

# Amphenol SOCAPEX

## USBFIELD™



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# OUR COMPANY



## Proven excellence in interconnect solutions

- Since **1947**, Amphenol Socapex has prescribed, designed and manufactured reliable and innovative interconnection solutions for harsh environments, specializing in standard and customized electrical and fiber optic connectors, contacts, accessories and cabling solutions.
- Located in the **Mont Blanc region** of France and Pune in India, Amphenol Socapex serve customers in over 100 countries around the world.
- Amphenol Socapex is part of the leading supplier of interconnect systems **Amphenol**.



**1100+**  
employees



**109 M€**  
Net Sales 2022  
71% Export - 29% France



Thyez, **France**  
Pune, **India**



## Our expertise has no boundaries

### Integrated Production in France & India

- 24 000 m<sup>2</sup> manufacturing capacity on 2 sites
- Design and manufacturing centers in France and India
- State-of-the-art manufacturing technology

## Our markets



**Military**



**Commercial  
Aerospace**



**Space**



**Industry**





# TECHNOLOGIES & INNOVATION

## Engineering Laboratory



**Product testing and qualification expertise in many fields:**

- Environmental, mechanical, electrical, chemical, climatic skills
- RF and fiber optics expertise

## High-Speed Expertise



**Strong expertise in high-speed signals**

- 3D EM simulation software & EM models
- Time Domain and frequency domain

## Materials Expertise



**Focus on materials expertise and manufacturing techniques to produce faster, smaller and stronger products**

- Advanced technology research and development: polymers, metals, platings, resins ...
- Cutting edge characterizations of interconnects: Radio Frequency, partial discharges ...
- 3D CAD mechanical software, simulation & analysis

## Eco-responsibility



**Sustainable environment approach, with pro-active management of regulations (REACH / RoHS / Conflict minerals...)**

- New materials development, plating, and suitable processes
- Recycling and rational resources consumption

## Our workshops



Our workshops located in France & India provide consistent quality adapted to your volume requirements.

**Automation & Tooling :** Tools for our different activities : molding, machining, assembly

**Molding :** Solid expertise in thermoplastic elastomer and thermoset molding

**Machining :** Manufacturing of cylindrical shells and rectangular shells

**Screw Machining :** Manufacturing of electrical contacts

**Plating :** Plating with cadmium, nickel, electroless nickel, silver, black zinc nickel, gold

**Assembly :** Connector and harness assembly (electrical & optical)

## Our certifications

Product certifications : MIL-DTL38999, EN3645, EN3155, VG (VG95328, VG95319, VG96944, VG95218, VG96949)



Certified Management System



Certified Management System



Certified Management System



Certified Management System

## Our memberships

Member of CMG (Connecting Manufacturing Group) Consortium

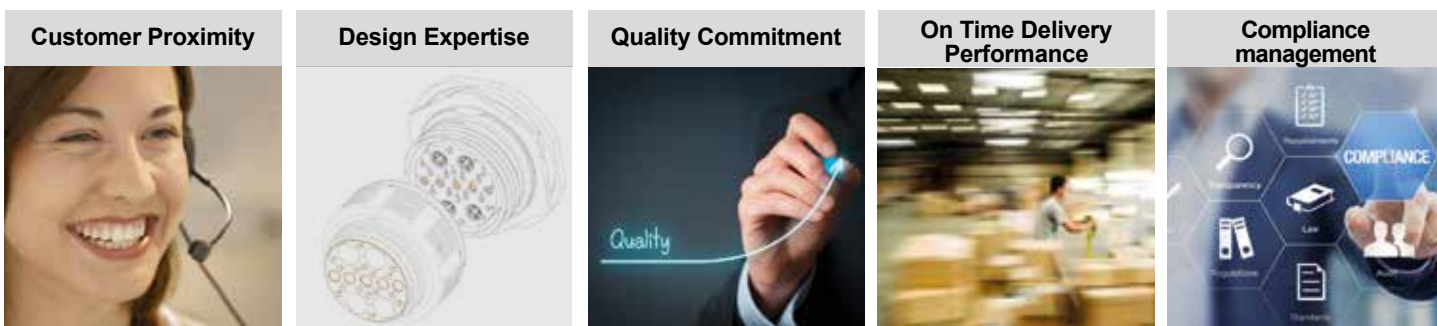


# CUSTOMER EXPERIENCE



► We have a strong reputation for helping customers solve their toughest challenges. This approach of serving your needs is ingrained in our company - from our sales team to our product development engineers.

## A partner you can trust



## Buy our solutions

You can access our solutions through our global network of sales offices or through our distributors.

### Field Sales Team :

- 10 in France
- 15 in Europe
- 100+ in North America and rest of the world.
- 5 Business Development Managers supporting local sales force Europe, North America and the rest of the world

- Technical Advisement & Multilingual Customer Service :**  
20 people



### Worldwide Distribution Network :

Our range of circular connectors, contacts, fiber optic connectors, PCB connectors and accessories are available thru our extensive distribution network.

It includes qualified distributors (QPL approved) for assembling MIL-DTL-38999 & derivatives and PT/451 (VG95328) connectors.

[Check our product inventory](#)



[Product Selectors & 3D Files](#)



**NEW**



# OUR HISTORY

1947



- Socapex creation in Suresnes, France
- 1<sup>st</sup> radio connector

1956-57



- Manufacturing unit in Cluses (74), France
- Thomson-CSF becomes primary shareholder

Early 1960's



- 1<sup>st</sup> board level connectors: HE8
- 1<sup>st</sup> "licence Bendix" manufactured connectors
- SL Series

1973



- New factory in Thyez (74) France with 250 people, 13 000m<sup>2</sup>

1975



- Production of 38999 connectors

1986

**Amphenol**  
Socapex

- Amphenol becomes primary shareholder

1995-96



- Expanded Beam connector CTOS launch
- Headquarters transferred to Thyez

2004



- RJ Field Electronica launch, "Award"

2005



- New factory in Pune, India

2010's



- LuxBeam™ and HDAS launch

2014-2017



- New workshops :
- Cable Assembly & Contact Manufacturing workshop

2019



- Increased manufacturing capacity with 2<sup>nd</sup> building in Pune, India

2022



- Harness in the box solution launch

Today & tomorrow



- New technologies :
- Investment in automation & technical expertise



- Amphenol SOCAPEX joins the "Convention des Entreprises pour le Climat".
- Our goal: to accelerate our transition to a more sustainable operation.

## MARKETS AND APPLICATIONS



### Military vehicles

Ground radios shelters  
Ground vehicles  
Battlefield  
Communication systems



### C5ISR

Threat detection system  
Soldier wearable equipment  
Rugged computer & digital radio  
Satellite reception unit



### Military Avionics & Airframe

Power unit  
Aircraft  
Radar  
Display unit  
Flight control system



### Commercial Avionics & Airframe

Landing gear  
Cockpit  
Ground power supply  
Engine Flowmeter



### Missiles & UAVS

Air missiles and UAVS  
Ground control station & launchers



### Navy

Navigation guidance



### Industrial

Automation  
Transportation  
Nuclear power station  
Robotics





## OTHER SOLUTIONS AND RELATED DOCUMENTATIONS

All our documentations are available in PDF format on our website : [www.amphenol-socapex.com](http://www.amphenol-socapex.com)



**Catalog RJ Field™**  
DOC-001041-ANG



**Catalog Rugged Ethernet Switch and Media Converters**  
DOC-001034-ANG



**Brochure μCom-10Gb+**  
DOC-000015-ANG



**Brochure TV μCom-10Gb+**  
DOC-001014-ANG



**Brochure RJF TV Reduced Flange**  
DOC-001013-ANG



**Brochure USB3F TV Reduced Flange**  
DOC-001012-ANG



**Brochure MDP FTV**  
DOC-001025-ANG



**Brochure HDMI FTV**  
DOC-001036-ANG



**Brochure RJF 6A**  
DOC-001021-ANG



**Brochure RJF TV6A**  
DOC-001020-ANG



**Brochure μCom & TVμCom USB3.2 Gen1**  
DOC-001032-ANG

## CONCEPT OVERVIEW AND BENEFITS

# 5 TOP REASONS to use USBFIELD™

## # 1 Military. Ruggedized. Connectors

Our concept is simple : use standard, well-know, military connectors as MIL-DTL-38999 series III and MIL-DTL-26482 series I to reinforce standard industrial connectors as RJ45 or USB.



## # 2 No tool. No cabling. Easy mounting

Our USB solution enables you to use a standard USB cordset and mount itself without any cabling operation or tool.



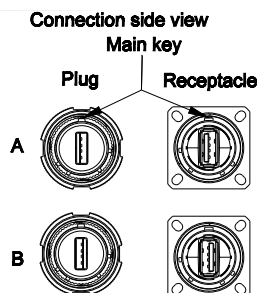
## # 3 Electric continuity. Metallized inserts

Our solutions provide a total shielding continuity per the metallisation of parts in the receptacle.



## # 4 Two codings. Only one reference

Our connectors, plugs and receptacles, can be configured in four different codings with the same reference.



## # 5 Modifiable. Repairable. Removal inserts

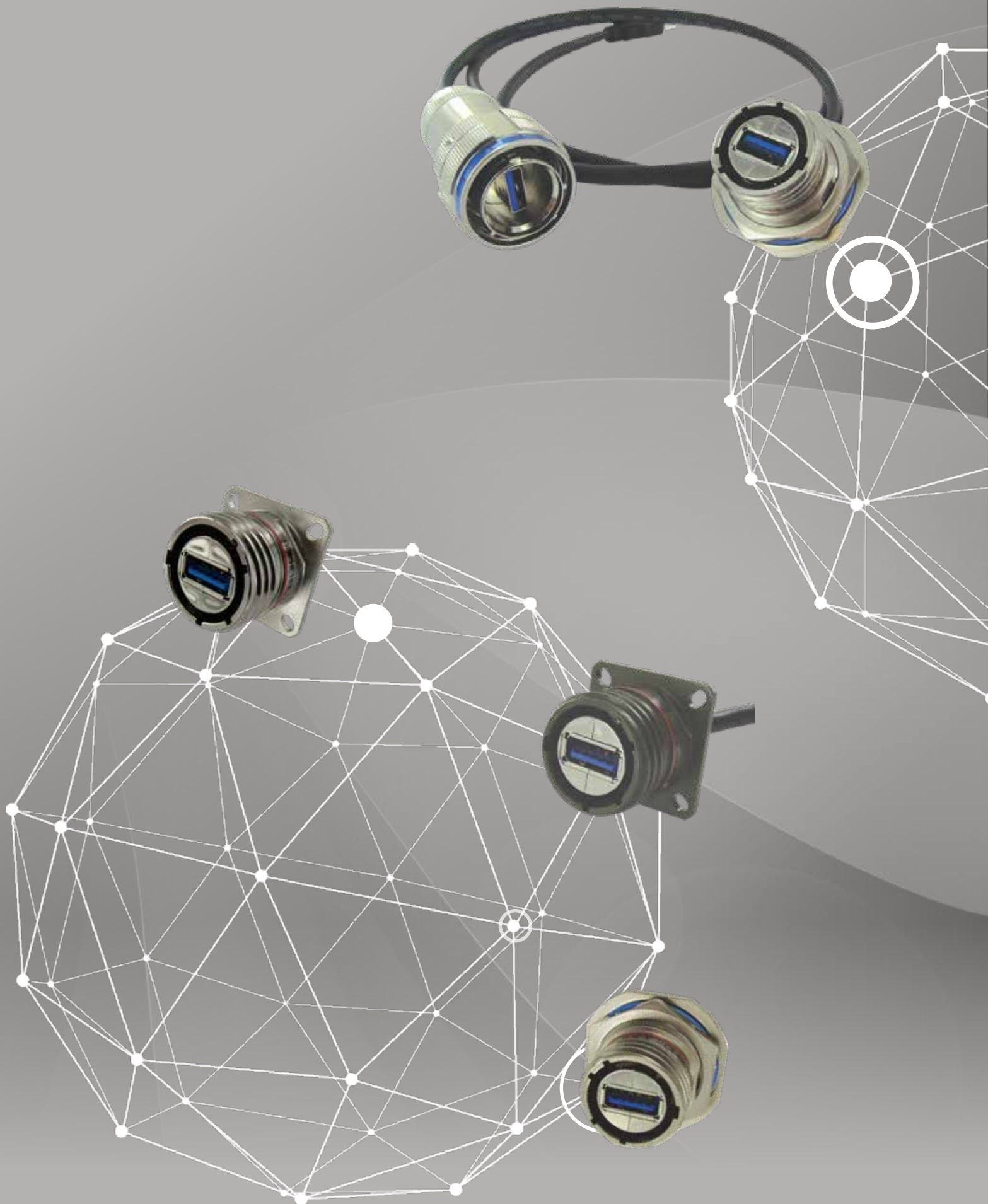
Our parts can be changed as simply as the assembly, using a dedicated tool or simply by hands. This allows to remove the cordset, change the coding option or repair the solution.



# USB STANDARDS AND APPROPRIATE SOLUTIONS

|                                   | USB2.0              | USB3.2 Gen1         |
|-----------------------------------|---------------------|---------------------|
| Data Rate                         | 480 Mb/s            | 5 Gb/s              |
| Voltage                           | 5 V                 | 5 V                 |
| Current                           | 1,5A                | 1,5A                |
| Power                             | 2,5 W               | 2,5 W               |
| Number of contacts                | 2 power<br>2 signal | 2 power<br>6 signal |
| Max cable length per USB standard | 4,80 m              | 3 m                 |
| USB3FTV™                          | ✓                   | ✓                   |
| USBFTV™                           | ✓                   |                     |
| USBBFTV                           | ✓                   | ✓                   |
| Cable and cordset                 | ✓                   | ✓                   |
| Adaptor and access point          | ✓                   | ✓                   |
| USB3FTV™ memory key               | ✓                   | ✓                   |
| ROK - Memory key                  | ✓                   | ✓                   |
| USBFTV™ - USB2.0 amplifier        | ✓                   |                     |





# USB3.2 GEN1



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# USB3FTV™



## Description

USB3FTV™ is a complete ruggedized solution around USB3.2 Gen1 Type-A standard using a Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) to connect the plug and receptacle.

This solution allows you to insert a standard USB3.2 Gen1 cordset into a metallic plug which will protect it from shocks, dust and fluids. The assembly of this ruggedized plug doesn't require any tools and can be assembled easily in the field. Perfectly adapted to the USB3.2 Gen1 standard, you have two coding possibilities to facilitate coupling when you have several receptacles on a panel.

The corresponding USB3FTV™ receptacle dedicated to be mounted on your panel enables you to reinforce and protect your system against leakage, shocks, vibrations and much more. This receptacle part is delivered with a defined coding when ordered but can be conveniently changed with our dedicated USBF ODE tool.

You have also the possibility to order a complete solution with the included USB3.2 Gen1 cable, on the plug or the receptacle side.

## Main features

### MAIN CHARACTERISTICS

- Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device - Shell size 15
- 2 mechanical coding / polarization possibilities (receptacle insert rotation)
- Sealed against fluids and dusts (IP68)
- Shock, vibration and traction resistant
- No cabling operation in field and no tools required
- Improved EMI protection
- USB3FTV plug retention in the receptacle: 100 N in the axis
- Mating cycles: 500 minimum

### DATA TRANSMISSION

- USB-A
- USB specification 3.2 Gen1
- Data rate: up to 5Gb/s for high speed USB

### ENVIRONMENTAL PROTECTION

- Sealing (when mated): IP68 (temporary immersion)
- Salt spray: - 48 h with nickel plating ✓  
- 500 h with black zinc nickel ✓  
- 500 h with olive drab cadmium  
- 1000 h with marine bronze shell ✓
- Fire retardant / low smoke: UL94 V0 and EN45545
- 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

### APPLICATIONS

- Battlefield communication systems
- C5ISR
- Data acquisition and transmission in harsh environment
- Navy
- Rail Mass Transit
- Industrial process control
- Robotics
- CNC machines
- Oil & Gas

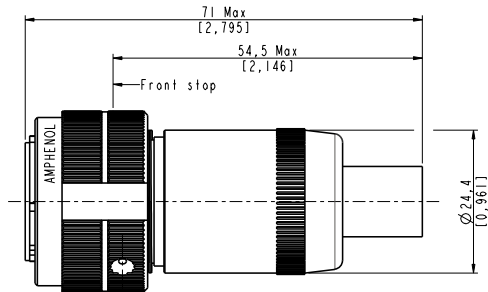
**How to order :** Please refer to page 86

## Back terminations

Type 1:  
female USB-A

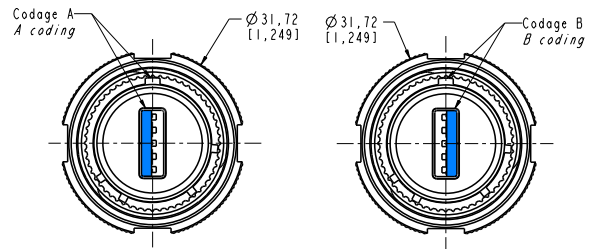
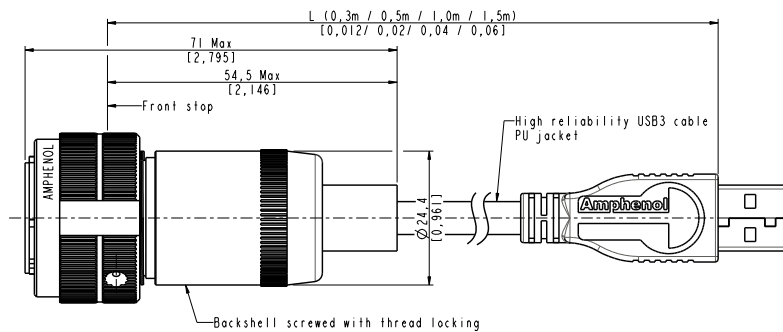


✓: RoHS compliant

**USB3FTV™****Overall dimension****Plug - Shell type 6**Part number type: **USB3FTV 6 X**

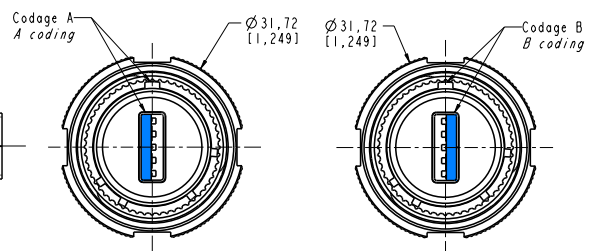
Coding A

Coding B

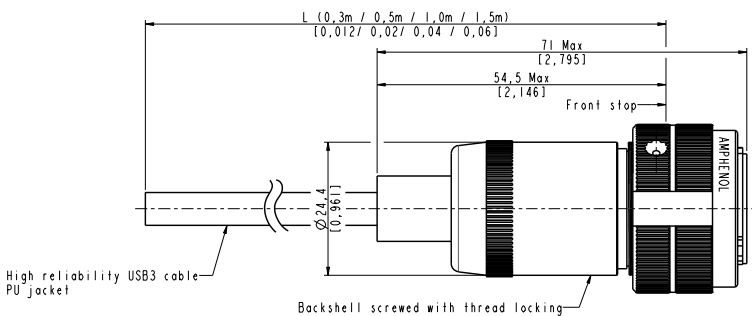
**Plug - Shell type 6 - USB-A cordset**Part number type: **USB3FTV 6 X XX X CROS****USB3FTV 6 X XX X STR**

Coding A

Coding B

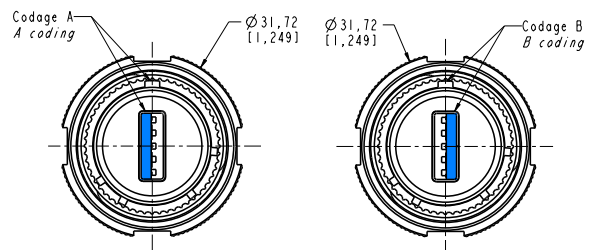
**Important note:**

- To define a straight or crossed USB3.2 Gen1 cordset, please refer to "Assembly instructions" page 80

**Plug - Shell type 6 - Open USB cordset**Part number type: **USB3FTV 6 X XX X OPEN**

Coding A

Coding B



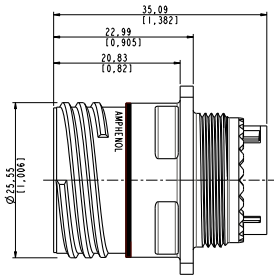


## USB3FTV™

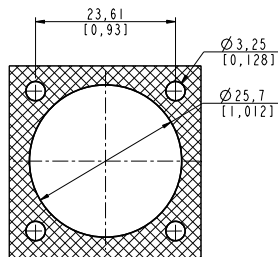
## Overall dimension

**Receptacle** - Square flange receptacle - 4 mounting holes - Shell type 2 - Back termination type 1

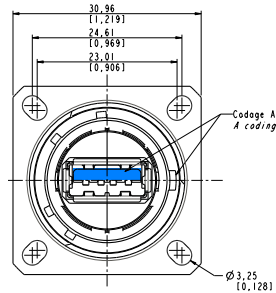
Part number type: **USB3FTV 2 1 X**



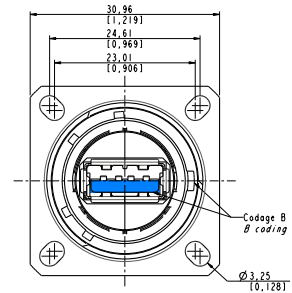
Panel Drilling



Coding A

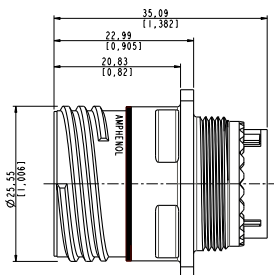


Coding B

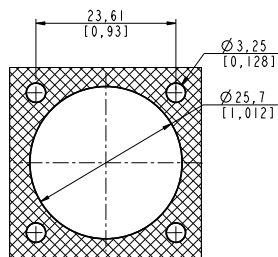


**Receptacle** - Square flange receptacle - 4 mounting holes - Shell type 2 - Back termination type 1 - Metal backshell

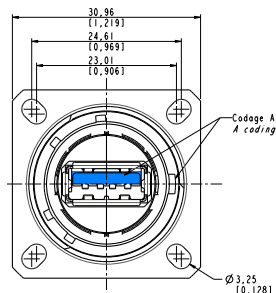
Part number type: **USB3FTV 2 X PE 1**



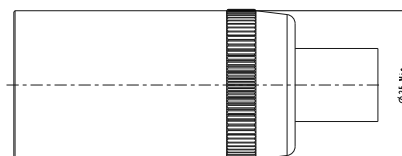
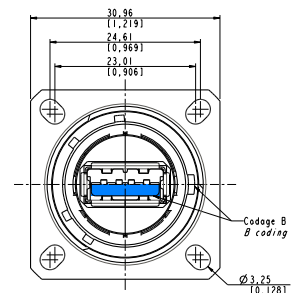
Panel Drilling



Coding A



Coding B

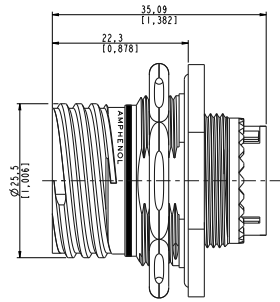


# USB3FTV™

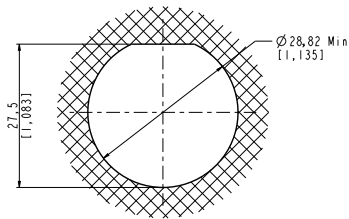
## Overall dimension

**Receptacle - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - Back termination type 1**

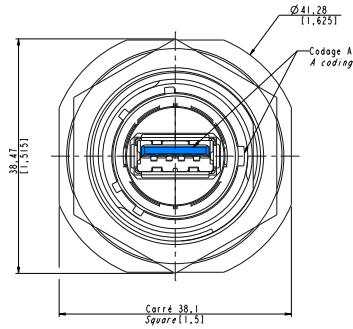
Part number type: **USB3FTV 7 1 X**



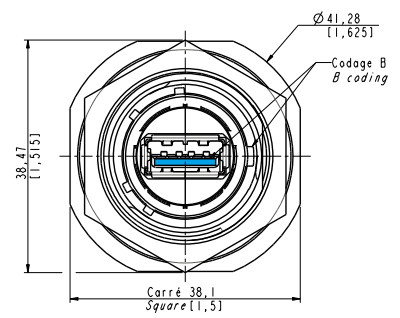
Panel Drilling



Coding A

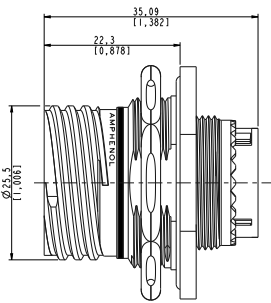


Coding B

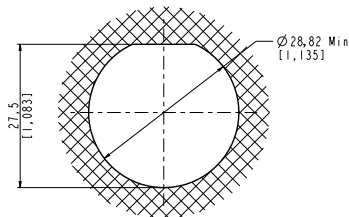


**Receptacle - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - Back termination type 1 - Metal backshell**

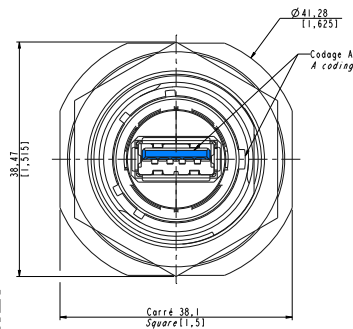
Part number type: **USB3FTV 7 X PE 1**



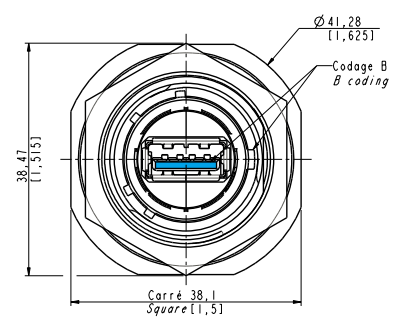
Panel Drilling



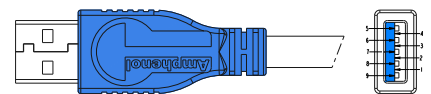
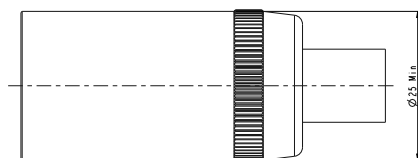
Coding A



Coding B



Metal backshell



# USB3FTV™ - TRANSVERSALLY SEALED AND HERMETIC RECEPTACLE

## Description



The transversally sealed receptacle is in all aspects equivalent to the standard and in addition, is improved with compound at the rear of the receptacle. This will prevent the sealing of the receptacle when unmated with his plug or protective cap.

