With the patented RJStop® system you can use a standard RJ45 cordset in a metallic plug which will protect it from shocks, dust and fluids.

**No hazardous on-field cabling and grounding!**

#### MAIN CHARACTERISTICS

- Compliant with IEC 60603-7 variant 11
- Bayonet coupling ("Audible & Visual" coupling signal)
- Robust metallic shells based on MIL-DTL-26482 H
- RJ45 cordset retention in the plug: 100 N in the axis
- Mating cycles: 500 min
- Sealed against fluids and dust (IP68)
- Shock, Vibration and Traction resistant
- No cabling operation in field and no tools required
- Mechanical Coding / Polarization (4 positions)
- Compatible with cable diameter from 5,5 mm [0.216 in] to 13 mm [0.512 in]

#### Environmental Protection

- Sealing: IP68
- Salt Spray: 48 h with Nickel plating  
> 96 h with black coating  
> 500 h with Oliv Drab Cadmium
- Fire Retardant/Low Smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 10 nano s.
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Thermal Shock: 5 cycles at - 40°C / +100°C
- Temperature Range: - 40°C / +85°C

#### Part Number Code

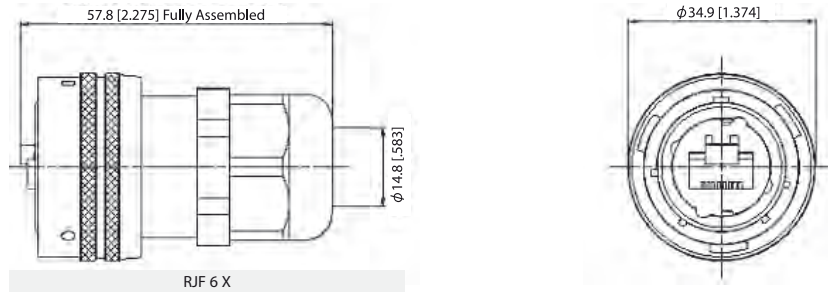
| Series                                                                 | RJF                                                                                    | 2 | 2 | B | 03 100BTX |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---|---|---|-----------|
| <b>RJField</b>                                                         |                                                                                        |   |   |   |           |
| <b>Shell Type</b>                                                      |                                                                                        |   |   |   |           |
| <b>6:</b>                                                              | Plug, Plastic Gland                                                                    |   |   |   |           |
| <b>6M:</b>                                                             | Plug, Metal Gland                                                                      |   |   |   |           |
| <b>2:</b>                                                              | Square Flange Receptacle                                                               |   |   |   |           |
| <b>2PE:</b>                                                            | Square Flange Receptacle, IP68 backshell, Plastic gland                                |   |   |   |           |
| <b>2PEM:</b>                                                           | Square Flange Receptacle, IP68 backshell, Metal gland                                  |   |   |   |           |
| <b>7:</b>                                                              | Jam Nut Receptacle                                                                     |   |   |   |           |
| <b>7PE:</b>                                                            | Jam Nut Receptacle, IP68 backshell, Plastic gland                                      |   |   |   |           |
| <b>7PEM:</b>                                                           | Jam Nut Receptacle, IP68 backshell, Metal gland                                        |   |   |   |           |
| <b>2SA, 7SA:</b>                                                       | Transversally sealed receptacle (unmated) see page 22                                  |   |   |   |           |
| <b>Back Terminations (For Receptacles only)</b>                        |                                                                                        |   |   |   |           |
| <b>1:</b>                                                              | Female RJ45                                                                            |   |   |   |           |
| <b>1RA:</b>                                                            | Right Angle Female RJ45                                                                |   |   |   |           |
| <b>2:</b>                                                              | RJ45 Cordset                                                                           |   |   |   |           |
| <b>Shell Finishes</b>                                                  |                                                                                        |   |   |   |           |
| <b>B:</b>                                                              | Black Coating - ROHS compliant                                                         |   |   |   |           |
| <b>N:</b>                                                              | Nickel ( <i>Note: with this version, the inserts are metallized</i> ) - ROHS compliant |   |   |   |           |
| <b>G:</b>                                                              | Olive Drab Cadmium ( <i>Note: with this version, the inserts are metallized</i> )      |   |   |   |           |
| <b>Cordset Length (For Receptacles with "2" Back Termination only)</b> |                                                                                        |   |   |   |           |
| <b>03 100 BTX:</b>                                                     | 0.3m [11.81 inches]                                                                    |   |   |   |           |
| <b>05 100 BTX:</b>                                                     | 0.5m [19.68 inches]                                                                    |   |   |   |           |
| <b>10 100 BTX:</b>                                                     | 1m [39.37 inches]                                                                      |   |   |   |           |
| <b>15 100 BTX:</b>                                                     | 1.5m [59.05 inches]                                                                    |   |   |   |           |
| <b>00:</b>                                                             | 8 tinned holes at the rear of the PCB to solder the cable                              |   |   |   |           |

**Remark: Cabling configuration: 100 BTX = 568B (Ethernet specification)**

- Examples:
- Nickel plug: RJF 6 N
  - Black square flange receptacle, female RJ45 back termination: RJF 2 1 B
  - Olive drab cadmium jam nut receptacle, 1.5m [59.05"] 100 BTX cordset termination: RJF 7 2 G 15 100BTX
  - Black in line square flange receptacle, 30cm [11.81"] 100BTX cordset termination: RJF 2PE 2 B 03 100BTX
  - Nickel jam nut receptacle, solder termination: RJF 72 N 00

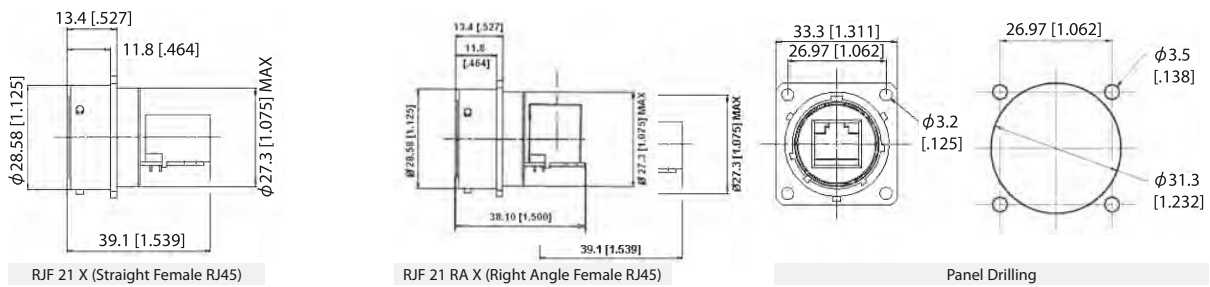
## Plug:

- Shell type 6 with Plastic or Metal Gland

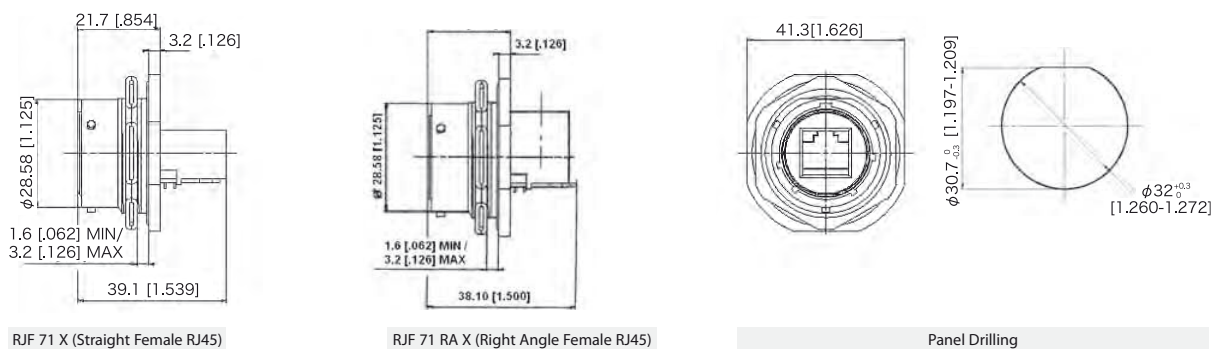


## Receptacles:

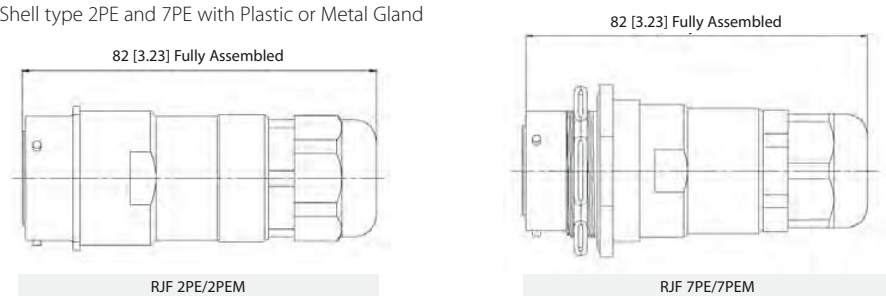
- Square flange receptacle • 4 mounting holes: Shell type 2



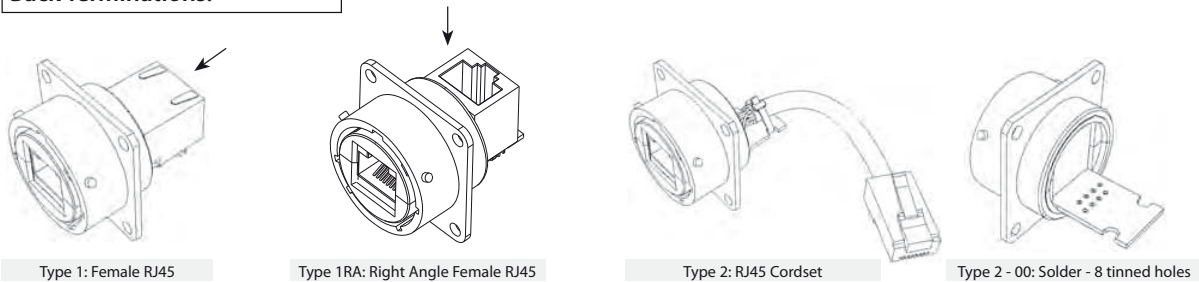
- Jam nut receptacle • Hexagonal Nut mounting: Shell type 7



- Receptacles with IP68 backshell: • Shell type 2PE and 7PE with Plastic or Metal Gland



## Back Terminations:

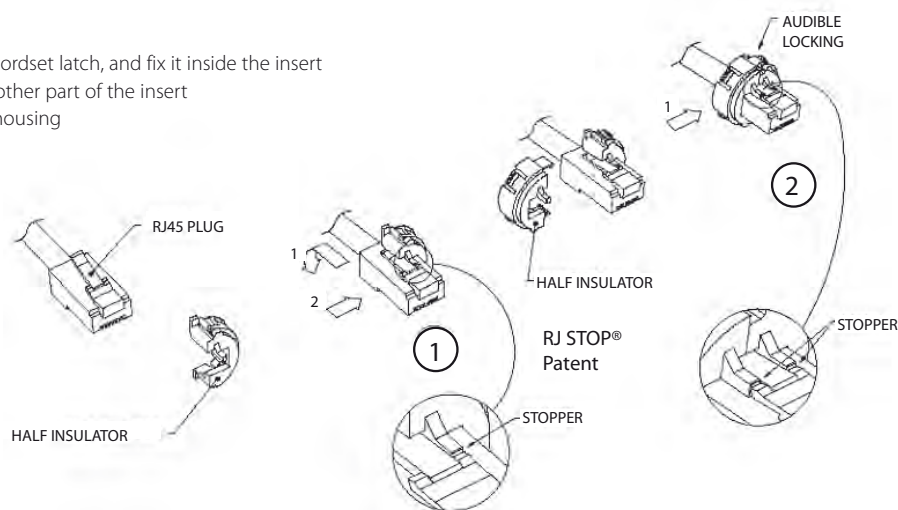


**Notes:** • Type 2 without RJ45 plug at the end of the cable is also available: consult factory

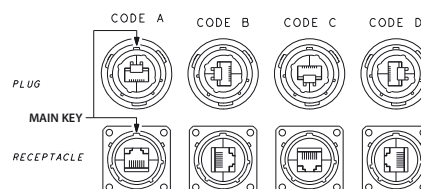
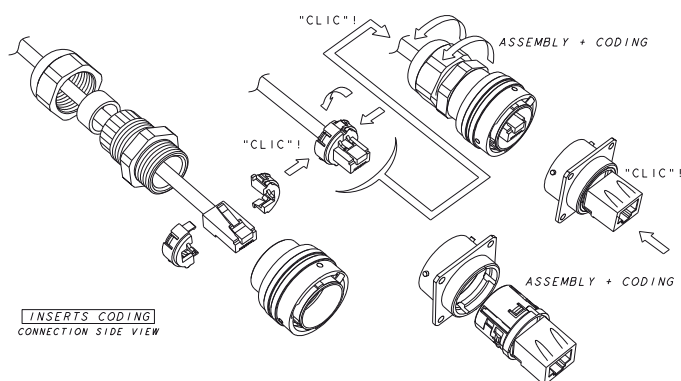
Universal: Can be used with all standard RJ45 Cat.5e cordset brands

#### Assembly instructions

1. Push down the RJ45 cordset latch, and fix it inside the insert
2. Press in and click the other part of the insert
3. Insert in the metallic housing



Easy and Safe: No field cabling tools required



#### Accessories:

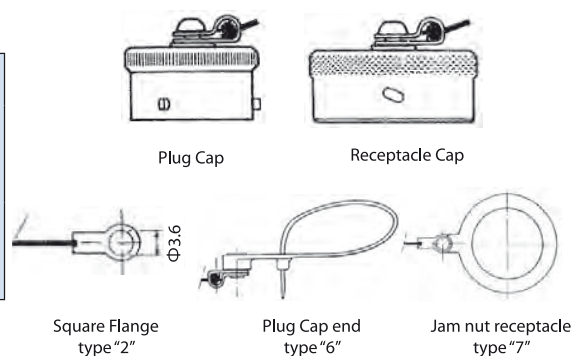
##### ■ Metallic cap

|                       | RJFC                           | 2 | B |
|-----------------------|--------------------------------|---|---|
| <b>Connector Type</b> |                                |   |   |
| 6:                    | Plug                           |   |   |
| 2:                    | Square Flange Receptacle       |   |   |
| 7:                    | Jam Nut Receptacle             |   |   |
| <b>Finishes</b>       |                                |   |   |
| B:                    | Black Coating - ROHS compliant |   |   |
| N:                    | Nickel - ROHS compliant        |   |   |
| G:                    | Olive Drab Cadmium             |   |   |

- Panel gasket for square flange « 2 » thickness: 0,6 mm – P/N: JE 18



- Insert removal tool for receptacle and plug  
P/N = RJF ODE



## Inline Cable Mount Receptacles



Inline receptacles allow you to make cable extensions in the field by using them with rugged RJFied series plugs.

**PART NUMBERS:**

## Plastic Gland

Black coating: **RJF2PEWF1B**

Nickel plating: **RJF2PEWF1N**

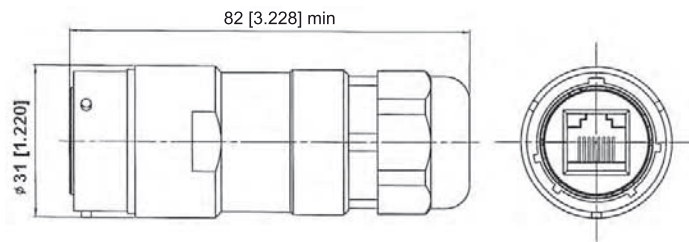
Olive Drab Cadmium plating: **RJF2PEWF1G**

### Metallic Gland

Black coating: **RJF2PEMWF1B**

Nickel plating: **RJF2PEMWF1N**

Olive Drab Cadmium plating: **RJF2PEMWF1G**

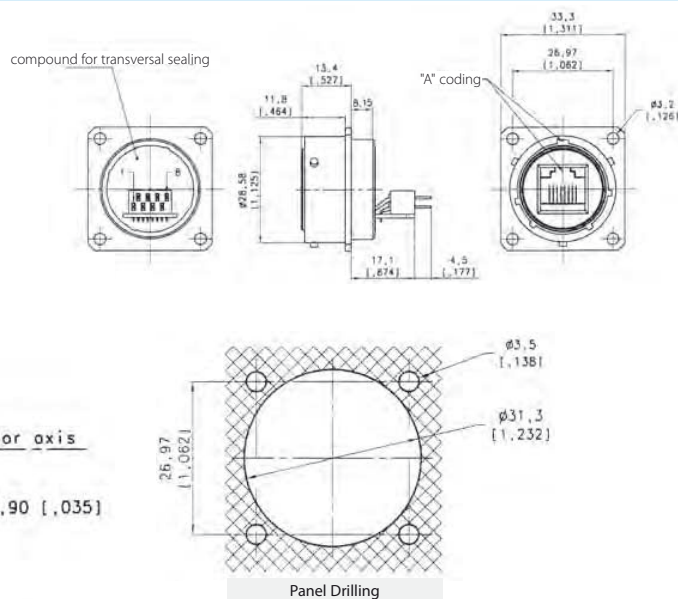
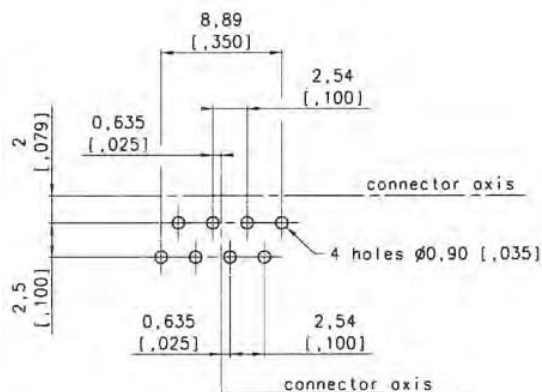


## PC Tails Receptacles



These receptacles can be soldered directly on your PCB. A compound insures a transversal sealing and good performance in high vibration environments. They can be connected with rugged RJField series plugs.

### PCB LAYOUT – SOLDER FACE VIEW



**PART NUMBERS:**

Note:

1. Platings available: "**B**": black coating • "**N**": nickel plating • "**G**": olive drab cadmium plating  
2. As these receptacles are compounded, coding position has to be specified in the P/N.

*See examples hereunder*

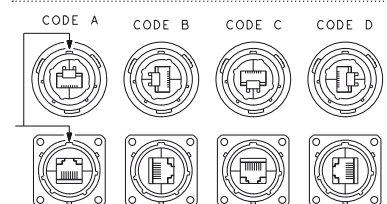
**Examples:**

Square flange receptacle – black coating – coding A: **RJF2SA5B**

Square flange receptacle – nickel plating – coding C: **RJF2SC5N**

Square flange receptacle – olive drab cadmium plating – coding D: **RJF2SD5G**

### MAIN KEY



# RJF TV

Ethernet Connection System for Harsh Environment



## Applications

- Data Acquisition and Transmission in harsh environment
- Railways
- Radars
- Shelters
- Battlefield Communication
- Systems
- Navy

## Data Transmission

10 BaseT, 100 BaseTX and 1000 BaseT networks  
Cat 5e per TIA/EIA 568B and ClassD per ISO/IEC 11801

RJFTV allows you to use an Ethernet Class D / Cat. 5e connection for 10 BaseT, 100 BaseTx or 1000 BaseT networks in harsh environments.

With the patented RJStop system you can use a standard RJ45 cordset in a metallic plug which will protect it from shocks, dust and fluids.

**No hazardous on-field cabling and grounding!**

## MAIN CHARACTERISTICS

- Sealed against fluids and dusts (IP68)
- Shock, Vibration and Traction resistant
- No cabling operation in field and no tools required
- Mechanical Coding / Polarization (4 positions)
- Improved EMI protection
- **Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device**
- **Robust metallic shells**
- RJ45 cordset retention in the plug: 100 N in the axis
- Mating cycles: 500 min
- Compatible with cable diameter from 5,5 mm [0.216 in] to 13 mm [0.512 in]

## Environmental Protection

- Sealing: IP68
- Salt Spray: 48 h with Aluminium shell - Nickel plating  
> 500 h with Aluminium shell - Olive Drab Cadmium plating  
1000h with Marine bronze shell
- Fire Retardant / Low Smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 10 nano s.
- Compounded versions tested per NAS 1599 (5-3000 Hz, 20g, 12h)
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Thermal Shock: 5 cycles at - 40°C / +100°C
- Temperature Range: - 40°C / +85°C

## Part Number Code

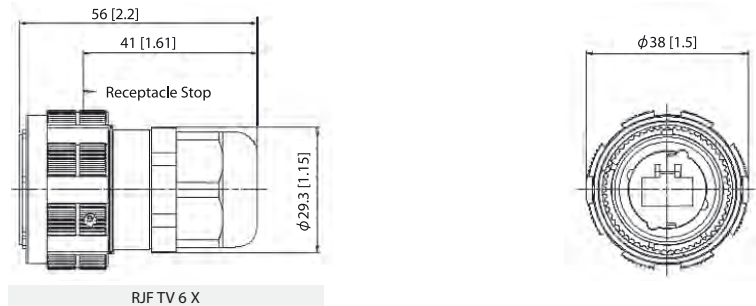
| Series                                               | RJF TV                                                                                | 2 | 2 | G | 03 100 BTX |
|------------------------------------------------------|---------------------------------------------------------------------------------------|---|---|---|------------|
| <b>RJ Field TV</b>                                   |                                                                                       |   |   |   |            |
| <b>Shell Type</b>                                    |                                                                                       |   |   |   |            |
| 6:                                                   | Plug with Plastic gland                                                               |   |   |   |            |
| 6M:                                                  | Plug with Metal gland                                                                 |   |   |   |            |
| 2:                                                   | Square Flange Receptacle                                                              |   |   |   |            |
| 2PE:                                                 | Square Flange Receptacle, IP68 backshell, Plastic gland                               |   |   |   |            |
| 2PEM:                                                | Square Flange Receptacle, IP68 backshell, Metal gland                                 |   |   |   |            |
| 7:                                                   | Jam Nut Receptacle                                                                    |   |   |   |            |
| 7PE:                                                 | Jam Nut Receptacle, IP68 backshell, Plastic gland                                     |   |   |   |            |
| 7PEM:                                                | Jam Nut Receptacle, IP68 backshell, Metal gland                                       |   |   |   |            |
| 2SA, 7SA:                                            | Transversally sealed receptacle (unmated) see page 22                                 |   |   |   |            |
| <b>Back Terminations (Receptacles only)</b>          |                                                                                       |   |   |   |            |
| 1:                                                   | Female RJ45                                                                           |   |   |   |            |
| 1RA:                                                 | Right Angle Female RJ45                                                               |   |   |   |            |
| 2:                                                   | RJ45 Cordset                                                                          |   |   |   |            |
| <b>Shells material &amp; Finish</b>                  |                                                                                       |   |   |   |            |
| N:                                                   | Aluminium shell - nickel plating (receptacle inserts are metallized) - ROHS compliant |   |   |   |            |
| G:                                                   | Aluminium shell - olive drab cadmium plating (receptacle inserts are metallized)      |   |   |   |            |
| BZ:                                                  | Marine bronze shell (receptacle inserts are metallized) - ROHS compliant              |   |   |   |            |
| <b>Cordset Length (type 2 back termination only)</b> |                                                                                       |   |   |   |            |
| 03 100 BTX:                                          | 0.3m [11.81 inches]                                                                   |   |   |   |            |
| 05 100 BTX:                                          | 0.5m 19.68 inches]                                                                    |   |   |   |            |
| 10 100 BTX:                                          | 1m [39.37 inches]                                                                     |   |   |   |            |
| 15 100 BTX:                                          | 1.5m [59.05 inches]                                                                   |   |   |   |            |
| 00:                                                  | 8 tinned holes at the rear of the PCB to solder the cable                             |   |   |   |            |

**Remark: Cabling configuration:** 100 BTX = 568B (Ethernet specification)

- Examples:
- Olive Drab Cadmium plug with plastic gland: RJF TV 6G
  - Olive Drab Cadmium Jam Nut Receptacle, female RJ45 back termination: RJF TV 71G
  - Nickel Jam Nut Receptacle, 1,5 m 100 BTX cordset back termination: RJF TV 72N 15 100BTX
  - Olive Drab Cadmium in line Square Flange Recept., 0,3 m 100 BTX cordset back termination: RJF TV 2PE 2 G 03 100BTX
  - Nickel Jam Nut Receptacle Solder termination 8 tinned holes: RJF TV 22 N 00

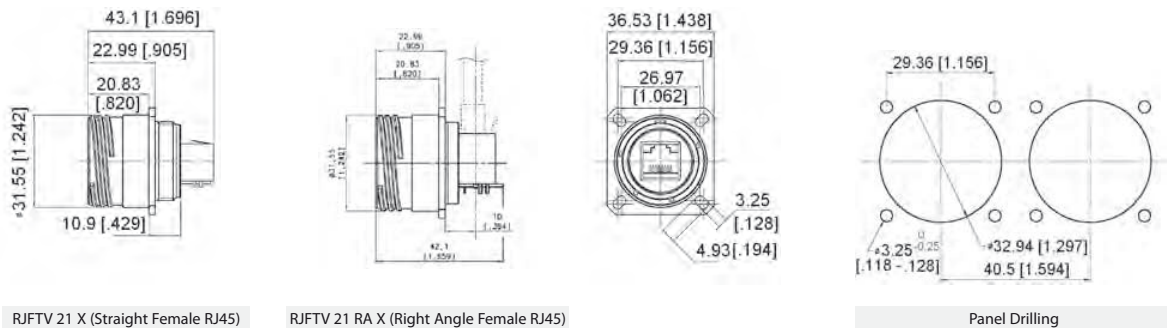
## Plug:

- Shell type 6 with Plastic or Metal Gland

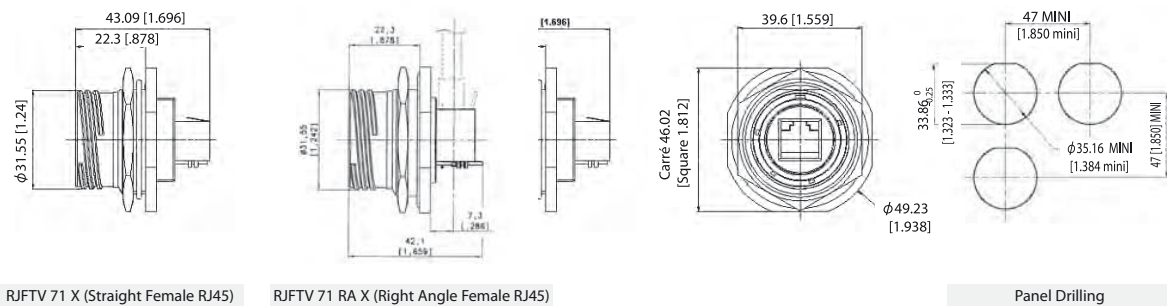


## Receptacles:

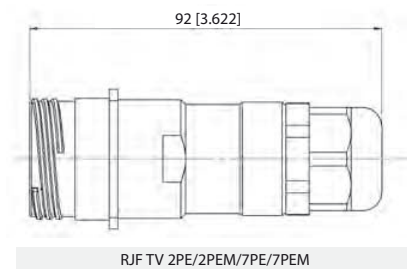
- Square flange receptacle • 4 mounting holes: Shell type 2



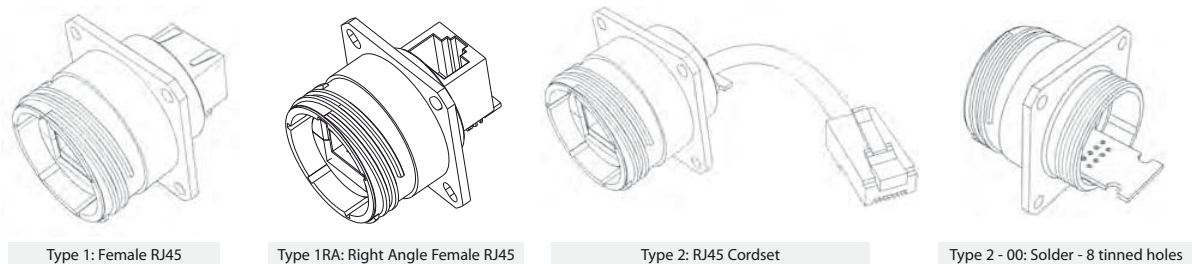
- Jam nut receptacle • Hexagonal Nut mounting: Shell type 7



- Receptacles with IP68 backshell: • Shell type 2PE and 7PE with Plastic or Metal Gland