The hermetic solution, as the transversally sealed one is compounded at the rear of the receptacle. Helium leakage is less than 1.10-6 cm<sup>3</sup> per second [0.1 micron cubit ft per hour] at one bar [15 psi] pressure differential. The test is performed on all of the hermetic receptacles.

## Main features

### MAIN CHARACTERISTICS

- Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device - Shell size 15
- 2 mechanical coding/polarization possibilities by the user (receptacle insert rotation)
- Sealed against fluids and dusts (IP68)
- Shock, vibration and traction resistant
- No cabling operation in field and no tools required
- Improved EMI protection
- USB3FTV plug retention in the receptacle: 100 N in the axis
- Mating cycles: 500 minimum

### DATA TRANSMISSION

- USB-A
- USB specification 3.2 Gen1
- Data rate: up to 5Gb/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 ✓
  - 500 h with black zinc nickel ✓
- Fire retardant / Low smoke: UL94 V0 and EN45545
- 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

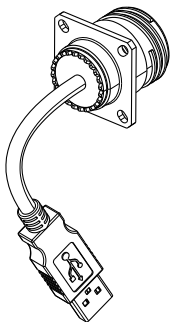
### APPLICATIONS

- Battlefield communication systems
- C5ISR
- Data acquisition and transmission in harsh environment
- Navy
- Rail Mass Transit
- Industrial process control
- Robotics
- CNC machines
- Oil & Gas

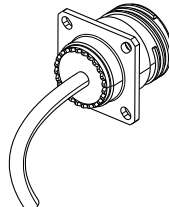
**How to order :** Please refer to page 87

## Back terminations

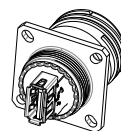
USB cable end type A



USB cable type «OPEN»



VG96949 Female USB-A



✓: RoHS compliant

# USB3FTV™ - TRANSVERSALLY SEALED AND HERMETIC RECEPTACLE

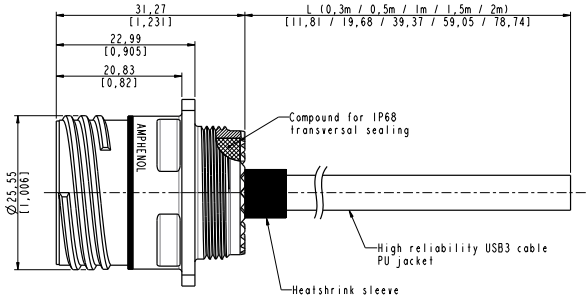
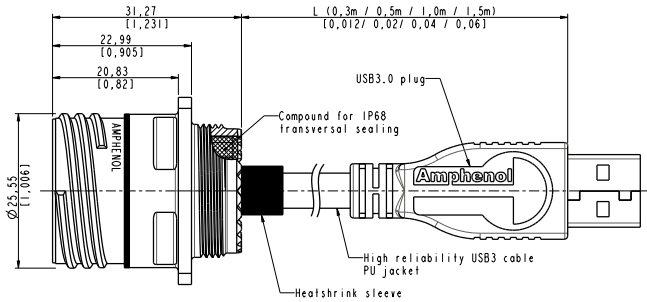
## Overall dimension

**Receptacle - Square flange receptacle - 4 mounting holes - Shell type 2 - USB-A or Open cordset**

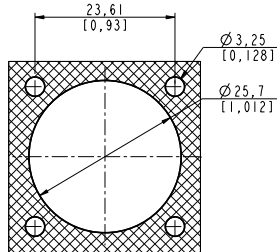
Part number type: **USB3FTV 2 S X XX X ACROS**

**USB3FTV 2 S X XX X ASTR**

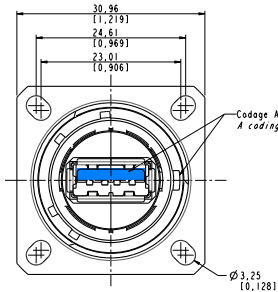
Part number type: **USB3FTV 2 S X XX X OPEN**



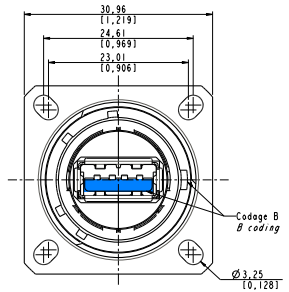
Panel drilling



Coding A



Coding B

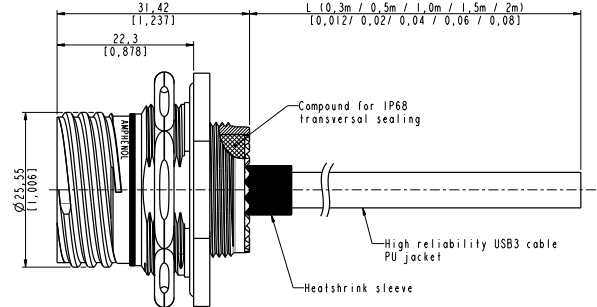
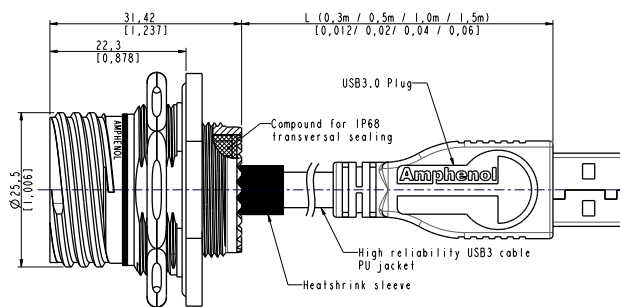


**Receptacle - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - USB-A or Open cordset**

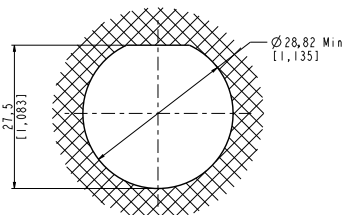
Part number type: **USB3FTV 7 S X XX X ACROS**

**USB3FTV 7 S X XX X ASTR**

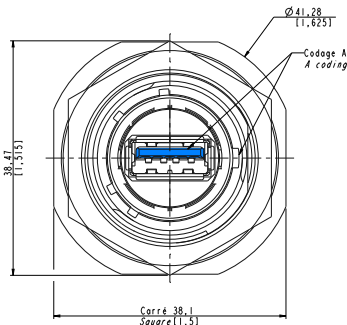
Part number type: **USB3FTV 7 S X XX X OPEN**



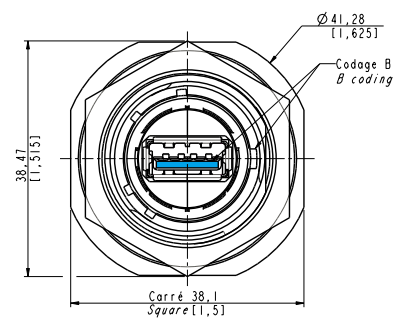
Panel drilling



Coding A



Coding B



### Important note:

- To define a straight or crossed USB3.0 cordset, please refer to "Assembly instructions" page 80



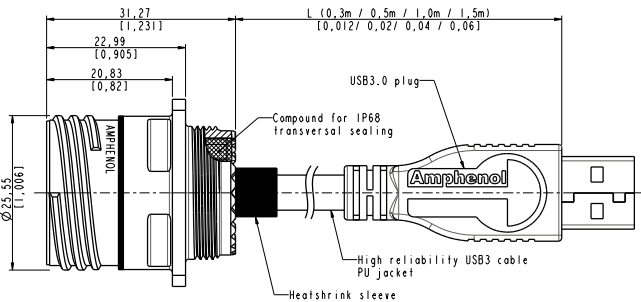
# USB3FTV™ - TRANSVERSALLY SEALED AND HERMETIC RECEPTACLE

## Overall dimension

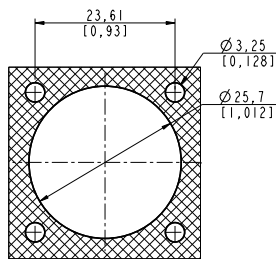
**Receptacle - Square flange receptacle - 4 mounting holes - Shell type 2 - USB-A or Open cordset**

Part number type: **USB3FTV 2 H X XX X ACROS**

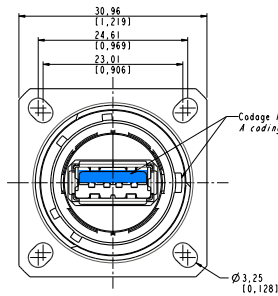
**USB3FTV 2 H X XX X ASTR**



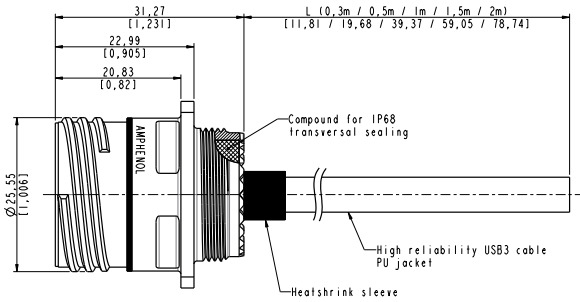
Panel drilling



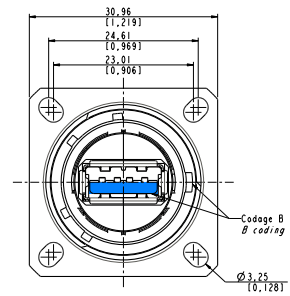
Coding A



Part number type: **USB3FTV 2 H X XX X OPEN**



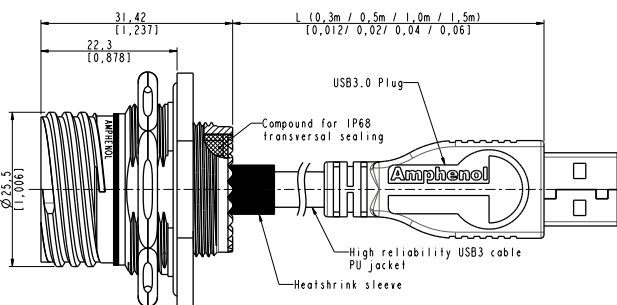
Coding B



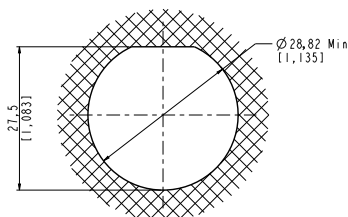
**Receptacle - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - USB-A or Open cordset**

Part number type: **USB3FTV 7 H X XX X ACROS**

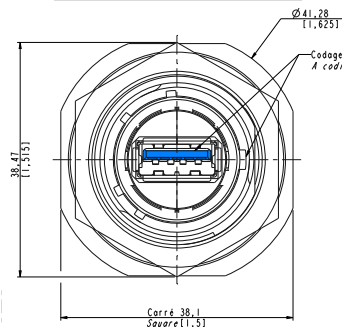
**USB3FTV 7 H X XX X ASTR**



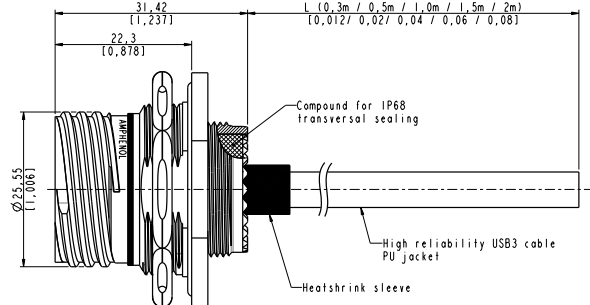
Panel drilling



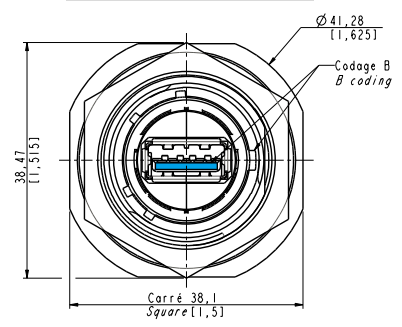
Coding A



Part number type: **USB3FTV 7 H X XX X OPEN**



Coding B



### Important note:

- To define a straight or crossed USB3.0 cordset, please refer to "Assembly instructions" page 80

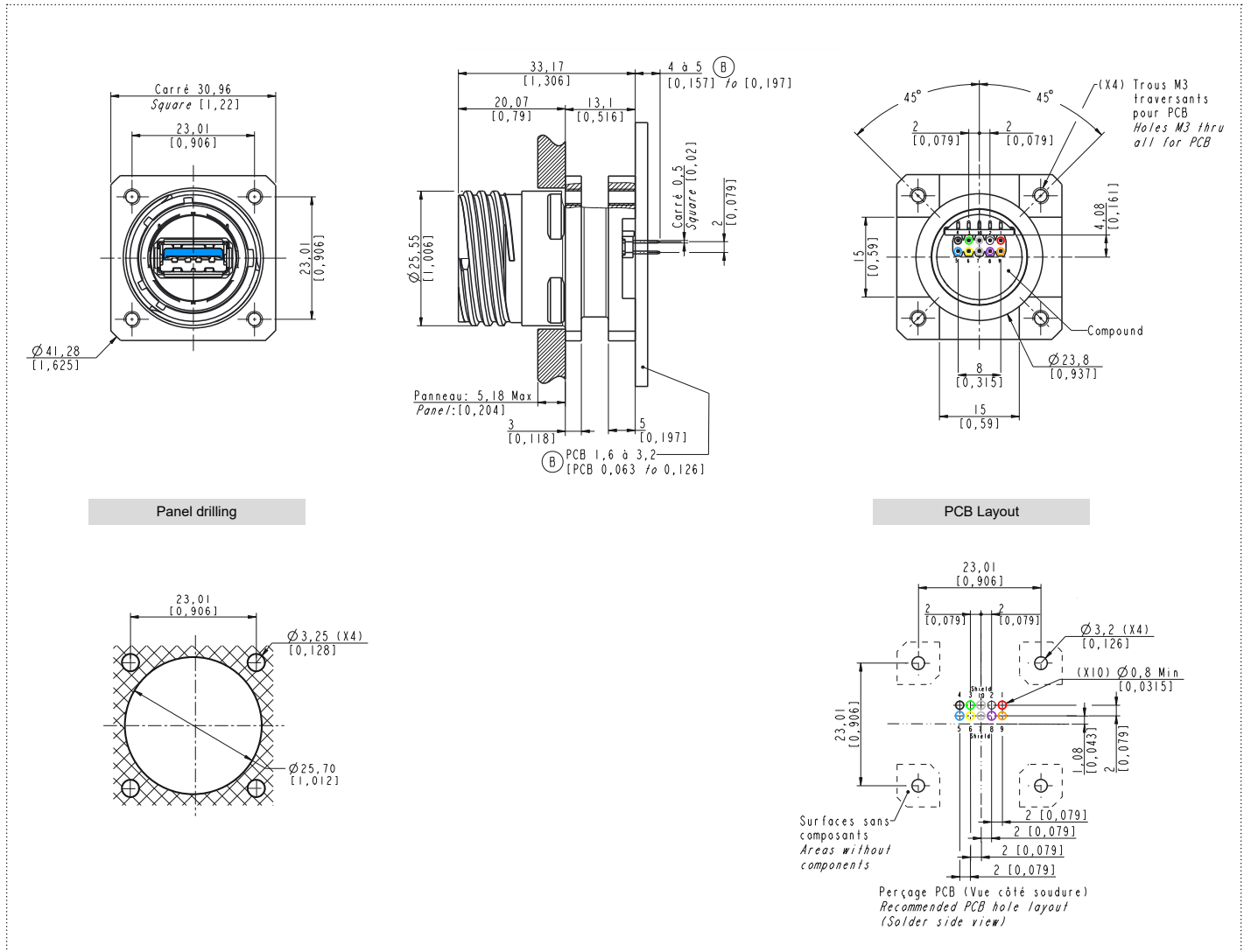
# USB3FTV™ - STAND OFF RECEPTACLE

## Description

This enhanced design allows you to mount the connector shell directly on the PC board. Soldering your contacts directly on the board will save you a lot of space inside your system. As the double-flange of this connector is directly fixed on the board, mechanical stresses are absorbed by the shell and not the contacts. In addition to this benefit, the sealing is improved by the compounded receptacle.

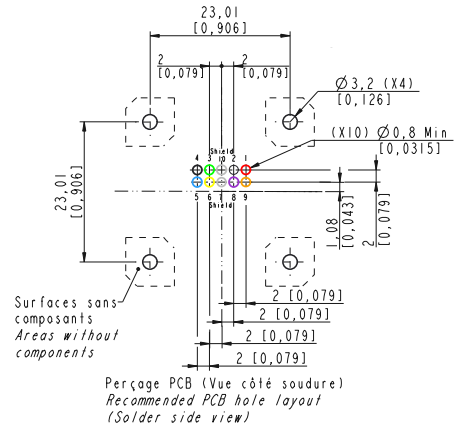
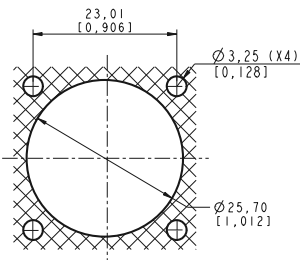
## Overall dimension

**Receptacle** - Square flange receptacle - 4 mounting holes - Shell type 2 - PC Tails contacts



Panel drilling

PCB Layout



### Part number for coding A

USB3FTV 2S A N F459

USB3FTV 2S A G F459

USB3FTV 2S A ZN F459

### Part number for coding B

USB3FTV 2S B N F459

USB3FTV 2S B G F459

USB3FTV 2S B ZN F459

### Plating

Nickel ✓

Olive drab cadmium

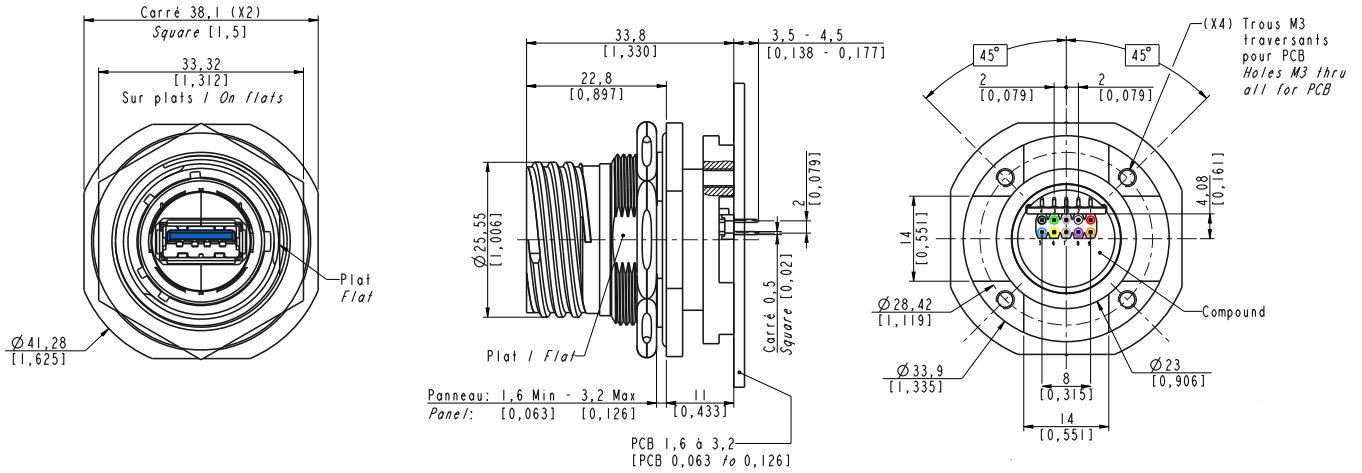
Black zinc nickel ✓

✓: RoHS compliant

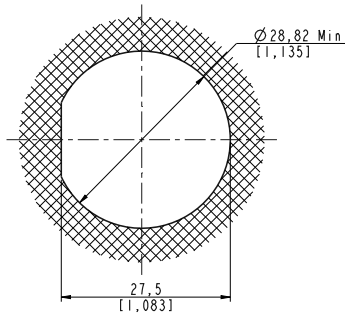
# USB3FTV™ - STAND OFF RECEPTACLE

## Overall dimension

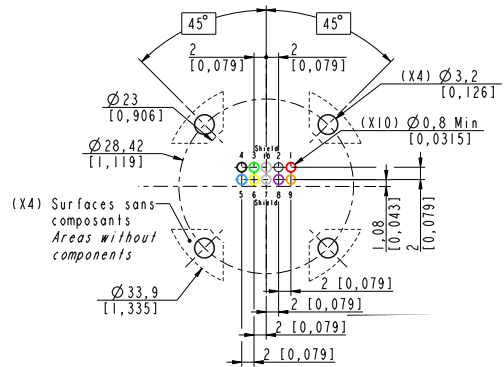
Receptacle - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - PC Tails contacts



Panel drilling



PCB Layout



Part number for coding A

USB3FTV 7S A N F459

USB3FTV 7S A G F459

USB3FTV 7S A ZN F459

Part number for coding B

USB3FTV 7S B N F459

USB3FTV 7S B G F459

USB3FTV 7S B ZN F459

Plating

Nickel ✓

Olive drab cadmium

Black zinc nickel ✓

✓: RoHS compliant

# USB3FTV™ - REDUCED FLANGE RECEPTACLE

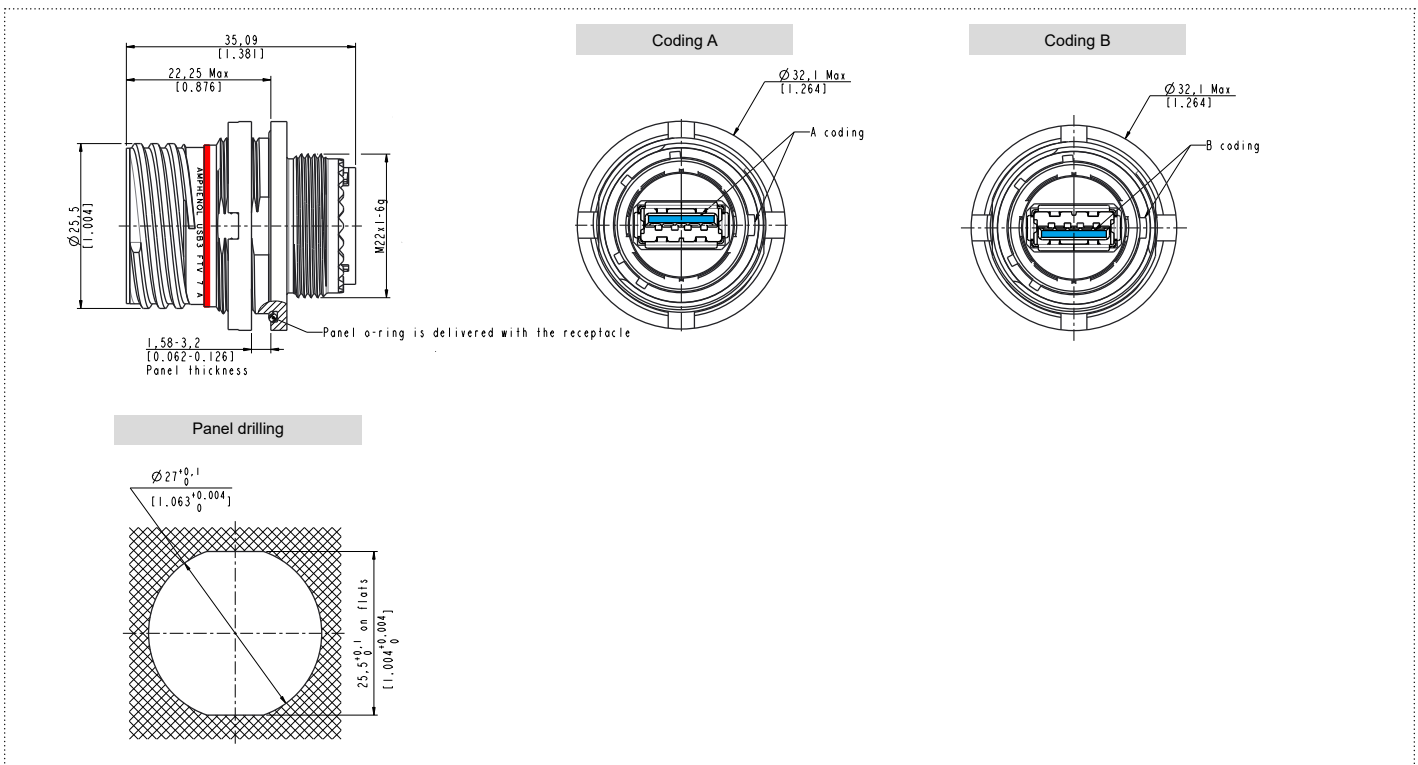


## Description

This Reduced Flange USB3FTV™ is ideal for applications where small dimensions and lower weight are critical. The flange of this receptacle is reduced in order to gain more space on the panel enabling you to mount more receptacles in the same amount of space. Internal dimensions are also modified to save some space internally, giving you more space. The reduced flange deviation saves 41% footprint surface reduction and is 15% lighter than standard USB3FTV™ receptacle. Finally, you have two castle nut options, standard castle nut and safety castle nut that enable you to add a lock wire for anti-rotation of the nut.