## Back Terminations

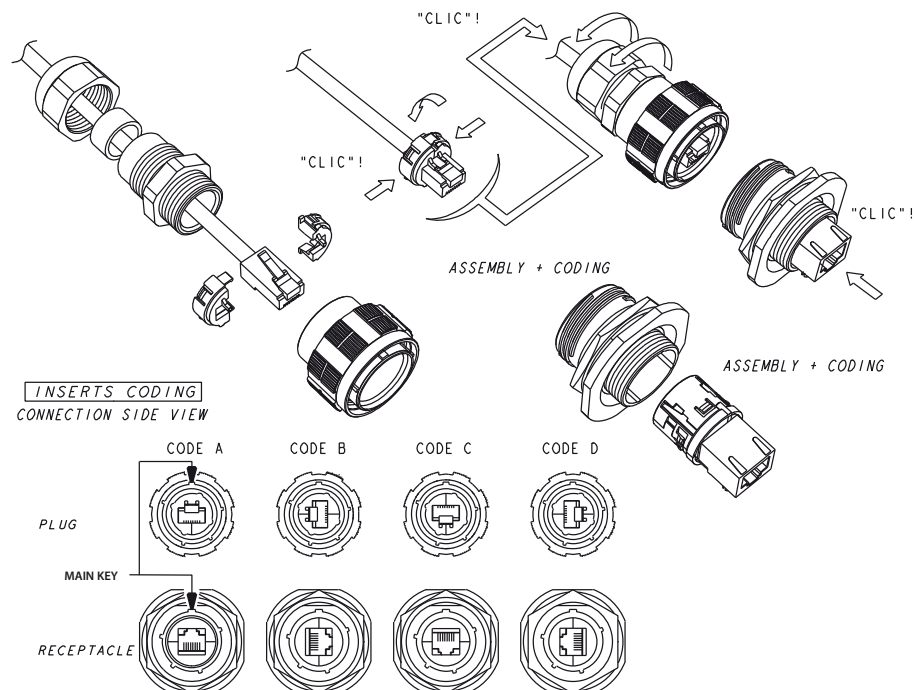


**Notes** Type 2 without RJ45 plug at the end of the cable is also available: consult factory

## Assembly instructions

### Insert Codings

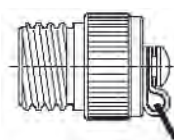
CONNECTION SIDE VIEW



### Accessories

#### ■ Metallic Caps

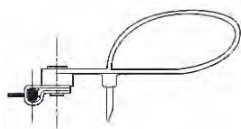
|                                                      |        |   |   |
|------------------------------------------------------|--------|---|---|
|                                                      | RJFTVC | 2 | G |
| <b>Connector Type</b>                                |        |   |   |
| 6: Plug                                              |        |   |   |
| 2: Square Flange Receptacle                          |        |   |   |
| 7: Jam Nut Receptacle                                |        |   |   |
| <b>Shell Material &amp; finish</b>                   |        |   |   |
| N: Aluminium shell - nickel plating - ROHS compliant |        |   |   |
| G: Aluminium shell - olive drab cadmium plating      |        |   |   |
| BZ: Marine bronze shell - ROHS compliant             |        |   |   |



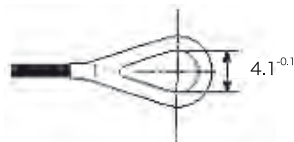
Plug Cap



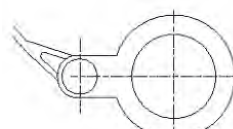
Receptacle Cap



Plug Cap end



Square flange receptacle cap end



Jam Nut receptacle cap end

- Panel Gasket for square flange receptacle  
(Thickness: 0,8 mm [.031]): JE19



- Insert removal tool: RJF ODE



# RJF TV

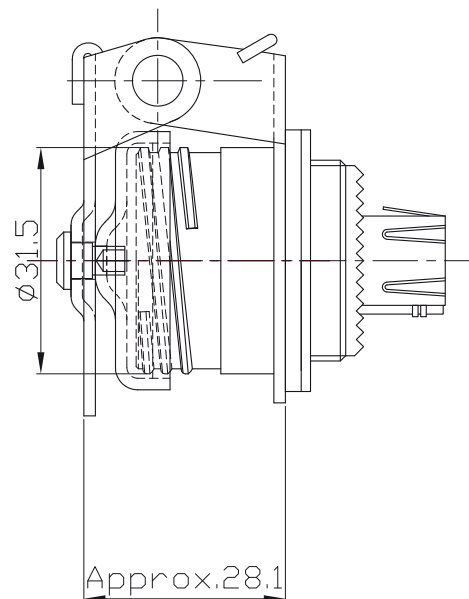
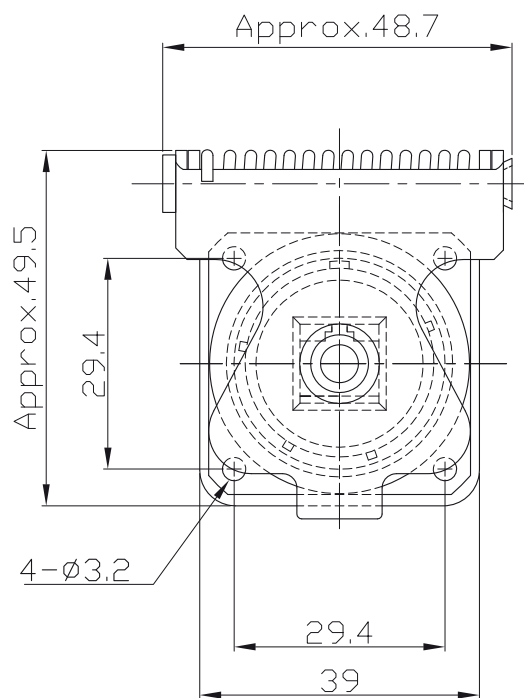
Self Closing Cap (SCC Series)



This Self Closing cap automatically protects the RJF TV square flange receptacle (MIL-DTL-38999 type), protecting your system from dust and water projection. A spring automatically closes the upper part of the cap when the RJF TV plug is removed from the receptacle.

## IMPORTANT NOTE

Metal Self Closing cap are sold separately (without receptacle)



- Panel Gasket for square flange receptacle (Thickness: 0,8 mm [.031]):

PART NUMBER: JE19



## PART NUMBER:

Self closing cap only: **RJFTVSCC**

**Remark:** Compatible only with RJFTV square flange receptacle type: RJFTV2XXX (see page 14)

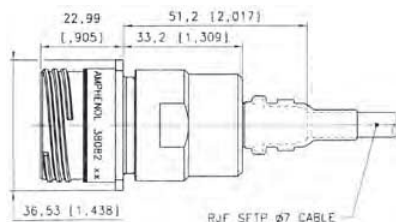
# RJFTV

Receptacles - Plugs with 360° EMI backshells



RJFTV series receptacles and plugs with EMI backshells provide a solution with 360° shielding: same protection than the one proposed by standard MIL-DTL-38999 series III connectors. With those solutions we recommend using our reinforced and double shielded cat5E cable, see page 24.

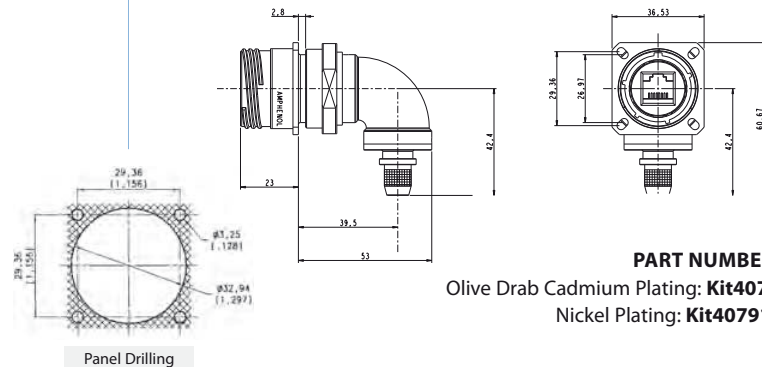
## Square Flange Receptacle *Straight Backshell*



### PART NUMBERS:

Olive Drab Cadmium Plating: **Kit38082**  
Nickel Plating: **Kit38082NI**

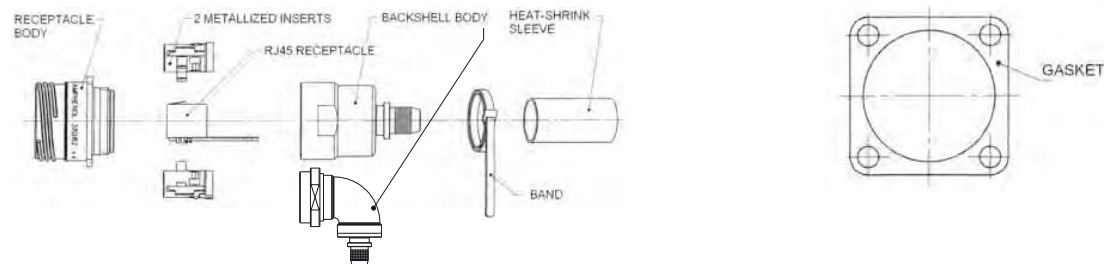
## Square Flange Receptacle *Right Angle Backshell*



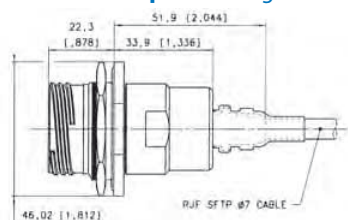
### PART NUMBERS:

Olive Drab Cadmium Plating: **Kit40791**  
Nickel Plating: **Kit40791NI**

Kit38082, Kit38082NI, Kit 40791 & Kit 40791NI include:



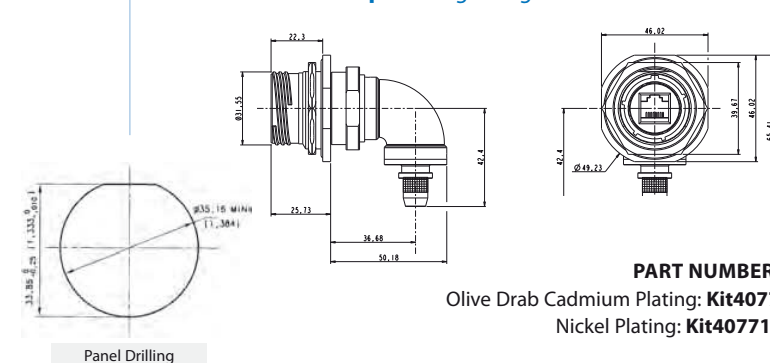
## Jam Nut Receptacle *Straight Backshell*



### PART NUMBERS:

Olive Drab Cadmium Plating: **Kit38204**  
Nickel Plating: **Kit38204NI**

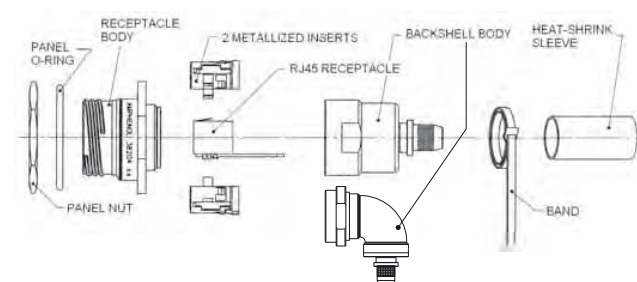
## Jam Nut Receptacle *Right Angle Backshell*



### PART NUMBERS:

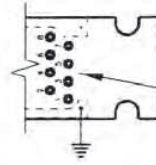
Olive Drab Cadmium Plating: **Kit40771**  
Nickel Plating: **Kit40771NI**

Kit38204, Kit38204NI, Kit 40771 & Kit 40771NI include:



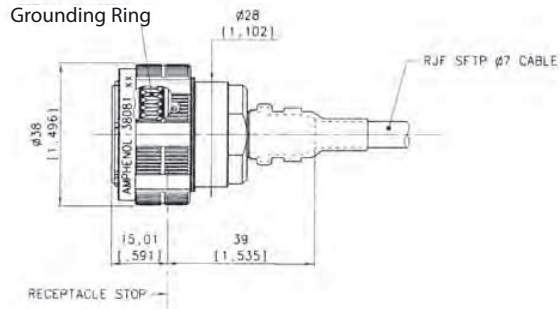
### IMPORTANT NOTE

With these receptacles, customer will have to solder his own cable on the PCB. So the wire positions have to be defined by the customer according to his network.



WIRE POSITION  
TO BE DEFINED  
BY CUSTOMER  
ACCORDING TO NETWORK

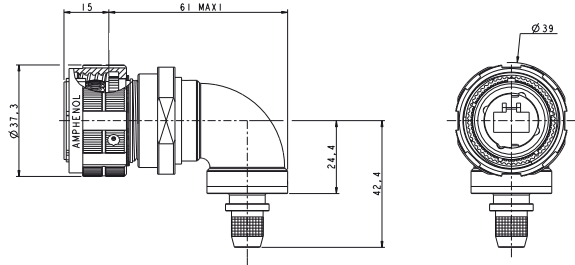
### Plug Straight Backshell



#### PART NUMBERS:

Olive Drab Cadmium Plating: **Kit38081**  
Nickel Plating: **Kit38081NI**

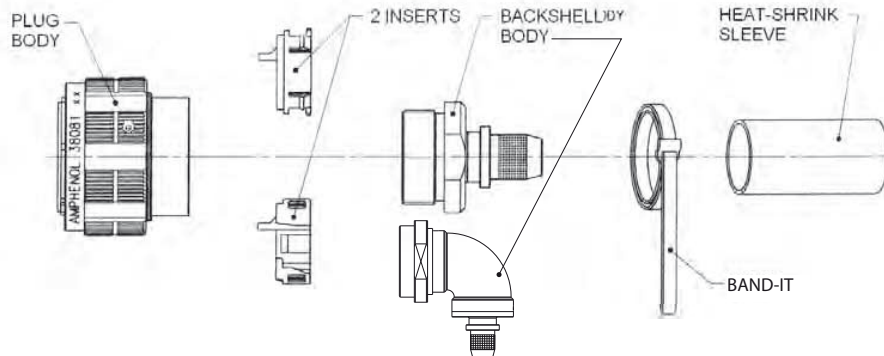
### Plug Right Angle Backshell



#### PART NUMBERS:

Olive Drab Cadmium Plating: **Kit40792**  
Nickel Plating: **Kit40792NI**

Kit38081, Kit38081NI, Kit40792 & Kit40792NI include:

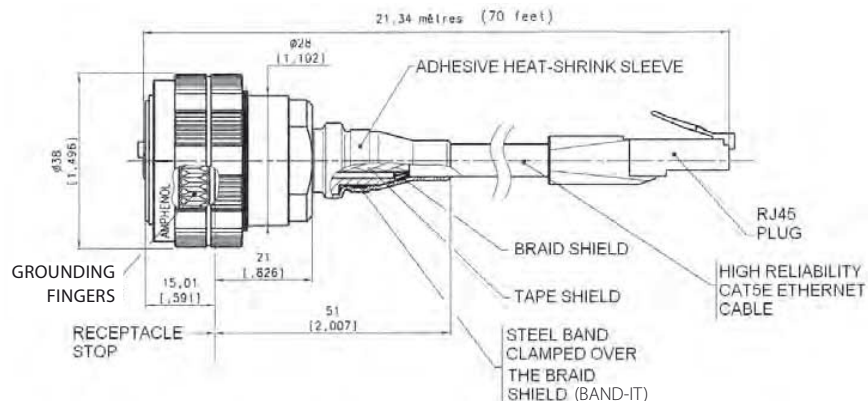


### IMPORTANT NOTE

With these plugs, the standard RJ45 plug is not provided. Customer will have to crimp a standard RJ45 on the cable by himself.

We advise using our double Shielded, reinforced Cat5E cable (see page 24) with these RJFTV series EMI connectors. If customer wants to use his own cable, please check with us regarding compatibility with our backshells: [contact@rjfield.com](mailto:contact@rjfield.com).

We also provide assembled cordsets, (see examples below). For this type of solution please provide the configuration needed: length, description of second end...



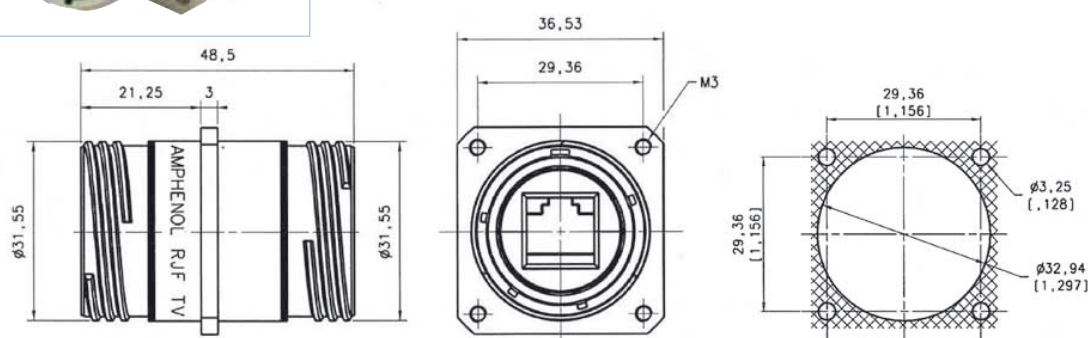
# RJFTV

Through Bulkhead – Stand-off receptacles

## Through Bulkhead Receptacles



Our RJFTV through bulkhead receptacles can be connected on each side with rugged RJFTV plugs. This system allows mechanical protection and a sealing (IP68) inside and outside the equipment, and keeps the flexibility offered by panel mount and plug connectors.



### PART NUMBERS:

Nickel plating – Non metallized inserts: **RJFTVB2N ISO BRUT**  
Nickel plating – Metallized inserts: **RJFTVB2N ISO NI**

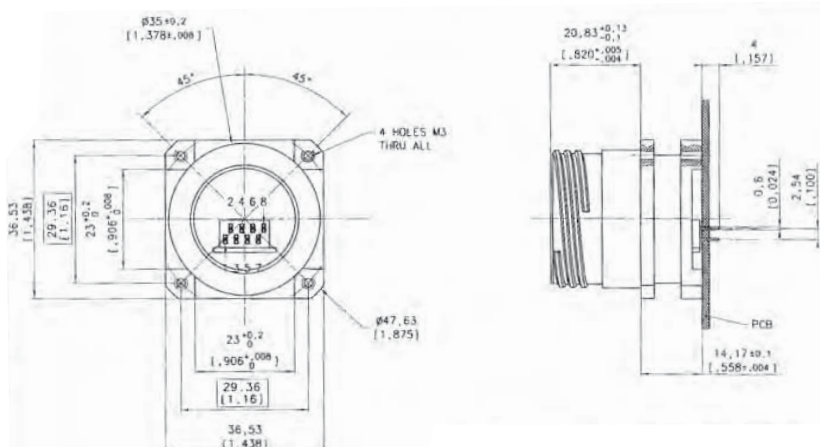
Olive Drab Cadmium plating – Non metallized inserts: **RJFTVB2G ISO BRUT**  
Olive Drab Cadmium plating – Metallized inserts: **RJFTVB2G ISO NI**

## Stand-off receptacles



These receptacles can be soldered directly to your PCB. A compound insures a transversal sealing and good performance in high-vibration environments. The shell of those receptacles are in the « Stand Off » style. They can be connected with RJFTV series plugs.

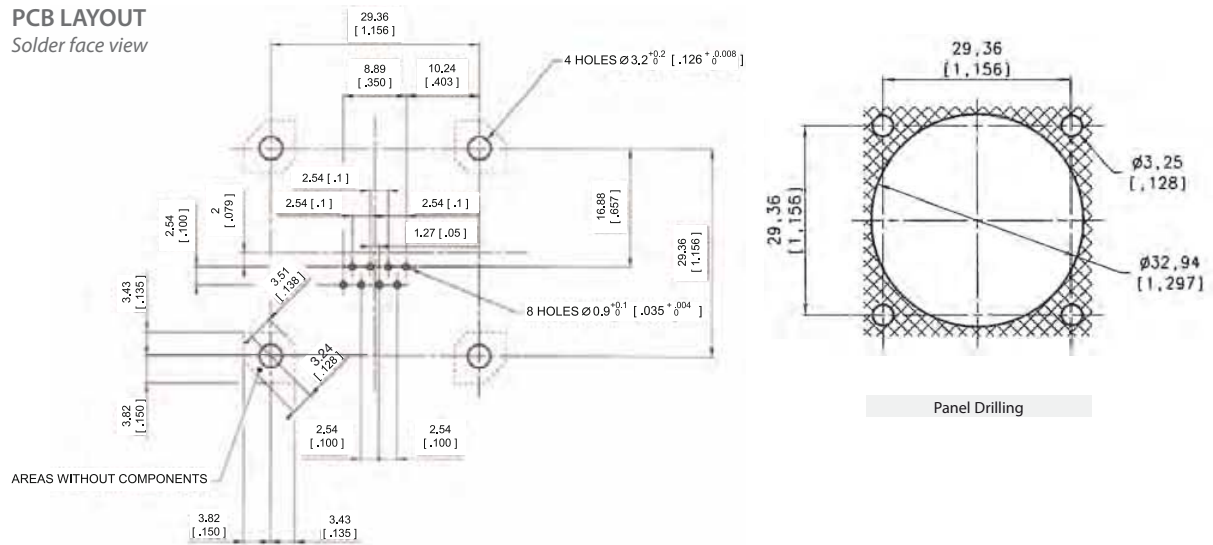
### Square Flange Receptacle



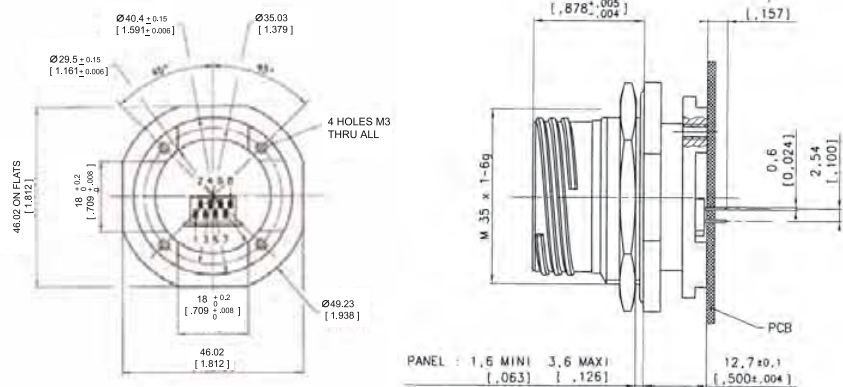
### PART NUMBERS:

Olive Drab Cadmium Plating: **RJFTV25GF459**  
Nickel Plating: **RJFTV25NF459**

*Solder face view*



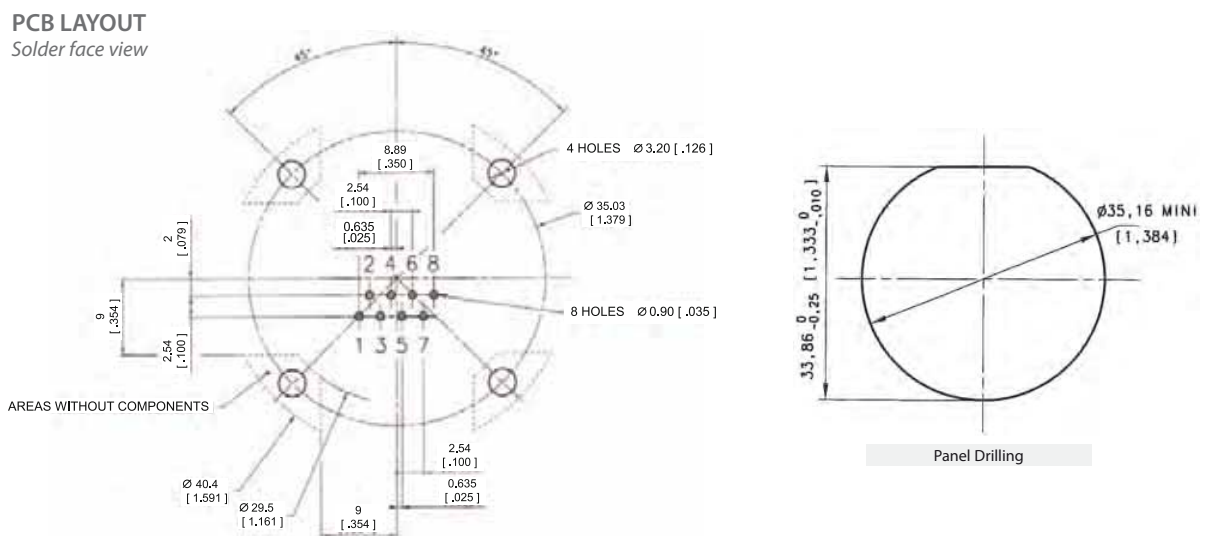
## Jam Nut Receptacle



**PART NUMBERS:**

Olive Drab Cadmium Plating: **RJFTV75GF459** - Nickel Plating: **RJFTV75NF459**

*Solder face view*



# RJF/RJF TV

Environmentally Sealed Receptacles, Transversally sealed receptacles



**SEALED RECEPTACLE** In some applications, a transversal sealing for the receptacle is a « must ». This will prevent fluids and dust from going through the receptacle when plug or cap are not mated to the receptacle. The sealed solution (version "S") has a compound at the rear of the receptacle as shown on the examples below. This feature is available both in RJF and RJF TV shells (please consult the relevant data sheet for product details and accessories). In addition, the Sealed RJF TV has been successfully tested in very high vibration corresponding to airplane applications.

## Applications

- Outdoor Equipment
- Airplanes Equipment
- Tactical Radios
- Shelters
- Rugged computers
- Data Acquisition and Transmission in Harsh Environments

## Data Transmission

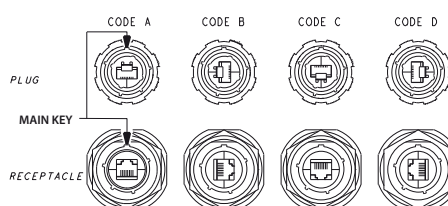
10 BaseT, 100 BaseTX and 1000 BaseT networks  
Cat 5e per TIA/EIA 568B and ClassD per ISO/IEC 11801

## IMPORTANT NOTE

Due to the compound, the coding of the connector must be done in the factory: use the codes A, B, C or D in the Part Number.

## MAIN CHARACTERISTICS

- Same as the RJF and RJF TV series ... a complete IP68 sealing of the receptacle (even with no plug or no protective cap mated) is added.
- Outside dimensions are the same as the standard RJF and RJF TV series.
- Vibrations: The compounded versions of the RJF TV have been tested in vibration following the NAS 1599 Aeronautic specification (Ambient temperature):  
5 - 3000 Hz, 20g, 2,5 mm [.1 inch] double amplitude, 3 axes, 12 hours  
Note: This specification exceeds MIL-C-26500 requirements.



RJFTV 7S A 2G 15 100BTX

## Part Number Code

| Series                                                                 | RJF TV                                                                                              | 7S | A | 2 | G | 03 100BTX |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----|---|---|---|-----------|
| <b>RJF:</b>                                                            | MIL-DTL-26482 H bayonet                                                                             |    |   |   |   |           |
| <b>RJFTV:</b>                                                          | MIL-DTL-38999 Series III                                                                            |    |   |   |   |           |
| <b>Shell Type</b>                                                      |                                                                                                     |    |   |   |   |           |
| <b>2S:</b>                                                             | Sealed Square Flange Receptacle                                                                     |    |   |   |   |           |
| <b>7S:</b>                                                             | Sealed Jam Nut Receptacle                                                                           |    |   |   |   |           |
| <b>Coding</b>                                                          | A,B,C,D                                                                                             |    |   |   |   |           |
| <b>Back Terminations (For Receptacles only)</b>                        |                                                                                                     |    |   |   |   |           |
| <b>1:</b>                                                              | Female RJ45                                                                                         |    |   |   |   |           |
| <b>1RA:</b>                                                            | Right Angle Female RJ45                                                                             |    |   |   |   |           |
| <b>2:</b>                                                              | RJ45 Cordset                                                                                        |    |   |   |   |           |
| <b>Shell material &amp; Finish</b>                                     |                                                                                                     |    |   |   |   |           |
| <b>B:</b>                                                              | Aluminium shell - black coating (Only available for RJF Series) - ROHS compliant                    |    |   |   |   |           |
| <b>N:</b>                                                              | Aluminium shell - nickel plating - ROHS compliant (note: receptacle inserts are metallized)         |    |   |   |   |           |
| <b>G:</b>                                                              | Aluminium shell - olive drab cadmium plating (note: receptacle inserts are metallized)              |    |   |   |   |           |
| <b>BZ:</b>                                                             | Marine bronze shell (only available for RJFTV) (receptacle inserts are metallized) - ROHS compliant |    |   |   |   |           |
| <b>Cordset Length (For Receptacles with "2" Back Termination only)</b> |                                                                                                     |    |   |   |   |           |
| <b>03 100 BTX:</b>                                                     | 0.3m [11.81 inches]                                                                                 |    |   |   |   |           |
| <b>05 100 BTX:</b>                                                     | 0.5m [19.68 inches]                                                                                 |    |   |   |   |           |
| <b>10 100 BTX:</b>                                                     | 1m [39.37 inches]                                                                                   |    |   |   |   |           |
| <b>15 100 BTX:</b>                                                     | 1.5m [59.05 inches]                                                                                 |    |   |   |   |           |

**Remark: Cabling configuration:** 100 BTX = 568B (Ethernet specification)

Examples:

- Bayonet, A coding, Olive Drab Cadmium Jam Nut sealed receptacle with female RJ45 Back termination: RJF 7SA 1 G
- Bayonet, A coding, Black square flange sealed receptacle, Female RJ45 Back termination: RJF 2SA 1 B
- Series III, A coding, Olive Drab Cadmium Jam Nut sealed receptacle, 1.5m [59.05"] 100 BTX cordset: RJF TV 7SA 2 G15 100BTX

# RJF/RJF TV

Hermetic receptacles



**HERMETIC RECEPTACLE** In some applications, a transversal hermiticity for the receptacle is a « must ». This will prevent gas from going through the receptacle when plug or cap are not mated to the receptacle. The hermetic solution (version "H") has a compound at the rear of the receptacle as shown on the examples below. This feature is available both in RJF and RJF TV shells (please consult the relevant data sheet for product details and accessories). Helium leakage is less than  $1.10^{-6}$  cm<sup>3</sup> per second [0.1 micron cubic ft per hour] at one bar [15 psi] pressure differential.