## Overall dimension

**Receptacle** - Reduced flange receptacle - Castle nut mounting - Shell type 7 - F312 or F311



| Part number for coding A | Part number for coding B | Mounting nut option | Plating             |
|--------------------------|--------------------------|---------------------|---------------------|
| USB3FTV 7 A N F312       | USB3FTV 7 B N F312       | Standard caste nut  | Nickel ✓            |
| USB3FTV 7 A G F312       | USB3FTV 7 B G F312       |                     | Olive drab cadmium  |
| USB3FTV 7 A ZN F312      | USB3FTV 7 B ZN F312      |                     | Black zinc nickel ✓ |
| USB3FTV 7 A N F311       | USB3FTV 7 B N F311       | Safety caste nut    | Nickel ✓            |
| USB3FTV 7 A G F311       | USB3FTV 7 B G F311       |                     | Olive drab cadmium  |
| USB3FTV 7 A ZN F311      | USB3FTV 7 B ZN F311      |                     | Black zinc nickel ✓ |

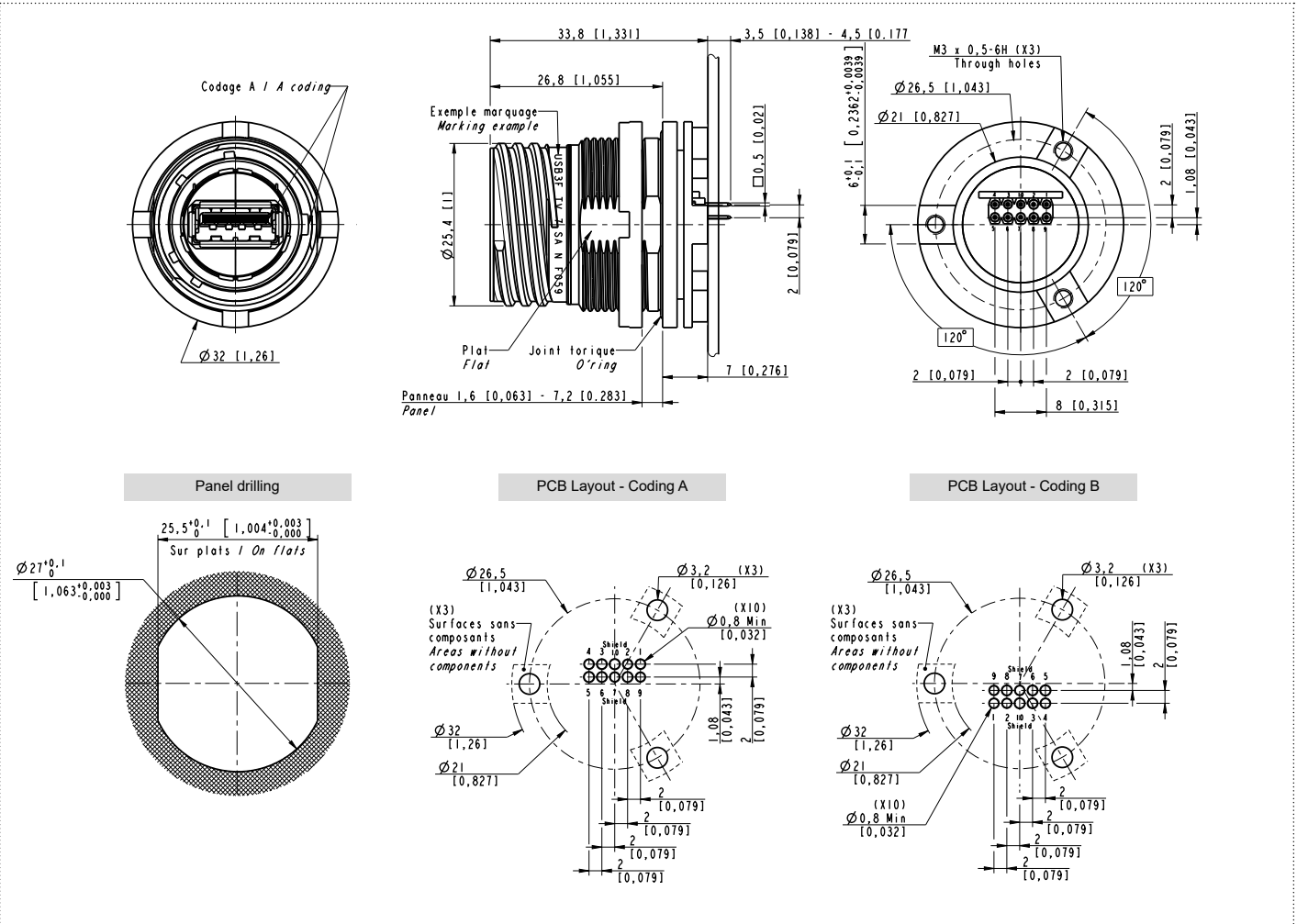
✓: RoHS compliant



# USB3FTV™ - REDUCED FLANGE RECEPTACLE

## Overall dimension

Receptacle - Reduced flange receptacle - Castle nut mounting - Shell type 7 - F059 or F058



| Part number for coding A             | Part number for coding B             | Mounting nut option | Plating             |
|--------------------------------------|--------------------------------------|---------------------|---------------------|
| <a href="#">USB3FTV 7 SA N F059</a>  | <a href="#">USB3FTV 7 SB N F059</a>  | Standard caste nut  | Nickel ✓            |
| <a href="#">USB3FTV 7 SA G F059</a>  | <a href="#">USB3FTV 7 SB G F059</a>  |                     | Olive drab cadmium  |
| <a href="#">USB3FTV 7 SA ZN F059</a> | <a href="#">USB3FTV 7 SB ZN F059</a> |                     | Black zinc nickel ✓ |
| <a href="#">USB3FTV 7 SA N F058</a>  | <a href="#">USB3FTV 7 SB N F058</a>  |                     | Nickel ✓            |
| <a href="#">USB3FTV 7 SA G F058</a>  | <a href="#">USB3FTV 7 SB G F058</a>  | Safety caste nut    | Olive drab cadmium  |
| <a href="#">USB3FTV 7 SA ZN F058</a> | <a href="#">USB3FTV 7 SB ZN F058</a> |                     | Black zinc nickel ✓ |

# USB3FTV™ - VG96949

## Description

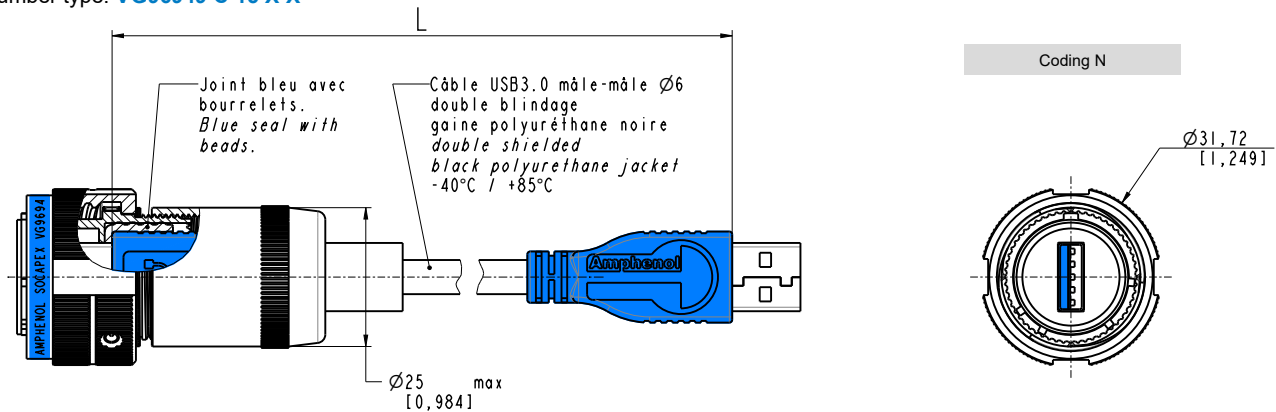
This version of our USB3FTV™ is qualified VG96949. According to this standard, receptacles are compounded, the panel nut of the jamnut receptacle version is according to VG95319 and the treatment is Tin Zinc RoHS.

**How to order :** Please refer to page 88

## Overall dimension

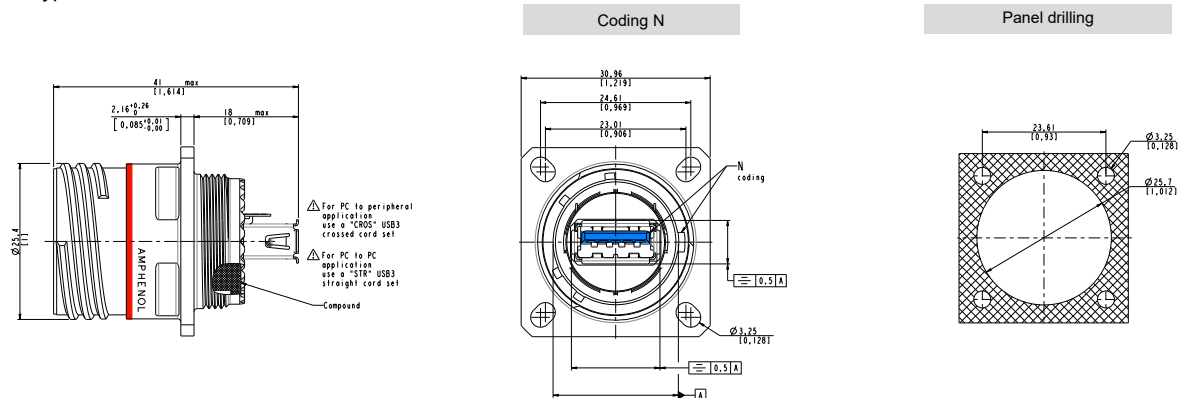
### Plug - Shell type 6

Part number type: **VG96949 C 15 X X**



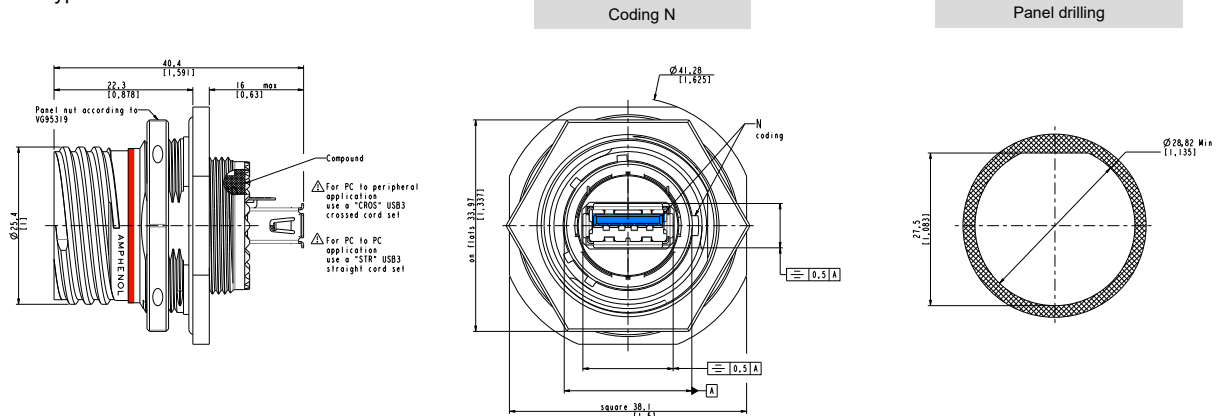
### Receptacle - Square flange receptacle - 4 mounting holes - Shell type 2 - Compounded

Part number type: **VG96949 A 15 X X**

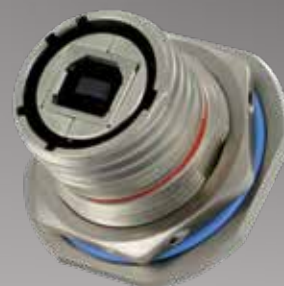
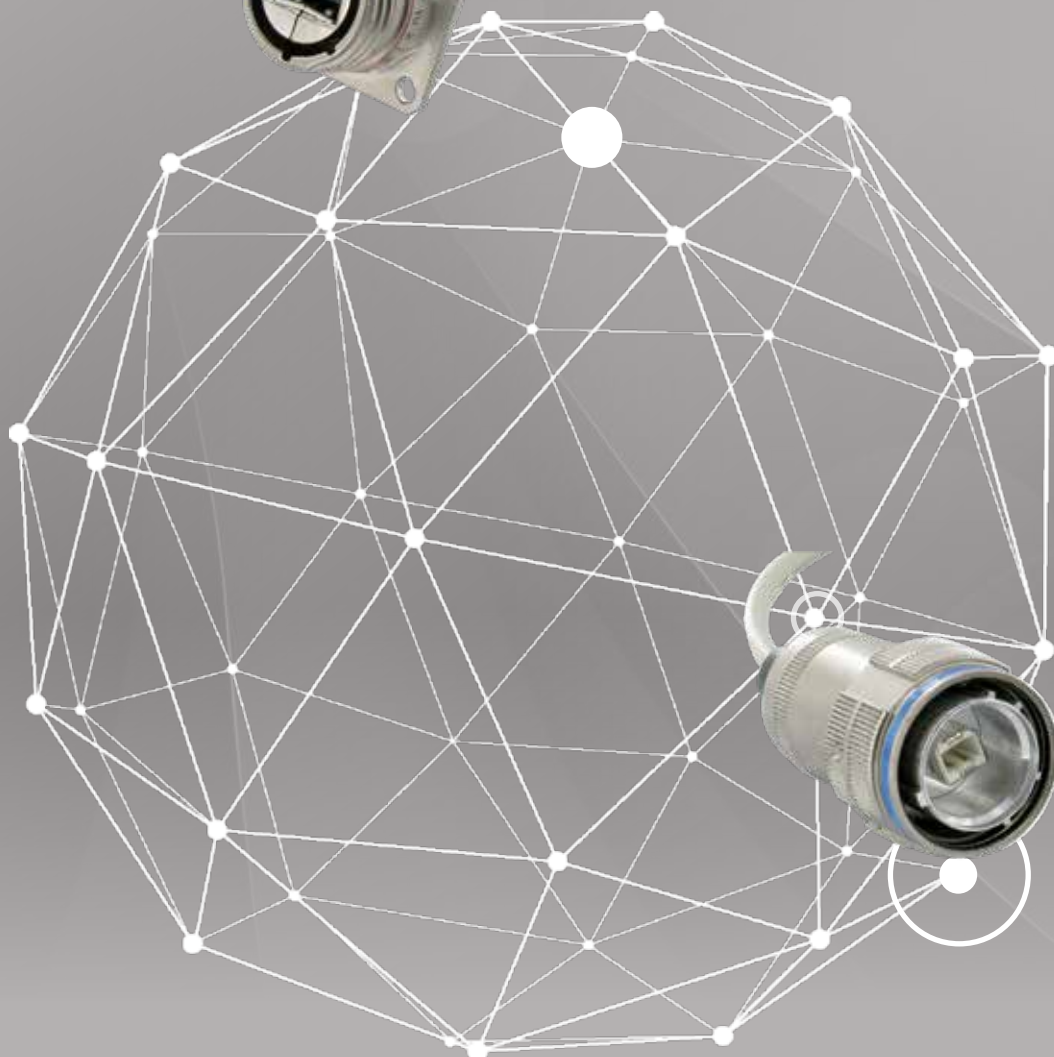


### Receptacle - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - Compounded

Part number type: **VG96949 B 15 X X**



✓ RoHS compliant



USB2.0



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# USBFTV™



## Description

USBFTV™ is a complete ruggedized solution around USB2.0 Type-A standard using a Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) to connect the plug and receptacle.

This solution allows you to insert a standard USB 2.0 cordset into a metallic plug which will protect it from shocks, dust and fluids. The assembly of this ruggedized plug doesn't require any tools and is easily assembled on the field. Perfectly adapted to the USB2.0 standard, you have two coding possibilities to facilitate coupling when you have several receptacles on a panel.

The corresponding USBFTV™ receptacle dedicated to be mounted on your panel enables you to reinforce and protect your system against leakage, shocks, vibrations and much more. This receptacle part is delivered with a defined coding when ordered but can be conveniently changed with our dedicated USBF ODE tool.

## Main features

### MAIN CHARACTERISTICS

- Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device - Shell size 15
- Sealed against fluids and dusts (IP68)
- Shock, vibration and traction resistant
- No cabling operation in field and no tools required
- Improved EMI protection
- 2 mechanical coding / polarization possibilities by the user (receptacle insert rotation)
- USBFTV™ plug retention in the receptacle: 100 N in the axis
- Mating cycles: 500 minimum

### DATA TRANSMISSION

- USB-A
- USB specification 2.0
- Data rate: up to 480 Mbps for high speed USB

### ENVIRONMENTAL PROTECTION

- Sealing (when mated): IP68 (temporary immersion)
- Salt spray:
  - 48 h with nickel plating ✓
  - 500 h black zinc nickel ✓
  - 500 h with olive drab cadmium
  - 1000 h with marine bronze shell ✓
- Fire retardant / low smoke: UL94 V0 and EN45545
- 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)
- Temperature range: - 40°C / +85°C

### APPLICATIONS

- Battlefield communication systems
- C5ISR
- Data acquisition and transmission in harsh environment
- Navy
- Rail Mass Transit
- Industrial process control
- Robotics
- CNC machines
- Oil & Gas

**How to order :** Please refer to page 89

## Back terminations

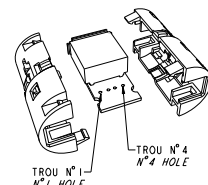
**Type 1:**  
female USB-A



**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



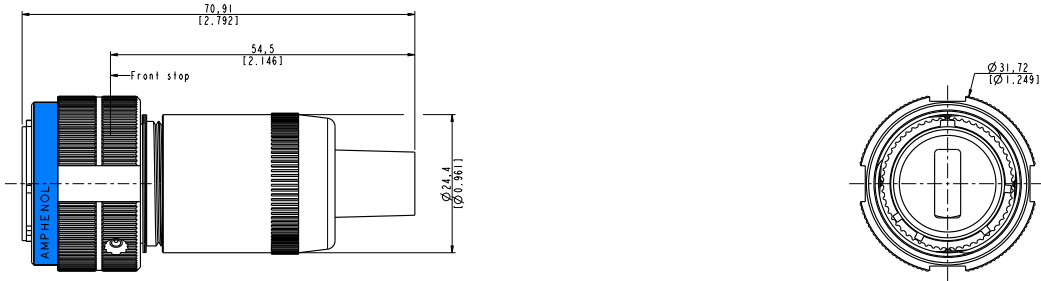
✓ : RoHS compliant



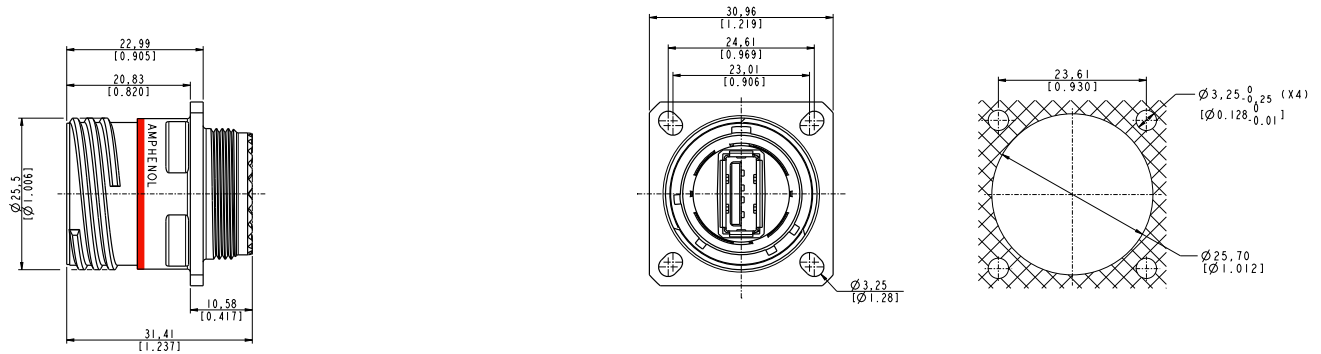
# USBFTV™

## Overall dimension

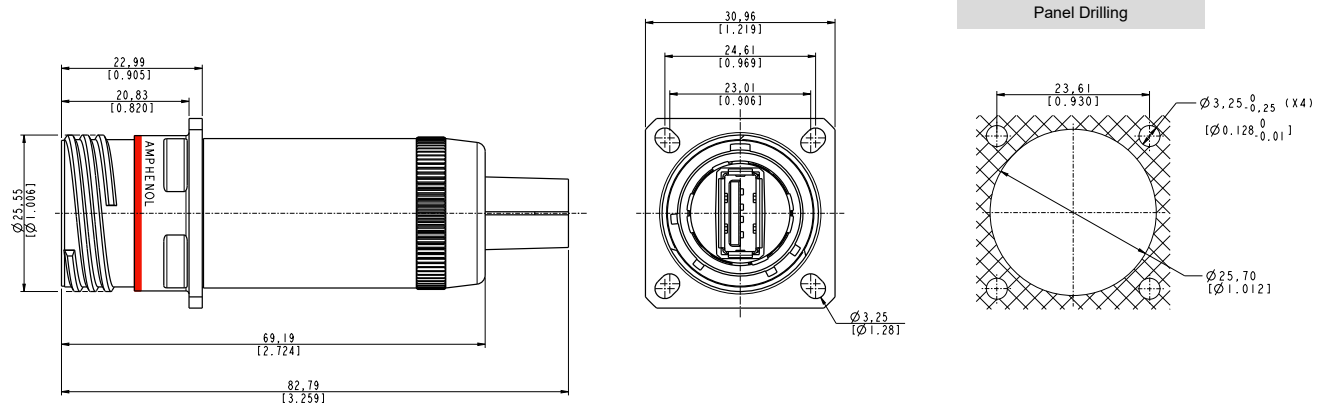
### Plug - Shell type 6

Part number type: **USBFTV 6 X**


### Receptacle - Square flange receptacle - 4 mounting holes - Shell type 2 - Back termination type 1

Part number type: **USBFTV 2 1 X**


### Receptacle - Square flange receptacle - 4 mounting holes - Shell type 2 - Back termination type 1 - Metal backshell

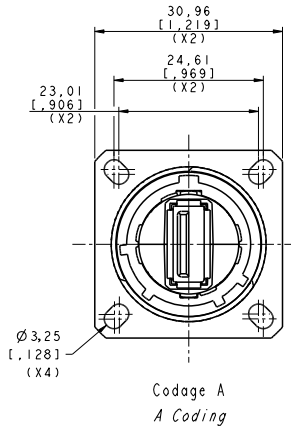
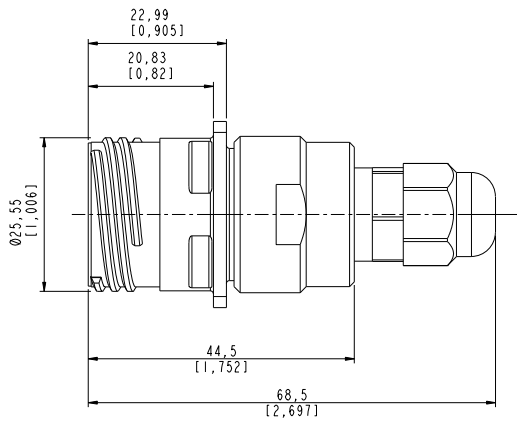
Part number type: **USBFTV 2 PE 1 X**