## Applications

- Outdoor Equipment
- Airplanes Equipment
- Tactical Radios
- Shelters
- Rugged computers
- Data Acquisition and Transmission in Harsh Environments

## Data Transmission

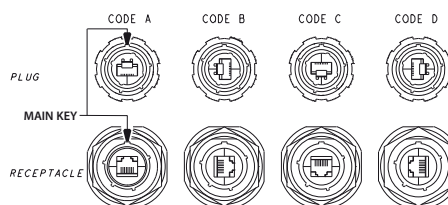
10 BaseT, 100 BaseTX and 1000 BaseT networks  
Cat 5e per TIA/EIA 568B and ClassD per ISO/IEC 11801

## IMPORTANT NOTE

Due to the compound, the coding of the connector must be done in the factory: use the codes A, B, C or D in the Part Number.

## MAIN CHARACTERISTICS

- Same as the RJF and RJF TV series ... a complete IP68 sealing of the receptacle (even with no plug or no protective cap mated) is added.
- Outside dimensions are the same as the standard RJF and RJF TV series.
- Vibrations: The compounded versions of the RJF TV have been tested in vibration following the NAS 1599 Aeronautic specification (Ambient temperature):  
5 - 3000 Hz, 20g, 2,5 mm [1 inch] double amplitude, 3 axes, 12 hours  
Note: This specification exceeds MIL-C-26500 requirements.



RJF TV 7 H 2G 15 100BTX

## Part Number Code

|                                                                 |                                                                                                     |    |   |   |   |           |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----|---|---|---|-----------|
| Series                                                          | RJF TV                                                                                              | 7H | A | 2 | G | 03 100BTX |
| RJF:                                                            | MIL-DTL-26482 H bayonet                                                                             |    |   |   |   |           |
| RJFTV:                                                          | MIL-C-38999 series III                                                                              |    |   |   |   |           |
| Shell Type                                                      |                                                                                                     |    |   |   |   |           |
| 2H:                                                             | Transversally Sealed and Hermetic Square Flange Receptacle                                          |    |   |   |   |           |
| 7H:                                                             | Transversally Sealed and Hermetic Jam Nut Receptacle                                                |    |   |   |   |           |
| Coding                                                          | A,B,C,D                                                                                             |    |   |   |   |           |
| Back Terminations (For Receptacles only)                        |                                                                                                     |    |   |   |   |           |
| 1:                                                              | Female RJ45                                                                                         |    |   |   |   |           |
| 1RA:                                                            | Right Angle Female RJ45                                                                             |    |   |   |   |           |
| 2:                                                              | RJ45 Cordset                                                                                        |    |   |   |   |           |
| Shell material & Finish                                         |                                                                                                     |    |   |   |   |           |
| B:                                                              | Aluminium shell - black coating (Only available for RJF Series) - ROHS compliant                    |    |   |   |   |           |
| N:                                                              | Aluminium shell - nickel plating - ROHS compliant (note: receptacle inserts are metallized)         |    |   |   |   |           |
| G:                                                              | Aluminium shell - olive drab cadmium plating (note: receptacle inserts are metallized)              |    |   |   |   |           |
| BZ:                                                             | Marine bronze shell (only available for RJFTV) (receptacle inserts are metallized) - ROHS compliant |    |   |   |   |           |
| Cordset Length (For Receptacles with "2" Back Termination only) |                                                                                                     |    |   |   |   |           |
| 03: 100 BTX:                                                    | 0.3m [11.81 inches]                                                                                 |    |   |   |   |           |
| 05: 100 BTX:                                                    | 0.5m [19.68 inches]                                                                                 |    |   |   |   |           |
| 10: 100 BTX:                                                    | 1m [39.37 inches]                                                                                   |    |   |   |   |           |
| 15: 100 BTX:                                                    | 1.5m [59.05 inches]                                                                                 |    |   |   |   |           |

**Remark: Cabling configuration:** 100 BTX = 568B (Ethernet specification)

Examples:

- Bayonet, A coding, Olive Drab Cadmium Jam Nut sealed receptacle with female RJ45 Back termination: RJF 7HA 1 G
- Bayonet, A coding, Black square flange sealed receptacle, Female RJ45 Back termination: RJF 2HA 1 B
- Series III, A coding, Olive Drab Cadmium Jam Nut sealed receptacle, 1.5m [59.05"] 100 BTX cordset: RJF TV 7HA 2 G15 100BTX

# CABLE CAT 5E

High Reliability Cat 5e Ethernet Cable & Cordsets



General Construction: A 4 pair, 24 AWG, 100 Ohm SFTP round patch cable, designed to the ISO / IEC 11801 Category 5e requirements (cat 5e on 76m). The cable contains 4 twisted pairs, cabled, double shielded with kevlar reinforcement strands, jacketed in black UV resistant Polyurethane HFFR. Designed for fixed or portable applications in harsh environments.

## Applications

- Robotics
- Motion Control
- Railways
- CNC Machines
- Battelfield communication
- Industrial Process Control

## HFFR: Halogen Free Flame Retardant

Jacket Compound Specification:

Halogen Free Flame Retardant Polyether-based Polyurethane. Glossy finish. Excellent hydrolysis resistance. High microbial resistance. UV resistant. High flexibility.

## PHYSICAL CHARACTERISTICS

|                                                 |                                                                                 |
|-------------------------------------------------|---------------------------------------------------------------------------------|
| <b>CONDUCTORS</b>                               | 24 AWG (0,25 mm <sup>2</sup> ) tinned copper, 7x0.20 mm                         |
| <b>INSULATION</b>                               | Color coded 568-B, Linear Low Density Polyethylene, Nom. Dia. 0,039" (1 mm)     |
| <b>ASSEMBLY</b>                                 | Pairs cabled with Kevlar strength members and separation tape wrapped           |
| <b>SHIELDS</b>                                  | Inner: Aluminium mylar 100% coverage<br>Outer: Tinned copper braid 80% coverage |
| <b>JACKET</b>                                   | Black, special PUR compound                                                     |
| <b>WEIGHT</b>                                   | 40 lbs / mft (59 kg/km)                                                         |
| <b>OUTSIDE DIAM.</b>                            | 0.28" (7.1 mm) nom.                                                             |
| <b>MIN BEND RADIUS</b><br>(During installation) | 67.5mm (9x O. D.)                                                               |
| <b>MIN BEND RADIUS</b><br>(During operation)    | 37.5mm (5 x O.D.)                                                               |
| <b>MIN FLEXES TO FAILURE</b>                    | Passes IEC 61156-6 requirtements                                                |
| <b>TEMPERATURE</b>                              | Plus 85°C, minus 40°C                                                           |

## Cordsets with a RJ45 plug overmolded on each end

| Length (m/ft)       | Part Number      |
|---------------------|------------------|
| 0,76 m / 2,5 ft     | RJF SFTP 5E 0076 |
| 1,00 m / 3.28 ft    | RJF SFTP 5E 0100 |
| 1,52 m / 5 ft       | RJF SFTP 5E 0152 |
| 3,05 m / 10 ft      | RJF SFTP 5E 0305 |
| 4,57 m / 15 ft      | RJF SFTP 5E 0457 |
| 5,00 m / 16.4 ft    | RJF SFTP 5E 0500 |
| 6,00 m / 19.68 ft   | RJF SFTP 5E 0600 |
| 6,24 m / 20.46 ft   | RJF SFTP 5E 0624 |
| 7,62 m / 25 ft      | RJF SFTP 5E 0762 |
| 8,00 m / 26.24 ft   | RJF SFTP 5E 0800 |
| 10,00 m / 32.78 ft  | RJF SFTP 5E 1000 |
| 14,00 m / 45.92 ft  | RJF SFTP 5E 1400 |
| 15,25 m / 50 ft     | RJF SFTP 5E 1525 |
| 22,87 m / 75 ft     | RJF SFTP 5E 2287 |
| 30,5 m / 100 ft     | RJF SFTP 5E 3050 |
| 45,75 m / 150 ft    | RJF SFTP 5E 4575 |
| 50,00 m / 164 ft    | RJF SFTP 5E 5000 |
| 61,00 m / 200.08 ft | RJF SFTP 5E 6100 |

## ELECTRICAL CHARACTERISTICS

|                                              |                                       |
|----------------------------------------------|---------------------------------------|
| <b>DC Resistance</b>                         | 96 Ohms/Km @ 20°C                     |
| <b>Impedance</b>                             | 100 +/- 15 Ohms 1-100 MHz             |
| <b>Attenuation</b>                           |                                       |
| 772 KHz                                      | 2.70 db/100m nom.                     |
| 1 MHz                                        | 3.15 db/100m nom.                     |
| 4 MHz                                        | 6.45 db/100m nom.                     |
| 10 MHz                                       | 9.90 db/100m nom.                     |
| 16 MHz                                       | 12.3 db/100m nom.                     |
| 20 MHz                                       | 13.8 db/100m nom.                     |
| 31.25 MHz                                    | 17.7 db/100m nom.                     |
| 62.5 MHz                                     | 25.6 db/100m nom.                     |
| 100 MHz                                      | 33 db/100m nom.                       |
| <b>N.E.X.T. (Near-End Crosstalk Loss)</b>    |                                       |
| 772 KHz                                      | 64 db min.                            |
| 1 MHz                                        | 62 db min.                            |
| 4 MHz                                        | 53 db min.                            |
| 10 MHz                                       | 47 db min.                            |
| 16 MHz                                       | 44 db min.                            |
| 20 MHz                                       | 42 db min.                            |
| 31.25 MHz                                    | 40 db min.                            |
| 62.5 MHz                                     | 35 db min.                            |
| 100 MHz                                      | 32 db min.                            |
| <b>Capacitance</b>                           | 46pF/m nom. @ 1KHz                    |
| <b>LCL</b>                                   | 43 dB min. @ 64 KHz                   |
| <b>Capacitance Unbalance</b>                 | 3.4 pF/m max. @ 1KHz (wire to ground) |
| <b>Insulation Resistance</b>                 | 150 M Ohm min.                        |
| <b>Voltage Rating</b>                        | 230 VMS                               |
| <b>Dielectric Strength</b>                   | VAC/1 min - 700 V/Min                 |
| <b>Propagation Delay (100 MHz)</b>           | 5.2 ns/m max. @ 100 MHz               |
| <b>Delay Skew</b>                            | 20 ns/100m max. @ 1-100 MHz           |
| <b>Resistance Unbalance</b>                  | 3% max. @ 20°C                        |
| <b>Structural Return Loss (100 MHz)</b>      | 23db/100m min. @ 1-20 MHz             |
| <b>Spark test (tested during production)</b> | 3 KV                                  |
| <b>Velocity of propagation</b>               | 67% nom.                              |

## Reel of cable (without RJ45 plug on ends)

| Length (m / ft) | Part Number   |
|-----------------|---------------|
| 100 m / ~328 ft | 190-038045-00 |
| 300 m / ~984 ft | 190-038045-01 |

# USBF TV (USB-A)

USB Connection System for Harsh Environment



With USB Field, you can insert a standard USB 2.0 cordset into a metallic plug which will protect it from shocks, dust and fluids.

## No hazardous on-field cabling and grounding!

This metallic plug is connected into a receptacle, using a Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device for high vibrations.

### Applications

- Embedded Computers
- Data Acquisition and transmission in harsh environment
- Railways
- Battelfield Communication Systems
- Navy Systems

### Data Transmission

USB Specification 2.0

Data Rate: Up to 480 Mb/s for High Speed USB

### MAIN CHARACTERISTICS

- Sealed against fluids and dusts (IP68)
- Shock, Vibration and Traction resistant
- No cabling operation in field and no tools required
- Improved EMI protection
- Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device
- 2 mechanical Coding / Polarization possibilities by the user (receptacle insert rotation)
- USBF TV plug retention in the receptacle: 100 N in the axis
- Mating cycles: 500 to 1500

### Environmental Protection

- Sealing (when mated): IP68 (Temporary immersion)
- Salt Spray: 48 h with Nickel plating  
> 500 h with Olive Drab Cadmium  
1000 h with marine bronze shell
- Fire Retardant / Low Smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 1micro s
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature Range: - 40°C / +85°C

### Part Number Code

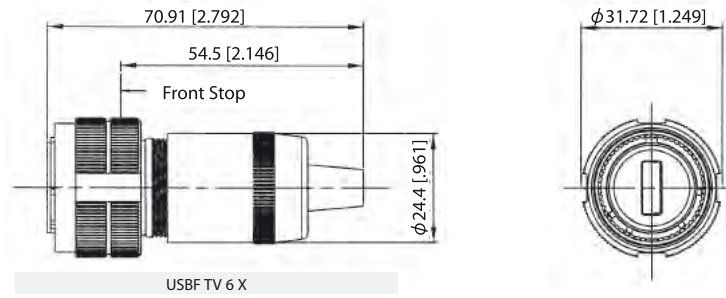
| Series                                      | USBF TV                                                                                                | 2 | 1 | G |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------|---|---|---|
| <b>USB Field TV</b>                         |                                                                                                        |   |   |   |
| <b>Shell Type</b>                           |                                                                                                        |   |   |   |
| 6:                                          | Plug                                                                                                   |   |   |   |
| 2:                                          | Square flange receptacle                                                                               |   |   |   |
| 2PE:                                        | Square flange receptacle with metal backshell (type 1) & with metal backshell + plastic gland (type 2) |   |   |   |
| 2PEM:                                       | Square flange receptacle with backshell + metal gland (only for back termination type 2 = Solder)      |   |   |   |
| 7:                                          | Jam nut receptacle                                                                                     |   |   |   |
| 7PE:                                        | Jam nut receptacle with metal backshell (type 1) & with metal backshell + plastic gland (type 2)       |   |   |   |
| 7PEM:                                       | Jam nut receptacle with backshell + metal gland (only for back termination type 2 = Solder)            |   |   |   |
| <b>Back Terminations (Receptacles only)</b> |                                                                                                        |   |   |   |
| 1:                                          | Female USB-A                                                                                           |   |   |   |
| 2:                                          | Solder (4 tinned holes)                                                                                |   |   |   |
| <b>Shells Material &amp; Finish</b>         |                                                                                                        |   |   |   |
| N:                                          | Aluminium shell - Nickel plating - ROHS compliant                                                      |   |   |   |
| G:                                          | Aluminium shell - Olive Drab Cadmium plating                                                           |   |   |   |
| BZ:                                         | Marine bronze shell - ROHS compliant                                                                   |   |   |   |

Examples:

- Olive Drab Cadmium Plug: USBF TV 6G
- Olive Drab Cadmium Square Flange Receptacle, USB-A back terminat°: USBF TV 21G
- Olive Drab Cadmium Jam Nut Receptacle, USB-A receptacle back terminat°: USBF TV 71G
- Nickel Jam Nut Receptacle, solder termination: USBF TV 72N

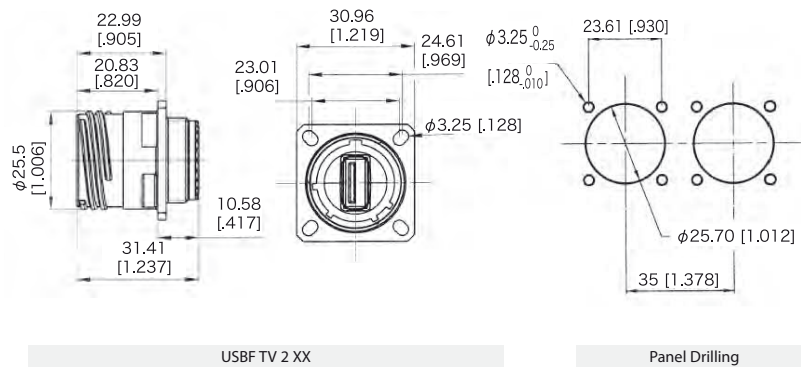
## Plug

- Shell type 6

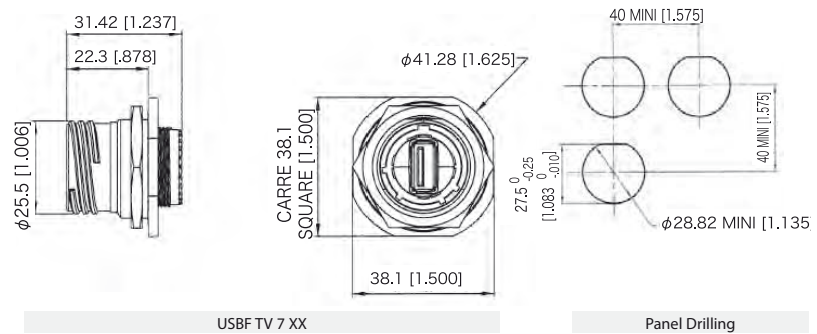


## Receptacles

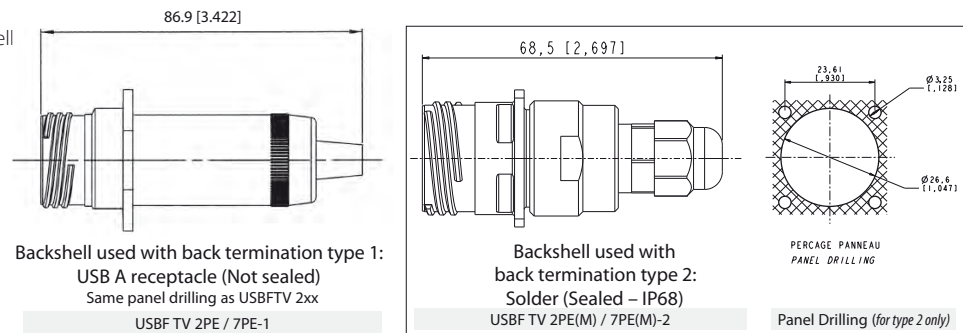
- Square flange receptacle
- 4 mounting holes: Shell type 2



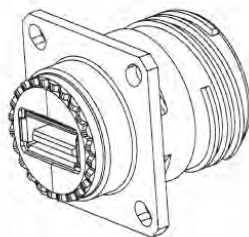
- Jam nut receptacle
- Hexagonal Nut mounting:  
Shell type 7



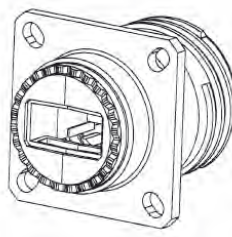
- Receptacles with backshell
- Shell type 2PE and 7PE



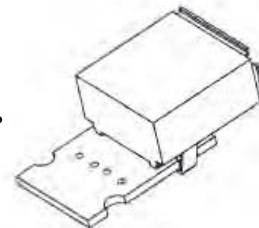
## Back Terminations



Type 1: Female USB-A



Type 2: Solder 4 Tinned holes to solder your cable



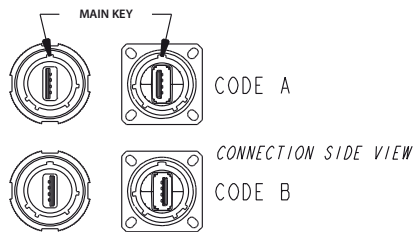
View of the PCB of the Type 2 version with 4 tinned holes for solder termination

## Assembly Instructions

Can be used with most the USB cordset brands: No tools required!

### Plug Assembly

1. Only if you need a full sealing (IP68): Install the white sticker around the plug, covering the 4 little holes of the overmolding
2. Insert the black O Ring around the front face of the USB A plug. This O Ring will ensure connection sealing
3. Insert the USB cordset into the metallic backshell
4. Insert the retention spacer laterally to the cable (this spacer is soft, in order to adapt to different shapes of overmolding) and slide the overmolding of the USB-A plug into this retention spacer
5. Insert the friction ring laterally to the cable
6. Choose the right coding (2 positions) and insert the USB-A plug into the protective plug. Note at this step, the main key is used for polarization.



7. Screw the backshell on the plug body. A wrench can be necessary to fully tighten it, and the connection to the receptacle can help

### IMPORTANT NOTE

The connection sealing is not done by the black retention spacer (which is slotted), but by the front face ORing (fig. 2)

### Receptacle Assembly

Insert the USB module from the rear. Reference is main key. Beware to have a coding compatible with the coding you used for the plug: on front view, the white shapes in the USBs must be on the same side.

To remove the USB module, insert the removal tool **USBF ODE** from the Front, and push back the module.

### Accessories

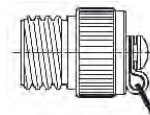
#### ■ Metallic Caps

| USBF TVC                            |                                           | 2 | G |
|-------------------------------------|-------------------------------------------|---|---|
| <b>Connector Type</b>               |                                           |   |   |
| 6:                                  | Plug                                      |   |   |
| 2:                                  | Square Flange Receptacle                  |   |   |
| 7:                                  | Jam Nut Receptacle                        |   |   |
| <b>Shells Material &amp; Finish</b> |                                           |   |   |
| N:                                  | Aluminium shell - Nickel - ROHS compliant |   |   |
| G:                                  | Aluminium shell - Olive Drab Cadmium      |   |   |
| BZ:                                 | Marine bronze shell - ROHS compliant      |   |   |

- Panel Gasket for square flange receptacle  
(Thickness: 0,8 mm [.031]): JE15



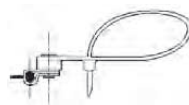
- Receptacle Insert removal tool: USBF ODE



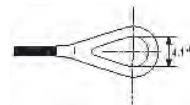
Plug Cap



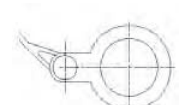
Receptacle Cap



Plug Cap end



Square flange receptacle cap end



Jam Nut receptacle cap end

# USBF TV

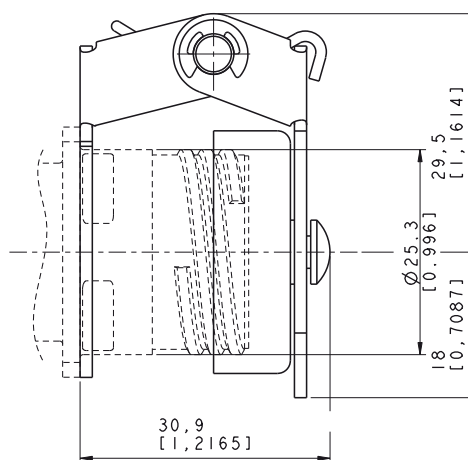
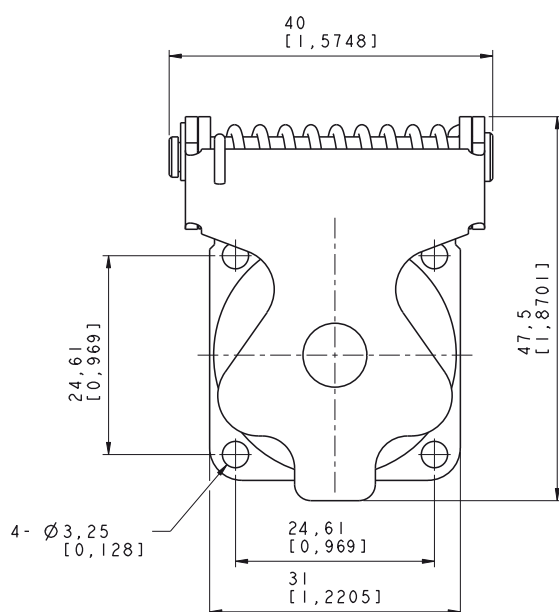
## Self Closing Cap (SCC Series)



This Self Closing cap automatically protects the USBF TV (type A) & USBBF TV (type B) square flange receptacles (MIL-DTL-38999 type), protecting your system from dust and water projection. A spring automatically closes the upper part of the cap when the USB plug is removed from the receptacle.

### IMPORTANT NOTE

Metal Self Closing cap are sold separately (without receptacle)



- Panel Gasket for square flange receptacle  
(Thickness: 0,8 mm [.031]):

**PART NUMBER: JE15**

**PART NUMBER:**

Self closing cap: **USBFTVSCC**

**Remark:** Compatible with USBFTV (type A) & USBBFTV (type B) square flange receptacles only:  
USBFTV**2**XX (see page 25)  
USBFTV**2**XX (see page 37)

# USBF TV

Transversally Sealed Receptacle



**SEALED RECEPTACLE** In some applications, a transversal sealing for the receptacle is a « must ». This will prevent fluids and dust from going through the receptacle when plug or cap are not mated to the receptacle. The sealed solution (version "S") has a compound at the rear of the receptacle below. In addition, the Sealed USBF TV has been successfully tested in very high vibration corresponding to airplane applications.