## USBFTV™

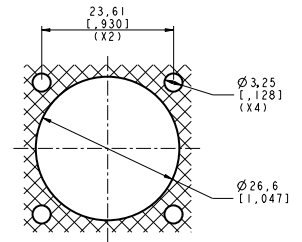
## Overall dimension

**Receptacle** - Square flange receptacle - 4 mounting holes - Shell type 2 - Back termination type 2 - Metal backshell

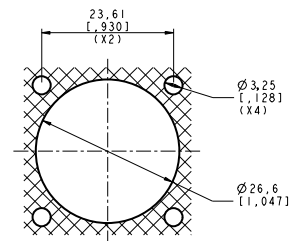
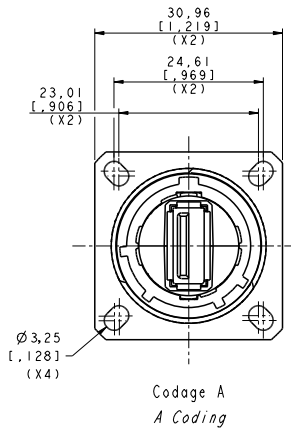
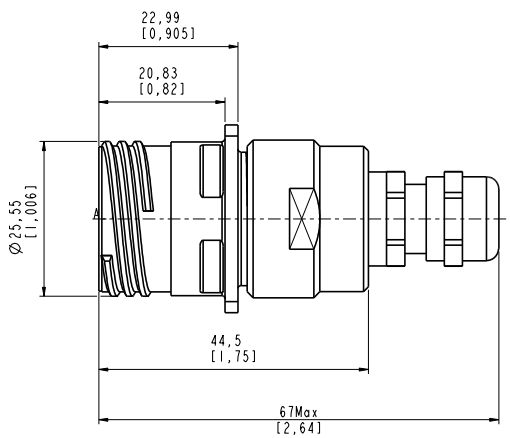
Part number type: **USBFTV 2 PE 2 X**



Panel Drilling



Part number type: **USBFTV 2 PEM 2 X**

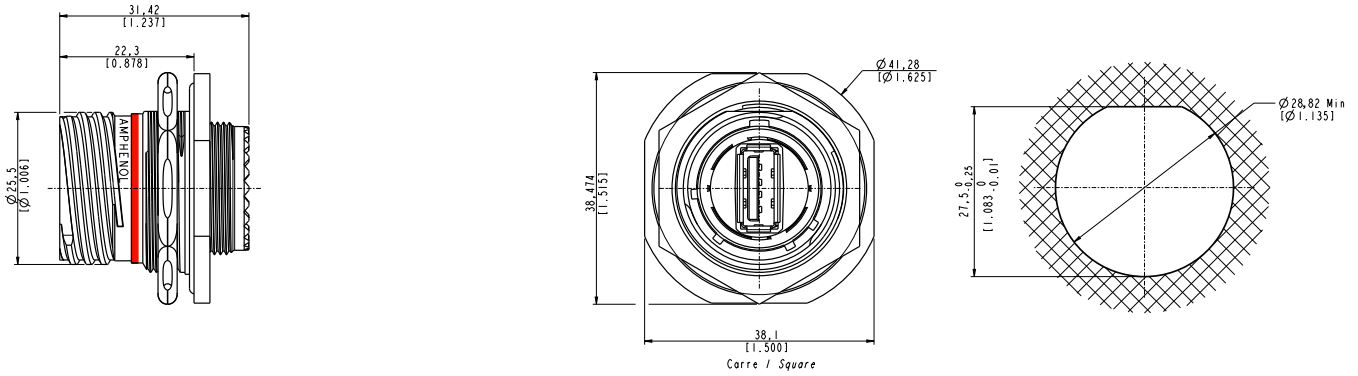


## USBFTV™

## Overall dimension

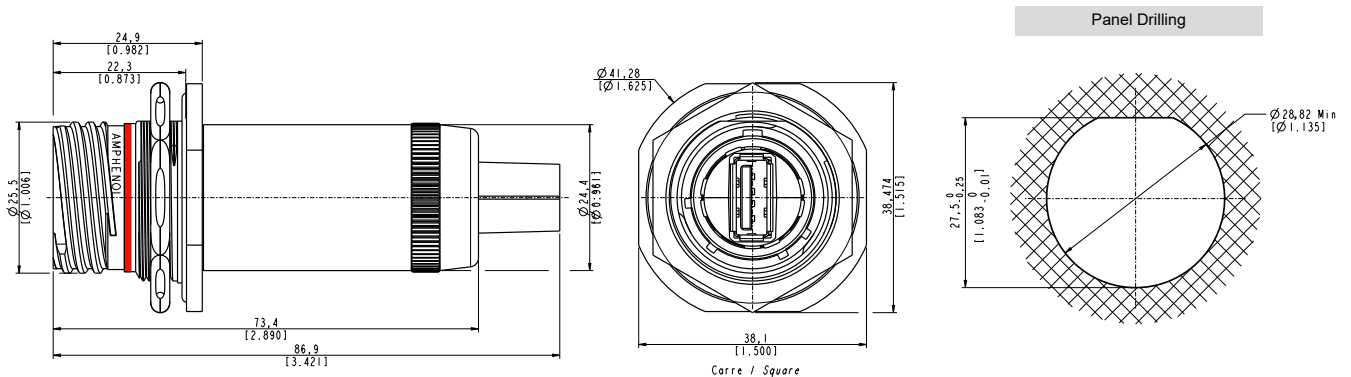
**Receptacle** - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - Back termination type 1

Part number type: **USBFTV 7 1 X**



**Receptacle** - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - Back termination type 1 - Metal backshell

Part number type: **USBFTV 7 PE 1 X**

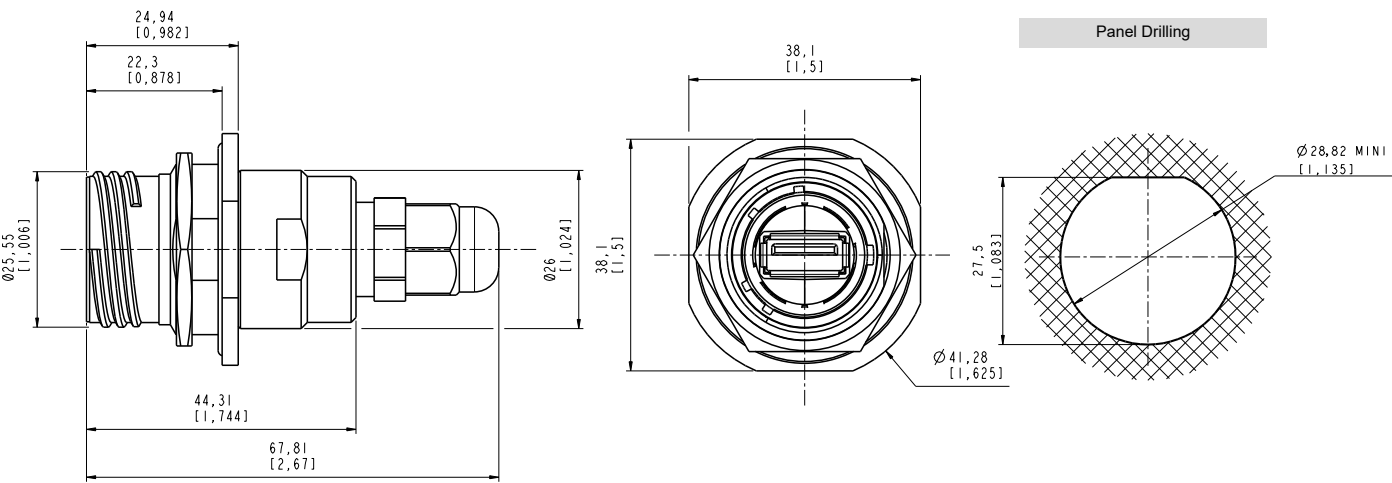


USBFTV™

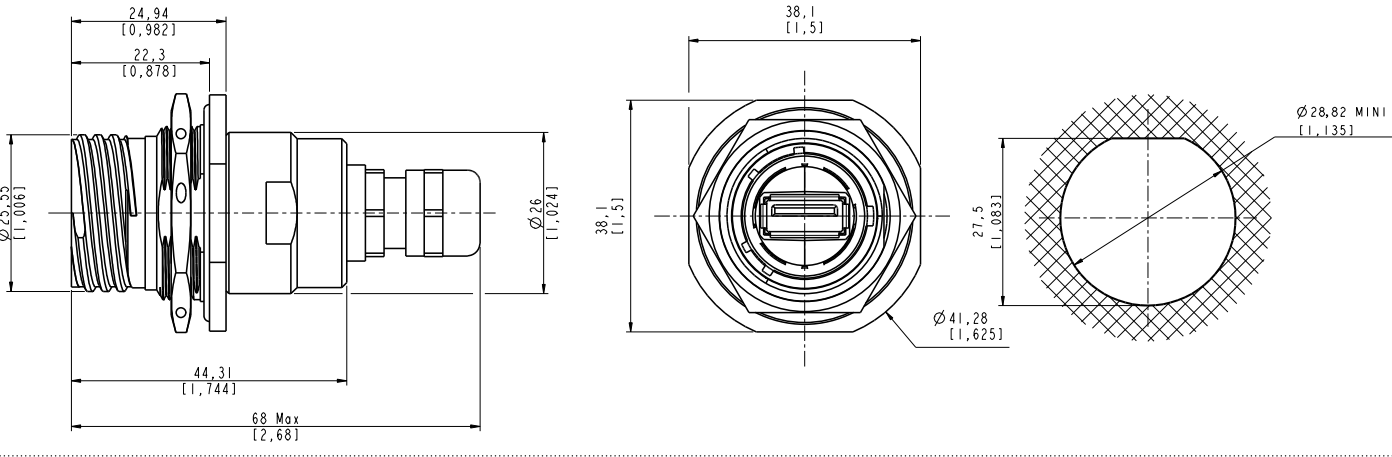
Overall dimension

Receptacle - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - Back termination type 2 - Metal backshell

Part number type: **USBFTV 7 PE 2 X**



Part number type: **USBFTV 7 PEM 2 X**



# USBFTV™ - TRANSVERSALLY SEALED AND HERMETIC RECEPTACLE

## Description



The transversally sealed receptacle is in all aspect equivalent to the standard and in addition, is improved with compound at the rear of the receptacle. This will prevent the sealing of the receptacle when unmated with his plug or protective cap.

The hermetic solution, as the transversally sealed one, is compounded at the rear of the receptacle. Helium leakage is less than 1.10-6 cm<sup>3</sup> per second [0.1 micron cubit ft per hour] at one bar [15 psi] pressure differential. The test is performed on all hermetic receptacles.

## Main features

### MAIN CHARACTERISTICS

- Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device - Shell size 15
- 2 mechanical coding/polarization possibilities by the user (receptacle insert rotation)
- Sealed against fluids and dusts (IP68)
- Shock, vibration and traction resistant
- No cabling operation in field and no tools required
- Improved EMI protection
- USBFTV™ plug retention in the receptacle: 100 N in the axis
- Mating cycles: 500 minimum

### DATA TRANSMISSION

- USB-A
- 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
  - 500 h with black zinc nickel ✓
  - 1000 h with marine bronze shell ✓
- Fire retardant / Low smoke: UL94 V0 and EN45545
- 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)
- Temperature range: - 40°C / +85°C

### APPLICATIONS

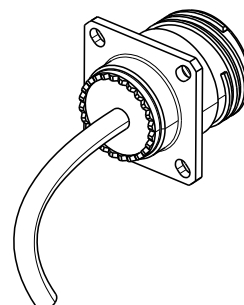
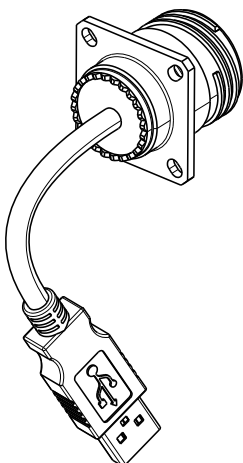
- Battlefield communication systems
- C5ISR
- Data acquisition and transmission in harsh environment
- Navy
- Rail Mass Transit
- Industrial process control
- Robotics
- CNC machines
- Oil & Gas

**How to order :** Please refer to page 90

## Back terminations

USB cable end type A

USB cable end type «OPEN»



✓: RoHS compliant

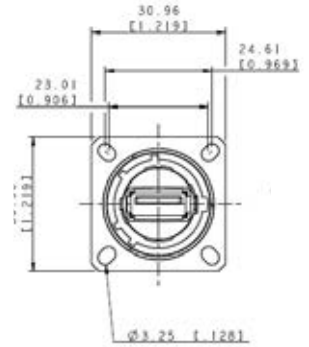
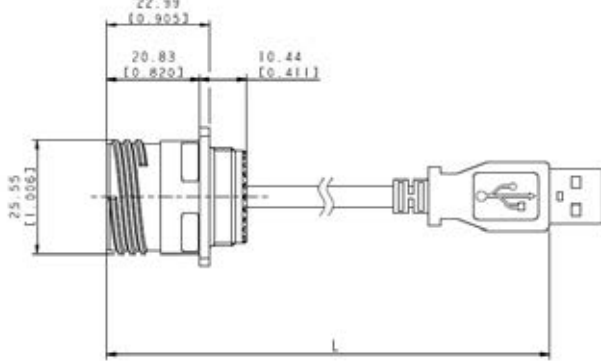


# USBFTV™ - TRANSVERSALLY SEALED AND HERMETIC RECEPTACLE

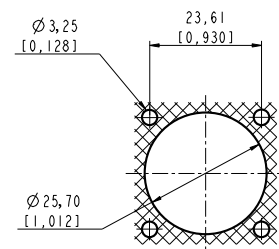
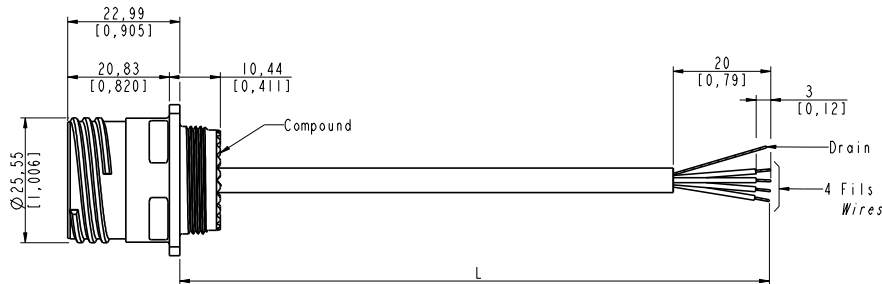
## Overall dimension

**Receptacle** - Square flange receptacle - 4 mounting holes - Shell type 2 - USB-A or Open cordset

Part number type: **USBFTV 2 SA 2 X XX A**



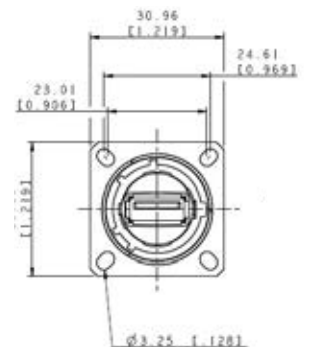
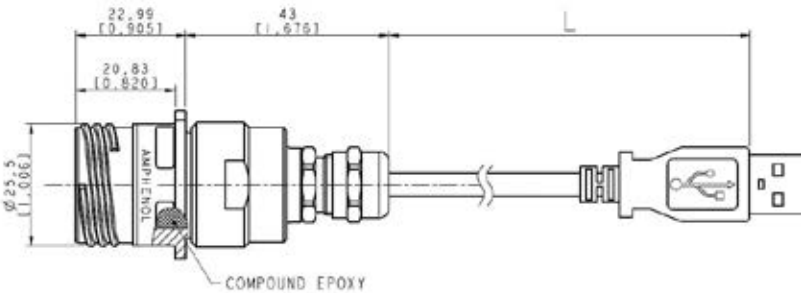
Part number type: **USBFTV 2 SA 2 X XX OPEN**



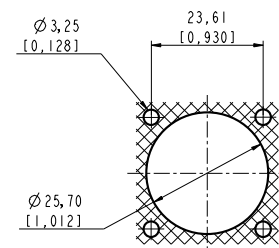
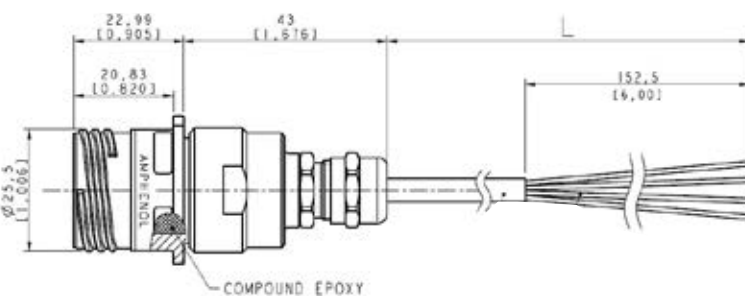
Panel Drilling

**Receptacle** - Square flange receptacle - 4 mounting holes - Shell type 2 - USB-A or Open cordset

Part number type: **USBFTV 2 PE SA 2 X XX A**  
**USBFTV 2 PEM SA 2 X XX A**



Part number type: **USBFTV 2 PE SA 2 X XX OPEN**  
**USBFTV 2 PEM SA 2 X XX OPEN**



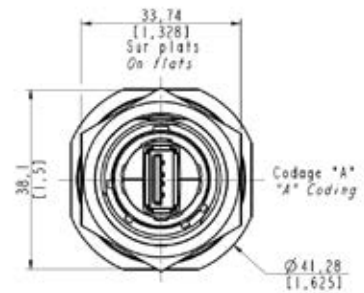
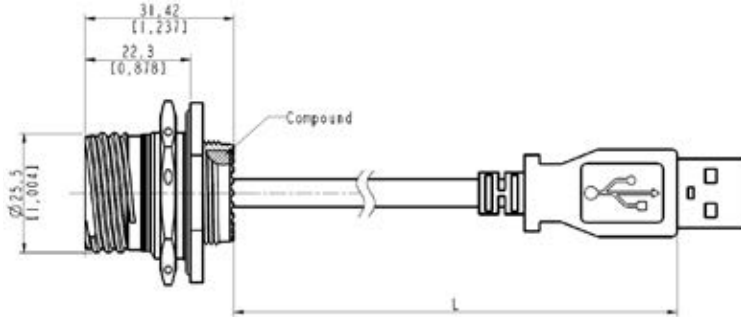
Panel Drilling

# USBFTV™ - TRANSVERSALLY SEALED AND HERMETIC RECEPTACLE

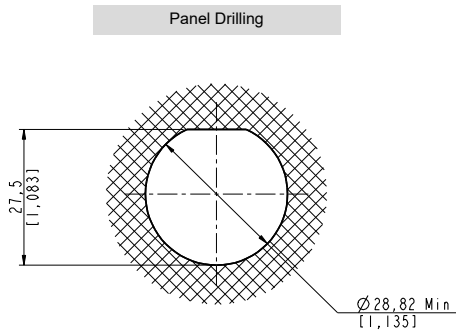
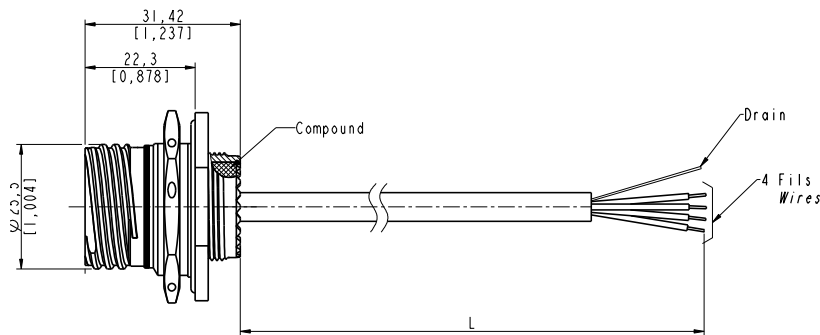
## Overall dimension

**Receptacle** - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - USB-A or Open cordset

Part number type: **USBFTV 7 SA 2 X XX A**

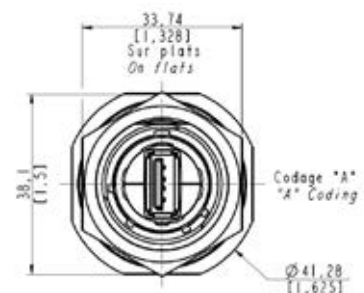
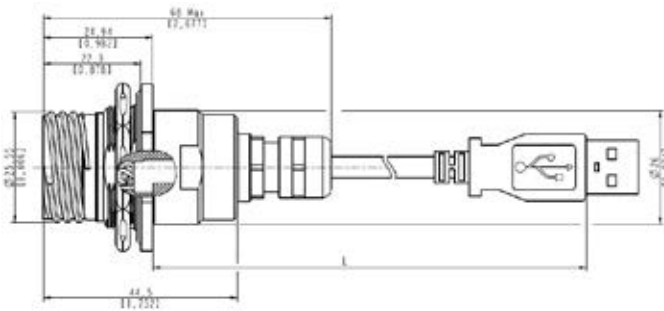


Part number type: **USBFTV 7 SA 2 X XX OPEN**

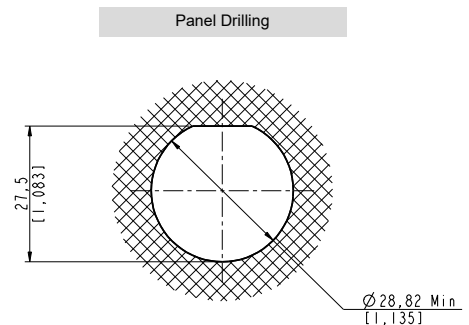
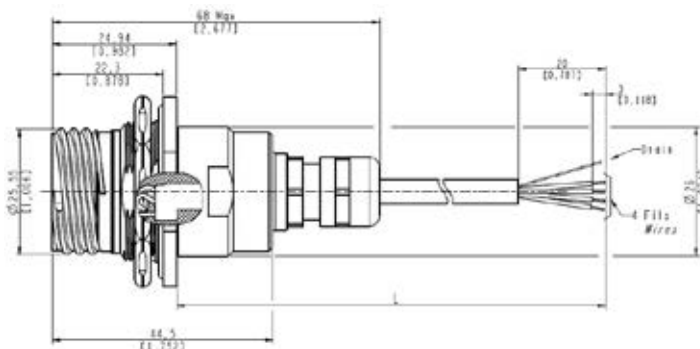


**Receptacle** - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - USB-A or Open cordset

Part number type: **USBFTV 7 PE SA 2 X XX A**  
**USBFTV 7 PEM SA 2 X XX A**



Part number type: **USBFTV 7 PE SA 2 X XX OPEN**  
**USBFTV 7 PEM SA 2 X XX OPEN**

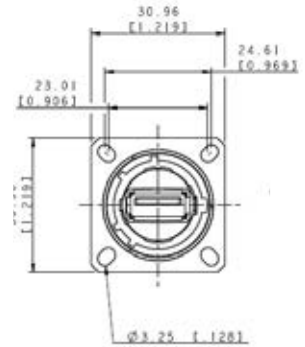
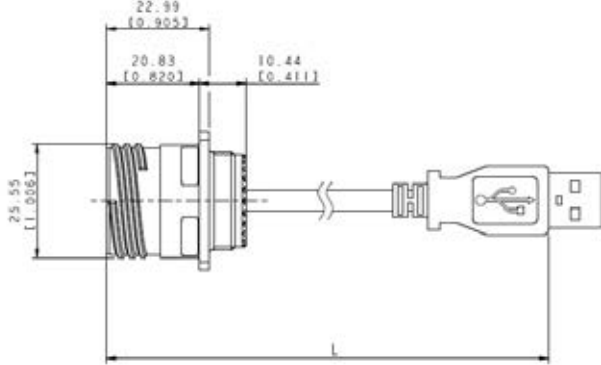


# USBFTV™ - TRANSVERSALLY SEALED AND HERMETIC RECEPTACLE

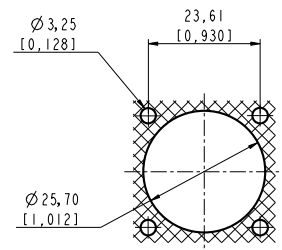
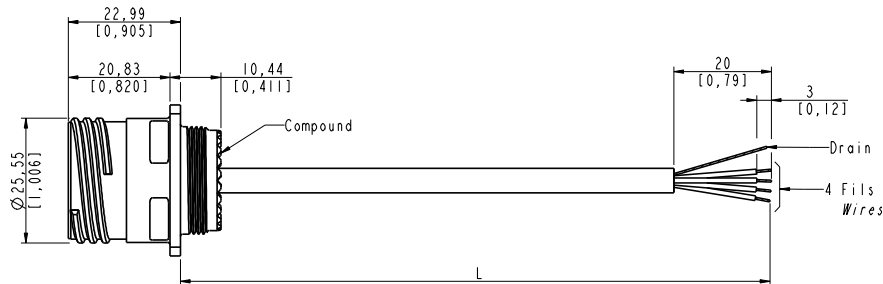
## Overall dimension

**Receptacle** - Square flange receptacle - 4 mounting holes - Shell type 2- USB-A or Open cordset

Part number type: **USBFTV 2 HA 2 X XX A**



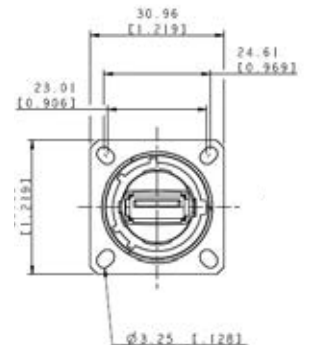
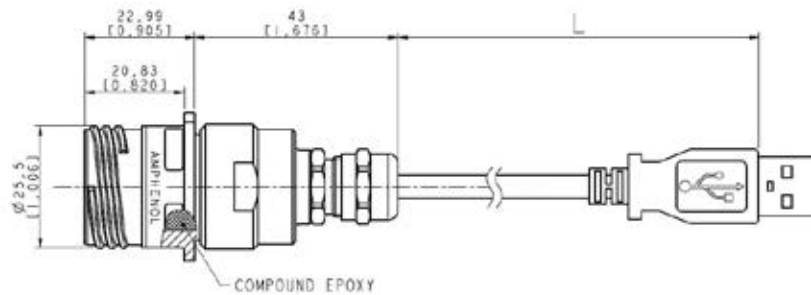
Part number type: **USBFTV 2 HA 2 X XX OPEN**