## Applications

- Embedded Computers
- Data Acquisition and transmission in harsh environment
- Railways
- Battelfield Communication Systems
- Navy Systems

## MAIN CHARACTERISTICS

- Sealed against fluids and dusts (IP68)
- Shock, Vibration and Traction resistant
- No cabling operation in field and no tools required
- Improved EMI protection
- Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-de-coupling device
- 2 mechanical Coding / Polarization possibilities by the user (receptacle insert rotation)
- USBF TV plug retention in the receptacle: 100 N in the axis
- Mating cycles: 500 to 1500

## Data Transmission

USB Specification 2.0  
Data Rate: Up to 480 Mb/s for High Speed USB

## Environmental Protection

- Sealing (when mated): IP68 (Temporary immersion)
- Salt Spray: 48 h with Nickel plating  
> 500 h with Olive Drab Cadmium  
1000 h with marine bronze shell
- Fire Retardant / Low Smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 1 micro s
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature Range: - 40°C / +85°C

## Part Number Code

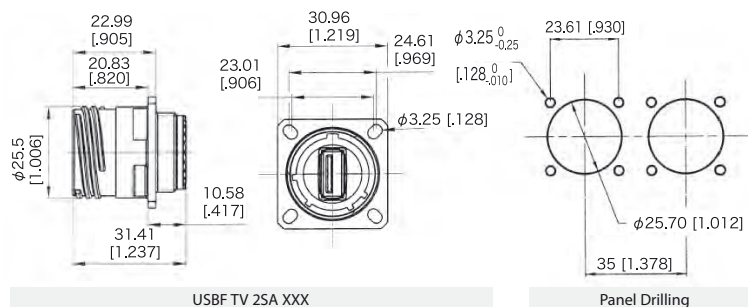
| Series                                                     | USBF TV | 2PES | A | 2 | N | 03 | A |
|------------------------------------------------------------|---------|------|---|---|---|----|---|
| <b>USB Field TV</b>                                        |         |      |   |   |   |    |   |
| <b>Shell Type</b>                                          |         |      |   |   |   |    |   |
| 2S : Square flange receptacle                              |         |      |   |   |   |    |   |
| 2PES: Square flange receptacle + backshell + plastic gland |         |      |   |   |   |    |   |
| 2PEMS: Square flange receptacle + backshell + metal gland  |         |      |   |   |   |    |   |
| 7S: Jam nut receptacle                                     |         |      |   |   |   |    |   |
| 7PES: Jam nut receptacle + backshell + plastic gland       |         |      |   |   |   |    |   |
| 7PEMS: Jam nut receptacle + backshell + metal gland        |         |      |   |   |   |    |   |
| <b>Coding</b>                                              |         |      |   |   |   |    |   |
| "A" (Standard) or "B"                                      |         |      |   |   |   |    |   |
| <b>Back Terminations</b>                                   |         |      |   |   |   |    |   |
| 2: Rugged USB cable (see corresponding datasheet page 42)  |         |      |   |   |   |    |   |
| <b>Shells Plating</b>                                      |         |      |   |   |   |    |   |
| N: Nickel                                                  |         |      |   |   |   |    |   |
| G: Olive drab cadmium plating                              |         |      |   |   |   |    |   |
| <b>USB cable length</b>                                    |         |      |   |   |   |    |   |
| 03: 30 cm [11.81 inches]                                   |         |      |   |   |   |    |   |
| 05: 50 cm [19.68 inches]                                   |         |      |   |   |   |    |   |
| 10: 1 meter [39.37 inches]                                 |         |      |   |   |   |    |   |
| <b>USB cable end</b>                                       |         |      |   |   |   |    |   |
| A: Standard USB-A plug                                     |         |      |   |   |   |    |   |
| OPEN: Open cable (no connector)                            |         |      |   |   |   |    |   |

USBF TV

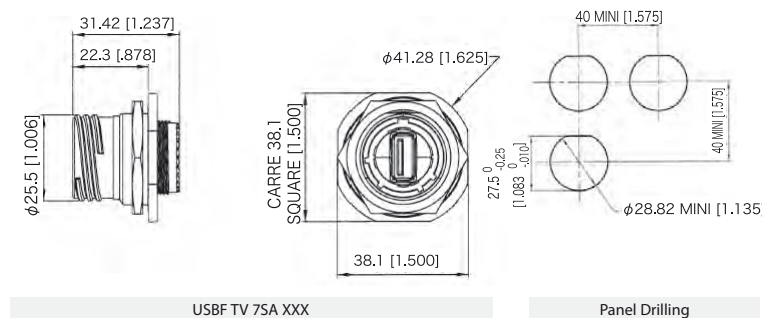
Amphenol

## Receptacles

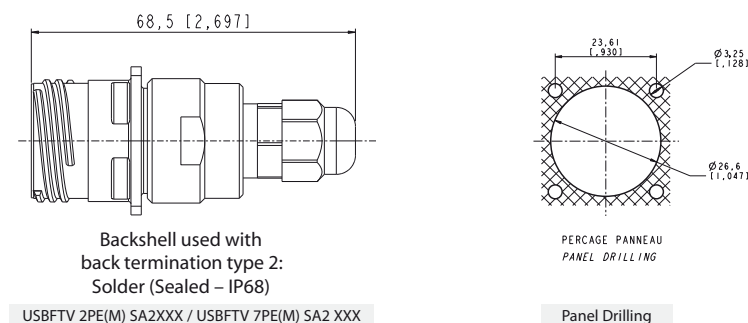
- Square flange receptacle  
4 mounting holes: Shell type 2



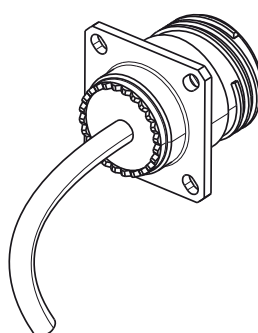
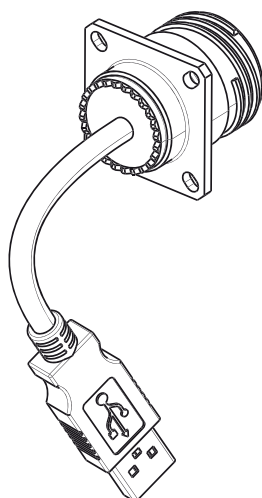
- Jam nut receptacle  
Hexagonal Nut mounting:  
Shell type 7



- Receptacles with backshell:  
Shell type 2PE(M) and 7PE(M)



## Cordset End





# Reinforced USBFTV MEMORY KEYS

Derived from MIL-DTL-38999 series III specification • from 512 MB to 64 GB



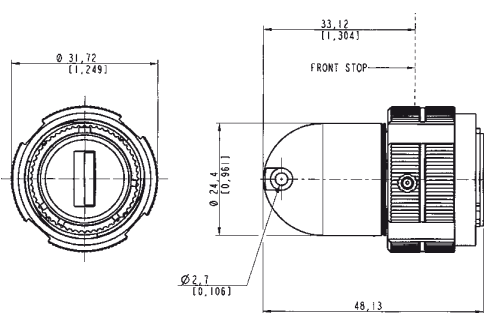
We provide reinforced USB memory keys available in different capacities. They can be used **ONLY** with our USBFTV series receptacles. When mated on the receptacle, the system is IP68.

## Environmental Protection

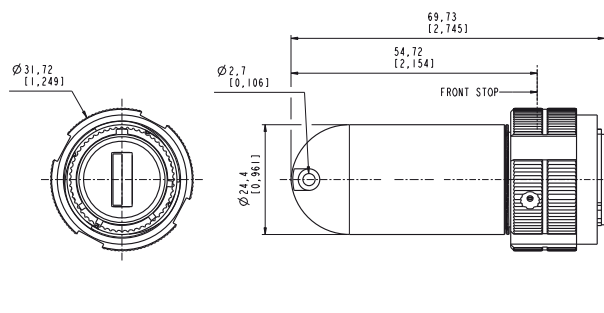
- Sealing: IP68 (when mated)
- Salt Spray: 48 h with Nickel plating (ROHS)  
> 500 h with Olive Drab Cadmium
- Vibrations: MIL-STD-810F method 514.5 fig 514.5.C cat 14
- Temperature Range: - 40°C / +85°C (MIL-STD-810F)
- Data transmission during vibration & temperature tests

## Other features

- Type: USB2.0
- Voltage: 5V DC - 500 mA max
- Electromagnetic compatibility: 89/336/EEC and Part 15 Class B



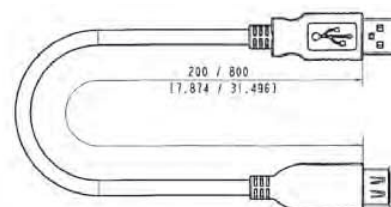
Up to memory size 4GB



From 8 to 64 GB

## IMPORTANT NOTE

USBFTV memory key to be used with USBFTV receptacle. See page 25 to 30



USB cordset is included with each memory key

## DEFINITION OF PART NUMBER

### USBFTV KEY 6

Beginning of every USBFTV  
Key part number.  
Remains unchanged.

### A

**CODING POSITION:**  
**A:** coding A  
**B:** coding B

\* The coding can be changed on the receptacle counter part using our tool USBFODE

### 64

**CAPACITY OF YOUR USBFTV KEY:**

0512 | 1024 | 2048 | 4096 | 8192  
16384 | 16384GT\*\* | 32768 | 64

Other capacity, please consult us at [contact@usbfield.com](mailto:contact@usbfield.com)

### N

**PLATING:**  
"N": nickel plating  
"G": olive drab cadmium

**NB:** please check the plating of your USBFTV receptacle

### CAP

**Cap:** With cap  
**Blank:** Without cap

\*\* GT: Fast Data Transfert

EXAMPLE: **USBFTVKEY6A0512N:** USBFTV KEY – CODING A – CAPACITY OF 512MB – NICKEL PLATING

EXAMPLE: **USBFTVKEY6A1024GCAP:** USBFTV KEY – CODING A – CAPACITY OF 1024MB – OLIVE DRAB CADMIUM PLATING - PROTECTIVE CAP



# Reinforced USB Memory Keys

Now available up to 64GB



We provide reinforced USB memory keys available in different capacities. When mated, the system is IP68. Shells are metallic with 1/4 turn bayonet coupling.

## Dimensions of rugged USBF Key:

### Environmental Protection

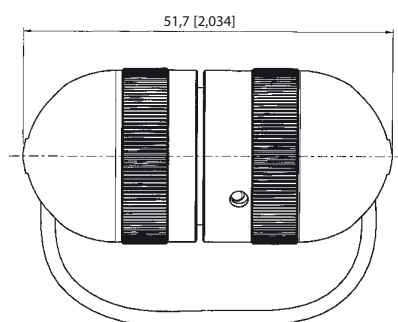
- Sealing: IP68 (when closed)
- Salt Spray: 48 h with Nickel plating (ROHS)  
> 96 h with Black coating (ROHS)  
> 500 h with Olive Drab Cadmium
- Vibrations: MIL-STD-810F method 514.5 fig 514.5.C cat 14
- Temperature Range: - 40°C / +85°C (MIL-STD-810F)

### Other features

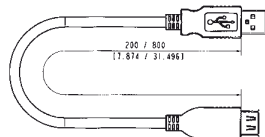
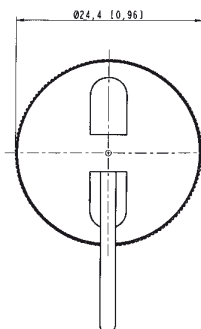
- Type: USB2.0
- Voltage: 5V DC - 500 mA max
- Electromagnetic compatibility: 89/336/EEC and Part 15 Class B

### IMPORTANT NOTE

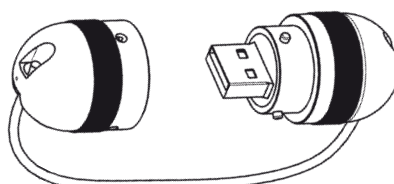
Compatible with any standard USB port



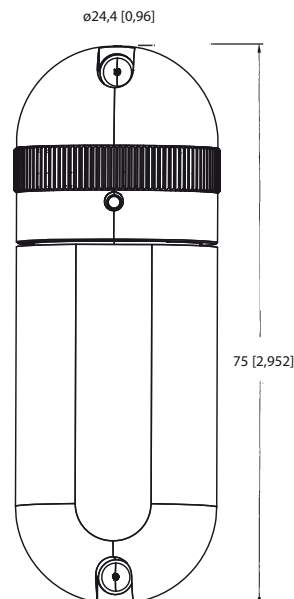
Up to memory size 4GB



USB cordset is included with each memory key



Rugged Metallic USB KEY with CAP SEALING: IP 67



From 8 to 64 GB

## DEFINITION OF PART NUMBER

### USBF KEY

Beginning of every  
USB Key part number.  
Remains unchanged.

### 8192

#### Capacity of your USBF Key:

0512 | 1024 | 2048 | 4096 | 8192 | 16384 | 16384GT\* | 32768 | 64

Other capacity, please consult us at [contact@usbfield.com](mailto:contact@usbfield.com)

### N

#### Shell finish:

N: Natural  
G: Green  
B: Black

\* GT: Fast Data Transfert

EXAMPLE: **USBFKEY0512N**: USB MEMORY KEY - CAPACITY OF 512MB - SHELL FINISH: NATURAL

EXAMPLE: **USBFKEY1024G**: USB MEMORY KEY - CAPACITY OF 1024MB - SHELL FINISH: GREEN

# High Reliability USB 2.0 Cordsets

Derived from MIL-DTL-38999 series III specification



## Applications

- Robotics
- Motion Control
- Railways
- CNC Machines
- Battelfield communication
- Industrial Process

**General Construction:** this is a USB-2.0 cable containing one 28 AWG 90Ω characteristic impedance data pair, two 24 AWG power conductors, overall SFTP shields (SFTP = double shielding, Braid and foil), jacketed in black UV resistant Polyurethane HFFR\*. Designed for fixed or portable applications in industrial and harsh environments.

\*HFFR: Halogen Free Flame Retardant.

## Jacket Compound Specification:

Halogen Free Flame Retardant Polyether-based Polyurethane. Glossy finish. Excellent hydrolysis resistance. High microbial resistance. UV resistant. High flexibility.

## PHYSICAL CHARACTERISTICS

|                                 |                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DATA CONDUCTORS</b>          | bare copper, 7/0.12 mm nom (28 AWG)                                                                                                                                |
| <b>DATA INSULATION</b>          | 0.9 mm nom                                                                                                                                                         |
| <b>COLOR DATA PAIR</b>          | Green & white                                                                                                                                                      |
| <b>POWER CONDUCTORS</b>         | Tinned copper, 7/0.2 mm (24 AWG)                                                                                                                                   |
| <b>POWER INSULATION</b>         | 1.1 mm nom                                                                                                                                                         |
| <b>COLOR POWER WIRE</b>         | Red & Black                                                                                                                                                        |
| <b>SHIELDS</b>                  | Foil: providing 100% coverage, in contact with tinned copper drain wire and an overall braid providing 65% nom. coverage made of 16x5/0.1 mm tinned copper strands |
| <b>JACKET</b>                   | PU compound                                                                                                                                                        |
| <b>COLOR JACKET</b>             | Black                                                                                                                                                              |
| <b>WEIGHT</b>                   | 26 lbs/mft (38 kg/km)                                                                                                                                              |
| <b>OUTSIDE DIAM.</b>            | 0.20 inch (5.1 mm nom. +/- 0.15)                                                                                                                                   |
| <b>MIN BEND RADIUS</b>          | 45.9 mm (9x O.D.)                                                                                                                                                  |
| <i>(During installation)</i>    |                                                                                                                                                                    |
| <b>MIN BEND RADIUS</b>          | 25.5mm (5 x O.D.)                                                                                                                                                  |
| <i>(During operation)</i>       |                                                                                                                                                                    |
| <b>TEMPERATURE installation</b> | Plus 60°C, minus 5°C                                                                                                                                               |
| <b>TEMPERATURE operational</b>  | Plus 85°C, minus 40°C                                                                                                                                              |

## ELECTRICAL CHARACTERISTICS

|                                |                          |
|--------------------------------|--------------------------|
| <b>DC RESISTANCE</b>           | 94 Ohms/Km @ 20°C        |
| <b>IMPEDANCE</b>               | 90 +/- 13 Ohms 1-400 MHz |
| <b>ATTENUATION</b>             |                          |
| <b>1 KHZ</b>                   | 8 db/100m max.           |
| <b>4 MHZ</b>                   | 15,6 db/100m max.        |
| <b>24 MHZ</b>                  | 38 db/100m max.          |
| <b>96 MHZ</b>                  | 76 db/100m max.          |
| <b>200 MHZ</b>                 | 128 db/100m max.         |
| <b>400 MHZ</b>                 | 232 db/100m max.         |
| <b>CAPACITANCE 2X28 AWG</b>    | 54pF/m nom. @ 1KHz       |
| <b>CAPACITANCE</b>             | 2.0 pF/m max. @ 1KHz     |
| <b>UNBALANCE</b>               | (wire to ground)         |
| <b>DIELECTRIC STRENGTH</b>     | VAC/1 min - 500 V/Min    |
| <b>RESISTANCE UNBALANCE</b>    | 2% max. @ 20°C           |
| <b>VELOCITY OF PROPAGATION</b> | 65% min. 68% max.        |

### CORDSETS WITH A USB A PLUG OVERMOLDED ON EACH END (OUT OF USB SPECIFICATION > 5 M)

| Length (m/ft)   | Part Number          |
|-----------------|----------------------|
| 6 m / 19.68 ft  | USB2 AA 600 PU HFFR  |
| 7 m / 22.96 ft  | USB2 AA 700 PU HFFR  |
| 8 m / 26.24 ft  | USB2 AA 800 PU HFFR  |
| 9 m / 29.52 ft  | USB2 AA 900 PU HFFR  |
| 10 m / 32.80 ft | USB2 AA 1000 PU HFFR |

### REEL OF DRUM (WITHOUT USB PLUG ON ENDS)

| Length           | PN            |
|------------------|---------------|
| 300 m / ~ 984 ft | 190-040567-00 |

### CORDSETS WITH A USB A PLUG OVERMOLDED ON EACH END (UNDER USB SPECIFICATION ≤ 5M)

| Length (m/ft)     | Part Number         |
|-------------------|---------------------|
| 0.5 m / 1.64 ft   | USB2 AA 050 PU HFFR |
| 1 m / 3.28 ft     | USB2 AA 100 PU HFFR |
| 1.50 m / 4.92 ft  | USB2 AA 150 PU HFFR |
| 2 m / 6.56 ft     | USB2 AA 200 PU HFFR |
| 2.50 m / 8.2 ft   | USB2 AA 250 PU HFFR |
| 3 m / 9.84 ft     | USB2 AA 300 PU HFFR |
| 3.50 m / 11.48 ft | USB2 AA 350 PU HFFR |
| 4 m / 13.12 ft    | USB2 AA 400 PU HFFR |
| 4.5 m / 14.76 ft  | USB2 AA 450 PU HFFR |
| 5 m / 16.40 ft    | USB2 AA 500 PU HFFR |



# USBFTV SC

Spring Loaded Receptacle



This product offers a new coupling solution, particularly for applications requiring quick disconnect. The system consists of a circular spring within the receptacle keeping the plug mated, and creating an internal coupling mechanism.



## MAIN CHARACTERISTICS

- Sealed against fluids and dusts (IP67)
- Shock, Vibration and Traction resistant
- No cabling operation in field and no tools required
- Improved EMI protection
- Mating cycles: 500
- Mating force after 500 cycles: 40 N
- Unmating force after 500 cycles: 55 N

## Environmental Protection

- Sealing (when mated): IP67 (Temporary immersion)
- Salt Spray: 48 h with Nickel plating  
> 500 h with Olive Drab Cadmium
- Fire Retardant / Low Smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 1 micro s
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature Range: - 40°C / +85°C

## Applications

- Embedded Computers
- Data Acquisition and transmission in harsh environment
- Railways
- Battelfield Communication Systems
- Navy Systems

## Data Transmission

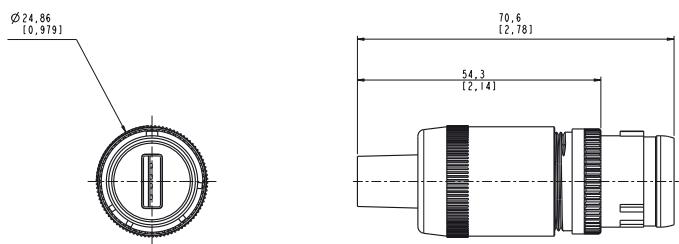
USB Specification 2.0  
Data Rate: Up to 480 Mb/s for High Speed USB

## Part Number Code

|                                      |                                                                                |   |   |   |
|--------------------------------------|--------------------------------------------------------------------------------|---|---|---|
| Series                               | USBFTV Spring Loaded                                                           | 2 | 1 | G |
| Shell Type                           |                                                                                |   |   |   |
| 6:                                   | Plug                                                                           |   |   |   |
| 1:                                   | Inline receptacle                                                              |   |   |   |
| 2:                                   | Square flange receptacle                                                       |   |   |   |
| 7:                                   | Jam nut receptacle                                                             |   |   |   |
| Back Terminations (Receptacles only) |                                                                                |   |   |   |
| 1:                                   | Female USB-A                                                                   |   |   |   |
| 2:                                   | Solder (4 tinned holes) - Not available for shell type "1" (Inline receptacle) |   |   |   |
| Shells Material & Finish             |                                                                                |   |   |   |
| N:                                   | Aluminium shell - Nickel plating - ROHS compliant                              |   |   |   |
| G:                                   | Aluminium shell - Olive Drab Cadmium plating                                   |   |   |   |
| BZ:                                  | Marine bronze shell - ROHS compliant                                           |   |   |   |

## Plug

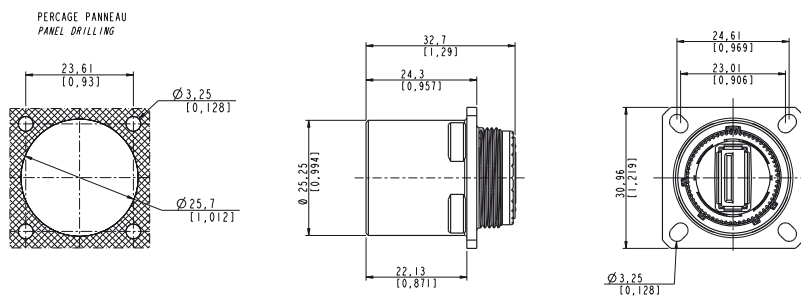
- Shell type 6



USBFSC 6 X

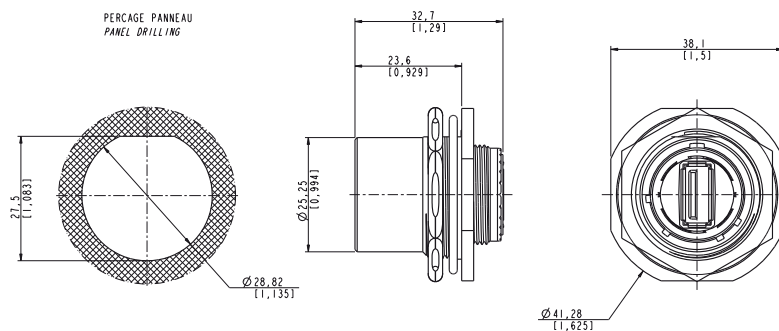
## Receptacles

- Square flange receptacle  
4 mounting holes: Shell type 2



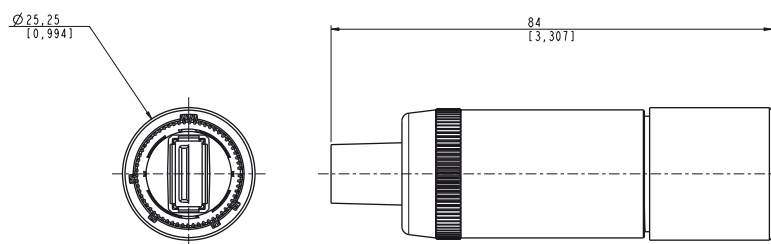
USBFSC 21 X

- Jam nut receptacle  
Hexagonal Nut mounting:  
Shell type 7



USBFSC 71 X

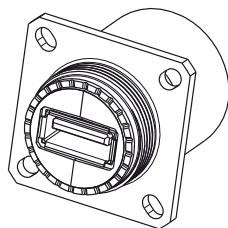
- Inline Receptacles:  
Shell type 1



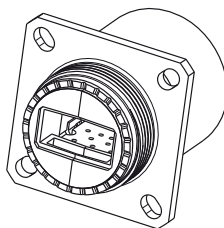
USBFSC 11 X

## Back Terminations

USBFSC Back Terminations Receptacles



Type 1: Female USB-A



Type 2: Solder (4 tinned holes)



# USBFTV

Receptacles with 360° EMI backshells stand off receptacles



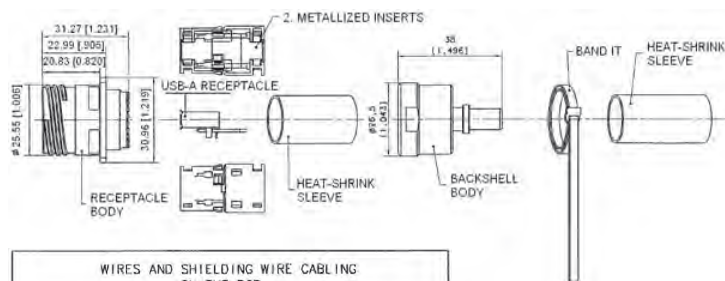
USBFTV Receptacles series with EMI backshells provide 360° shielding: same protection than the one proposed per Standard MIL-DTL-38999 serie III Connectors. We offer these EMI backshells with square flange and jam nut receptacles. The available platings are nickel or olive drab cadmium. With those solutions we suggest using our reinforced USB cable (shielded – zero halogen jacket). See page 33.

We can provide those receptacles:

- with cordset already soldered
- without cordset

## RECEPTACLES WITH 360° EMI BACKSHELLS

### EXAMPLE WITH A SQUARE FLANGE RECEPTACLE (PROVIDED WITHOUT CABLE)



| WIRES AND SHIELDING WIRE CABLING ON THE PCB |                      |
|---------------------------------------------|----------------------|
|                                             | WIRES                |
| 1                                           | RED AWG24            |
| 2                                           | WHITE AWG28          |
| SHIELDING WIRE                              | SHIELDING WIRE AWG28 |
| 3                                           | GREEN AWG28          |
| 4                                           | BLACK AWG24          |

#### PART NUMBERS:

Jam nut receptacle – Nickel: **KIT40245**

Jam nut receptacle – Olive Drab Cadmium: **KIT40245G**

Square flange receptacle – Nickel: **KIT40263**

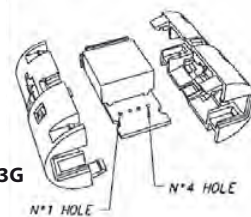
Square flange receptacle – Olive Drab Cadmium: **KIT40263G**

#### IMPORTANT NOTE

With receptacles provided without cable, customer will have to solder his cable on the PCB, please find below the cabling specification.

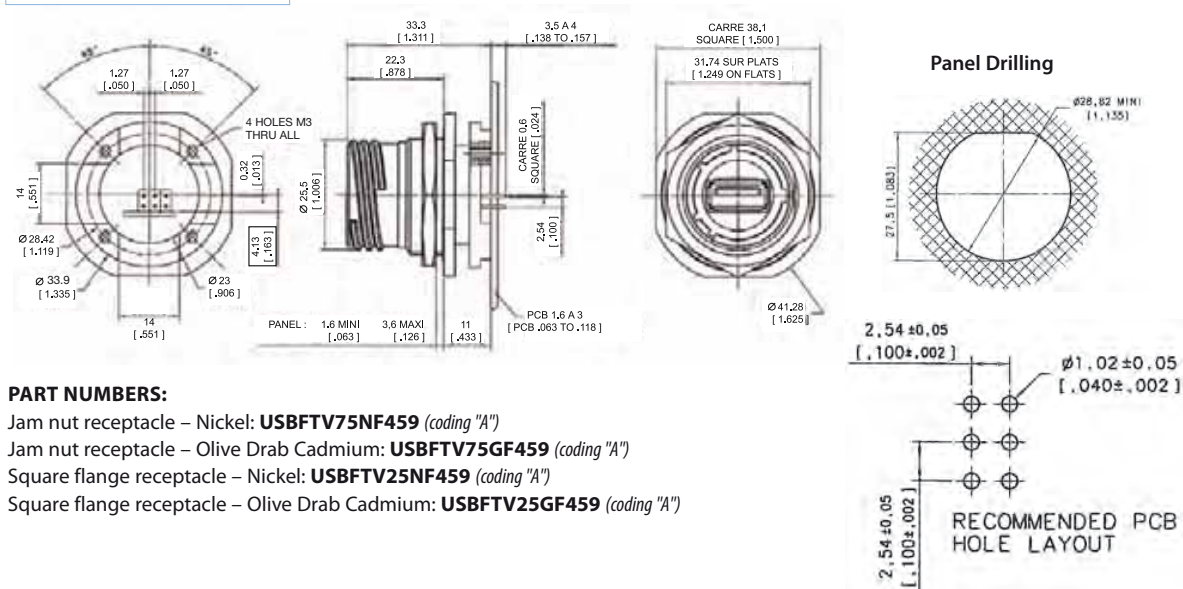
If customer prefers to use his cable, please check with us compatibility with our EMI backshells:

[www.usbfield.com](http://www.usbfield.com)



#### STAND OFF RECEPTACLE

Those receptacles can be soldered directly on your PCB. A compound insures a transversal sealing and good performance in high-vibration environments. The shell of these receptacles are in the « Stand Off » style. They can be connected with rugged USBFTV series plugs.