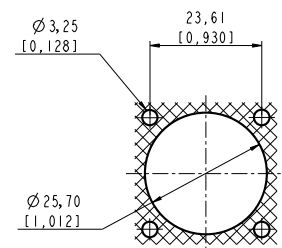
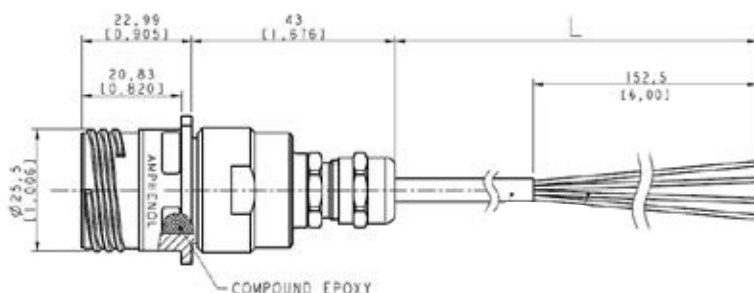
Panel Drilling

**Receptacle** - Square flange receptacle - 4 mounting holes - Shell type 2 - Metal backshell - USB-A or Open cordset

Part number type: **USBFTV 2 PE HA 2 X XX A**  
**USBFTV 2 PEM HA 2 X XX A**



Part number type: **USBFTV 2 PE HA 2 X XX OPEN**  
**USBFTV 2 PEM HA 2 X XX OPEN**



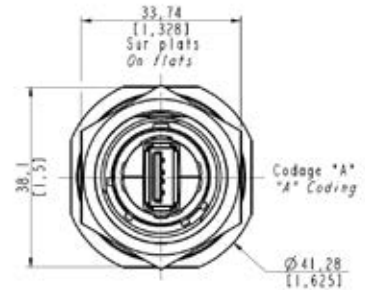
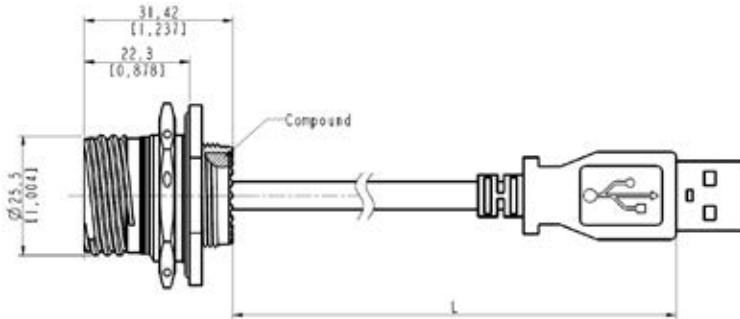
Panel Drilling

# USBFTV™ - TRANSVERSALLY SEALED AND HERMETIC RECEPTACLE

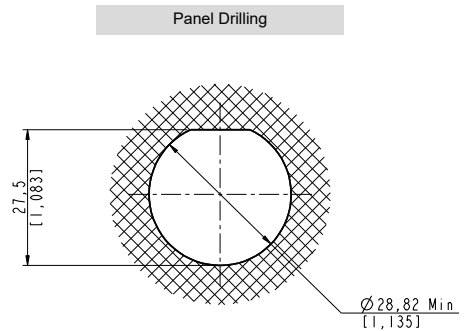
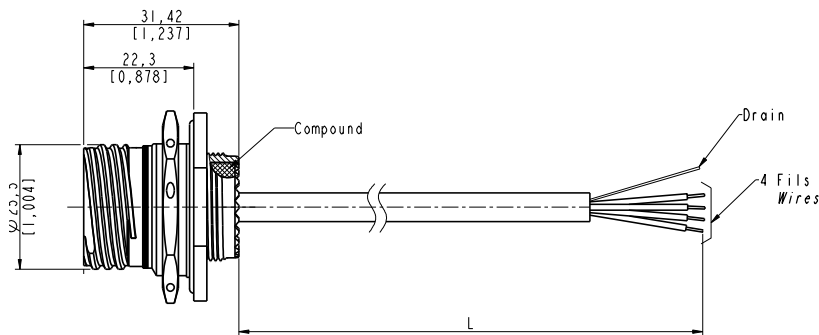
## Overall dimension

**Receptacle** - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - USB-A or Open cordset

Part number type: **USBFTV 7 HA 2 X XX A**

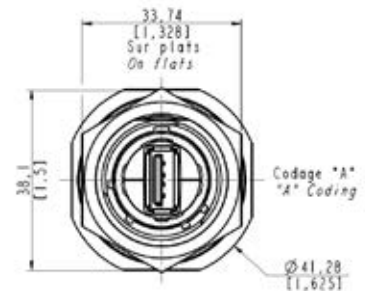
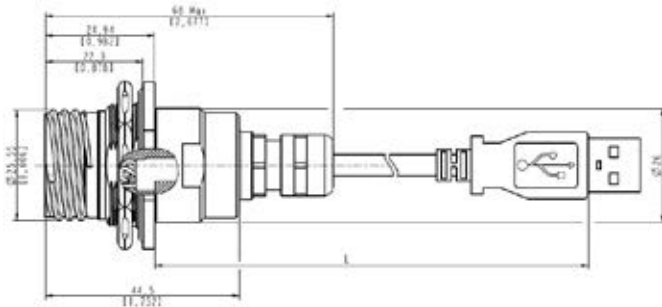


Part number type: **USBFTV 7 HA 2 X XX OPEN**

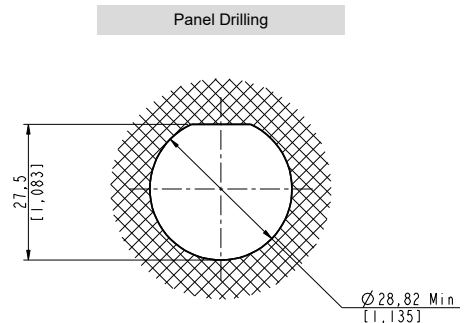
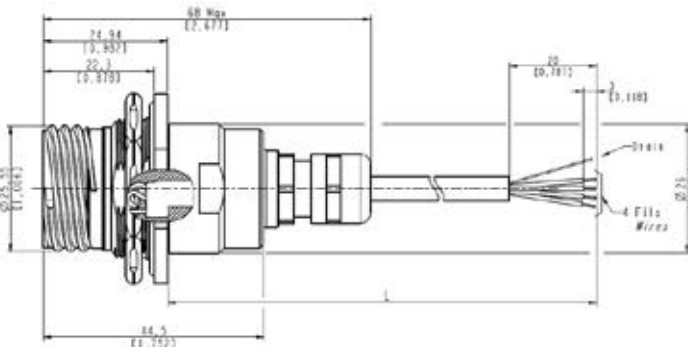


**Receptacle** - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - Metal backshell - USB-A or Open cordset

Part number type: **USBFTV 7 PE HA 2 X XX A**  
**USBFTV 7 PEM HA 2 X XX A**



Part number type: **USBFTV 7 PE HA 2 X XX OPEN**  
**USBFTV 7 PEM HA 2 X XX OPEN**



# USBFTV™ - STAND OFF RECEPTACLE

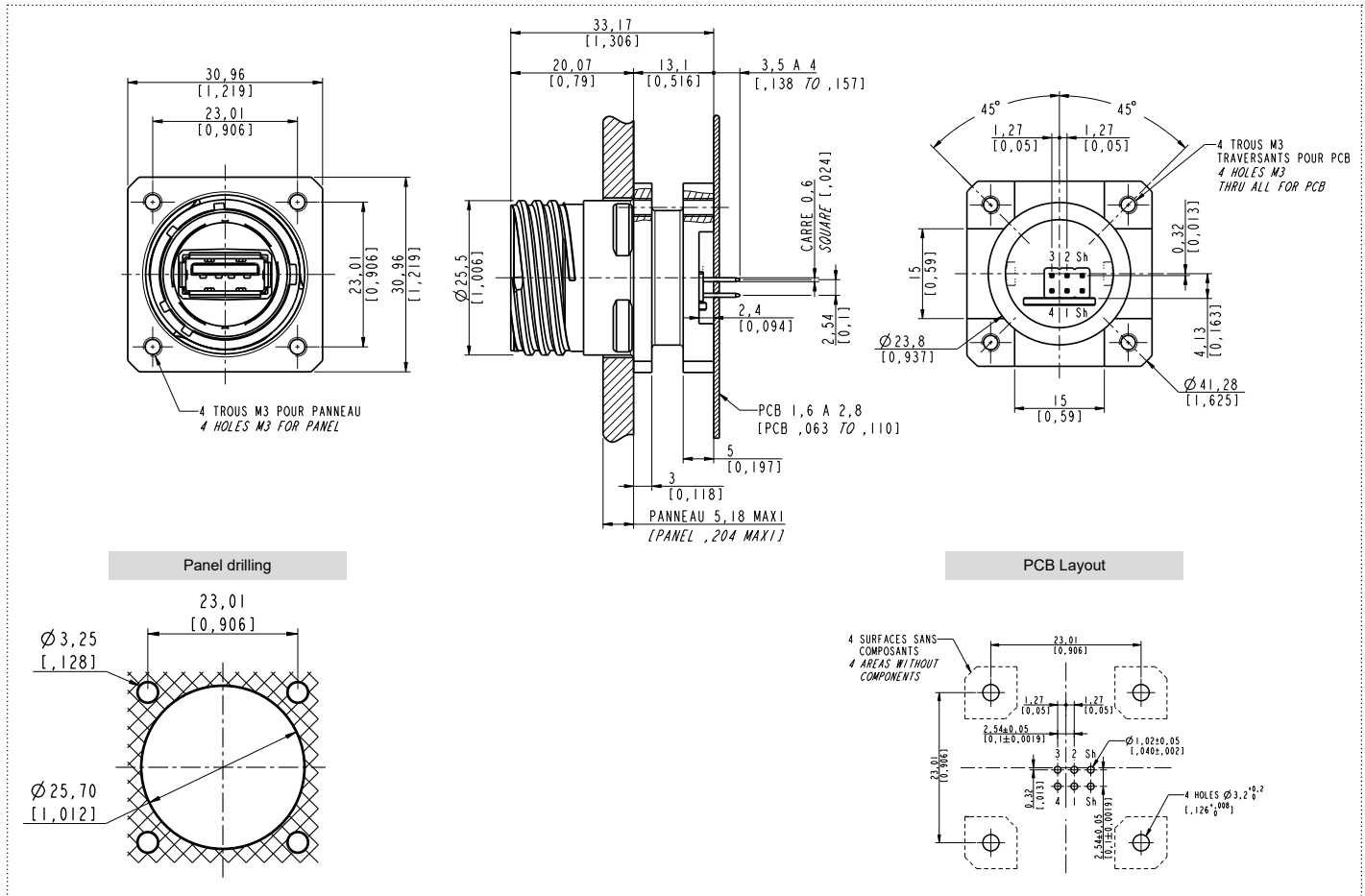


## Description

This enhanced design allows you to mount the connector shell directly on your PC board. Soldering your contacts directly on the board will help to save you a lot of space inside of your system. As this double-flange of this connector is directly fixed on the board, mechanical stresses are absorbed by the shell and not the contacts. In addition to this benefit, the sealing is improved by the compounded receptacle.

## Overall dimension

Receptacle - Square flange receptacle - 4 mounting holes - Shell type 2 - PC Tails contacts



### Part number for coding A

USBFTV 2S A 5 N F459

USBFTV 2S A 5 G F459

USBFTV 2S A 5 ZN F459

### Part number for coding B

USBFTV 2S B 5 N F459

USBFTV 2S B 5 G F459

USBFTV 2S B 5 ZN F459

### Plating

Nickel ✓

Olive drab cadmium

Black zinc nickel ✓

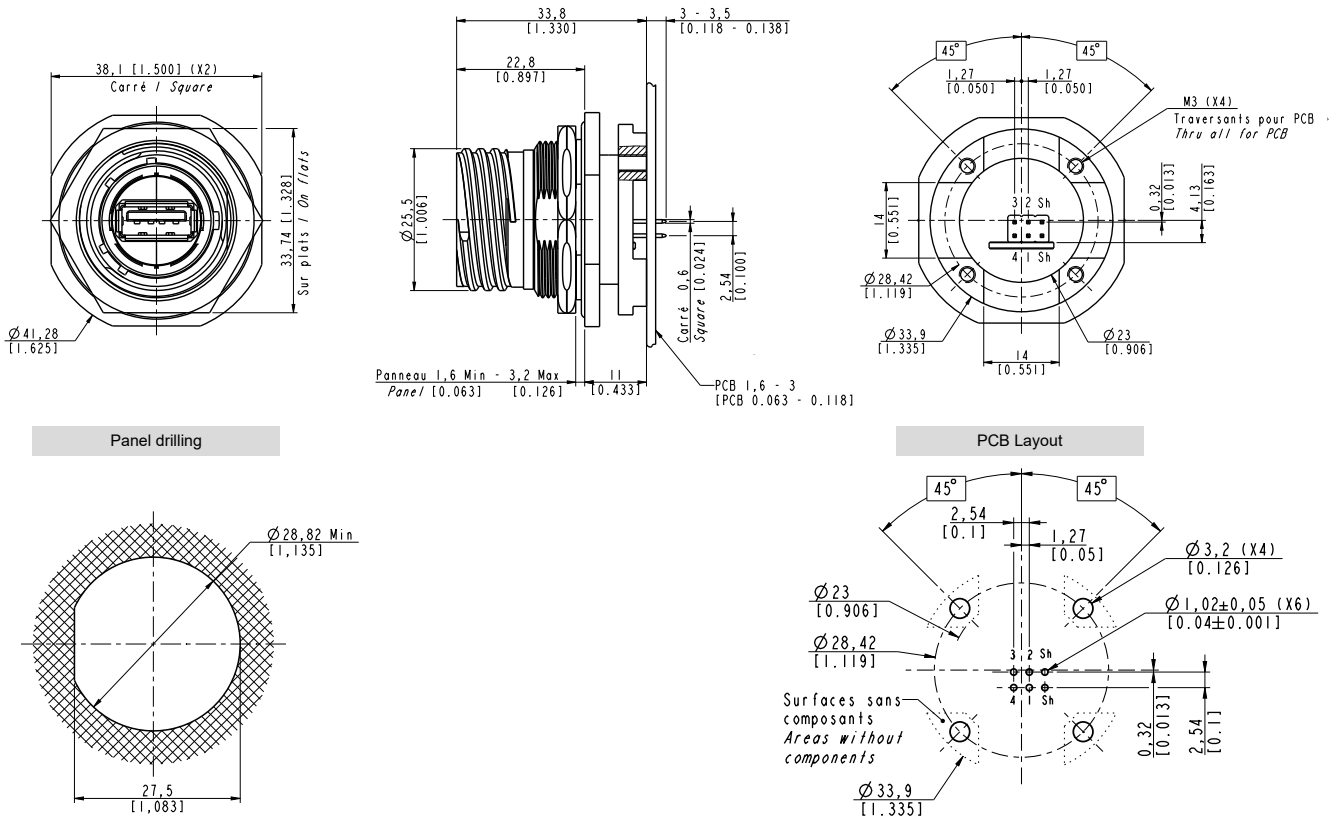
✓: RoHS compliant



# USBFTV™ - STAND OFF RECEPTACLE

## Overall dimension

Receptacle - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - PC Tails contacts



| Part number for coding A | Part number for coding B | Plating             |
|--------------------------|--------------------------|---------------------|
| USBFTV 7 SA 5 N F459     | USBFTV 7S B 5 N F459     | Nickel ✓            |
| USBFTV 7 SA 5 G F459     | USBFTV 7S B 5 G F459     | Olive drab cadmium  |
| USBFTV 7 SA 5 ZN F459    | USBFTV 7S B 5 ZN F459    | Black zinc nickel ✓ |

✓: RoHS compliant

# USBFTV™ - THROUGH-BULKHEAD RECEPTACLE

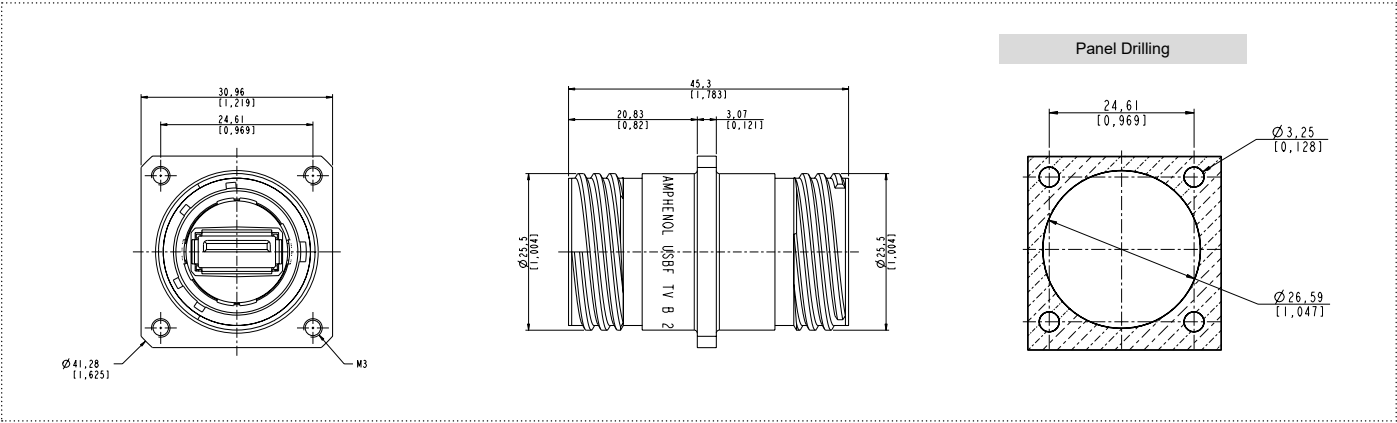


## Description

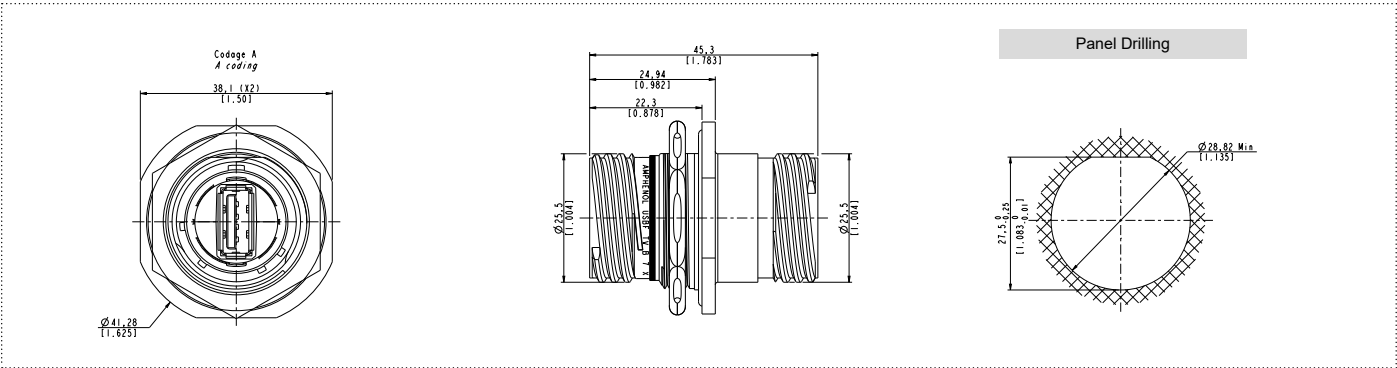
The USBFTV™ Through-bulkhead is a double-ended receptacle that enables you to connect two USBFTV plugs on both sides of your panel. In your system, it provides you the best protection and remains very easy to assemble.

## Overall dimension

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



Receptacle - Jam nut receptacle - Hexagonal nut mounting - Shell type 7



| Part number for square flange receptacle | Part number for Jam nut receptacle | Plating             |
|------------------------------------------|------------------------------------|---------------------|
| USBFTV B 2 N                             | USBFTV B 7 N                       | Nickel ✓            |
| USBFTV B 2 G                             | USBFTV B 7 G                       | Olive drab cadmium  |
| USBFTV B 2 ZN                            | USBFTV B 7 ZN                      | Black zinc nickel ✓ |

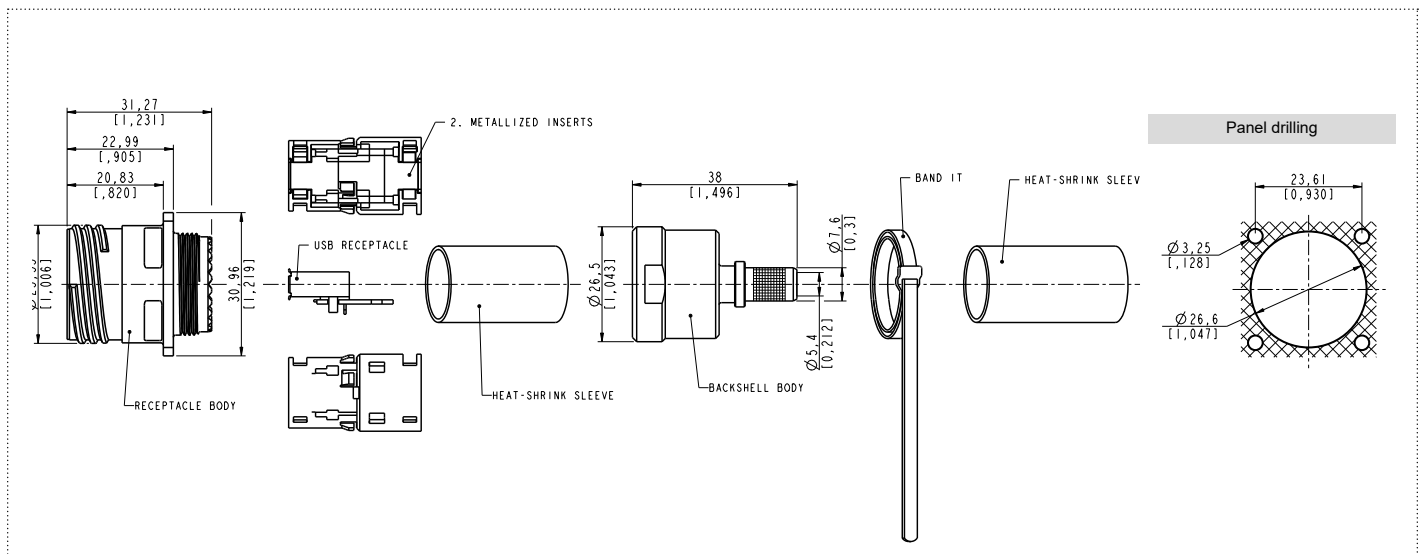
# USBFTV™ - RECEPTACLE WITH 360° EMI BACKSHELL

## Description

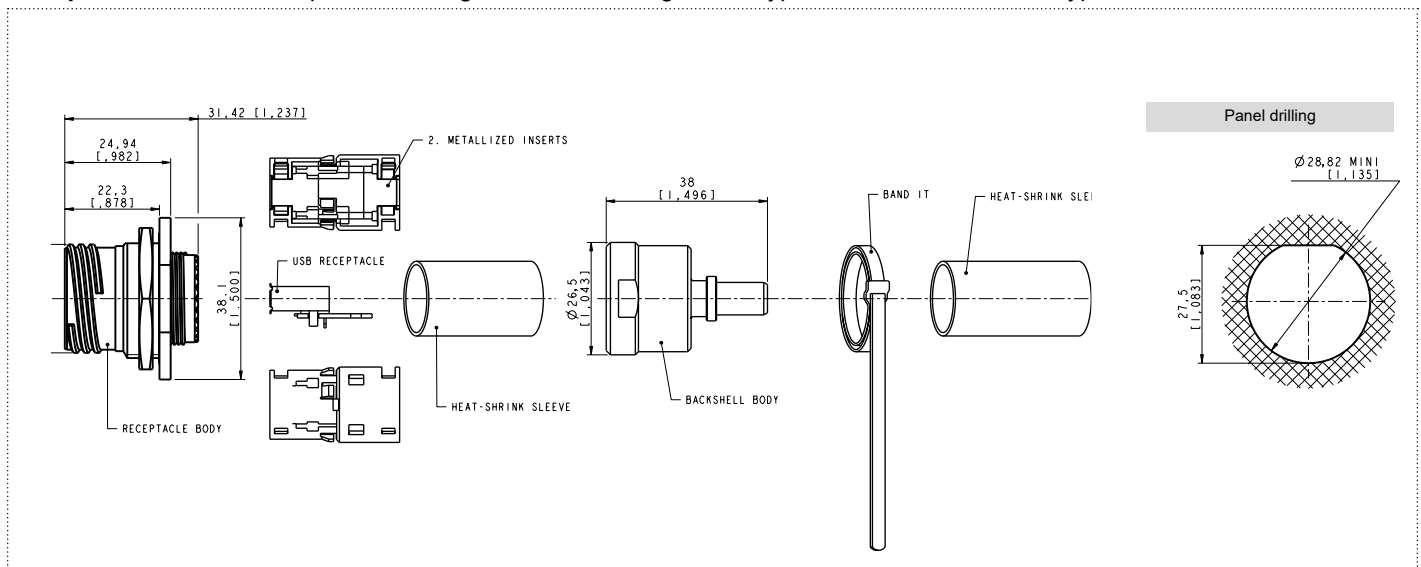
This USBFTV™ kit includes all components necessary to build up a totally 360° EMI shielded receptacle. This kit is mainly composed of an 360° backshell and the USB receptacle with PCB with 4 tinned holes for solder termination. With this receptacle kit provided without cable, you have to solder the cable on the PCB. You can find below, wires and shielding wire cabling specifications. We recommend to use our reinforced USB cable page 53. If you prefer to use your own cable, please check with us to see if your USB cable is compatible. In the case you need a complete 360° EMI shield receptacle already mounted with a define length of cable, please consult us.

## Overall dimension

**Receptacle - Square flange receptacle - 4 mounting holes - Shell type 2 - Back terminations type 2**



**Receptacle - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - Back terminations type 2**



| Part number for Square flange receptacle | Part number for Jam nut receptacle | Plating                     |
|------------------------------------------|------------------------------------|-----------------------------|
| KIT40263                                 | KIT40245                           | Nickel ✓                    |
| KIT40263G                                | KIT40245G                          | Olive drab cadmium          |
| KIT40263ZN                               | KIT40245ZN                         | Black zinc nickel plating ✓ |

✓: RoHS compliant

# USBFTV™ - ATEX ZONE 2



## Description

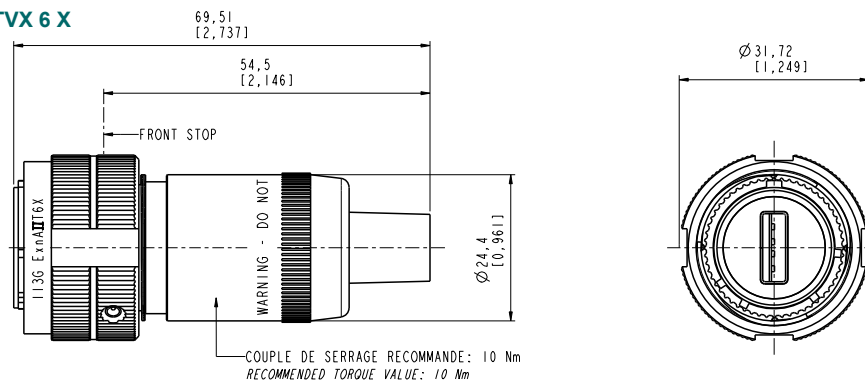
USBFTVX connectors are the same as the standard USBFTV™, but in addition, they are certified for use in explosive environments. This range is fitted to be used in ATEX zone 2 environments and 100% tested at 500V during 1 minute without sparking.

**How to order :** Please refer to page 91

## Overall dimension

### Plug - Shell type 6

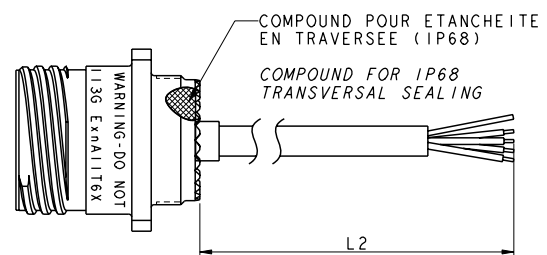
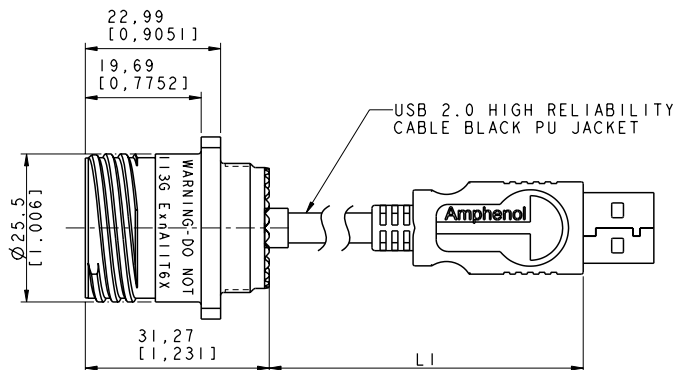
Part number type: **USBFTVX 6 X**



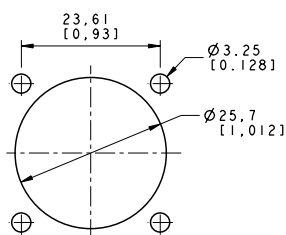
### Receptacle - Square flange receptacle - 4 mounting holes - Shell type 2 - USB-A or Open cordset

Part number type: **USBFTVX 2S X 2 X XX A**

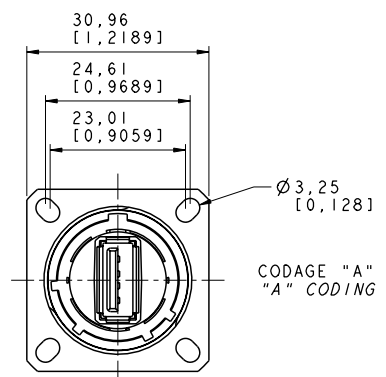
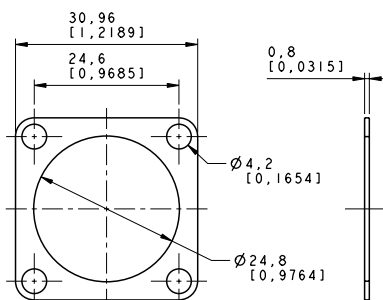
Part number type: **USBFTVX 2S X 2 X XX OPEN**



Panel drilling



JE15 Panel Gasket

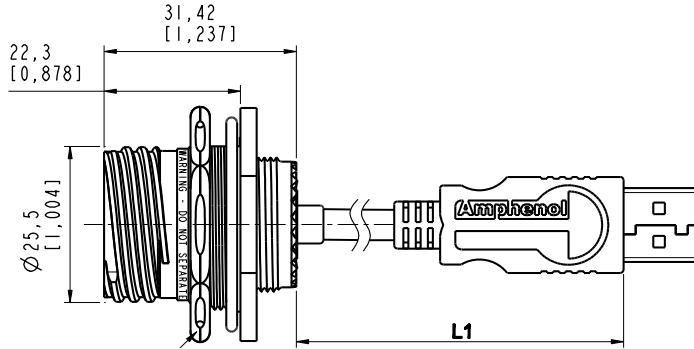


# USBFTV™ - ATEX ZONE 2

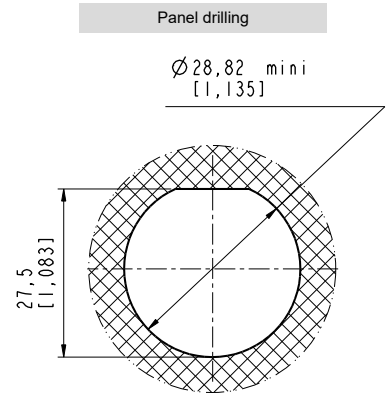
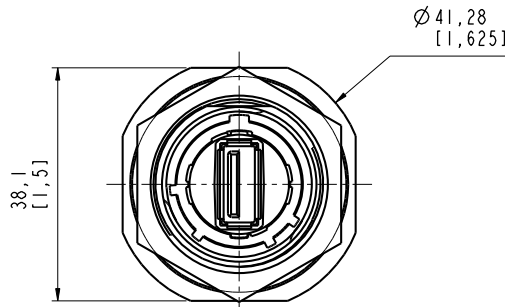
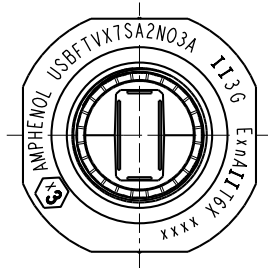
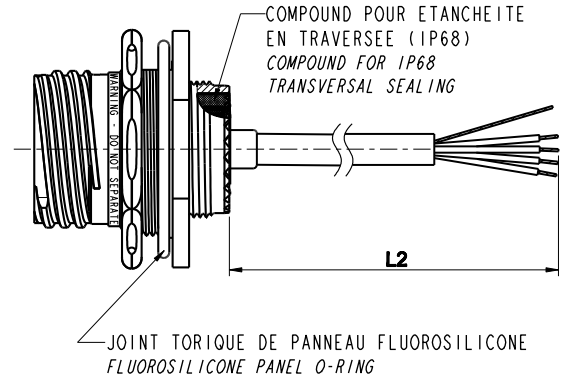
## Overall dimension

**Receptacle** - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - USB-A or Open cordset

Part number type: **USBFTVX 7S X 2 X XX A**



Part number type: **USBFTVX 7S X 2 X XX OPEN**





# USBBFTV



## Description

USBBFTV is a complete ruggedized solution around USB2.0 Type-B standard using a Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) to connect the two plug and receptacle parts.

This solution allows you to insert a standard USB 2.0 cordset into a metallic plug which will protect it from shocks, dust and fluids. The assembly of this ruggedized plug doesn't require any tools and can be assembled easily in the field. Perfectly adapted to the USB2.0 standard, you have two coding possibilities to facilitate coupling when you have several receptacles on a panel.

The corresponding USBBFTV receptacle dedicated to be mounted on your panel enables you to reinforce and protect your system against leakage, shocks, vibrations and much more. This receptacle part is delivered with a defined coding when ordered but can be conveniently changed with our dedicated USBF ODE tool.

## Main features

### 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 - Shell size 15
- Plug retention in the receptacle: 100N in the axis
- Mating cycles: 500 minimum

### DATA TRANSMISSION

- USB-B
- 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
  - 500 h with black zinc nickel ✓
  - 1000 h with marine bronze shell ✓
- Fire retardant / Low smoke: UL94 V0 and EN45545
- 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)
- Temperature range: - 40°C / +85°C

### APPLICATIONS

- Battlefield communication systems
- C5ISR
- Data acquisition and transmission in harsh environment
- Navy
- Rail Mass Transit
- Industrial process control
- Robotics
- CNC machines
- Oil & Gas

**How to order :** Please refer to page 92

## Back terminations

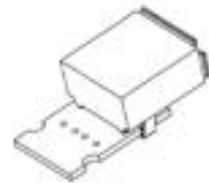
**Type 1:**  
female USB-A



**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



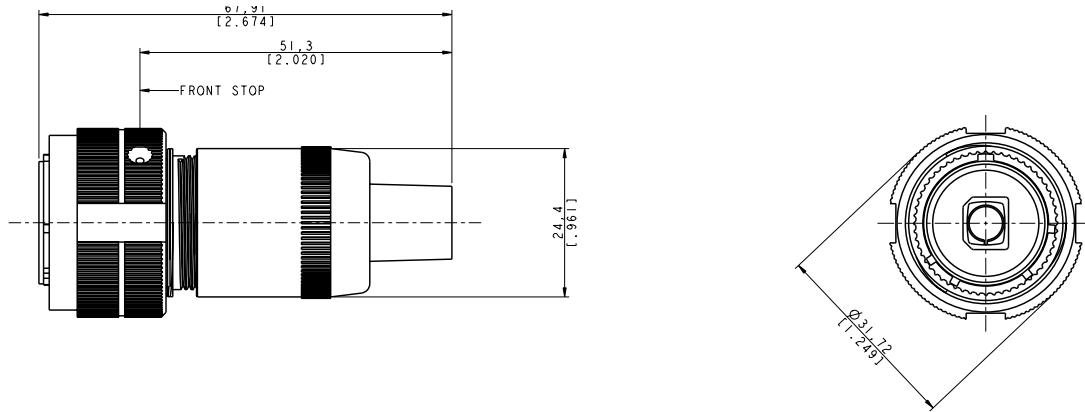
✓: RoHS compliant

# USBBFTV

## Overall dimension

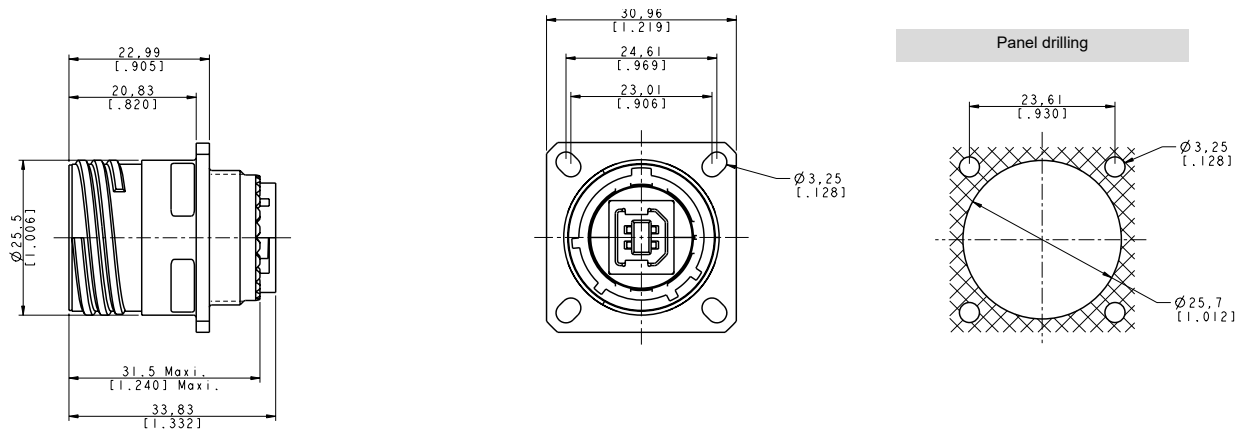
### Plug - Shell type 6

Part number type: **USBBF TV 6 X**



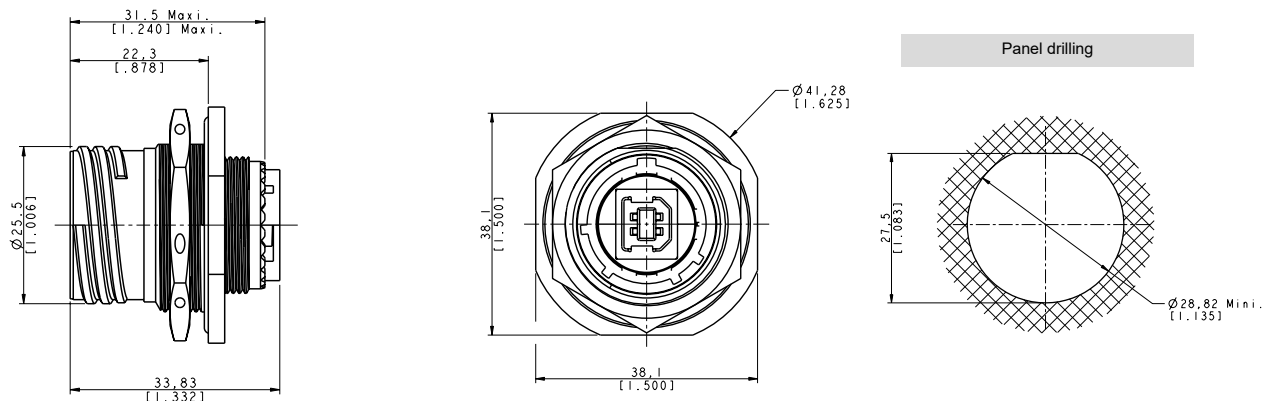
### Receptacle - Square flange receptacle - 4 mounting holes - Shell type 2 - Back terminations type 1

Part number type: **USBBF TV 2 X X**



### Receptacle - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - Back terminations type 1

Part number type: **USBBF TV 7 X X**

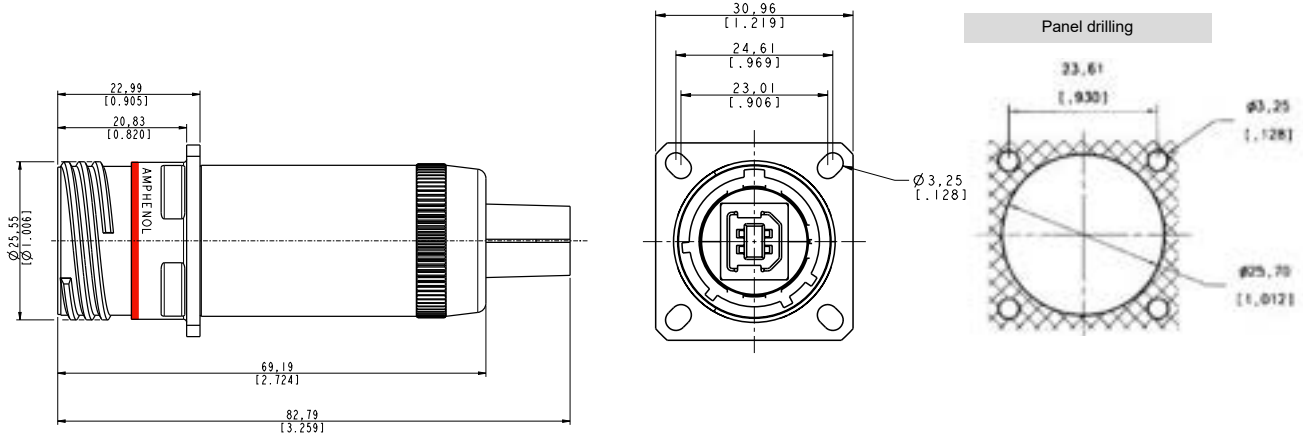


# USBBFTV

## Overall dimension

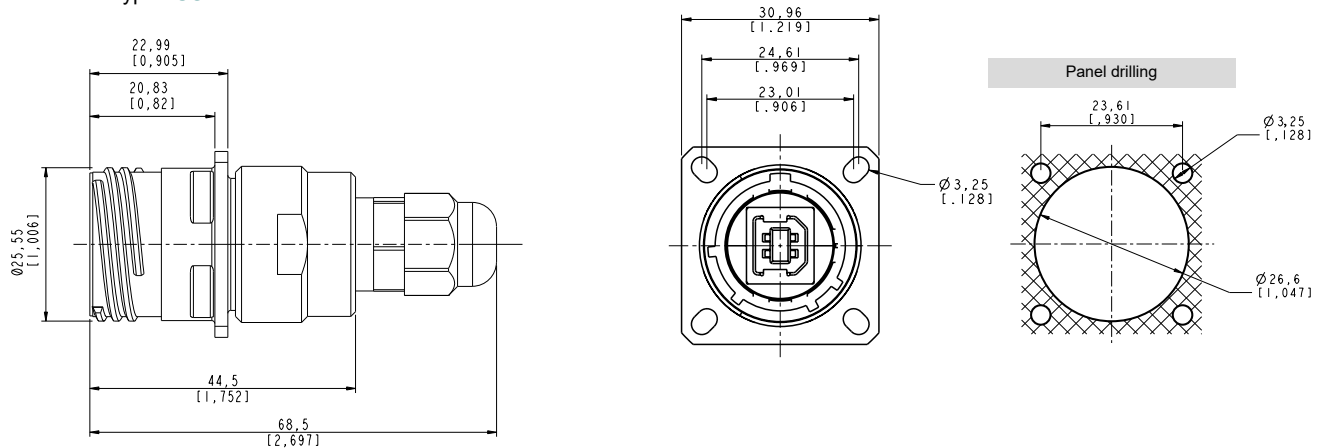
**Receptacle** - Square flange receptacle - 4 mounting holes - Shell type 2 - Back termination type 1 - Metal backshell

Part number type: **USBBF TV 2PE 1 X**

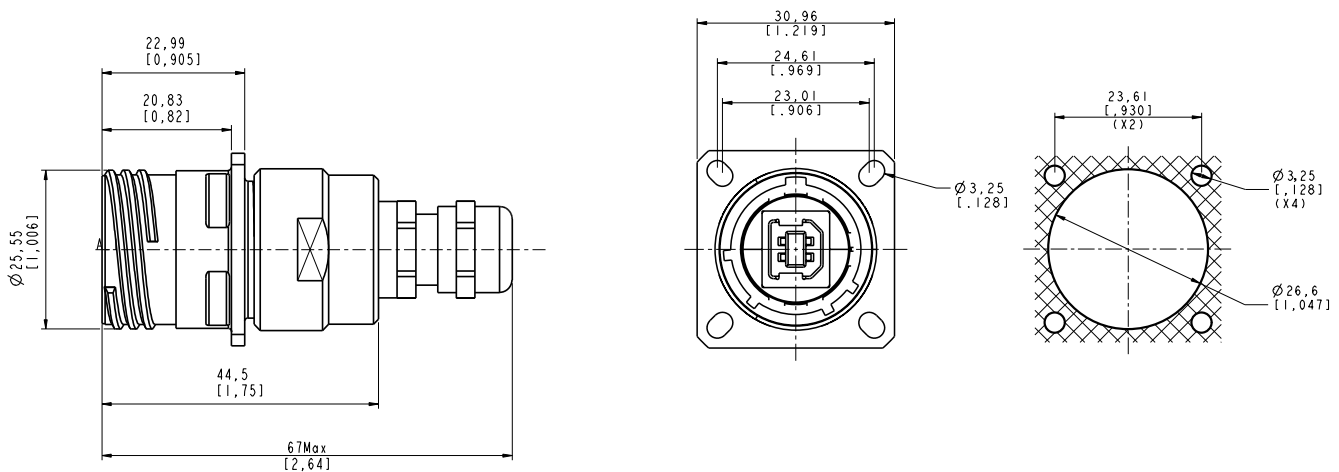


**Receptacle** - Square flange receptacle - 4 mounting holes - Shell type 2 - Back termination type 2 - Metal backshell

Part number type: **USBBF TV 2PE 2 X**



Part number type: **USBBF TV 2PEM 2 X**

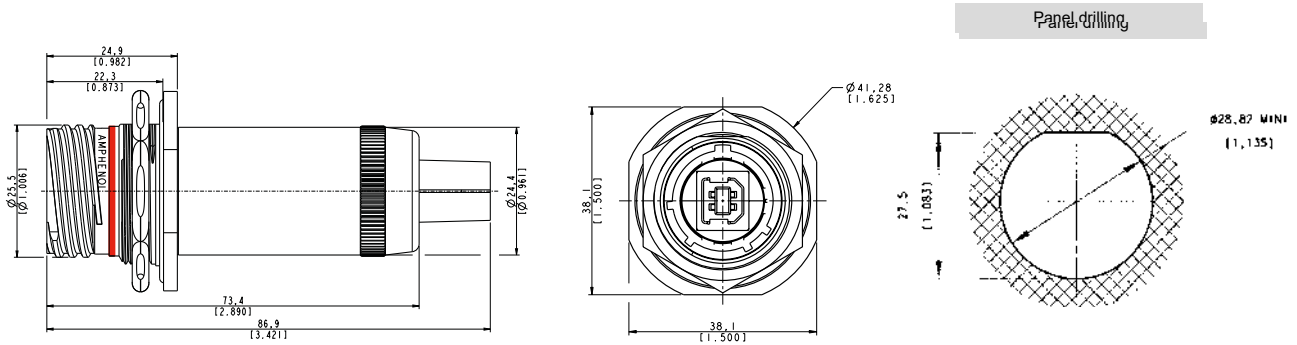


# USBBFTV

## Overall dimension

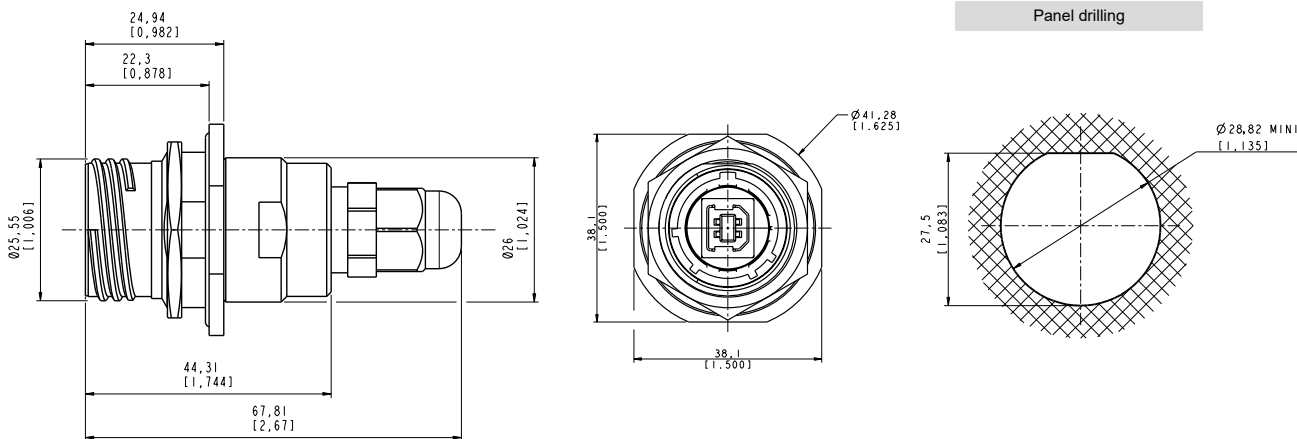
**Receptacle** - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - Back termination type 1 - Metal backshell

Part number type: **USBBF TV 7PE 1 X**

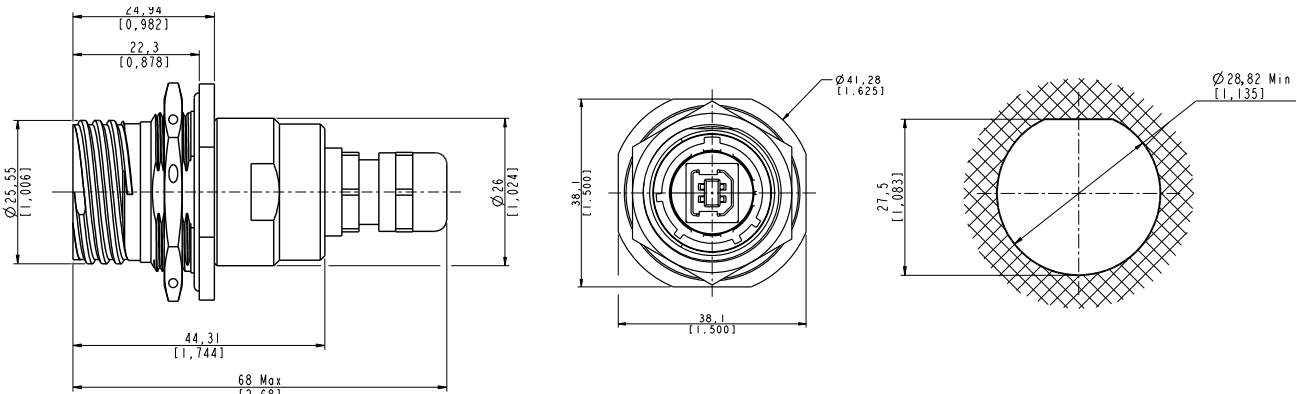


**Receptacle** - Jam nut receptacle - Hexagonal nut mounting - Shell type 7 - Back termination type 2 - Metal backshell

Part number type: **USBBF TV 7PE 2 X**



Part number type: **USBBF TV 7PEM 2 X**



# USBBFTV - TRANSVERSALLY SEALED RECEPTACLE

## Description



The transversally sealed receptacle is in all aspects equivalent to the standard and in addition, is improved with compound at the rear of the receptacle. This will prevent the sealing of the receptacle when unmated with his plug or protective cap.