# USBBF TV (USB-B)

USB Connection System for Harsh Environment



## Applications

- Embedded Computers
- Data Acquisition and transmission in harsh environment
- Railways
- Battelfield Communication Systems
- Navy Systems

**USB Field allows you to use a standard USB 2.0 connection in harsh environments :**

- Sealed against fluids and dusts (IP68)
- Shock, Vibration and Traction resistant
- No cabling operation in field and no tools required
- Improved EMI protection
- Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device
- Plug retention in the receptacle: 100N in the axis
- Mating cycles: 500 to 1500

## Back terminations available:

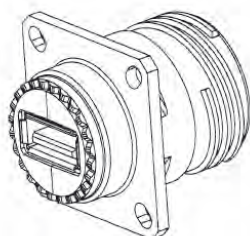
- a USB-A receptacle
- solder: 4 tinned holes on the PCB to solder your wires

## Part Number Code

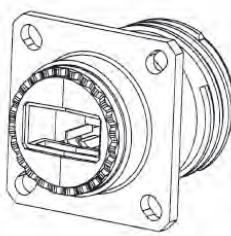
| Series                                      | USBBF TV                                                                                               | 2 | 1 | G |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------|---|---|---|
| <b>USBB Field TV</b>                        |                                                                                                        |   |   |   |
| <b>Shell Type</b>                           |                                                                                                        |   |   |   |
| 6:                                          | Plug                                                                                                   |   |   |   |
| 2:                                          | Square flange receptacle                                                                               |   |   |   |
| 2PE:                                        | Square flange receptacle with metal backshell (type 1) & with metal backshell + plastic gland (type 2) |   |   |   |
| 2PEM:                                       | Square flange receptacle metal gland (only for soldering back termination type 2)                      |   |   |   |
| 7:                                          | Jam nut receptacle                                                                                     |   |   |   |
| 7PE:                                        | Jam nut receptacle with metal backshell (type 1) & with metal backshell + plastic gland (type 2)       |   |   |   |
| 7PEM:                                       | Jam nut receptacle metal gland (only for soldering back termination type 2)                            |   |   |   |
| <b>Back Terminations (Receptacles only)</b> |                                                                                                        |   |   |   |
| 1:                                          | Female USB-A                                                                                           |   |   |   |
| 2:                                          | Solder (4 tinned holes)                                                                                |   |   |   |
| <b>Shells Material &amp; Finish</b>         |                                                                                                        |   |   |   |
| N:                                          | Aluminium shell - Nickel plating - ROHS compliant                                                      |   |   |   |
| G:                                          | Aluminium shell - Olive Drab Cadmium plating                                                           |   |   |   |

Examples: - Plug-cadmium plating: USBBF TV 6G  
- Square Flange Receptacle-USB-A back terminat<sup>o</sup> -cadmium plating: USBBF TV 21G  
- JamNut Receptacle, solder terminat<sup>o</sup> -nickel plating: USBBF TV 72N

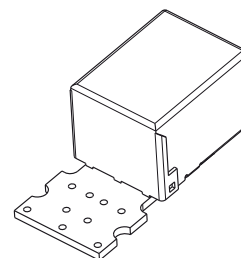
## Back Terminations



Type 1: Female USB-A

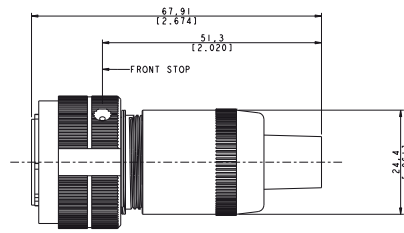


Type 2: Solder (4 tinned holes)

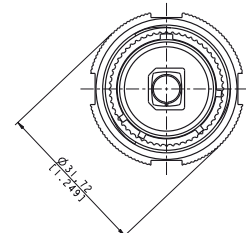


## Plug:

- 6 Shell



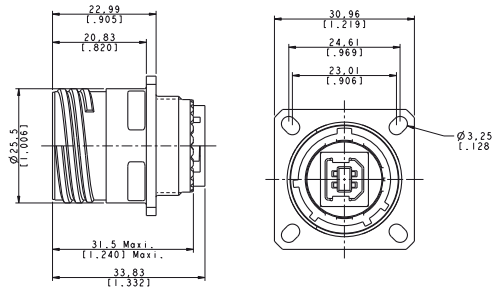
USBBFTV 6 X



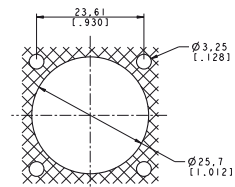
Panel Drilling

## Receptacles:

- Shell type 2 - Square flange receptacle

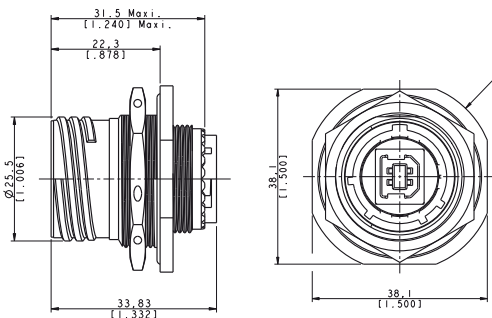


USBBFTV 2 XX

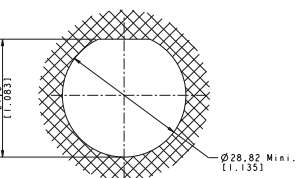


Panel Drilling

- Shell type 7 - Jam nut receptacle

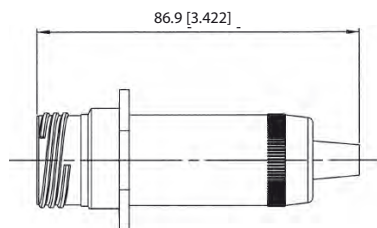


USBBFTV 7 XX

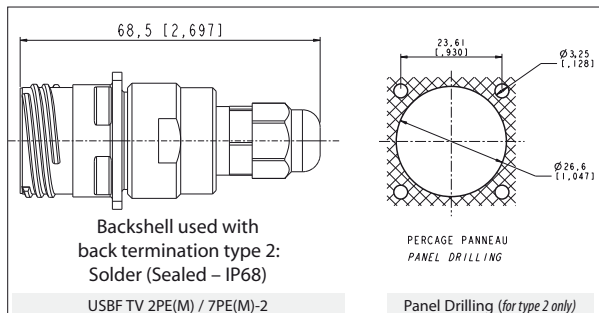


Panel Drilling

- «2PEM» and «7PEM» Shells with Backshell to protect Back termination from dust, shocks and vibration.



Backshell used with back termination type 1:  
USB A receptacle  
Same panel drilling as USBBFTV 2xx  
USBF TV 2PE / 7PE-1



Backshell used with  
back termination type 2:  
Solder (Sealed - IP68)

USBF TV 2PE(M) / 7PE(M)-2

Panel Drilling (for type 2 only)

## Accessories

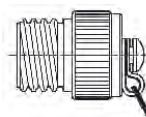
- Metallic Caps (same as USB-A version - see page 31)

| Connector Type                      | USB TVC                         | 2 | G |
|-------------------------------------|---------------------------------|---|---|
| 6:                                  | Plug                            |   |   |
| 2:                                  | Square Flange Receptacle        |   |   |
| 7:                                  | Jam Nut Receptacle              |   |   |
| <b>Shells Material &amp; Finish</b> |                                 |   |   |
| N:                                  | Nickel plating - ROHS compliant |   |   |
| G:                                  | Olive Drab Cadmium plating      |   |   |

- Panel Gasket for square flange receptacle  
(Thickness: 0,8 mm [0.031]): JE15



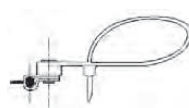
- Receptacle Insert removal tool: USBBF ODE



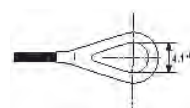
Plug Cap



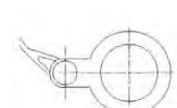
Receptacle Cap



Plug Cap end



Square flange  
receptacle cap end



Jam Nut receptacle  
cap end

# USBBF TV

Transversally sealed receptacle



With USB Field, you can insert a standard USB 2.0 cordset into a metallic plug which will protect it from shocks, dust and fluids.

## No hazardous on-field cabling and grounding!

This metallic plug is connected into a receptacle, using a Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device for high vibrations.

### Applications

- Embedded Computers
- Data Acquisition and transmission in harsh environment
- Railways
- Battelfield Communication Systems
- Navy Systems

### Data Transmission

USB Specification 2.0

Data Rate: Up to 480 Mb/s for High Speed USB

### MAIN CHARACTERISTICS

- Sealed against fluids and dusts (IP68)
- Shock, Vibration and Traction resistant
- No cabling operation in field and no tools required
- Improved EMI protection
- Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device
- 2 mechanical Coding / Polarization possibilities by the user (receptacle insert rotation)
- USBF TV plug retention in the receptacle: 100 N in the axis
- Mating cycles: 500 to 1500

### Environmental Protection

- Sealing (when mated): IP68 (Temporary immersion)
- Salt Spray: 48 h with Nickel plating  
> 500 h with Olive Drab Cadmium  
1000 h with marine bronze shell
- Fire Retardant / Low Smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 1micro s
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature Range: - 40°C / +85°C

### Part Number Code

| Series            | USBBF TV                                                    | 7S | 2 | G | 10 | OPEN |
|-------------------|-------------------------------------------------------------|----|---|---|----|------|
| USBB Field TV     |                                                             |    |   |   |    |      |
| Shell Type        |                                                             |    |   |   |    |      |
| 2S:               | Sealed Square flange receptacle                             |    |   |   |    |      |
| 2PES:             | Sealed Square flange receptacle + backshell + plastic gland |    |   |   |    |      |
| 2PEMS:            | Sealed Square flange receptacle + backshell + metal gland   |    |   |   |    |      |
| 7S:               | Sealed Jam nut receptacle                                   |    |   |   |    |      |
| 7PES:             | Sealed Jam nut receptacle with backshell                    |    |   |   |    |      |
| 7PEMS:            | Sealed Jam nut receptacle + backshell + metal gland         |    |   |   |    |      |
| Back Terminations |                                                             |    |   |   |    |      |
| 2:                | Rugged USB cable                                            |    |   |   |    |      |
| Shells Plating    |                                                             |    |   |   |    |      |
| N:                | Nickel                                                      |    |   |   |    |      |
| G:                | Olive drab cadmium                                          |    |   |   |    |      |
| USB cable length  |                                                             |    |   |   |    |      |
| 03:               | 30 cm [11.81 inches]                                        |    |   |   |    |      |
| 05:               | 50 cm [19.68 inches]                                        |    |   |   |    |      |
| 10:               | 1 meter [39.37 inches]                                      |    |   |   |    |      |
| USB cable end     |                                                             |    |   |   |    |      |
| A:                | Standard USB-A plug                                         |    |   |   |    |      |
| OPEN:             | Open USB cable (no connector)                               |    |   |   |    |      |

Examples: - Olive Drab Cadmium Jam Nut Receptacle: USBBF TV 7 XX  
- Nickel Square Flange Receptacle: USBBF TV 2 XX

USBBF TV

Amphenol

# USB B Field



## SEALED (IP68) USB-B CONNECTION SYSTEM

- USB-B male plug overmolded on USB2.0 cable
- USB-A plug can be used with USBFTV
- USB-B female receptacle with 50 mm wires & 5 way connectors
- Plastic shells
- Thread coupling
- Rear mount Jam Nut receptacle with panel gasket included
- To -20°C +80°C

## Applications

- Embedded Computers
- Data Transfer
- Numerical Control Machine

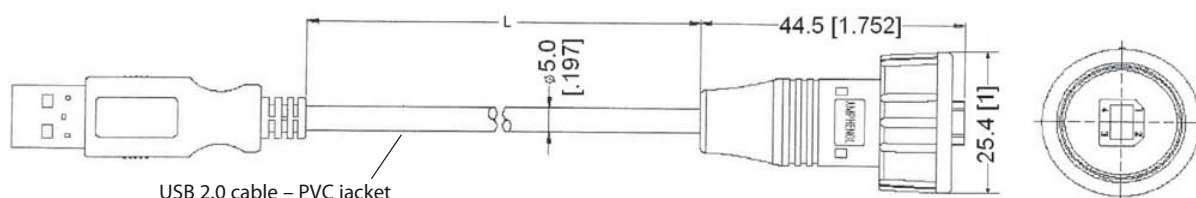
## MALE SEALED PLUG USB-B / USB-A CORDSET



## FEMALE RECEPTACLE AND CAP



## PLUG CORDSET – MALE SEALED USB-B / MALE USB-A (\*)



### PART NUMBERS:

L = 1000±50mm [39.37±1.97] - P/N: **USBBF6100**

L = 2000±50mm [78.74±1.97] - P/N: **USBBF6200**

### PIN ASSIGNMENTS (FRONT VIEW)

1 = RED (AWG 24)

2 = WHITE (AWG 28)

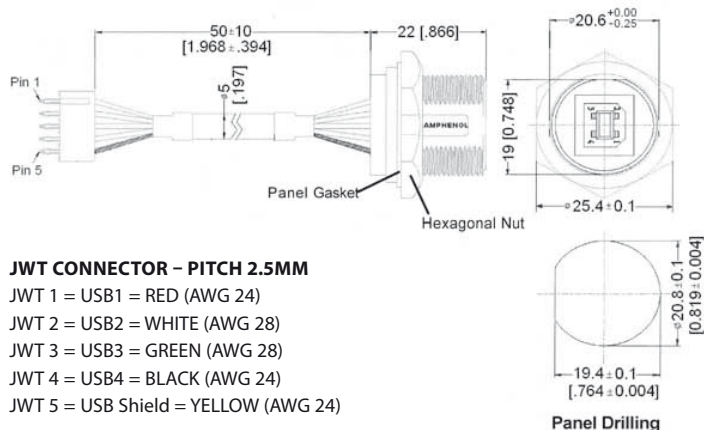
3 = GREEN (AWG 28)

4 = BLACK (AWG 24)

Shield = Drain

(\*) To get a sealed USB-A plug, you can use our USB FTV series.

## RECEPTACLE – FEMALE USB-B



### JWT CONNECTOR – PITCH 2.5MM

JWT 1 = USB1 = RED (AWG 24)

JWT 2 = USB2 = WHITE (AWG 28)

JWT 3 = USB3 = GREEN (AWG 28)

JWT 4 = USB4 = BLACK (AWG 24)

JWT 5 = USB Shield = YELLOW (AWG 24)

## RECEPTACLE & CAP PART NUMBER



RECEPTACLE PN:  
**USBBF7**

CAP PN: **USBBFC7**



# FWF TV

IEEE 1394A Connection System for Harsh Environments



With FW Field, you can insert a standard IEEE1394A cordset into a metallic plug which will protect it from shocks, dust and fluids.

## No hazardous on-field cabling and grounding!

This metallic plug is connected into a receptacle, using a Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device for high vibrations.

### Applications

- Embedded Computers
- Video
- Railways
- Battelfield Communication Systems
- Naval & Shipboard Systems
- Robotics & Automation
- Process Control
- Rugged Communications

### Data Transmission

IEEE 1394a-2000  
400 Mb/s/second over 4.5 meters

### MAIN CHARACTERISTICS

- No assembly tools required
- Sealed against fluids and dusts (IP68)
- No time-consuming in-field cabling operation necessary
- **Tri-start thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device**
- FW plug retention in the receptacle: 100 N in the axis
- Mating cycles: 500 to 1500 times
- Improved EMI protection

### Environmental Protection

- Sealing (mated): IP68 (Temporary immersion - 1 meter up to 30 minutes)
- Salt Spray: 48 h with Nickel plating  
> 500 h with Olive Drab Cadmium
- Fire Retardant / Low Smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 1 micro s
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature Range: - 40°C / +85°C

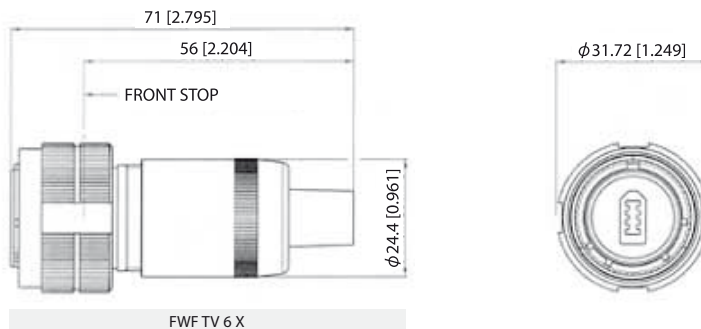
### Part Number Code

| Series                                                                                                      | FW F TV | 2 | 1 | G |
|-------------------------------------------------------------------------------------------------------------|---------|---|---|---|
| IEEE1394 Field TV                                                                                           |         |   |   |   |
| <b>Shell Type</b>                                                                                           |         |   |   |   |
| 6: Plug                                                                                                     |         |   |   |   |
| 2: Square Flange Receptacle                                                                                 |         |   |   |   |
| 2PE: Square flange receptacle with metal backshell (type 1) & with metal backshell + plastic gland (type 2) |         |   |   |   |
| 7: Jam Nut Receptacle                                                                                       |         |   |   |   |
| 7PE: Jam nut receptacle with metal backshell (type 1) & with metal backshell + plastic gland (type 2)       |         |   |   |   |
| <b>Back Terminations (Receptacles only)</b>                                                                 |         |   |   |   |
| 1: IEEE 1394 receptacle                                                                                     |         |   |   |   |
| 2: Solder Board (6 tinned holes)                                                                            |         |   |   |   |
| <b>Shell Plating</b>                                                                                        |         |   |   |   |
| N: Nickel - ROHS Compliant                                                                                  |         |   |   |   |
| G: Olive Drab Cadmium                                                                                       |         |   |   |   |

- Examples:
- Olive Drab Cadmium Plug: FWF TV 6G
  - Olive Drab Cadmium Square Flange Receptacle, IEEE 1394 front & back: FWF TV 21G
  - Olive Drab Cadmium Jam Nut Receptacle, IEEE 1394 front and back: FWF TV 71G
  - Nickel Jam Nut Receptacle, solder board termination: FWF TV 72N

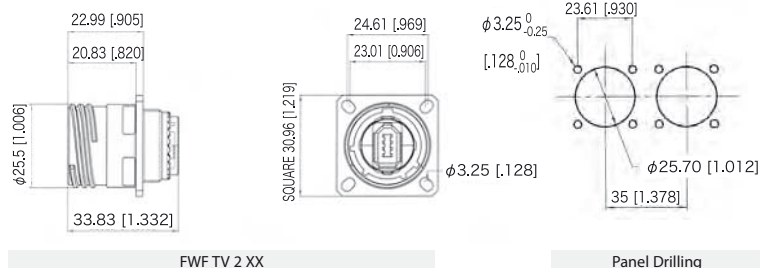
## Plug

- Shell type 6

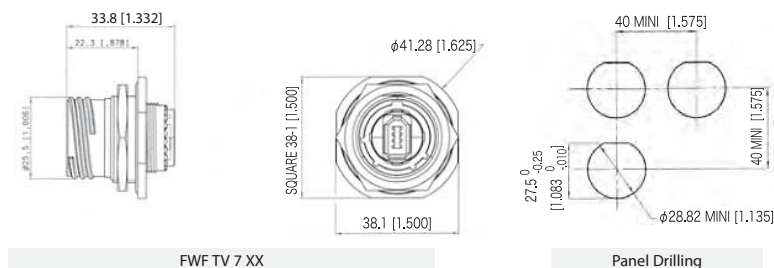


## Receptacles

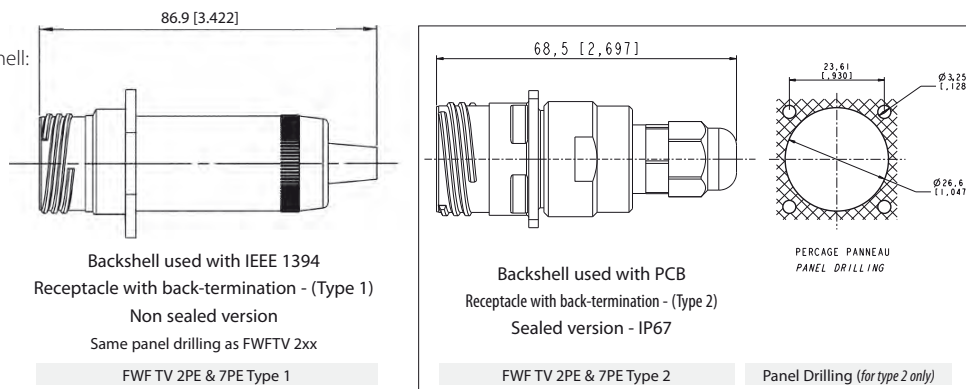
- Square flange receptacle  
4 mounting holes: Shell type 2



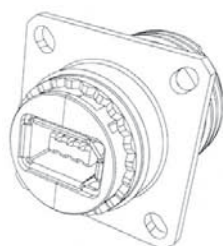
- Jam nut receptacle  
Hexagonal Nut mounting:  
Shell type 7



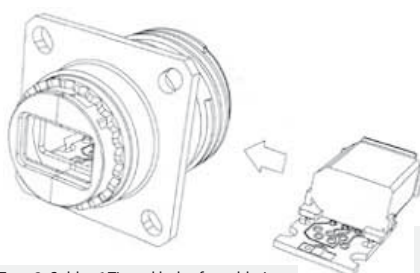
- Receptacles with backshell:  
Shell type 2PE and 7PE



## Back Terminations



Type 1: IEEE 1394 Receptacle



Type 2: Solder 6 Tinned holes for soldering

View of the PCB Type 2  
version - with 6 tinned holes for  
solder termination

## Assembly Instructions

*Can be used with most IEEE 1394 cordset brands: No tools required!*  
**Plug Assembly**

1. If a fully sealed (IP68) assembly is required: Install the white tape around the plug to cover the 4 holes of the overmolding. If there are no holes omit this step.
2. Insert the black O Ring around the front face of the IEEE 1394 plug. This O Ring will ensure the seal.
3. Insert the IEEE 1394 cordset into the metallic backshell.
4. Insert the retention spacer laterally onto the cable (this spacer is soft so as to adapt to various overmolding styles) and slide the IEEE 1394 plug into this retention spacer.
5. Insert the friction ring laterally onto the cable cordset.
6. Insert the IEEE 1394 plug into the metallic circular shell. Note at this step that the main key is used for polarization.
7. Screw the backshell on the plug body. A spanner may be required to fully close the backshell to the circular shell.

**Important Note:** The sealing of the connector is not done by the black retention spacers which are slotted, but rather by the front face O-Ring (Fig 2).

## Receptacle Assembly

To Solder your cable onto the PCB:

1. Attach the 2 metallized plastic inserts around the PCB (Fig 1a & 1b).
2. Insert the IEEE 1394 module from the rear of the connector.

## Removing Modules

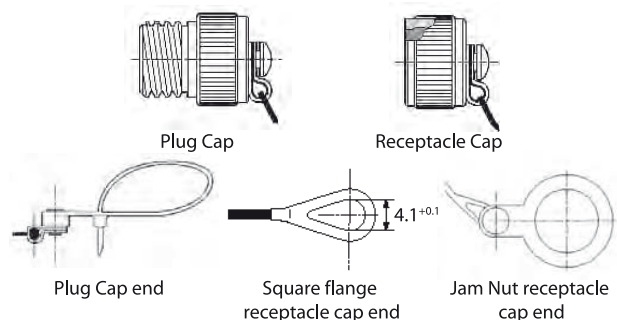
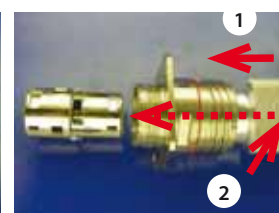
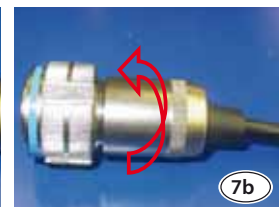
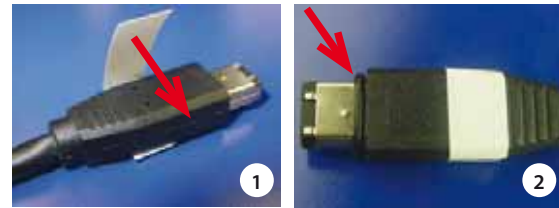
1. Insert the removal tool FWF ODE from the front
2. Push the module back with thumb.

## Accessories

### ■ Metallic Caps

|                       | FWF TVC                  | 2 | G |
|-----------------------|--------------------------|---|---|
| <b>Connector Type</b> |                          |   |   |
| 6:                    | Plug                     |   |   |
| 2:                    | Square Flange Receptacle |   |   |
| 7:                    | Jam Nut Receptacle       |   |   |
| <b>Shell plating</b>  |                          |   |   |
| N:                    | Nickel - ROHS Compliant  |   |   |
| G:                    | Olive Drab Cadmium       |   |   |

- Panel Gasket for square flange receptacle (Thickness: 0,8 mm [.031]); JE15
- Receptacle Insert removal tool: FWF ODE



# SELF CLOSING CAP

For RJ Field, USB and IEEE1394 receptacles



This Self Closing Cap automatically protects the RJ Field square flange receptacles (MIL-C-26482 type), protecting your system from dust and water projections. The same cap can be used to protect USB and IEEE1394 receptacles. A spring automatically closes the upper part of the cap when either the RJ Field plug, RJ45 cordset, USB or IEEE1394 cordset, or USB key are removed from the receptacle.

## Sealing level IP54 (Splash and dust Proof)

RJF 21 X SCC

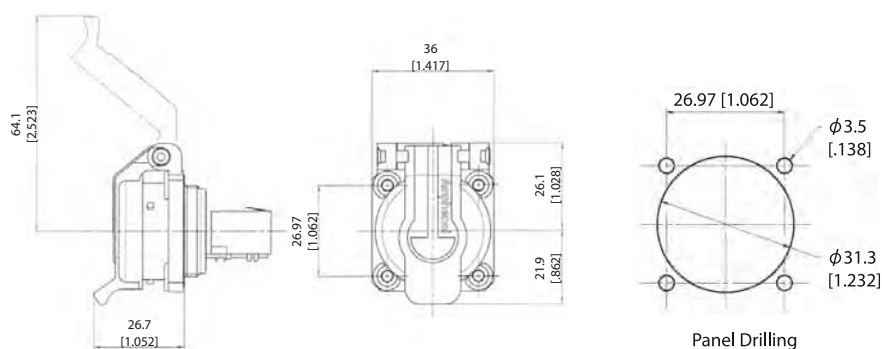


**Version: RJ45**

**RJF 21N SCC** Nickel plated shell and metallized inserts (EMI)

**RJF 21B SCC** Black coated shell and blank insert

**Remark:** Could be used with RJF series rugged plug (*see page 10*)



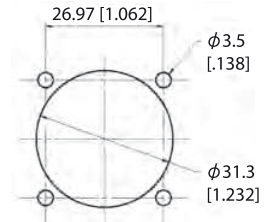
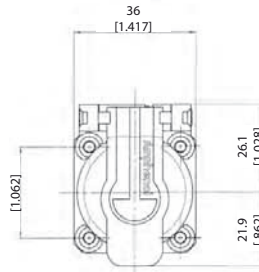
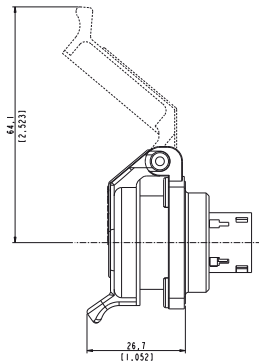
## USBF 21 X SCC



**Version: USB-A** (front and back termination)

**USBF 21N SCC** Nickel plated shell and metallized inserts (EMI)

**USBF 21B SCC** Black coated shell and blank insert



Panel Drilling

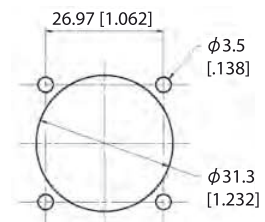
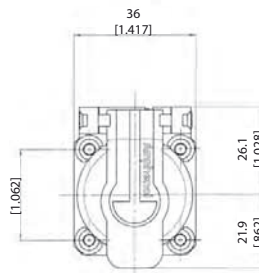
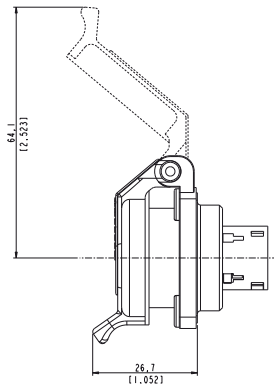
## USBBF 21 X SCC



**Version: USB-B** (front in USB-B and back termination in USB-A)

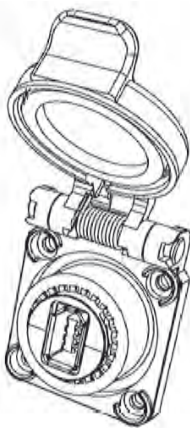
**USBBF 21N SCC** Nickel plated shell and metallized inserts (EMI)

**USBBF 21B SCC** Black coated shell and blank insert



Panel Drilling

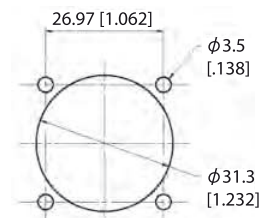
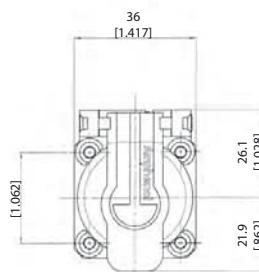
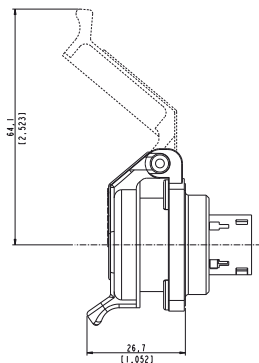
## FWF 21 X SCC



**Version: IEEE1394**

**FWF 21N SCC** Nickel plated shell and metallized inserts (EMI)

**FWF 21B SCC** Black coated shell and blank insert



Panel Drilling

■ Note: Panel gasket with any of these receptacles: JE18



# RJ11F

Rugged RJ11/RJ12 Connection System for Harsh Environment



RJ11Field allows you to use a standard phone RJ11 / RJ12 connection in harsh environments. With the patented RJStop® system you can use a standard RJ11 / RJ12 cordset in a metallic plug which will protect it from shocks, dust and fluids. **No hazardous on-field cabling!**

## MAIN CHARACTERISTICS

- Bayonet coupling ("Audible & Visual" coupling signal)
- Robust metallic shells based on MIL-DTL-26482 H
- 4 mechanical user-defined coding / Polarization settings (insert rotation)
- RJ11 cordset retention in the plug: 100 N in the axis
- Mating cycles: 500 min

## Applications

- Industrial applications
- Battlefield communication

## Environmental Protection

- Sealing: IP68
- Salt Spray: 48 h with Nickel plating  
> 96 h with black coating  
> 500 h with Oliv Drab Cadmium
- Fire Retardant / Low Smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 10 nano s.
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors (*mated pair*)
- Humidity: 21 days, 43°C, 98% humidity
- Thermal Shock: 5 cycles at - 40°C / +100°C
- Temperature Range: - 40°C / +85°C

## Part Number Code

|                                          |                                |   |   |   |
|------------------------------------------|--------------------------------|---|---|---|
| Series                                   | RJ11F                          | 2 | 2 | B |
| RJ11Field                                |                                |   |   |   |
| Shell Type                               |                                |   |   |   |
| 6:                                       | Plug, Plastic Gland            |   |   |   |
| 2:                                       | Square Flange Receptacle       |   |   |   |
| 7:                                       | Jam Nut Receptacle             |   |   |   |
| Back Terminations (For Receptacles only) |                                |   |   |   |
| 1:                                       | Female RJ11                    |   |   |   |
| 2:                                       | Solder (6 tinned holes)        |   |   |   |
| Shell Finishes                           |                                |   |   |   |
| B:                                       | Black Coating - ROHS Compliant |   |   |   |
| N:                                       | Nickel - ROHS Compliant        |   |   |   |
| G:                                       | Olive Drab Cadmium             |   |   |   |

- Examples:
- Black Plug: RJ11F 6 B
  - Black square flange receptacle, Female RJ11 Back termination: RJ11F 2 1 B
  - Nickel Jam Nut Receptacle, solder termination: RJ11F 72 N

## Accessories

- Metallic cap

|                |                                |   |   |
|----------------|--------------------------------|---|---|
|                | RJ11FC                         | 2 | B |
| Connector Type |                                |   |   |
| 6:             | Plug                           |   |   |
| 2:             | Square Flange Receptacle       |   |   |
| 7:             | Jam Nut Receptacle             |   |   |
| Finishes       |                                |   |   |
| B:             | Black Coating - ROHS Compliant |   |   |
| N:             | Nickel - ROHS Compliant        |   |   |
| G:             | Olive Drab Cadmium             |   |   |

- Panel gasket for square flange « 2 »  
thickness: 0,6 mm P/N: JE 14



Plug cap



Receptacle cap



Square Flange  
type « 2 »

Plug Cap end  
type « 6 »

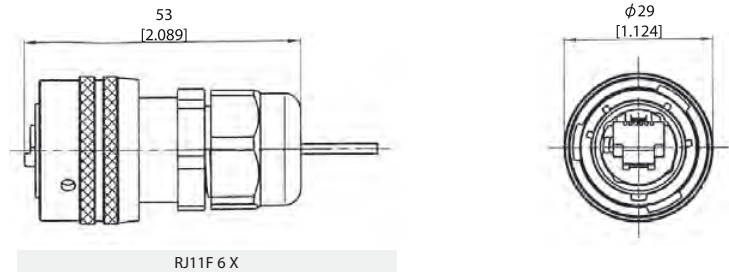
Jam nut receptacle  
type « 7 »

- Insert removal tool  
for receptacle and plug  
P/N = RJ11F ODE



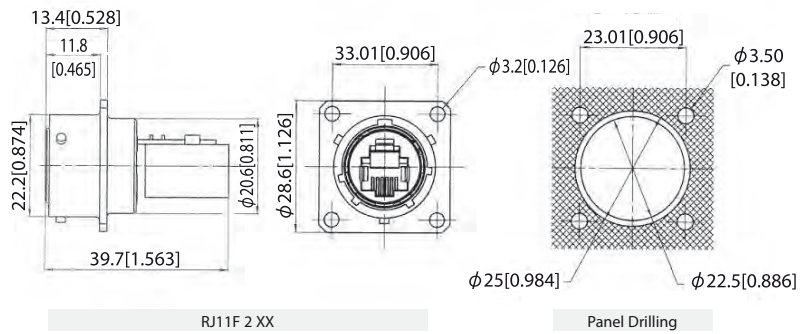
## Plug

- Shell type 6 with Plastic Gland

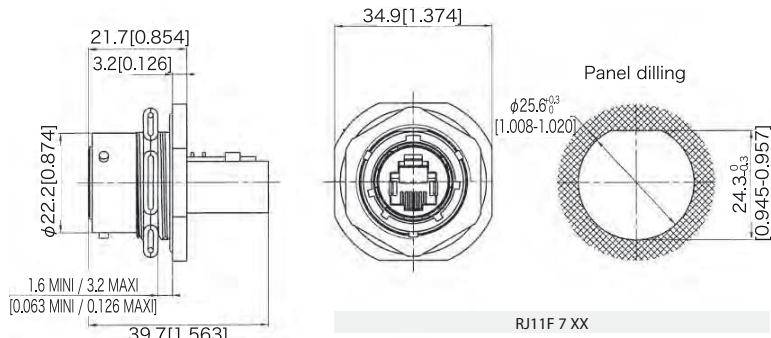


## Receptacles

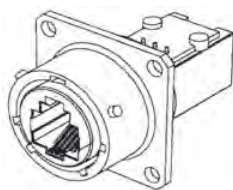
- Square flange receptacle  
4 mounting holes: Shell type 2



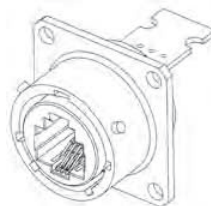
- Jam nut receptacle  
Hexagonal Nut mounting: Shell type 7



## Back Terminations

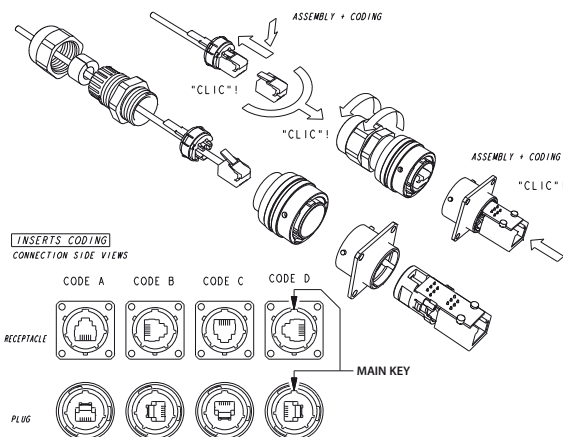


Type 1: Female RJ11 / RJ12



Type 2: Solder 6 Tinned through holes to solder your cable

## Assembly instructions



### Easy and Safe: No field cabling tools required

1. Pass the RJ11 / RJ12 plug « A » through the plastic gland « B »
2. Laterally slide the insert « C » on the cable
3. Fix the RJ11 / RJ12 plug « A » in the insert « C », pushing on the lever
4. Insert in the metallic housing « D »
5. Tighten the plastic gland « B »



# MTRJF TV

Transform your MTRJ patchcord into an Environmental Connector



With MTRJF TV you can use a standard MTRJ patchcord in a metallic plug which will protect it from shocks, dust and fluids.

## No hazardous on-field cabling!

The MTRJ Field offers an easy system to upgrade from a standard to an environmental MTRJ.

- Sealed against fluids and dust (IP68)
- Shock, Vibration proof,
- No cabling operation in field and no tools required for installation

### Applications

- Railways
- Base Station
- Military communication
- Navy

### MECHANICAL CHARACTERISTICS

- Number of Channels: 1/2/4
- Typical Insertion Loss: 0,5db in MM
- Durability: 500 mating/unmating cycles (changes for <0,2 db)

### Part Number Code

| Serie               | MTRJF TV                                                    | 6M | C | G | N |
|---------------------|-------------------------------------------------------------|----|---|---|---|
| MTRJ Field TV       |                                                             |    |   |   |   |
| Shell Type          |                                                             |    |   |   |   |
| 6:                  | Plug with metal backshell, plastic PG clamp                 |    |   |   |   |
| 6M:                 | Plug with metal backshell and metal PG clamp                |    |   |   |   |
| 2:                  | Square flange receptacle                                    |    |   |   |   |
| 2PE:                | Square flange, metal backshell and plastic PG clamp         |    |   |   |   |
| 2PEM:               | Square flange, metal backshell and metal PG clamp           |    |   |   |   |
| 7:                  | Jam nut receptacle                                          |    |   |   |   |
| 7PE:                | Jam nut, metal backshell and plastic PG clamp               |    |   |   |   |
| 7PEM:               | Jam nut, metal backshell and metal PG clamp                 |    |   |   |   |
| Cable Type          |                                                             |    |   |   |   |
| Only for receptacle |                                                             |    |   |   |   |
| 0:                  | Receptacle without backshell                                |    |   |   |   |
| Only for plug       |                                                             |    |   |   |   |
| C:                  | Mini round cable 2,8 mm                                     |    |   |   |   |
| D:                  | Flat duplex cable 1,6 mm                                    |    |   |   |   |
| S:                  | Duplex zipcord 1,6 mm                                       |    |   |   |   |
| T:                  | Flat duplex cable + Duplex zipcord for 1,6 mm - 2mm - 2,8mm |    |   |   |   |
| Shell Finish        |                                                             |    |   |   |   |
| N:                  | Nickel plated                                               |    |   |   |   |
| G:                  | Olive drab cadmium plated                                   |    |   |   |   |
| B:                  | Bronze                                                      |    |   |   |   |
| D:                  | Black zinc cobalt                                           |    |   |   |   |
| Z:                  | Olive drab zinc cobalt                                      |    |   |   |   |
| Polarization        |                                                             |    |   |   |   |
| N:                  | Normal                                                      |    |   |   |   |
| A / B / C / D / E   |                                                             |    |   |   |   |

| Cap Series                 | B                                            | EC | N | TV | W | 13 |
|----------------------------|----------------------------------------------|----|---|----|---|----|
| <b>Protective cap type</b> |                                              |    |   |    |   |    |
| EC:                        | For square flange receptacle                 |    |   |    |   |    |
| ER:                        | For jam nut receptacle                       |    |   |    |   |    |
| F:                         | For plug                                     |    |   |    |   |    |
| <b>Wire type</b>           |                                              |    |   |    |   |    |
| N:                         | Nylon cord                                   |    |   |    |   |    |
| Blank:                     | Metallic chain                               |    |   |    |   |    |
| TV:                        | Series                                       |    |   |    |   |    |
| <b>Shell finish</b>        |                                              |    |   |    |   |    |
| B:                         | Bronze                                       |    |   |    |   |    |
| F:                         | Electroless nickel plated, aluminium version |    |   |    |   |    |
| W:                         | Olive drab cadmium plated, aluminium version |    |   |    |   |    |
| D:                         | Black zinc cobalt                            |    |   |    |   |    |
| Z:                         | Olive drab zinc cobalt                       |    |   |    |   |    |

### Requested information to order MTRJ Field Patchcord

Plug MTRJ: Male /Female  
 Type of fiber: 50/125, 62,5/125, 9/125  
 Patchcord length: ex 10.5m  
 Drawing: description of the product

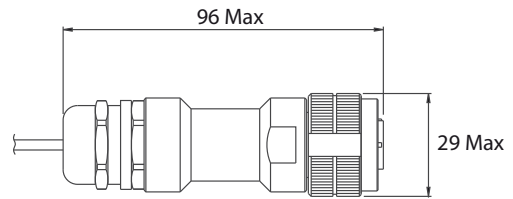
Contact us for other configuration

### Dismounting Tool Ordering Information

MTRJF TV DM TOOL

## Line drawings (Dimensions in mm)

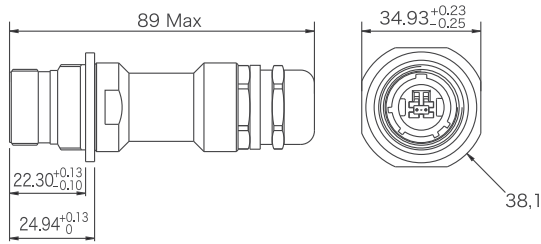
- Plug (MIL DTL 38 999 series III Size 13)



MTRJ FTV 6 X

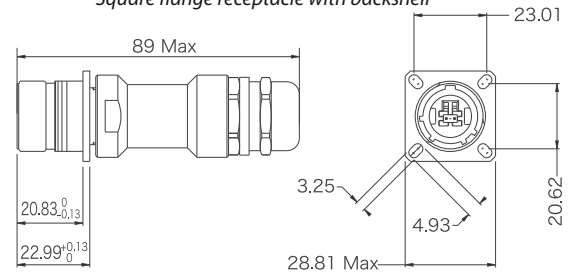
- Receptacle (MIL DTL 38 999 series III Size 13) with backshell

### Jam Nut receptacle with backshell



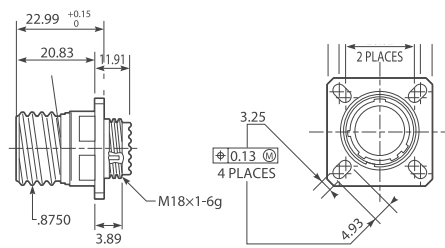
MTRJ FTV 7PE/7PEM

### Square flange receptacle with backshell



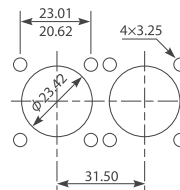
MTRJ FTV 2PE/2PEM

- Square Flange Receptacle (MIL DTL 38 999 series III Size 13)

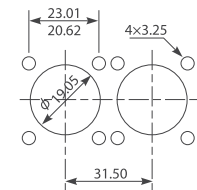


MTRJ FTV 2 XXX

### Square flange receptacle rear panel mounting

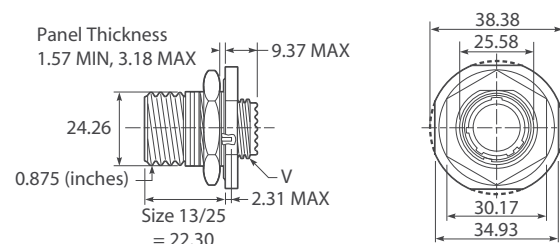


### Square flange receptacle front panel mounting



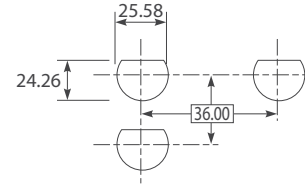
Panel Drilling

- Jam Nut Receptacle (MIL DTL 38 999 series III Size 13)



MTRJ FTV 7 XXX

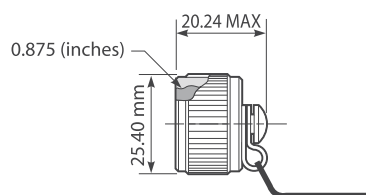
### Jam nut receptacle rear panel mounting



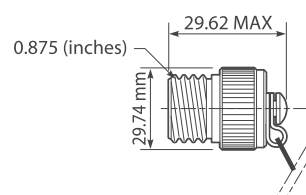
Panel Drilling

## Protective caps

### Protective cap for plug (nylon cord)



### Protective cap for receptacles (nylon cord)





# LC FIELD

Transform your LC patchcord into an Environmental Connector



The LC Field offers an easy system to upgrade from a standard to an environmental LC.

- Sealed against fluids and dust (IP68)
- Shock, Vibration proof
- No cabling operation in field and no tools required for installation (except 1,6mm and 2mm zipcord cable)

With the patented RJStop<sup>®</sup> system you can use a standard LC patchcord in a metallic plug which will protect it from shocks, dust and fluids.

**No hazardous on-field cabling!**

## Applications

- Railways
- Base Station
- Military communication
- Navy

## MECHANICAL CHARACTERISTICS

- Number of Channels: 2
- Typical Insertion Loss: 0,5db in MM and SM
- Durability 500 mating/unmating cycles (changes for <0,2 db)

## Part Number Code

|                                                             |                                                               |    |   |   |   |
|-------------------------------------------------------------|---------------------------------------------------------------|----|---|---|---|
| Serie                                                       | LCFTV                                                         | 6M | D | G | N |
| Optical connector type                                      |                                                               |    |   |   |   |
| Shell Type                                                  |                                                               |    |   |   |   |
| 6M:                                                         | Plug with metal backshell and metal PG clamp                  |    |   |   |   |
| 2:                                                          | Square flange receptacle without backshell                    |    |   |   |   |
| 7:                                                          | Jam nut receptacle without backshell                          |    |   |   |   |
| Cable Type                                                  |                                                               |    |   |   |   |
| Only for plug                                               |                                                               |    |   |   |   |
| D:                                                          | Flat duplex cable 1,6 mm                                      |    |   |   |   |
| E:                                                          | Duplex zipcord 1,6 mm                                         |    |   |   |   |
| F:                                                          | Flat duplex cable 2 mm                                        |    |   |   |   |
| G:                                                          | Duplex zipcord 2 mm                                           |    |   |   |   |
| H:                                                          | Flat duplex cable 2,8 mm                                      |    |   |   |   |
| I:                                                          | Duplex zipcord 2,8 mm                                         |    |   |   |   |
| T:                                                          | Flat duplex cable + Duplex zipcord for 1,6 mm - 2 mm - 2,8 mm |    |   |   |   |
| Only for receptacle (no backshell available for receptacle) |                                                               |    |   |   |   |
| 0:                                                          | Receptacle without backshell                                  |    |   |   |   |
| Shell Finish                                                |                                                               |    |   |   |   |
| N:                                                          | Nickel plated                                                 |    |   |   |   |
| G:                                                          | Olive drab cadmium plated                                     |    |   |   |   |
| B:                                                          | Bronze                                                        |    |   |   |   |
| D:                                                          | Black zinc cobalt                                             |    |   |   |   |
| Z:                                                          | Olive drab zinc cobalt                                        |    |   |   |   |
| Polarization                                                |                                                               |    |   |   |   |
| N:                                                          | Normal                                                        |    |   |   |   |
| A / B / C / D / E                                           |                                                               |    |   |   |   |

|                                     |                                              |    |   |    |   |    |
|-------------------------------------|----------------------------------------------|----|---|----|---|----|
| Cap Series                          | B                                            | EC | N | TV | W | 19 |
| Protective cap type                 |                                              |    |   |    |   |    |
| EC:                                 | For square flange receptacle                 |    |   |    |   |    |
| ER:                                 | For jam nut receptacle                       |    |   |    |   |    |
| F:                                  | For plug                                     |    |   |    |   |    |
| Wire type                           |                                              |    |   |    |   |    |
| N:                                  | Nylon cord                                   |    |   |    |   |    |
| Blank:                              | Metallic chain                               |    |   |    |   |    |
| TV:                                 | Series                                       |    |   |    |   |    |
| Shell finish                        |                                              |    |   |    |   |    |
| B:                                  | Bronze                                       |    |   |    |   |    |
| F:                                  | Electroless nickel plated, aluminium version |    |   |    |   |    |
| W:                                  | Olive drab cadmium plated, aluminium version |    |   |    |   |    |
| D:                                  | Black zinc cobalt                            |    |   |    |   |    |
| Z:                                  | Olive drab zinc cobalt                       |    |   |    |   |    |
| Corresponding connector shell size: | 19                                           |    |   |    |   |    |

## Requested information to order LC Field Patchcord

Type of connector: Male /Female  
Type of fiber: 50/125, 62,5/125, 9/125  
Patchcord length: ex 10.5m  
Drawing: description of the product

Contact us for other configuration

## Tools informations:

### Mounting Tools:

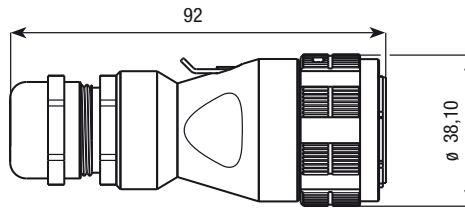
LCFTV MO TOOL: LC FIELD Mounting tools

### Dismounting Tools:

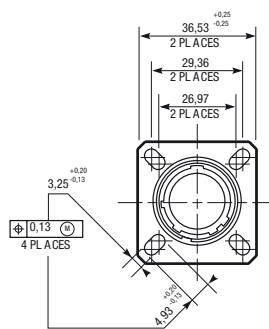
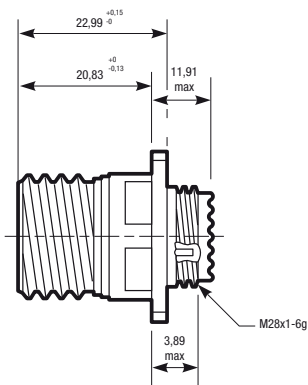
LCFTV DM TOOL: LC FIELD Dismounting tools  
(To dismount the LC you need to use both dismounting and mounting tools)

## Line drawings (Dimensions in mm)

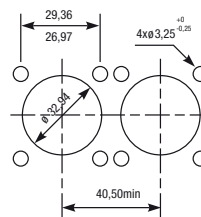
### ■ Plug (MIL DTL 38 999 series III Size 19)



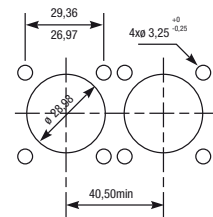
### ■ Square Flange Receptacle (MIL DTL 38 999 series III Size 19)



Square flange receptacle rear panel mounting

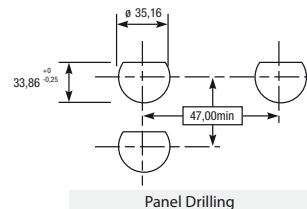
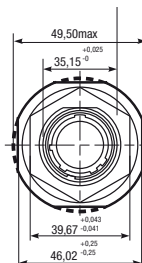
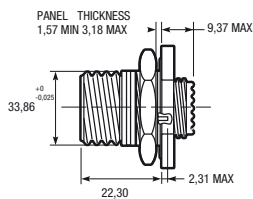


Square flange receptacle front panel mounting



Panel Drilling

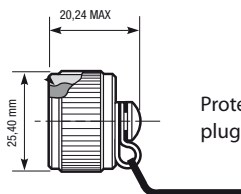
### ■ Jam Nut Receptacle (MIL DTL 38 999 series III Size 19)



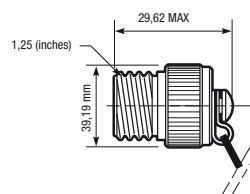
Jam nut receptacle rear panel mounting

Panel Drilling

## Protective caps



Protective cap for plug (nylon cord)



Protective cap for receptacles (nylon cord)



# RJFTVX, USBFTVX, RJ11FTVX

RJ45, USB, RJ11/12 explosion proof solutions for Zone 2



Amphenol Atex Field Bus range is designed for device group II category 3G. According to EN60079-15 it may be operated within zone 2 and class I, Division 2, as low power non sparking connectors.

## RJFTVX • Rugged and sealed RJ45 connector

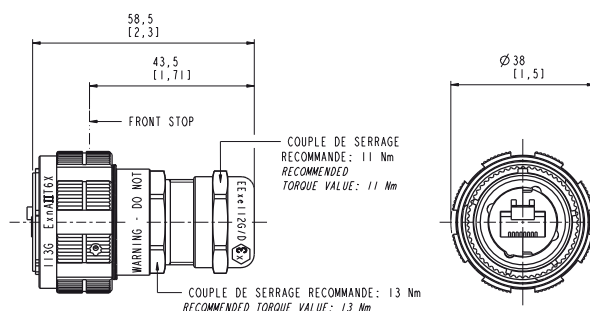


RJFTVX allows you to use an Ethernet Class D / Cat. 5e connection for 10 BaseT, 100 BaseTx or 1000 BaseT networks in ATEX zone 2 environments. With the patented RJStop system you can use a standard RJ45 cordset in a metallic plug which will protect it from shocks, dust and fluids. RJFTVX features the same main characteristics than RJFTV series (see page 14)

### CHARACTERISTICS

|                             |                                                                                                  |
|-----------------------------|--------------------------------------------------------------------------------------------------|
| Ex marking                  | II3G ExnAIIIT6 X                                                                                 |
| Operating temperature range | -40°C / +60°C                                                                                    |
| Voltage                     | 60 Veff max                                                                                      |
| Power                       | 20 W max                                                                                         |
| Outside cable diameter      | 6mm to 12mm                                                                                      |
| Sealing                     | IP68                                                                                             |
| Data transmission           | 10 BaseT, 100 BaseTX & 1000 BaseT networks. Cat. 5e per TIA/EIA 568B & Class D per ISO/IEC 11801 |

### RJFTVX6 PLUG

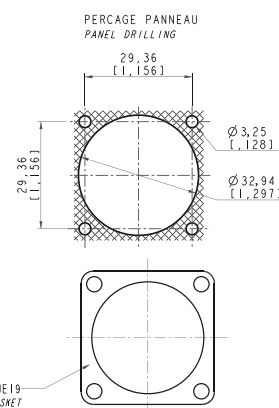
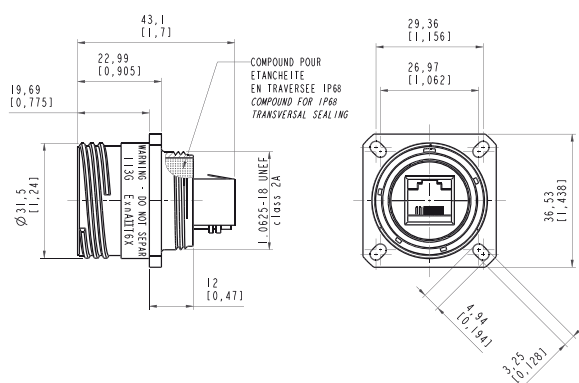


### PART NUMBERS:

Nickel Plated plug: **RJFTVX6MN**  
Olive drab cadmium plug: **RJFTVX6MG**

IP68 metallic cap: **RJFTVC6N**  
IP68 metallic cap: **RJFTVC6G**

### RJFTVX2 receptacle



### PART NUMBERS:

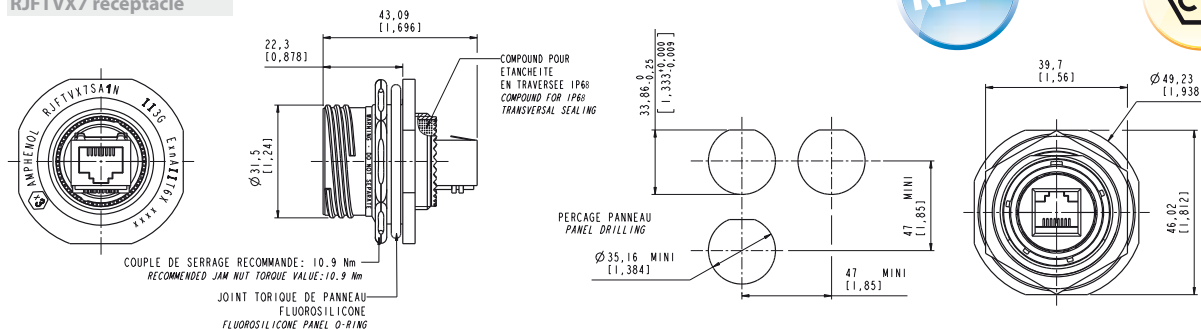
#### RECEPTACLE

Nickel Plated • RJ45 back termination • coding A: **RJFTVX2SA1N**  
Olive drab cadmium • RJ45 back termination • coding A: **RJFTVX2SA1G**

#### RECEPTACLE CAP

Nickel: **RJFTVC2N**  
Olive drab cadmium: **RJFTVC2G**

## RJFTVX7 receptacle



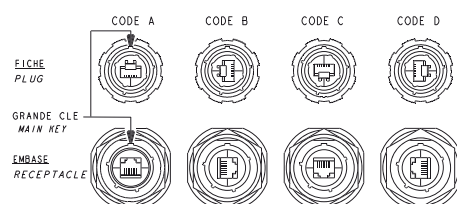
### PART NUMBERS:

#### RECEPTACLE

Nickel Plated • RJ45 back termination • coding A: **RJFTVX7SA1N**  
Olive drab cadmium • RJ45 back termination • coding A: **RJFTVX7SA1G**

#### RECEPTACLE CAP

IP68 metallic cap: **RJFTVC7N**  
IP68 metallic cap: **RJFTVC7G**



**REMARK:** As receptacles are compounded (IP68 transversally sealing), coding position has to be specified in the part number: "A" (standard), "B", "C" or "D".

Receptacles can be provided with RJ45 cordsets.

There are 4 standard lengths as described hereunder (*with coding "A"*):

Nickel plated / 0,3 meters RJ45 cordsets: RJFTVX2SA2N03100BTX

Nickel plated / 0,5 meters RJ45 cordsets: RJFTVX2SA2N05100BTX

Nickel plated / 1,0 meters RJ45 cordsets: RJFTVX2SA2N10100BTX

Nickel plated / 1,5 meters RJ45 cordsets: RJFTVX2SA2N15100BTX

For Olive Drab Cadmium plating replace the "N" with a "G" in the P/N.