The hermetic solution, as the transversally sealed one is compounded at the rear of the receptacle. Helium leakage is less than  $1.10 \cdot 10^{-6} \text{ cm}^3$  per second [0.1 micron cubit ft per hour] at one bar [15 psi] pressure differential. This test is performed on all of the hermetic receptacles.

## Main features

### MAIN CHARACTERISTICS

- Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device - Shell size 15
- 2 mechanical coding/polarization possibilities by the user (receptacle insert rotation)
- Sealed against fluids and dusts (IP68)
- Shock, vibration and traction resistant
- No cabling operation in field and no tools required
- Improved EMI protection
- USBFTV plug retention in the receptacle: 100 N in the axis
- Mating cycles: 500 minimum

### DATA TRANSMISSION

- USB-B
- 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
  - 500 h with black zinc nickel ✓
  - 1000 h with marine bronze shell ✓
- Fire retardant / Low smoke: UL94 V0 and EN45545
- 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)
- Temperature range: - 40°C / +85°C

### APPLICATIONS

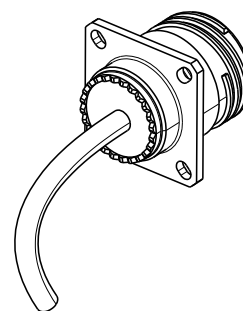
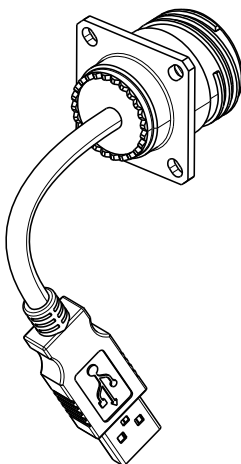
- Battlefield communication systems
- C5ISR
- Data acquisition and transmission in harsh environment
- Navy
- Rail Mass Transit
- Industrial process control
- Robotics
- CNC machines
- Oil & Gas

**How to order :** Please refer to page 93

## Back terminations

USB cable end type A

USB cable type «OPEN»



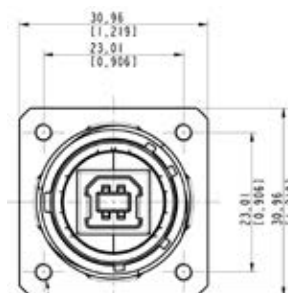
✓: RoHS compliant



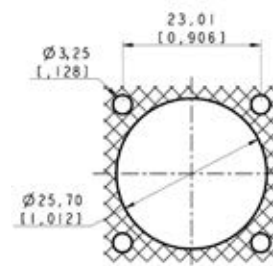


The USBFTV enhanced design allows you to mount the connector shell directly on the PC board. Soldering your contacts directly on the board saves you a lot of space inside of your system. As this double-flange of this connector is directly fixed on the board, mechanical stresses are absorbed by the shell and not the contacts. In addition to this benefit, the sealing is improved by the compounded receptacle.

**Receptacle** - Square flange receptacle - 4 mounting holes - Shell type 2 - PC Tails



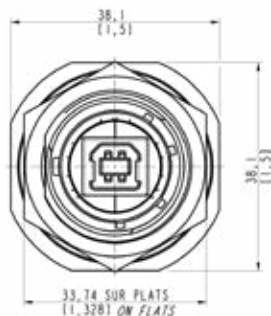
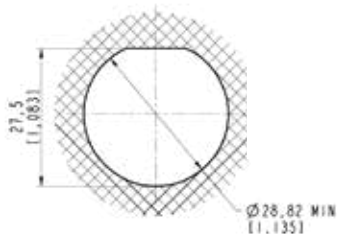
Panel drilling



✓: RoHS compliant

## Overall dimension

|              |                       |             |                    |                            |                     |        |        |
|--------------|-----------------------|-------------|--------------------|----------------------------|---------------------|--------|--------|
| How to order | Assembly instructions | Accessories | Rugged electronics | Adapters and access points | Cables and cordsets | USB2.0 | USB3.0 |
|--------------|-----------------------|-------------|--------------------|----------------------------|---------------------|--------|--------|

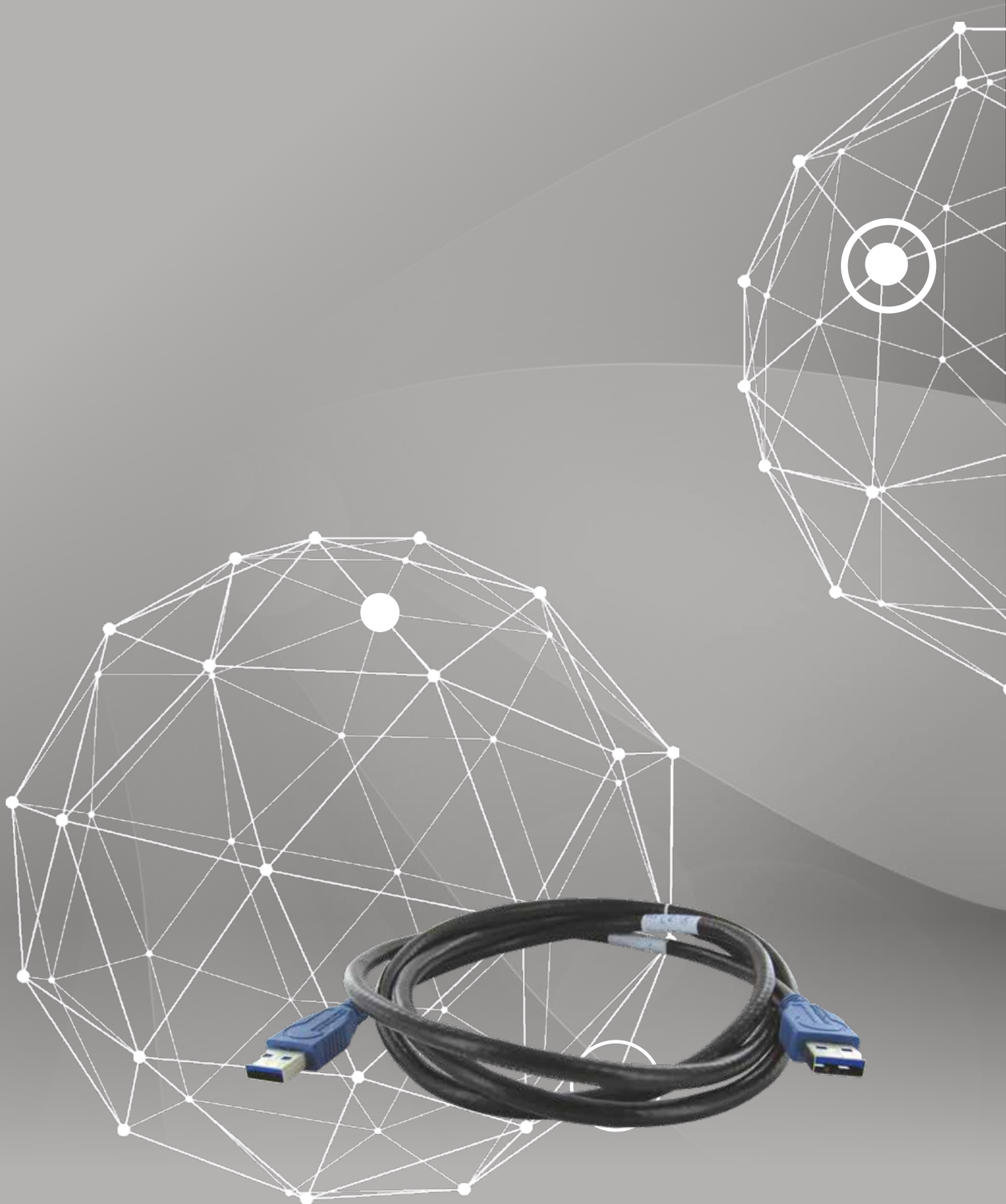
[illegible]

| Part number          | Plating             |
|----------------------|---------------------|
| USBBF TV 7 5 N F459  | Nickel ✓            |
| USBBF TV 7 5 G F459  | Olive drab cadmium  |
| USBBF TV 7 5 ZN F459 | Black Zinc Nickel ✓ |

NOTES

Notes section with horizontal lines for writing.

- USB3.0
- USB2.0**
- Cables and cordsets
- Adapters and access points
- Rugged electronics
- Accessories
- Assembly instructions
- How to order



CABLES AND CORDSETS



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| USB3.2 Gen1 cable and cordset | 54        |
| USB2.0 cable and cordset      | 55        |



# USB3.2 GEN1 CABLE AND CORDSET



## Description

This USB3.2 Gen1 cable is specifically designed for fixed or deployable military or industrial applications. Can be ordered as cordset with USB-A at both end or as reel of 300m to be used for cabling activity. Its special polyurethane can withstand the harshest environment.

## Design

|                              |            |                                                                                      |
|------------------------------|------------|--------------------------------------------------------------------------------------|
| USB3.2 Gen1<br>2 X Data Pair | Conductors | 2 x 28 AWG Stranded tinned copper wire (Ø0,39mm)                                     |
|                              | Insulation | Polyethylene (Ø1,0mm)                                                                |
|                              | Colors     | Pair 1: Purple and orange<br>Pair 2: Blue and yellow                                 |
|                              | Drain      | 2 x 28 AWG Stranded tinned copper drain wire (Ø0,39mm)                               |
|                              | Shield     | Aluminate foil and plastic tape overlapped                                           |
| USB2.0<br>1 X Data Pair      | Conductors | 2 x 28 AWG Stranded tinned copper wire (Ø0,39mm)                                     |
|                              | Insulation | Polyethylene (Ø0,73mm)                                                               |
|                              | Colors     | Green and White                                                                      |
| Power<br>1 X Power Pair      | Conductors | 2 x 24 AWG Stranded tinned copper wire (Ø0,6mm)                                      |
|                              | Insulation | Polyethylene (Ø1,1mm)                                                                |
|                              | Colors     | Red and Black                                                                        |
| Overall                      |            | Fillers, Aluminate foil overlapped and 36 AWG shield braiding of tinned copper wires |
| Jacket                       | Insulation | Polyurethane (Ø5,7±0,2mm)                                                            |
|                              | Color      | Black                                                                                |

## Electrical characteristics at 20°C

|                              |                       |                |                 |
|------------------------------|-----------------------|----------------|-----------------|
| USB3.2 Gen1<br>2 X Data Pair | Test voltage          | 500 V          |                 |
|                              | Impedance             | 90±7% Ohm      |                 |
|                              | Attenuation (dB/100m) | 625 MHz - 10   | 5 000 MHz - 36  |
|                              |                       | 1 250 MHz - 15 | 7 500 MHz - 47  |
|                              |                       | 2 500 MHz - 25 |                 |
| Outer screen resistance      | ≤ 15 Ohm/km           |                |                 |
| USB2.0<br>1 X Data Pair      | Test voltage          | 500 V          |                 |
|                              | Impedance             | 90±15% Ohm     |                 |
|                              | Attenuation (dB/100m) | 1 MHz - 4,0    | 48 MHz - 27,0   |
|                              |                       | 4 MHz - 7,8    | 96 MHz - 38,0   |
|                              |                       | 8 MHz - 11,4   | 200 MHz - 64,0  |
|                              |                       | 12 MHz - 13,4  | 400 MHz - 116,0 |
|                              |                       | 24 MHz - 19,0  |                 |
| Power Wire                   | Conductor resistance  | ≤ 85 Ohm/km    |                 |
|                              | Insulation resistance | ≥ 200 MOhm*km  |                 |
|                              | Operating voltage     | ≤ 1 000 V      |                 |
|                              | Test voltage          | 500 V          |                 |

## Other characteristics

|                                                |                                                                                           |
|------------------------------------------------|-------------------------------------------------------------------------------------------|
| Halogen Free Flame Retardant                   | Resistance to microbial/fungus growth: MIL-STD-810G, method 508.6 = grade 1-2             |
| Oil resistance acc. to 1584, sec. 480 (60°)    | Min. bending radius allowed: repeated 10 X Ø single 5 X Ø                                 |
| Flame retardant acc. to UL 1581, sec. 1090 (H) | Permissible temperature range for transport, installation and operating: -40°C up to 85°C |
| Flame retardant acc. to IEC 60332-1-2          |                                                                                           |
| RoHS compliant (Directive 2011/65/EC)          | Weight: 46 kg/km                                                                          |

**How to order :** Please refer from page 94 to 95

# USB2.0 CABLE AND CORDSET



## Description

This USB2.0 cable has been specially selected for fixed or portable military or industrial applications. Can be ordered as cordset with USB-A at both end or as reel of 300m to be used for cabling activity. Its special polyurethane can withstand the harshest environment.

## Design

|                         |            |                                                                                     |
|-------------------------|------------|-------------------------------------------------------------------------------------|
| USB2.0<br>1 X Data Pair | Conductors | 2 x 28 AWG Stranded tinned copper wire (Ø0,39mm)                                    |
|                         | Insulation | Polyethylene (Ø0,9mm)                                                               |
|                         | Colors     | Green and White                                                                     |
| Power<br>1 X Power Pair | Conductors | 2 x 24 AWG Stranded tinned copper wire (Ø0,58mm)                                    |
|                         | Insulation | Polyethylene (Ø1,1mm)                                                               |
|                         | Colors     | Red and Black                                                                       |
| Drain Wire              | Conductor  | 26 AWG Stranded tinned copper drain wire                                            |
| Overall                 |            | Aluminate foil overlapped and shield braiding of tinned copper wires (16 x 5 x 0,1) |
| Jacket                  | Insulation | UV resistant polyurethane (Ø5,1±0,2mm)                                              |
|                         | Color      | Black                                                                               |

## Electrical characteristics at 20°C

|                         |                       |               |
|-------------------------|-----------------------|---------------|
| USB2.0<br>1 X Data Pair | Test voltage          | 1000 V        |
|                         | Attenuation (dB/100m) | 1 MHz - 4,0   |
|                         |                       | 4 MHz - 5,5   |
|                         |                       | 8 MHz - 8,2   |
|                         |                       | 12 MHz - 9,9  |
|                         |                       | 24 MHz - 14,1 |
| Power Wire              | Conductor resistance  | ≤ 90 Ohm/km   |
|                         | Insulation resistance | ≥ 20 MOhm*km  |
|                         | Operating voltage     | ≤ 100 V       |
|                         | Test voltage          | 1000 V        |

## Other characteristics

|                                                |                                                                                           |
|------------------------------------------------|-------------------------------------------------------------------------------------------|
| Halogen Free Flame Retardant                   | Resistance to microbial/fungus growth: MIL-STD-810G, method 508.6 = grade 1-2             |
| Oil resistance acc. to 1584, sec. 480 (60°)    | Min. bending radius allowed: repeated 10 X Ø single 5 X Ø                                 |
| Flame retardant acc. to UL 1581, sec. 1090 (H) | Permissible temperature range for transport, installation and operating: -40°C up to 85°C |
| Flame retardant acc. to IEC 60332-1-2          |                                                                                           |
| RoHS compliant (Directive 2011/65/EC)          | Weight: 46 kg/km                                                                          |

**How to order :** Please refer from page 94 to 95



# ADAPTORS AND ACCESS POINTS



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| Composite USB2.0 access point                    | 60 |
| USB2.0 to type EN3646 - PT/451 - ABS1547 adaptor | 65 |

USB3.0

USB2.0

Cables and  
cordsetsAdaptors and  
access pointsRugged  
electronics

Accessories

Assembly  
instruction

How to order



# USB3.2 GEN1 AND USB2.0 ACCESS POINT

## Description

This USB receptacle is perfectly suitable for access point applications to connect a standard USB key or a USB cable. These receptacles are available on USB3.2 Gen1 - Type A and USB2.0 - Type A or B.

The square flange receptacle is a derivate from MIL-DTL-26482 series size 18. The included composite self-closing cap protects your receptacle against splash and dust.

## Main features

### MAIN CHARACTERISTICS

- Sealing level: IP54 when not mated
- Temperature range: -40°C / +85°C
- RoHS compliant

### DATA TRANSMISSION

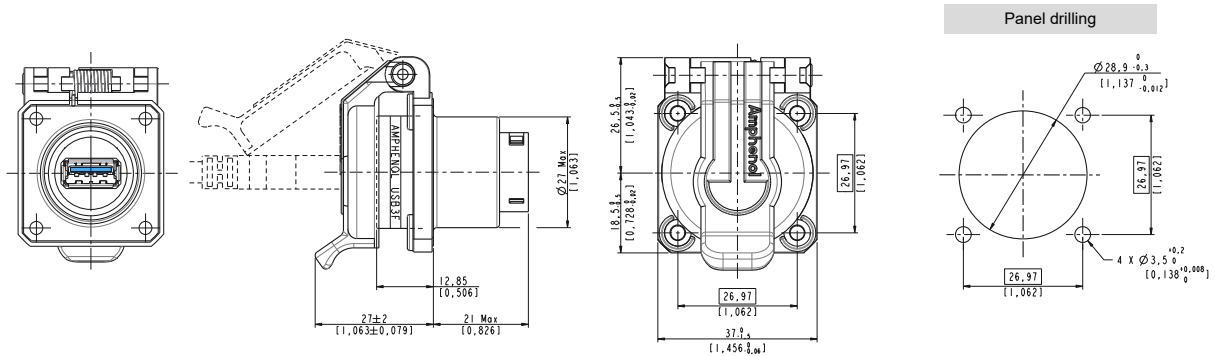
- UBS-A
- USB specification 3.2 Gen1
- Data rate: up to 5 Gb/s for high speed USB
- USB specification 2.0
- Data rate: up to 480 Mb/s for high speed USB

### APPLICATIONS

- Access point
- Telecom equipments
- Video control
- Robotics
- Industrial process control
- CNC machines
- Special machines

## Overall dimension

### USB3.2 Gen1 access point - With self-closing cap



#### Important note:

- The part number included the receptacle and the self-closing cap.
- This version is with USB-A in front and back termination.

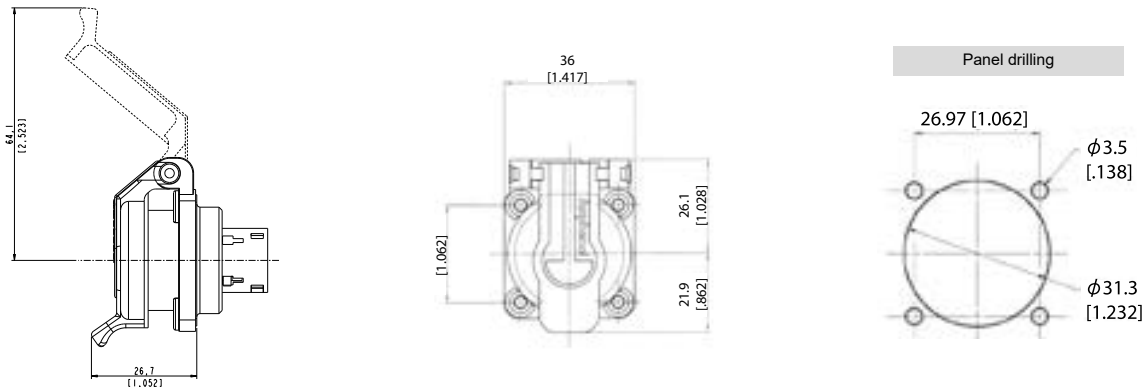
| Part number     | Plating                   | Metallized inserts (EMI) |
|-----------------|---------------------------|--------------------------|
| USB3 F 2 B SCC  | Black coated ✓            | No                       |
| USB3 F 2 N SCC  | Nickel plated ✓           | Yes                      |
| USB3 F 2 G SCC  | Olive drab cadmium plated | Yes                      |
| USB3 F 2 ZN SCC | Black Zinc Nickel ✓       | No                       |

✓: RoHS compliant

# USB3.2 GEN1 AND USB2.0 ACCESS POINT

## Overall dimension

### USB2.0 access point - With self-closing cap

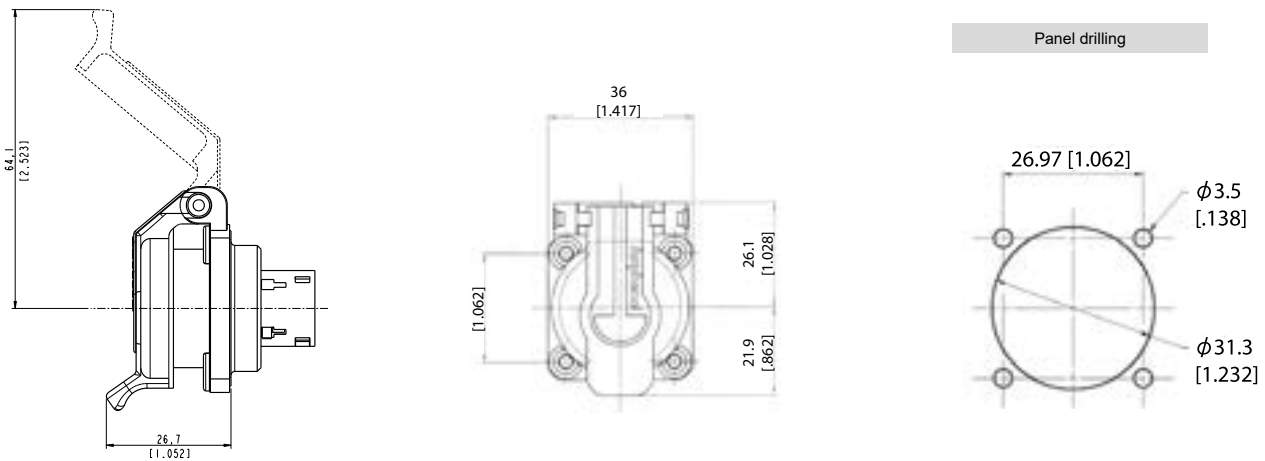


#### Important note:

- The part number included the receptacle and the self-closing cap.
- This version is with USB-B in front and USB-A in back termination.

| Part number      | Plating                   | Metallized inserts (EMI) |
|------------------|---------------------------|--------------------------|
| USB F 2 1 B SCC  | Black coated ✓            | No (blank insert)        |
| USB F 2 1 N SCC  | Nickel plated ✓           | Yes                      |
| USB F 2 1 G SCC  | Olive drab cadmium plated | Yes                      |
| USB F 2 1 ZN SCC | Black zinc nickel ✓       | No                       |

### USB-B access point - With self-closing cap



#### Important note:

- The part number included the receptacle and the self-closing cap.
- This version is with USB-B in front and USB-A in back termination.

| Part number       | Plating                   | Metallized inserts (EMI) |
|-------------------|---------------------------|--------------------------|
| USBB F 2 1 B SCC  | Black coated ✓            | No (blank insert)        |
| USBB F 2 1 N SCC  | Nickel plated ✓           | Yes                      |
| USBB F 2 1 G SCC  | Olive drab cadmium plated | Yes                      |
| USBB F 2 1 ZN SCC | Black Zinc Nickel ✓       | No                       |

✓: RoHS compliant



# COMPOSITE USB2.0 ACCESS POINT



## Description

The rugged USB plastic access point is a rugged USB access point solution designed to be used in any industrial harsh environments.

The Self Closing Cap enclosure protects the USB-A Field receptacle from splash and dust when the plug or the USB Memory key is unmated.