## USBFTVX • Rugged and sealed USB connector

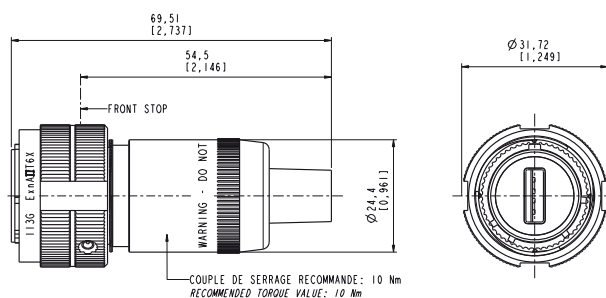


With USBFTVX, you can insert a standard USB 2.0 cordset into a metallic plug which will protect it from shocks, dust and fluids. This range is fitted to be used in Atex zone 2 environments. This metallic plug is connected into a receptacle, using a Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device for high vibrations. USBFTVX features the same main characteristics than USBFTV series (see page 25)

### CHARACTERISTICS

|                             |                        |
|-----------------------------|------------------------|
| Ex marking                  | II3G ExnAII6 X         |
| Operating temperature range | -40°C / +70°C          |
| Voltage                     | 60 Veff max            |
| Power                       | 20 W max               |
| Outside cable diameter      | 4mm to 6mm             |
| Sealing                     | IP68                   |
| Data transmission           | USB 2.0 up to 480 Mb/s |

### USBFTVX6 PLUG



### PART NUMBERS:

#### PLUG

Nickel: **USBFTVX6N**  
Olive drab cadmium: **USBFTVX6G**

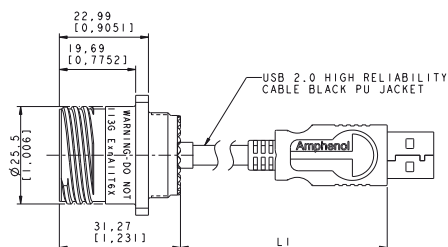
#### PLUG CAP

Nickel: **USBFTVC6N**  
Olive drab cadmium: **USBFTVC6G**

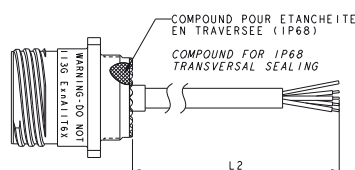


## USBTX2 & USBTX2 receptacles

### Square Flange Receptacle Type USBFTV2

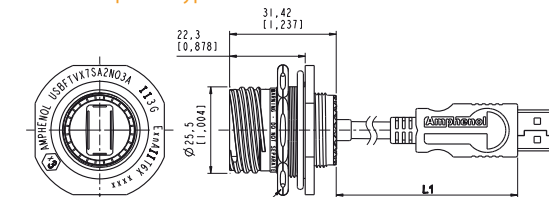


Cable end Type "A" (Standard USB "A" Plug)



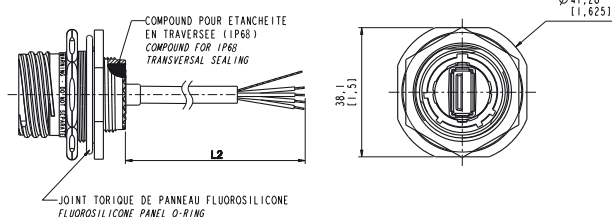
Cable end Type "OPEN" (No connector)

### Jam Nut Receptacle Type USBFTV7



COUPLE DE SERRAGE RECOMMANDE: 8,6 Nm  
RECOMMENDED JAM NUT TORQUE VALUE: 8,6 Nm

Cable end Type "A" (Standard USB "A" Plug)



Cable end Type "OPEN" (No connector)

## RECEPTACLE CAPS PART NUMBERS:

Nickel plated cap for USBFTVX2: **USBFTVC2N**

Nickel plated cap for USBFTVX7: **USBFTVC7N**

Olive drab cadmium cap for USBFTVX2: **USBFTVC2G**

Olive drab cadmium cap for USBFTVX7: **USBFTVC7G**

| Series                       | USBFTVX                  |                            | 2S | A | 2 | N | 03 | A |
|------------------------------|--------------------------|----------------------------|----|---|---|---|----|---|
| USB Field TV                 |                          |                            |    |   |   |   |    |   |
| Shell Type                   |                          |                            |    |   |   |   |    |   |
| 2S: Square flange receptacle | 7S:                      | Jam nut receptacle         |    |   |   |   |    |   |
| Coding                       |                          |                            |    |   |   |   |    |   |
| "A" (Standard) or "B"        |                          |                            |    |   |   |   |    |   |
| Back Terminations            |                          |                            |    |   |   |   |    |   |
| 2: Rugged USB cable          |                          |                            |    |   |   |   |    |   |
| Shells Plating               |                          |                            |    |   |   |   |    |   |
| N: Nickel                    | G:                       | Olive drab cadmium plating |    |   |   |   |    |   |
| USB cable length             |                          |                            |    |   |   |   |    |   |
| 03: 30 cm [11.81 inches]     | 05: 50 cm [19.68 inches] | 10: 1 meter [39.37 inches] |    |   |   |   |    |   |
| USB cable end                |                          |                            |    |   |   |   |    |   |
| A: Standard USB-A plug       | OPEN:                    | Open cable (no connector)  |    |   |   |   |    |   |

## RJ11FTVX • Rugged and sealed RJ11/12 connector



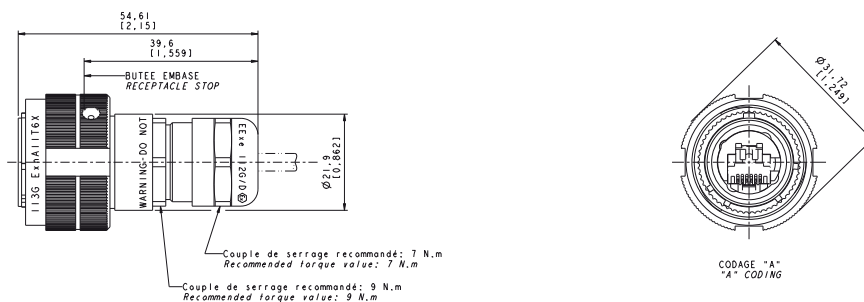
RJ11FTVX allows you to use a standard phone RJ11 / RJ12 connection in Atex zone 2 environments. With the patented RJStop® system you can use a standard RJ11 / RJ12 cordset in a metallic plug which will protect it from shocks, dust and fluids.

## CHARACTERISTICS

|                                    |                                                                            |
|------------------------------------|----------------------------------------------------------------------------|
| Ex marking                         | II3G ExnAII6 X                                                             |
| Operating temperature range        | -40°C / +60°C                                                              |
| Voltage                            | 60 Veff max                                                                |
| Power                              | 20 W max                                                                   |
| Outside cable diameter             | 4mm to 5.5mm                                                               |
| Sealing                            | IP68                                                                       |
| Coupling mechanism                 | Tri Start thread with anti-decoupling device (MIL-DTL-38999 series III)    |
| Mating cycles                      | 500 min                                                                    |
| Salt spray                         | 48h with nickel plating / 500 h with olive drab cadmium plating            |
| Coding                             | 4 mechanical user-defined coding / Polarization settings (insert rotation) |
| Fire retardant / Low Smoke         | UL94 V0 and NF16 101 & 16 102                                              |
| RJ11 cordset retention in the plug | 100 N in the Axis                                                          |



### RJ11FTVX6 PLUG



### PART NUMBERS:

#### PLUG

Nickel plated: **RJ11TVX6MN**

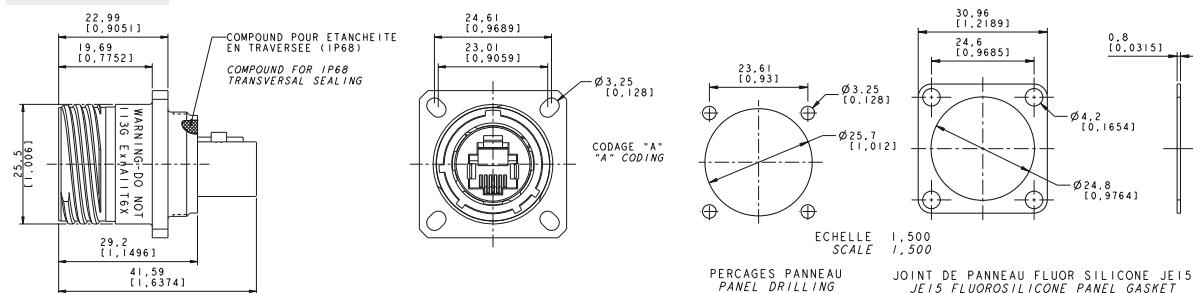
Olive drab cadmium: **RJ11FTVX6MG**

#### CAP

Nickel plated: **RJ11FTVC6N**

Olive drab cadmium: **RJ11FTVC6G**

### RJ11FTVX2



### PART NUMBERS:

#### RECEPTACLE

Nickel Plated - Female RJ45 back termination - coding A-: **RJ11FTVX2SA1N**

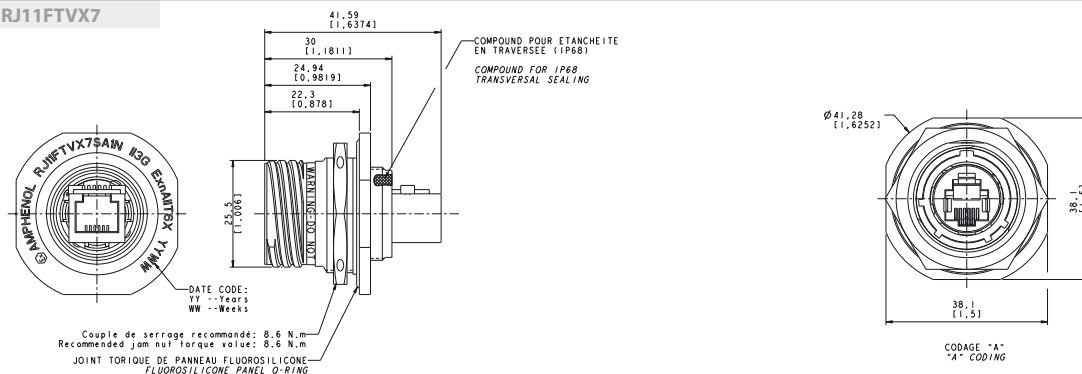
Olive drab cadmium - Female RJ45 back termination - coding A: **RJ11FTVX2SA1G**

#### RECEPTACLE CAP

Nickel plated: **RJ11FTVC2N**

Olive drab cadmium: **RJ11FTVC2G**

### RJ11FTVX7



### PART NUMBERS:

#### RECEPTACLE

Nickel Plated - Female RJ45 back termination - coding A-: **RJ11FTVX7SA1N**

Olive drab cadmium - Female RJ45 back termination - coding A: **RJ11FTVX7SA1G**

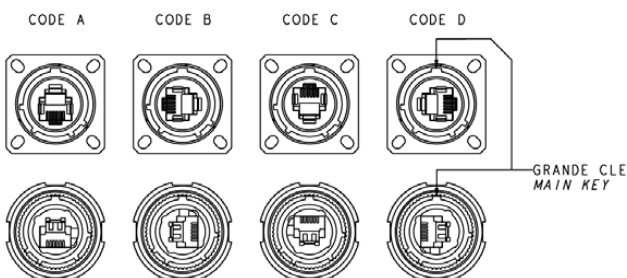
#### RECEPTACLE CAP

Nickel: **RJ11FTVC7N**

Olive drab cadmium: **RJ11FTVC7G**

### INSERTS CODING

#### CONNECTION SIDE VIEWS



### REMARK:

As receptacles are compounded (IP68 transversally sealing), coding position has to be specified in the part number: "A" (standard), "B", "C" or "D".



# RJ SWITCH

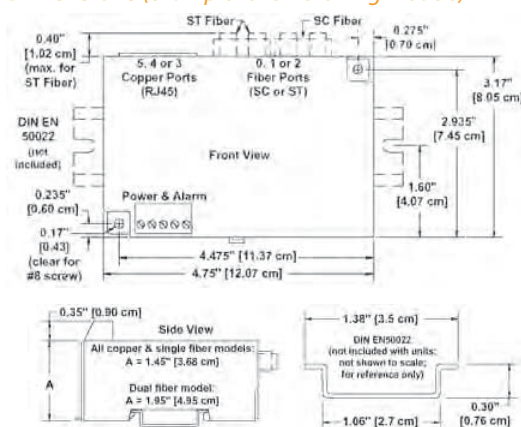
Industrial Gigabit Ethernet Switch IP30



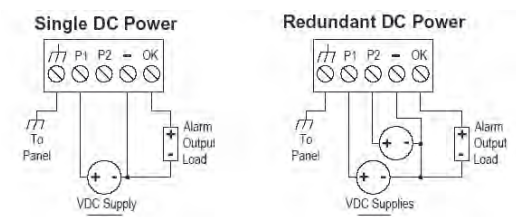
## Applications

- Factory Automation
- Robotics
- Process Control
- Transportation Systems
- Data Acquisition & Transmission

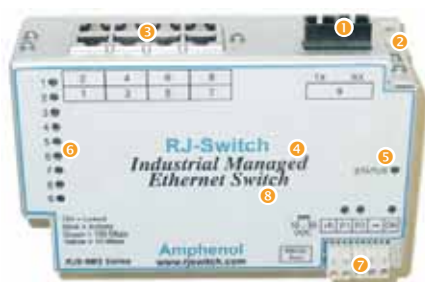
## Dimensions (example for 5 Port Ring Models)



## Power and alarm wiring



## Description



## INDUSTRIAL RUGGED ETHERNET SWITCH

Amphenol offers a full range of Rugged Ethernet switches for industrial use. These switches are specifically designed for industrial applications where Real-Time is a key requirement. The wide range, from unmanaged Plug & Play switches to those managed with fiber optics ports, will fulfill all your needs. This family of switches, IP30 rated, is suitable for both Din-Rail or flat panel mounting. This is an easy way to make the Ethernet networks of your manufacturing site, automation or control units deterministic.

This wide range of Ethernet switches is available with following features:

- Unmanaged, Real-Time Ring and Managed models
- RJ45 ports and up to two fiber optics ports (multimode or singlemode)
- 5 or 9 port models
- **Up to 3 Gigabit ports are offered**

## KEY FEATURES

- Redundant power inputs with surge/spike protection
- Ultra reliable 1,000,000 hours MTBF
- Hazardous location: operation in Zone 2
- Wide operating temperature range of -40°C to 70/85°C
- Rugged metal packaging with DIN rail or direct panel mounting
- Auto-detecting, auto-crossover and auto-polarity
- Full-Duplex operation with flow control (no collisions!)
- Ring Switch Networking Features
  - Real-Time Ring for ultra-fast fault-tolerant loops
  - Recovery time of 30 ms + 5 ms per hop!
  - Ideal for deterministic systems and PLCs
  - Real-time traffic prioritization
  - Port mirroring for traffic diagnostic
  - 3 ports 10/100/1000 - BaseT(X) (\*)
- Managed Switch Networking Features
  - Rapid Spanning Tree (RSTP) for fast redundant rings
  - Priority queuing for real-time performance (QoS and CoS)
  - SNMP v1 and v2 for network management
  - SNMPv3 for authentication and encryption
  - IGMP for multicast filtering
  - VLAN for traffic segregation
  - User friendly configuration (web, Telnet, RS232)
  - Encryption using HTTPS, SSL, SSH, SNMPv3
  - Message filtering to stop broadcast storms
  - RMON and port mirroring for diagnostics
  - The Power of Linux Inside
  - 3 ports 10/100/1000 - BaseT(X) (\*)

- 1 SC or ST fiber connector (1, 2 or none)
- 2 DIN-Rail or Panel Mounting Fixture
- 3 5 or 9 connectors (RJ45, SC or ST fiber)
- 4 Unmanaged, Ring or Managed Capability
- 5 Indicators for Power, Alarm Output Status
- 6 Indicators for Link Status and Datarate
  - 10 Mbps
  - 100 Mbps
  - 1000 Mbps
- 7 Terminal block for Redundant Power Inputs + Alarm Output
- 8 IP30 Iridized Aluminum Enclosure



## MANAGED, RING & UNMANAGED SWITCH FEATURES

### IEEE Ethernet Standards

| Models  | Features          | 802.3/u | 802.3x | 802.3z | 802.1p | 802.1D | 802.1w | 802.1Q |
|---------|-------------------|---------|--------|--------|--------|--------|--------|--------|
| RJS 9ES | Unmanaged         | ✓       | ✓      |        |        |        |        |        |
| RJS 9RS | RING              | ✓       | ✓      |        | ✓      |        |        |        |
| RJS 9RG | RING - Gigabit    | ✓       | ✓      | ✓      | ✓      |        |        |        |
| RJS 9MS | Managed           | ✓       | ✓      |        | ✓      | ✓      | ✓      | ✓      |
| RJS 9MG | Managed - Gigabit | ✓       | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      |

|               |                                           |               |                                         |
|---------------|-------------------------------------------|---------------|-----------------------------------------|
| IEEE 802.3 /u | 10 Mbps Ethernet & 100 Mbps Fast Ethernet | IEEE 802.1p   | Priority queuing – QoS, CoS, ToS/DS     |
| IEEE 802.3x   | Full-Duplex with Flow Control             | IEEE 802.1D/w | Rapid Spanning Tree for redundant rings |
| IEEE 802.3z   | 1000 Mbps Gigabit Ethernet                | IEEE 802.1Q   | VLAN for traffic segregation            |

### Regulatory Approvals

|                    |                                                                                                            |
|--------------------|------------------------------------------------------------------------------------------------------------|
| EMI emissions      | EN55022, FCC part 15, ICES-003                                                                             |
| EMC immunity       | IEC61326-1, IEEE C37.90                                                                                    |
| Shocks             | IEC60068-2-27                                                                                              |
| Vibrations         | IEC60068-2-6                                                                                               |
| Free Fall          | IEC60068-2-32                                                                                              |
| Hazardous Location | UL1604, CSA C22.2/213 (Class 1, Div. 2), EN50021/Zone 2<br>EN 60079-15 (Zone 2 locations - EEx nA II T4 x) |

### Ethernet features

|                         |                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RJ45 ports              | 5 or 9 Shielded RJ45 ports 10/100 or 1000 BaseT(x)                                                                                                                                                                                                                                                                                               |
| Fiber optic ports       | LC or SC or ST connectors<br>Data rate 100BaseFX (100Mbps) or 1000 Mbps for 9RG & 9MG models<br>Wavelength 1300 nm center<br>Fiber multimode (mm) optimal: 62.5/125 um<br>Fiber singlemode (sm) optimal: 9/125 um<br>Fiber max distance (Full duplex): 2km (mm), 15 or 40 km (sm) (except gigabit)<br>0,5km (mm), 10km (sm) for 9RG & 9MG models |
| Ethernet switch type    | Intelligent store & forward                                                                                                                                                                                                                                                                                                                      |
| Full / Half Duplex      | Configurable                                                                                                                                                                                                                                                                                                                                     |
| RJ45 speed              | 10, 100 or 1000 Mbps auto-negotiation                                                                                                                                                                                                                                                                                                            |
| RJ45 MDI/MDIX           | Auto-crossover connection                                                                                                                                                                                                                                                                                                                        |
| RJ45 TD and RD polarity | Auto-polarity                                                                                                                                                                                                                                                                                                                                    |
| Typical latency         | 16 us + frame time @ 10 Mbps (varies on load and settings)<br>5 us + frame time @ 100 Mbps                                                                                                                                                                                                                                                       |
| MAC addresses supported | 8192 (MG & RG); 2048 for all other models                                                                                                                                                                                                                                                                                                        |
| Memory bandwidth        | 32 Gbps (MG & RG); 3.2 Gbps for all other models                                                                                                                                                                                                                                                                                                 |

### Environmental

|                           |                                                                                 |
|---------------------------|---------------------------------------------------------------------------------|
| Operating Temperature     | - 40°C to +85°C (5 ports model + RJS 9ES)<br>- 40°C to +70°C (All other models) |
| Storage Temperature       | - 40°C to +85°C                                                                 |
| Humidity (non-condensing) | 5 to 95 % RH                                                                    |

### Status Ring & Managed models only

|                                                           |                                          |
|-----------------------------------------------------------|------------------------------------------|
| "OK" contact output<br>(or 10 - 50V DC depends on models) | 10 - 30V DC<br><br>Maximum current 0.5 A |
|-----------------------------------------------------------|------------------------------------------|

### Power Supply

|                                 |                                                                          |
|---------------------------------|--------------------------------------------------------------------------|
| Input Power (depends on models) | 2 W to 9W typical, all ports active at 100 Mbps                          |
| Redundant Inputs                | 10 - 50V DC (models RJS-5RS ; RJS-9RS)<br>10 - 30V DC (all other models) |

### EXCEEDS MIL-STD-1275

| Power protection rating | Industrial                   | MIL-STD-1275<br>Available on:<br>RJS-5RS / RJS-9RS<br>RJS-9MS -4 & -5<br>100 V for 1s |
|-------------------------|------------------------------|---------------------------------------------------------------------------------------|
| Surge protection        |                              |                                                                                       |
| Transient protection    | 15 KW peaks                  | 15 KW peaks                                                                           |
| Spike protection        | 5 KW<br>(10 times for 10 µs) | 5 KW<br>(10 times for 10 µs)<br>250 V<br>(50 times for 100 µs)                        |



### Part Number Code

| Series                                                                                       | RJS | 5ES | 1 | - | - |
|----------------------------------------------------------------------------------------------|-----|-----|---|---|---|
| <b>RJ-Switch</b>                                                                             |     |     |   |   |   |
| <b>Type of Electronics</b>                                                                   |     |     |   |   |   |
| <b>5ES:</b> 5 ports total, Ethernet unmanaged switch                                         |     |     |   |   |   |
| <b>9ES:</b> 9 ports total, Ethernet unmanaged switch                                         |     |     |   |   |   |
| <b>5RS:</b> 5 ports total, Ethernet Ring switch                                              |     |     |   |   |   |
| <b>9RS:</b> 9 ports total, Ethernet Ring switch                                              |     |     |   |   |   |
| <b>5MS:</b> 5 ports total, Ethernet Managed switch                                           |     |     |   |   |   |
| <b>9MS:</b> 9 ports total, Ethernet Managed switch                                           |     |     |   |   |   |
| <b>RJ45 or fiber ports</b>                                                                   |     |     |   |   |   |
| <b>1:</b> RJ45 ports only, no fiber                                                          |     |     |   |   |   |
| <b>2:</b> 1 multimode fiber ports                                                            |     |     |   |   |   |
| <b>3:</b> 1 singlemode fiber ports                                                           |     |     |   |   |   |
| <b>4:</b> 2 multimode fiber ports (except for 9ES- models)                                   |     |     |   |   |   |
| <b>5:</b> 2 singlemode fiber ports (except for 9ES- models)                                  |     |     |   |   |   |
| <b>Style of Fiber connectors</b>                                                             |     |     |   |   |   |
| <b>Blank:</b> No fiber                                                                       |     |     |   |   |   |
| <b>SC:</b> SC style fiber connector(s)                                                       |     |     |   |   |   |
| <b>ST:</b> ST style fiber connector(s)                                                       |     |     |   |   |   |
| <b>SCL:</b> SC style fiber connector(s), long haul fiber (40km), on singlemode models        |     |     |   |   |   |
| <b>STL:</b> ST style fiber connector(s), long haul fiber (40km), on singlemode models        |     |     |   |   |   |
| <b>Pre-set for Ring models only</b>                                                          |     |     |   |   |   |
| <b>E0:</b> Pre-set for 0 rings (special order)                                               |     |     |   |   |   |
| <b>E1:</b> Pre-set for 1 ring (standard order), configured on last 2 ports                   |     |     |   |   |   |
| <b>E2:</b> Pre-set for 2 rings (special order), Ring 1 = last 2 ports, Ring 2 = ports 1 & 2. |     |     |   |   |   |

Example: RJ-Switch, 5 ports Ethernet Ring switch, with 1 multimode ST fiber port, pre-set for 1 ring: **RJS-5RS-2-ST-E1**

| Series                                                                                                | RJS | 9RG | CC |
|-------------------------------------------------------------------------------------------------------|-----|-----|----|
| <b>RJ-Switch</b>                                                                                      |     |     |    |
| <b>Type of Electronics</b>                                                                            |     |     |    |
| <b>9RG:</b> 9 ports, Unmanaged RING Ethernet Switch including 3 gigabit ports                         |     |     |    |
| <b>9MG:</b> 9 ports, Managed Ethernet Switch including 3 gigabit ports                                |     |     |    |
| <b>RJ45 or fiber (FO) ports</b>                                                                       |     |     |    |
| <b>CC:</b> 6 ports RJ45 100 Mbps + 3 gigabit RJ45 ports                                               |     |     |    |
| <b>MM:</b> 6 ports RJ45 100 Mbps + 1 port gigabit RJ45 + 2 ports FO multimode gigabit (LC connectors) |     |     |    |
| <b>SS:</b> 6 ports RJ45 100 Mbps + 1 port gigabit RJ45 + 2 ports FO multimode gigabit (LC connectors) |     |     |    |

**Note:** 9RG models have ports 8&9 (FO or gigabit RJ45) pre-set for a ring.

## ATEX ZONE 2 RUGGED & IP68 SEALED ETHERNET SWITCH



### Outstanding features :

- IP65/68 Sealing
- ATEX Zone 2 IIBG ExnAII T4X (EN60079-15 & EN60079-0)
- Plug and Play simplicity
- Ring redundancy
- Operating temperature: -40°F to 170°F (-40°C to +75°C)

### Industrial Applications

- Oil & Gas
- Process Control
- Factory Automation

This Ethernet Switch is a combination of rugged packaging with locking device for Zone 2 hazardous location, with fault-tolerant network redundancy.

### P/N: RJSPC-EX-5ES1-PLG-CAPS

#### Note: this part number includes:

- One ATEX Zone 2 IP68 Plug and Play Ethernet switch equipped with caps on Ethernet connectors
- One power plug equipped with anti decoupling nut
- Five Ethernet plugs equipped with anti decoupling spring

### P/N: RJSPC-EX-5RS1-PLG-CAPS

#### Note: this part number includes:

- One ATEX Zone 2 IP68 RING Ethernet switch equipped with caps on Ethernet connectors
- One power plug equipped with anti decoupling nut
- Five Ethernet plugs equipped with anti decoupling spring

### Key Features

- Ring Switch Networking Features (managed features available!)
  - Real-Time Ring for ultra-fast fault-tolerant loops
    - Recovery time of 30 ms + 5 ms per hop!
  - Modbus monitoring over Ethernet
    - Ideal for deterministic systems and PLCs
  - Real-time traffic prioritization (QoS and CoS)
    - Assure delivery of real-time data
    - Improve network utilization
    - User settable priority assignments
  - Advanced switch features
    - User configurable port settings
    - Port mirroring for traffic diagnostics
    - Pre-configurable for Plug-And-Play simplicity



- 1 LEDs indicating activity, link status, datarate (10/100 Mbps)
- 2 LED indicating ring status
- 3 5 rugged IP68 RJ Field Ethernet ports
- 4 Real-time ring feature
- 5 IP68 polyester enclosure reinforced with glass fiber
- 6 OK power & ring status
- 7 LEDs indicating power
- 8 Anti-decoupling nut for power plug
- 9 Anti-decoupling spring for ethernet plugs

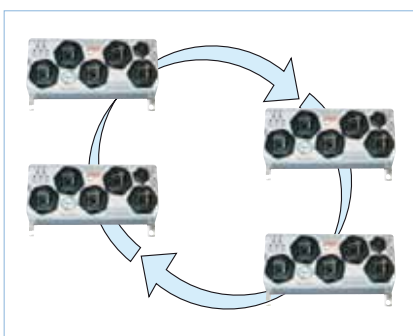
### Description (example for Ring model)

- Waterproof IP68 Rating (NEMA 6)
- Reduced Installation Costs with the patented RJStop® system
- Use any standard RJ45 cordset
- Rugged Enclosure in Polyester reinforced with 30% glass fiber
- Redundant power inputs with surge/spike protection
- Ultra reliable 1,000,000 hours Mean Time Between Failure (MTBF)
- Zone 2 hazardous location (models RJSPC-EX)



# RJ SWITCH

Harsh Environment Industrial Ethernet Switch Plastic Enclosure - IP68



## Industrial Applications

- Factory Automation
- Robotics
- Process Control
- Transportation Systems
- Data Acquisition & Transmission

## Rugged & Waterproof Switch

Amphenol offers a small size 5 port waterproof Ethernet Switch that can withstand a variety of extreme conditions - low & high temperatures, shocks & vibrations, dust particles or even liquid immersion. This is an easy way to make the Ethernet networks of your manufacturing site, automation or control units deterministic.

## Amphenol IP68 Industrial Ring Switch

Amphenol IP68 Ring Ethernet switch is a combination of very fast, fault-tolerant network redundancy Sixnet technology and IP68 sealed & rugged packaging, specifically designed for the harshest environments. Rings self-configure and just run, without any complex configuration. The switch board is sealed within a waterproof IP68 polyester enclosure suitable for highly corrosive environments. The polyester material is glass fiber reinforced. This makes it very rugged against shocks and vibration. The I/O interfaces are waterproof & rugged RJ45 connectors from the RJ FIELD plastic circular series.

## Key Features

- Ring Switch Networking Features (managed features available!)
  - Real-Time Ring for ultra-fast fault-tolerant loops
    - Recovery time of 30 ms + 5 ms per hop!
  - Modbus monitoring over Ethernet
    - Ideal for deterministic systems and PLCs
  - Real-time traffic prioritization (QoS and CoS)
    - Assure delivery of real-time data
    - Improve network utilization
    - User settable priority assignments
  - Advanced switch features
    - User configurable port settings
    - Port mirroring for traffic diagnostics
    - Pre-configurable for Plug-And-Play simplicity



- 1 LEDs indicating activity, link status, datarate (10/100 Mbps)
- 2 LED indicating ring status
- 3 5 rugged IP68 RJ Field Ethernet ports
- 4 Real-time ring feature
- 5 IP68 polyester enclosure reinforced with glass fiber
- 6 OK power & ring status
- 7 LEDs indicating power
- 8 Redundant power inputs
- 9 OK contact output

## IP68 Unmanaged and Ring Switch Features

### IEEE Ethernet Standards

|                      |                                                        |
|----------------------|--------------------------------------------------------|
| IEEE 802.3           | 10Mbps Ethernet                                        |
| IEEE 802.3u          | 100Mbps Fast Ethernet                                  |
| IEEE 802.3x          | Full-Duplex with Flow Control                          |
| IEEE 802.1p standard | QoS/CoS - Quality/Class of Service for Ring model only |

### Regulatory Approvals

|               |                                |
|---------------|--------------------------------|
| EMI emissions | EN55022, FCC part 15, ICES-003 |
| EMC immunity: | IEC61326-1, IEEE C37.90        |
| Shocks:       | IEC60068-2-27                  |
| Vibrations:   | IEC60068-2-6                   |
| Free Fall:    | IEC60068-2-32                  |

### Ethernet features

|                         |                                                                                            |
|-------------------------|--------------------------------------------------------------------------------------------|
| Ports                   | 5 Shielded RJ45 ports 10/100BaseTX                                                         |
| Ethernet switch type    | Intelligent store & forward                                                                |
| Full / Half Duplex      | Configurable                                                                               |
| RJ45 speed              | 10 or 100 Mbps auto-negotiation                                                            |
| RJ45 MDI/MDIX           | Auto-crossover connection                                                                  |
| RJ45 TD and RD polarity | Auto-polarity                                                                              |
| Typical latency         | 16 us + frame time @ 10 Mbps (varies on load and settings)<br>5 us + frame time @ 100 Mbps |
| MAC addresses supported | 2048                                                                                       |
| Memory bandwidth        | 3.2 Gbps                                                                                   |
| Ethernet isolation      | 1500 Vrms 1 minute                                                                         |
| Ring features           | Link loss recovery time: 30 ms plus 5 ms per hop                                           |
| (for Ring model only)   | Maximum switches in ring: 50+<br>Dual Ring support                                         |

### Power Supply

|                       |                                    |
|-----------------------|------------------------------------|
| Input power (typical) | ES: 2,4 W ; RS: 2,7 W              |
| Redundant inputs      | 10-30 VDC; 10-50 VDC for EP models |

### Status Reporting (for Ring model only)

|                     |                                                             |
|---------------------|-------------------------------------------------------------|
| "OK" contact output | Output current: 0.5 A max                                   |
| "OK" contact State  | OFF when a fail occurs<br>ON when power and switching is OK |

### Environmental

|                       |                 |
|-----------------------|-----------------|
| Operating Temperature | - 40°C to +75°C |
| Storage Temperature   | - 40°C to +85°C |

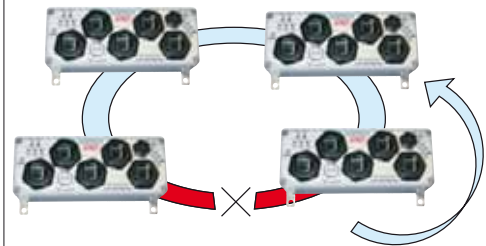
### Weight

0.54 kg

## Real-Time Ring Switches

Amphenol Real-Time Ring switches combines the Plug&Play simplicity of an unmanaged switch with high performances of Sixnet Ring managed switches.

- **Real-Time fault-tolerant Ring**  
Recovery time of 30 ms + 5 ms per hop!
- **Real-Time traffic prioritization (QoS & CoS)**  
Assure delivery of real-time data
- **Available Managed features**  
User configurable port settings  
Port mirroring for traffic diagnostics  
Pre-configurable for Plug & Play simplicity



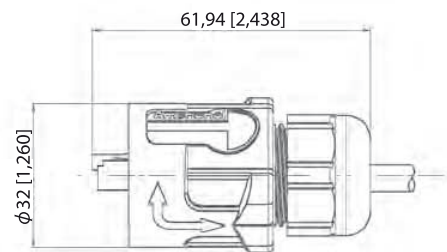
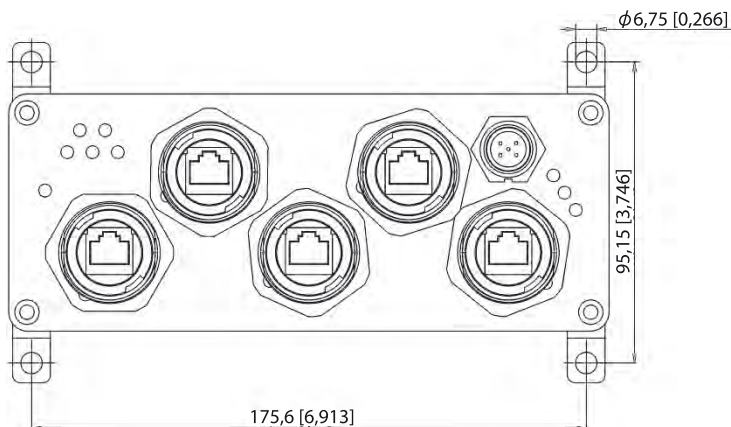
The use of such switches provides a fast network and avoids faults. When a break occurs, the switch instantly transfers data to new path. The link loss recovery is 30 ms plus 5 ms times the number of Ring switches in the ring. For example, 10 ring switches will recover in less than 80 ms. Rings can be pre-configured to "just run". They don't need an assigned IP address. But if you like, you can fine tune the performance of the ring by using a simple Windows wizard (which is free).

Ring networks can be divided into multiple "sub-rings" which enhance reliability and recovery speed through small ring paths.

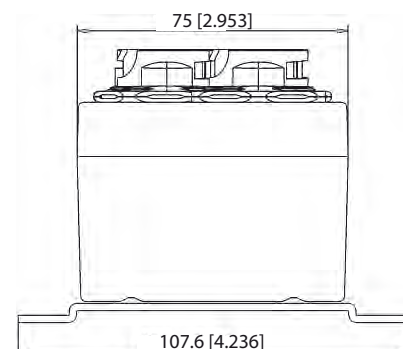
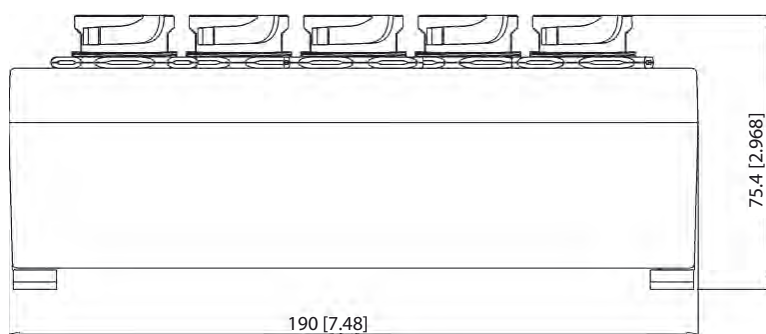
The prioritization of messages assures delivery of real-time data. Some applications need to force no-real-time data (such as video information) to lower priority and force critical real-time data at higher priority. Network utilization is improved.

**This combination of Ethernet technology associated with rugged and sealed protective enclosure is the ideal solution to deliver deterministic performance to your industrial systems even in the harshest environment!**

### Dimensions (mm/inch)



Accessory: Plugs for RJ45 ports



## Part Numbers

|                                     |                                                                |     |   |
|-------------------------------------|----------------------------------------------------------------|-----|---|
| Series                              | RJS-PC                                                         | 5ES | 1 |
| IP68 RJ-Switch, with polyester body |                                                                |     |   |
| Type of Electronics                 |                                                                |     |   |
| 5RS:                                | 5 ports 10/100 Mbps, Ring switch (standard order)              |     |   |
| 5ES:                                | 5 ports 10/100 Mbps, Unmanaged switch (special order)          |     |   |
| Connectors                          |                                                                |     |   |
| 1:                                  | RJ45 ports, 10/100BaseT(X)                                     |     |   |
| 1CAPS:                              | Caps are attached on both power and data receptacles           |     |   |
| Military Rated Protection           |                                                                |     |   |
| Blank:                              | Industrial protection (standard order)                         |     |   |
| EP:                                 | Extended power protection exceeds MIL-STD-1275 (special order) |     |   |

Example IP68 Ethernet Ring switch, 5 ports 10/ 100 Mbps, with caps attached on the receptacles: RJS-PC-5RS-1CAPS

Note The Ring model is pre-set for 1 ring enabled on the ports 4 and 5.  
You may change the configuration by using the free windows configuration tool.  
Simply choose the desired pair of ports for your new enabled ring.

## Accessories



- P/N: RJF PC5 PWR  
Plug for power port  
Sealing protection: IP68



- P/N: RJF RB 6  
Plugs for RJ45 ports  
Sealing protection: IP68

**FREE WINDOWS CONFIGURATION TOOL**  
Download it at [www.rjswitch.com](http://www.rjswitch.com)



# RJ SWITCH

Harsh Environment Gigabit IP68 sealed & rugged military ethernet switch



## Applications

### Military Applications

- Data Acquisition & Transmission
- Battlefield Communication C4ISR
- Rugged Networks
- Mobile Communications
- Submarine
- Avionic & Shipboard Systems

## Sealed, Rugged & Waterproof Switch

Amphenol offers 9 ports managed, RING and unmanaged Ethernet Switches that can withstand a variety of extreme conditions. Whatever the situation - high temperatures, extreme shocks & vibrations, dust particles or even liquid immersion there is a solution available.

This is an easy way to make the Ethernet networks of your systems deterministic. **Up to 3 gigabit ports** are offered! The switch electronics are sealed within a waterproof IP68 metallic enclosure. The conductive cadmium plating is suitable for most demanding EMI-RFI environments. The I/O interface includes redundant power inputs as well as waterproof rugged RJ45 connectors from the RJF TV FIELD threaded product series based on MIL-DTL-38999 (Series III) metallic shell size 19. This series enables the transformation without tooling of any standard RJ45 cordset into a robust and waterproof connection system.



- 1 IP68 Aluminium enclosure with cadmium conductive plating or black paint (RoHS)
- 2 Non-managed, Ring or Managed Capability
- 3 LEDs for Power
- 4 LEDs indicating activity, link status, datarate (10/100Mbps or Gigabit)
- 5 Redundant power inputs & OK output
- 6 Balance pressure vent
- 7 Fixture for vertical mounting
- 8 9 rugged IP68 RJF TV Ethernet ports with cadmium or nickel plating



Optional Caps Available for Unused Ports

## Key Features

### Rugged environmental features

- Rugged metal packaging with cadmium or paint protection
- MIL-DTL-38999 III connectors for both power and Ethernet ports
- IP65/IP68 rated
- MIL-STD-461E (CE03) • MIL-STD 704A • RTCA/DO-160B 600 V spike suppression (optional)
- MIL-STD-1275 Surge and Spike protection (\*)
- MIL-STD-810F shocks
- RTCA/DO-160C Vibrations
- Wide operating temperature range of -40°C to 70°C
- MIL-STD-810F Altitude 50,000 ft - 15,000 m

### Ethernet features

- 3 ports 10/100/1000-BaseT(X) + 6 ports 10/100-BaseT(X) (\*)
- Unmanaged, RING unmanaged and **Managed** models
- Full-Duplex operation with flow control (no collisions!)
- Auto-detecting, auto-crossover and auto-polarity

## Features for ring and managed models.

### RING switch

- Ring for fast fault-tolerant loops
- Recovery time of 30 ms + 5 ms per hop!
- QoS and CoS priority queuing

### MANAGED switch

- RSTP for redundant rings
- QoS and CoS priority queuing
- SNMPv3 authentication and encryption
- IGMP for multicast filtering
- VLAN for traffic segregation
- And much more!

(\*): depend on models

## Managed & Unmanaged Switch Features

### IEEE Ethernet Standards

| Models     | Features          | 802.3/u | 802.3x | 802.3z | 802.1p | 802.1D | 802.1w | 802.1Q |
|------------|-------------------|---------|--------|--------|--------|--------|--------|--------|
| RJS ML 9ES | Unmanaged         | ✓       | ✓      |        |        |        |        |        |
| RJS ML 9RS | RING              | ✓       | ✓      |        | ✓      |        |        |        |
| RJS ML 9RG | RING - Gigabit    | ✓       | ✓      | ✓      | ✓      |        |        |        |
| RJS ML 9MS | Managed           | ✓       | ✓      |        | ✓      | ✓      | ✓      | ✓      |
| RJS ML 9MG | Managed - Gigabit | ✓       | ✓      | ✓      | ✓      | ✓      | ✓      | ✓      |

|               |                                           |               |                                         |
|---------------|-------------------------------------------|---------------|-----------------------------------------|
| IEEE 802.3 /u | 10 Mbps Ethernet & 100 Mbps Fast Ethernet | IEEE 802.1p   | Priority queuing – QoS, CoS, ToS/DS     |
| IEEE 802.3x   | Full-Duplex with Flow Control             | IEEE 802.1D/w | Rapid Spanning Tree for redundant rings |
| IEEE 802.3z   | Gigabit 1000 Mbps Ethernet                | IEEE 802.1Q   | VLAN for traffic segregation            |

### Environmental specifications

|               |                                                                          |
|---------------|--------------------------------------------------------------------------|
| EMI emissions | EN55022 class A, FCC part 15, ICES-003                                   |
| EMC immunity  | IEC61326-1, IEEE C37.90                                                  |
| Shocks        | MIL-STD-810F: 40g, 11ms, 18 saw tooth shocks                             |
| Vibrations    | RTCA/DO-160C Sinusoidal vibrations 5-55 Hz: 0.01 inch ; 55-500 Hz: 1.5 g |
| Altitude      | MIL-STD-810F : 50,000 ft - 15,000 m                                      |
| Temperature   | Operating: - 40°C to +70°C<br>Storage: - 40°C to +85°C                   |
| Weight        | approx 2.2Kg                                                             |

### Power Supply

|                      |                                                                                                                                                                                                                                                                                                                            |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 24V DC Input         | 10 - 30V DC for 9ES model (single power)<br>10 - 50V DC redundant for 9RS models<br>10 - 30V DC redundant for 9RG, 9MS and 9MG models                                                                                                                                                                                      |
| Input power          | 4 to 9 W typical (all ports active), depends on models                                                                                                                                                                                                                                                                     |
| Connectors for power | MIL-DTL-38999 III Jam nut receptacle, olive drab cadmium or nickel plated<br>9ES models: 1 connector TVx07xx 0998P: 3 cts # 20 (wire 0.6 mm <sup>2</sup> max)<br>Other models: 2 connectors TVx07xx 0935P: 6 cts # 22D (wire 0.4 mm <sup>2</sup> max)<br>The second connector facilitates the cabling for redundant power. |
| "OK" contact output  | (Ring models only) Sourcing power; Maximum current: 0.5 A                                                                                                                                                                                                                                                                  |

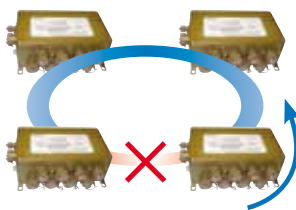
### Ethernet features

|                           |                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------|
| RJ45 ports                | 9 shielded RJ45 ports 10/100 Base T(X) or 1000 Base T(X)                                        |
| Connectors for RJ45 ports | RJFTV 7 G: Jam nut receptacle based on MIL-DTL-38999 III<br>Olive drab cadmium or nickel plated |
| RJ45 speed                | 10, 100 or 1000 Mbps auto-negotiation                                                           |
| Typical latency           | 16 us + frame time @ 10 Mbps (varies on load and settings)<br>5 us + frame time @ 100 Mbps      |
| Full / Half Duplex        | Automatic or configurable                                                                       |
| MDI / MDIX                | Auto-crossover                                                                                  |
| MAC addresses supported   | 8192 (MG & RG); 2048 for all other models                                                       |
| Memory bandwidth          | 32 Gbps (gigabit); 3.2 Gbps for all other models                                                |

| Power protection | Models<br>ES; MS; RG & MG | Model RJS-ML-9RS1<br>MIL-STD-1275              | Optional -704 Specifications<br>Available for all models                                                    |
|------------------|---------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Surge            |                           | 100 V for 1s                                   | 100 V, 60 ms<br>MIL-STD-1275A<br>Fig. 8&9 of MIL-STD-704A                                                   |
| Transient        | 15 KW peaks               | 15 KW peaks                                    |                                                                                                             |
| Spike            | 5 KW<br>(10x for 10 µs)   | 5 KW (10x for 10 µs)<br>250 V (50x for 100 µs) | 400 V, 5 µs (DO160)<br>600 V, 10 µs<br>(MIL-STD-461C CS06 limits)<br>Protection against reverse<br>voltages |

## Real-Time Ring Switches

Amphenol Real-Time Ring switches combines the Plug&Play **simplicity** of an unmanaged switch with **high performances** of managed switches.



### Real-Time fault-tolerant Ring

Recovery time of 30 ms + 5 ms per hop!

### Real-Time traffic prioritization (QoS & CoS)

Assure delivery of real-time data

### Available Managed features

User configurable port settings

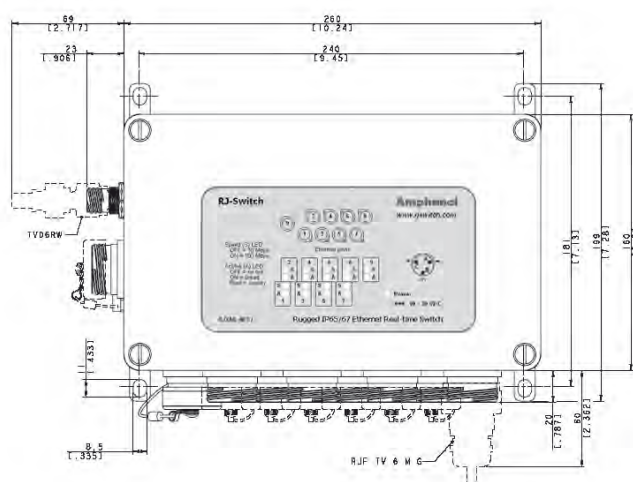
Port mirroring for traffic diagnostics

Pre-configurable for Plug & Play simplicity

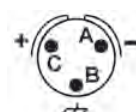
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Ring networks can be divided into multiple "sub-rings" which enhance reliability and recovery speed through the small ring paths.

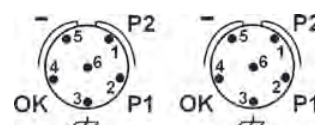
## Dimensions (mm/inch) Military Aluminum ML Enclosure



## Pin-out for power



Pin-out for the 9ES1 models



Pin-out for the 2 power connectors of the Ring and managed models

Note: The use of 2 connectors facilitates the cabling of redundant power inputs.

## Part Numbers

| Series                     | RJS | ML                                                                                                                                  | 9ES1 | - | - |
|----------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------|------|---|---|
| RJ-Switch                  |     |                                                                                                                                     |      |   |   |
| <b>Type of Enclosure</b>   |     |                                                                                                                                     |      |   |   |
| <b>ML</b>                  |     | MIL-DTL-38999 (Series III) Receptacles, OD Cadmium Plating                                                                          |      |   |   |
| <b>BKN</b>                 |     | RAL 9005 (Jet black) Paint on Aluminum box, Nickel plated 38999 (Series III) Receptacles, Additional coating on PCB, RoHs compliant |      |   |   |
| <b>Type of Electronics</b> |     |                                                                                                                                     |      |   |   |
| <b>9ES1</b>                |     | Unmanaged 9 ports 10/100 Base T(X)                                                                                                  |      |   |   |
| <b>9RS1</b>                |     | Unmanaged RING 9 ports 10/100 Base T(X)                                                                                             |      |   |   |
| <b>9RG1</b>                |     | Unmanaged RING 6 ports 10/100 Base T(X) + 3 ports 10/100/1000 Base T(X)                                                             |      |   |   |
| <b>9MS1</b>                |     | Managed 9 ports 10/100 Base T(X)                                                                                                    |      |   |   |
| <b>9MG1</b>                |     | Managed 6 ports 10/100 Base T(X) + 3 ports 10/100/1000 Base T(X)                                                                    |      |   |   |
| <b>Optional</b>            |     | Transient suppression module; 600V spike suppressor                                                                                 |      |   |   |
| <b>Blank</b>               |     | No transient suppression module                                                                                                     |      |   |   |
| <b>704</b>                 |     | Switch equipped with additional transient suppression module                                                                        |      |   |   |
| <b>Accessories</b>         |     | Caps for receptacles fixed with string directly to the receptacle                                                                   |      |   |   |
| <b>Blank</b>               |     | No caps included. The Ethernet ports are still sealed but the contacts are not protected                                            |      |   |   |
| <b>Caps</b>                |     | Attached caps for both power and data included                                                                                      |      |   |   |

### EXAMPLES:

- **RJS ML 9MG1 CAPS:** Managed switch in an aluminum enclosure with olive drab green conductive cadmium plating, 6 ports 10/100 Base T(X) + 3 gigabit ports, RJF TV threaded coupling receptacles, caps are added to the switch
- **RJS BKN 9ES1 704 CAPS :** Unmanaged switch in a black paint enclosure, 9 ports 10/100 Base T(X), RJF TV threaded coupling receptacles, both power and Ethernet receptacles are Nickel plated, caps are added to the switch, additional transient suppression module included.

### NOTES:

- All BKN Ethernet switches and nickel plated accessories are RoHs compliant.
- With the -704 option, a filter module is included inside the switch allowing to meet MIL-STD-461 and other aircraft standards.



## Accessories



### ■ Plugs for Ethernet ports

**RJF TV 6 M G:** Cadmium OD plating  
**RJF TV 6 M N:** Nickel plating

Based on MIL-DTL-38999  
**No tool required!**



### ■ Caps for Ethernet ports

**RJSMC C7G:** Cadmium OD plating  
**RJSMC C7N:** Nickel plating

A simple screwdriver is needed!  
*Note: Do not order the caps in addition with pre-equipped  
 RJS-xxxx- CAPS switches.*



### ■ Plugs for I/O ports:

MIL-DTL-38999, cadmium plated, crimp contacts.

#### For 9ES1 model:

One plug (3 cts #20)

**TV 06 RW 0998 S:** Cadmium OD plating

**TV S06 RF 0998 S:** Nickel plating

#### For 9RS1, 9RG1, 9MS1 & 9MG1 models

Two plugs (6 cts # 22D)

**TV 06 RW 0935 S:** Cadmium OD plating

**TV S06 RF 0935 S:** Nickel plating



### ■ Backshells for I/O plugs

We suggest to use MIL-DTL-38999 III backshells.  
 Consult the dedicated catalog (E118) for details.

#### Examples:

**TVNSA 09 014:** shielding backshell, cadmium OD plating

**TVNSA 09 023:** shielding backshell, nickel plating

+ **804221** straight heat shrink for sealing

#### EXAMPLES:

with an **RJSMC 9MG1 CAPS** switch, we suggest to use hereafter accessories:

**RJF TV 6 M G** (up to 9) for Ethernet ports

**TV 06 RW 0935 S** (x2) + **TVNSA 09 014** (x2) + **804221** (x2) for power ports

## But Also: We offer box assembly

- Based on customer specification
- Using our IP68 box solutions
- Large range of waterproof connectors
  - For power supply > TV or PT series
  - For Ethernet network > RJField
  - For USB > USBField
  - For Fiber optic > TVOP, CTOS and others



Cabling box with RJF receptacles and self-closing caps



Kit with TVOP fiber connectors and RJFTV connectors

# RJ FIELD GLOSSARY

## **10BASE-T**

10 Mbps Ethernet on twisted-pair (Category 3) cable.

## **100BASE-T**

The twisted pair version of 100 Mbps Ethernet. Requires Category 5 cabling.

## **1000BASE-T**

A recent LAN standard for implementing 1000 Mbps Ethernet on Category 5 cable. Also called Gigabit Ethernet.

## **Auto-MDIX**

A protocol which allows two Ethernet devices to negotiate their use of the Ethernet Transmit (Tx) and Receive (Rx) cable pairs. This allows two Ethernet devices with MDI or MDI-X connectors to connect without using a cross-over cable.

## **Baud**

A unit of measurement that denotes the number of bits that can be transmitted per second. For example, if a modem is rated at 9600 baud it is capable of transmitting data at a rate of 9600 bits per second.

## **Bandwidth**

The maximum capacity of a network channel. Usually expressed in bits per second (bps). Ethernet channels have bandwidths of 10, 100, and 1000 Mbps (Gigabit).

## **bps**

Bits Per Second is the unit used for measuring line speed, the number of information units transmitted per second.

## **Broadcast**

A transmission initiated by one station and sent to all stations on the network.

## **Byte**

The amount of memory needed to store one character such as a letter or a number. Equal to 8 bits of digital information. The standard measurement unit of a file size.

## **Category 5**

A performance classification for twisted pair cables, connectors and systems. Specified to 100 MHz. Suitable for voice and data applications up to 155 Mbps.

## **Category 5 e**

Also called Enhanced Category 5. A performance classification for twisted pair cables, connectors and systems. Specified to 100 MHz. Suitable for voice and data applications up to 1000 Mbps.

## **Category 6**

A performance classification for twisted pair cables, connectors and systems. Specified up to 250 MHz.

## **CSMA/CD**

Carrier Sense Multiple Access/Collision Detect. The Medium Access Control (MAC) protocol used in Ethernet.

## **Data rate**

The speed of the data transmission, measured in bps (bits per second) or Mbps.

## **Duplex (Full, Half)**

Full duplex is a communications method that allows for the simultaneous transmission and reception of data. In Half Duplex communication, transmissions and receptions can occur in either direction but not at the same time.

## **Ethernet**

The most common network protocol in use. A protocol is a set of rules enabling data communications. Ethernet can operate over several different media including fiber optic, coaxial cable and twisted-pair cable.

## **IEEE 802.3**

IEEE Working Group for CSMA/CD, the protocol used in Ethernet transmissions.

## **IGMP snooping**

The ability of a switch to observe Internet Group Multicast Protocol (IGMP) traffic in order to learn IP Multicast group membership. The purpose is to restrict multicast transmissions to only those ports which have requested them.

## **LAN**

Local Area Network. A network of directly-connected machines (located in close proximity), providing high speed communication over physical media such as fiber optics, coaxial cable, or twisted pair wiring.

**MAC Address**

A unique address assigned to a station interface, identifying that station on the network. With Ethernet, this is the unique 48-bit station address. Same as the physical address.

**Megabit (Mb)**

Megabit. One million bits of information, usually used to express a data transfer rate ; 1 Megabit/second = 1Mbps.

**Megabyte (MB)**

MegaByte. A unit of data storage size which represents one million characters of information.

**Multicast**

A transmission initiated by one station to many stations of the network.

**Port Mirroring**

Port mirroring allows a switch port to monitor packets from any or all of its ports so that traffic can be analysed.

**Quality of Service (QoS)**

Some switches support QoS (per 802.1p and 802.1Q standards) whereby messages can be assigned levels of priority. QoS is important where time-critical applications can be impaired by data delays.

**RJ45**

8-position modular jacks used on twisted pair links for Ethernet cabling.

**RJ-Field**

A wide range of connectors which allow to reinforce and seal standard RJ45 cable. See [www.rjfield.com](http://www.rjfield.com)

**SNMP**

Simple Network Management Protocol. This is THE standard used for switch management programs.

**Spanning Tree Protocol (STP)**

A link management protocol providing path redundancy and preventing network loops by defining a tree to span all switches in a network. It forces redundant data paths into a standby (blocked) state. If a path malfunction occurs, the topology is reconfigured and the link reestablished by activating the standby path.

**TCP/IP**

Transmission Control Protocol/Internet Protocol. A set of protocols, resulting from ARPA efforts, used by the Internet to support services such as remote login (TELNET), file transfer (FTP) and mail (SMTP).

**TELNET**

The Internet standard protocol for remote login (terminal connection) service. TELNET allows a user at one site to interact with a remote timesharing system at another site as if the user's terminal were connected directly to the remote computer.

**VLAN**

Virtual Local Area Network. A LAN that maps stations on a basis other than location such as by department, user type or application. Managing traffic, workstations, and bandwidth can be easier with a VLAN and improve network efficiency.

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