## Main features

### MAIN CHARACTERISTICS

- Data transmission: USB specification 2.0
- Data rate: up to 480 Mb/s for high speed USB
- UBS-A
- Sealing level: IP54 when not mated
- Temperature range: -40°C / +85°C
- RoHS compliant

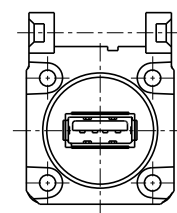
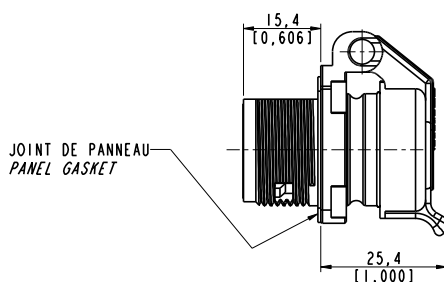
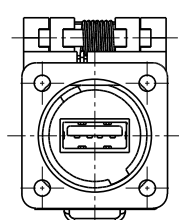
### APPLICATIONS

- Access point
- Telecom equipments
- Video control
- Robotics
- Industrial process control
- CNC machines
- Special machines

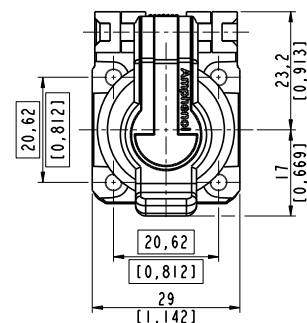
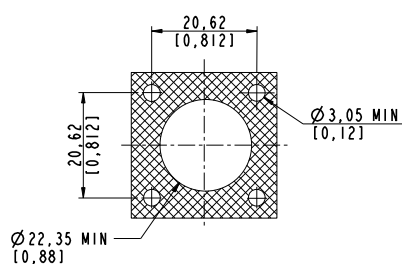
## Overall dimension

### Square flange access point

Part number : **USB AP SCC 21**



Panel drilling



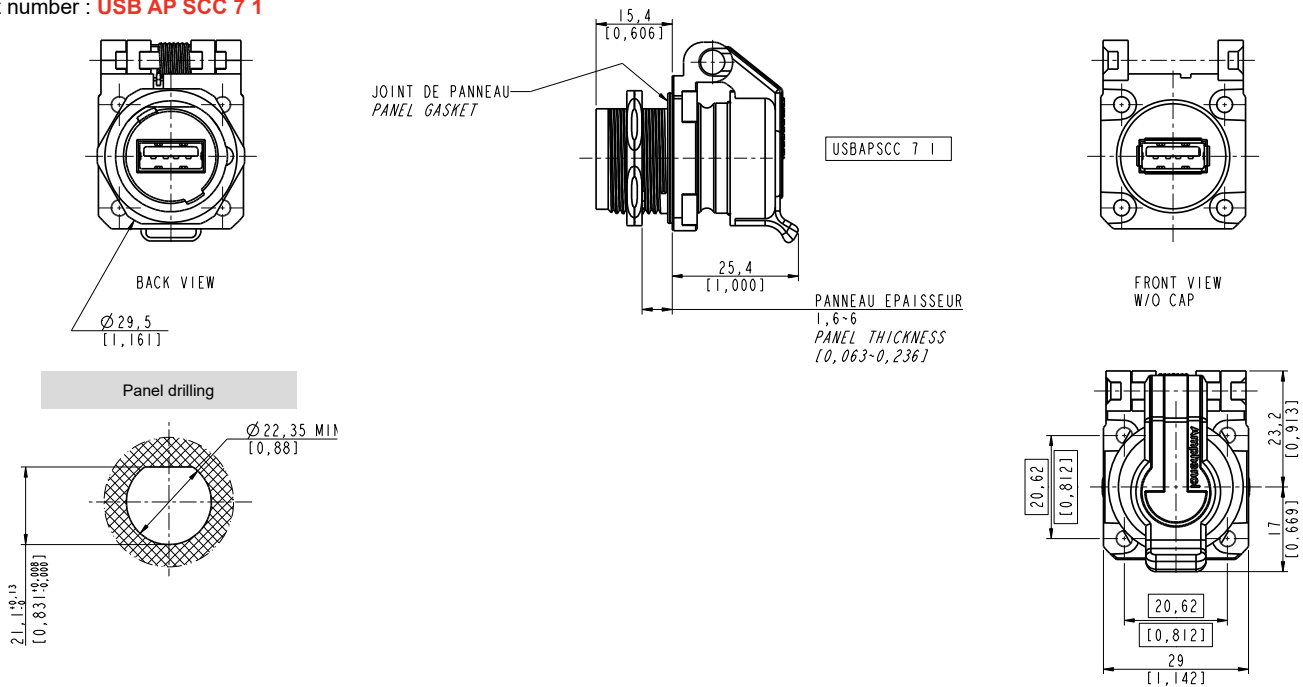


# COMPOSITE USB2.0 ACCESS POINT

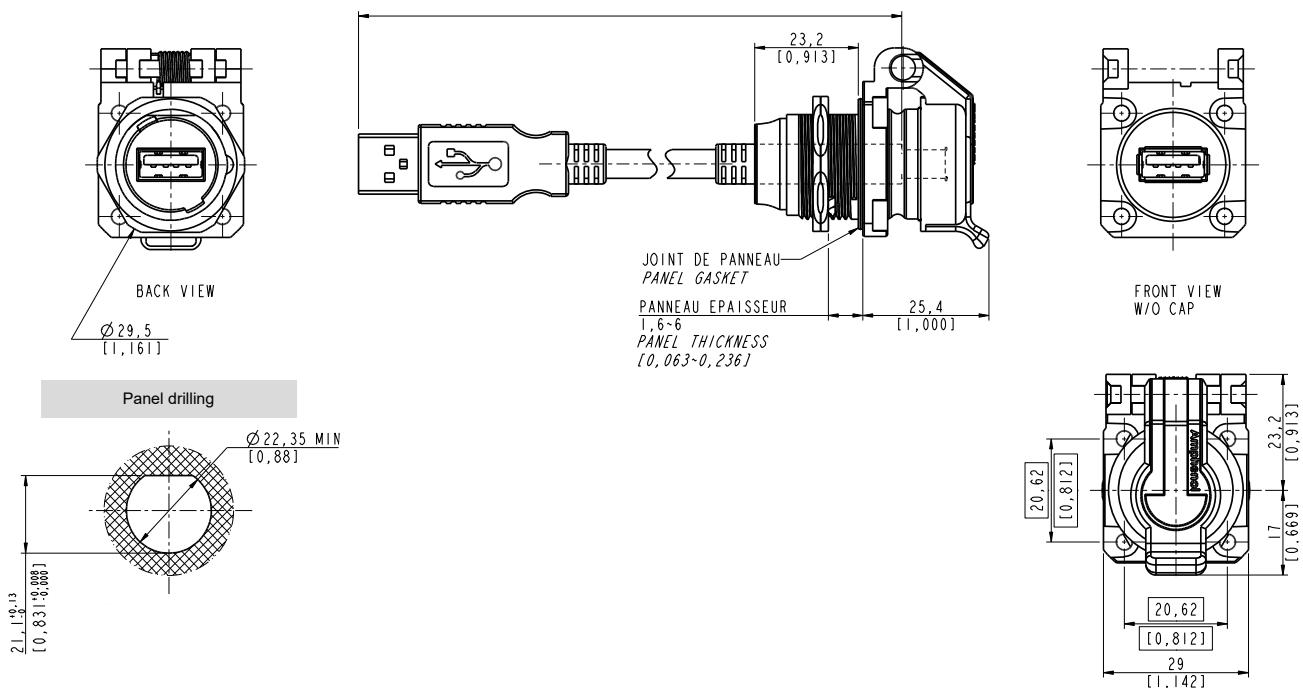
## Overall dimension

### Jam nut access point

Part number : **USB AP SCC 7 1**



### Jam nut access point - USB-A cordset



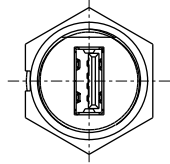
| Part number                | Cordset length (Meters) | Cordset length (Feet) |
|----------------------------|-------------------------|-----------------------|
| <b>USB AP SCC 7 2 02 A</b> | 0.2                     | 0.66                  |
| <b>USB AP SCC 7 2 03 A</b> | 0.3                     | 0.98                  |
| <b>USB AP SCC 7 2 05 A</b> | 0.5                     | 1.65                  |
| <b>USB AP SCC 7 2 10 A</b> | 1.0                     | 3.28                  |

# COMPOSITE USB2.0 ACCESS POINT

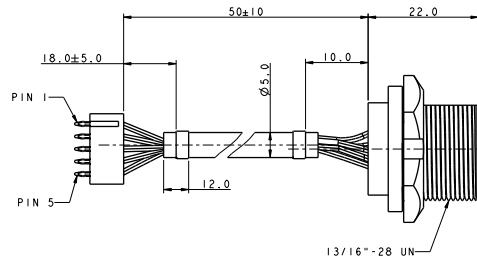
## Overall dimension

### USB-A receptacle and plug

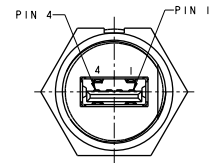
Part number : **USB AF 7**



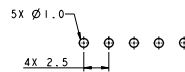
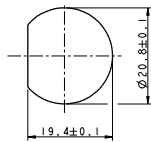
Panel drilling



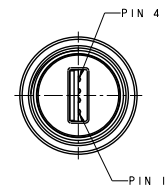
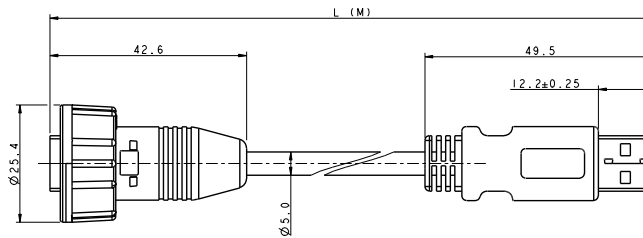
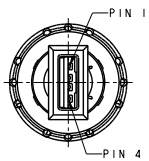
PCB layout



Pin assignments



Part number type: **USB AF 6A XXX**



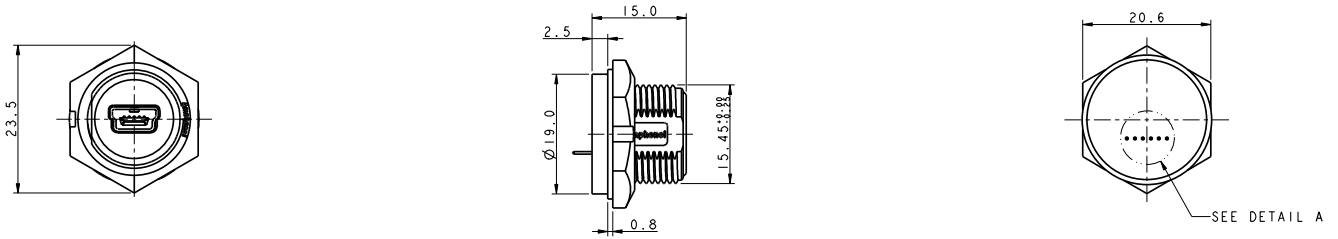
| Part number          | Cordset length (Meters) | Cordset length (Feet) |
|----------------------|-------------------------|-----------------------|
| <b>USB AF 6A 200</b> | 2.0                     | 3.28                  |
| <b>USB AF 6A 500</b> | 5.0                     | 16.40                 |

# COMPOSITE USB2.0 ACCESS POINT

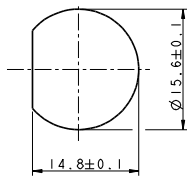
## Overall dimension

### USB Mini B receptacle and plug

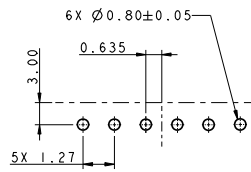
Part number : **USB MINI BF 7 PCB**



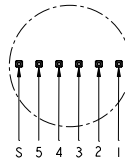
Panel drilling



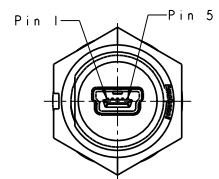
PCB layout



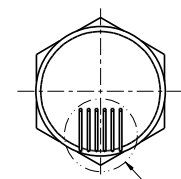
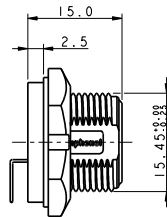
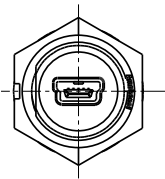
Detail A



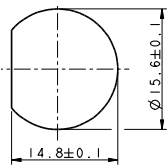
Pin assignments



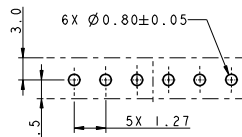
Part number : **USB MINI BF 7 PCB 90**



Panel drilling

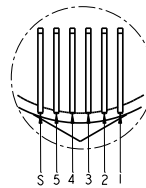


PCB layout

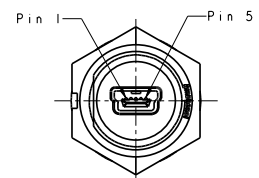


The Distance from PCB edge is 2.5mm max.

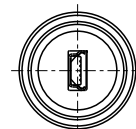
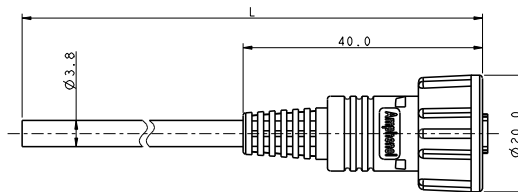
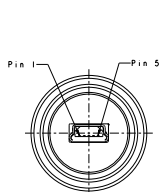
Detail A



Pin assignments



Part number type: **USB MINI BF 6 XXX OPEN**



Part number

Cordset length (Meters)

Cordset length (Feet)

**USB MINI BF 6 200 OPEN**

2.0

3.28

**USB MINI BF 6 500 OPEN**

5.0

16.40



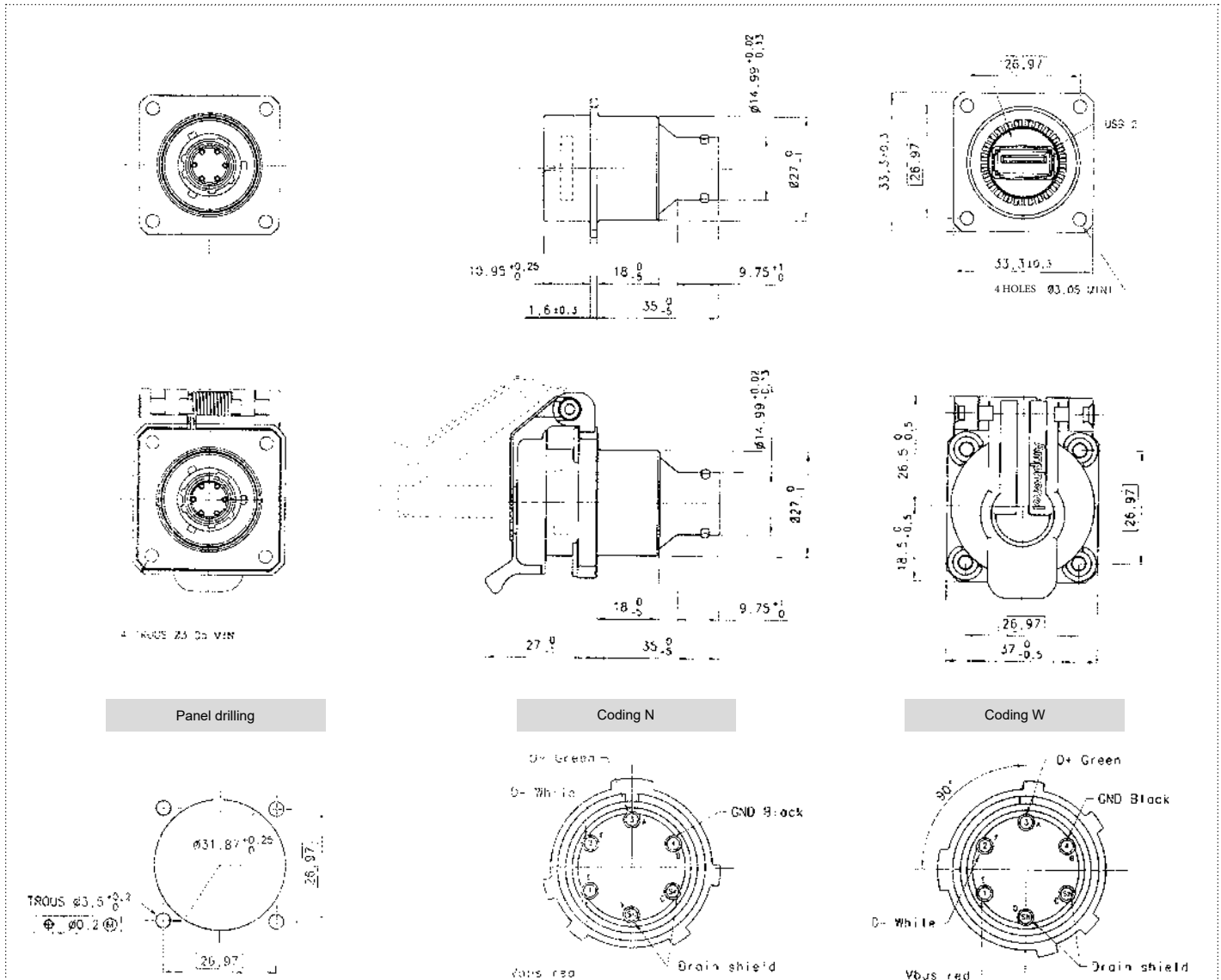
## USB2.0 TO TYPE EN3646 - PT/451 - ABS1547 ADAPTOR

### Description

This special USB adaptor is the easiest way to connect your EN3646 and PT/451 connector to a USB 2.0 - Type A. Connector. The arrangement of this connector is 10-6 as below. If you want to use this adaptor as an access point, you can include a composite self-closing cap to protect your receptacle against splash and dust. This adaptor is qualified ABS1547.

### Overall dimension

USB adaptor to EN3646 - PT/451 with 10-6 arrangement - With or without self-closing cap



| Part number | ABS1547 part number | Plating          | Coding | Self-closing cap |
|-------------|---------------------|------------------|--------|------------------|
| 35608N      | ABS1547-003A02N     | Black anodized ✓ | N      | No               |
| 35615W      | ABS1547-003A02W     |                  | W      |                  |
| 35616N      | ABS1547-003A03N     |                  | N      | Yes              |
| 35617       | ABS1547-003A03W     |                  | W      |                  |

✓: RoHS compliant





# RUGGED ELECTRONICS



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| USBFTV™ - USB2.0 amplifier | 70        |

USB3.0

USB2.0

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access pointRugged  
electronics

Accessories

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# USB3FTV™ MEMORY KEY



## Description

The USB3.2 Gen1 reinforced memory key allows you to carry sensitive information in total security. Its design, based on MIL-DTL-38999 series III can only be mated to our USB3FTV™ or USBFTV™ receptacles and is available, as standard, in capacities from 32 to 256Gb. We provide reinforced USB memory keys available in different capacities.

## Main features

### MAIN CHARACTERISTICS

- Type: USB3.2 Gen1 (capacities 32, 64, 128 & 256 GB)
- Only compatible with USB3FTV and USBFTV receptacle
- UBS-A
- Voltage: 5V DC - 500 mA max

### SPECIFIC FEATURES

- Engineering control (Product change notice & end of life Policy)
- Memory type: MLC (3000 read/write cycles)
- Wear Leveling function
- MTBF: 1,000,000 hours

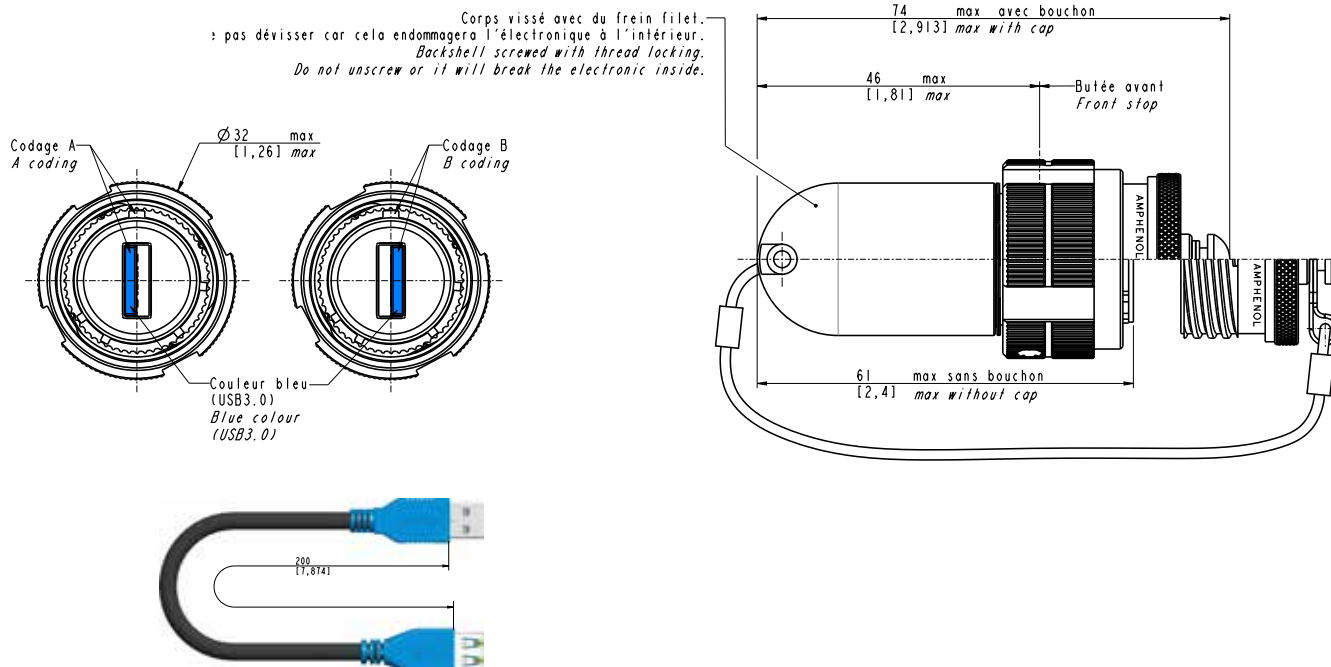
### ENVIRONMENTAL PROTECTION

- Sealing: IP68 (when mated)
- Salt spray:
  - 48 h with nickel plating ✓
  - 500 h with olive drab cadmium
  - 500 h with black zinc nickel ✓
- Vibrations: MIL-STD-810H method 514.8
- Temperature range: - 40°C / +85°C (MIL-STD-810F)
- Data transmission during vibration & temperature tests

**How to order :** Please refer to page 96

## Overall dimension

Part number type: **USB3FTV KEY X XXX X XXX APA UV**



### Important note:

- Under request, we can provide you with electronic manufacturer details so you can check if their specific configuration will work with the electronic (please specify memory capacity).
- USB3FTV memory key has to be used with USBFTV receptacle (3.2 Gen1 and 2.0).

✓: RoHS compliant

# ROK - RUGGED OVAL KEY



## Description

ROK, Rugged Oval Key is a reinforced memory key that allows you to save and carry your information in total security. This memory key cannot be damaged. It is fire proof and so durable that it can be run over by truck and remain undamaged. This rugged memory key is available in capacities from 16 to 256Gb, fast with a USB3.2 Gen1 transfer rate of 5 Gb/s and can be connected to any USB port.

## Main features

### MAIN CHARACTERISTICS

- Type: USB3.2 Gen1 (capacities 32, 64, 128 & 256 GB)
- Compatible with any USB port receptacle.
- Black painting ✓

### DATA TRANSMISSION

- USB3.2 Gen1 max transfer rate : 5 Gb/s
- Compatible with USB2.0 transfer with 480Mb/s.

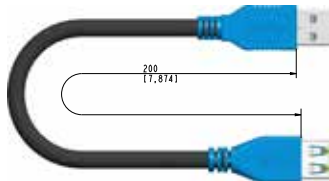
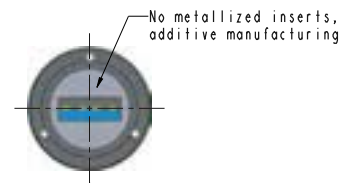
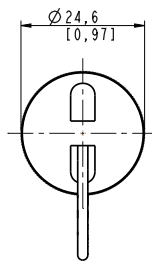
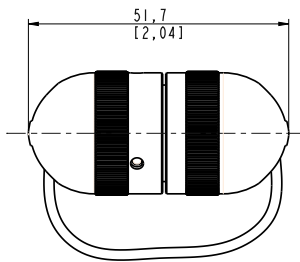
### ENVIRONMENTAL PROTECTION

- Resistance against shocks, fire, vibrations.
- Sealed against fluids and dusts : IP68 mated.
- Storage temperature : - 10°C / +70°C.
- Operating temperature : 0°C / +35°C.

**How to order :** Please refer to page 97

## Overall dimension

Part number type: **USB3F KEY XXX X**



✓: RoHS compliant

# USBFTV - USB2.0 AMPLIFIER



## Description

As the USB2.0 protocol is limited to 4.8 meters, the reinforced USB2.0 amplifier enables you to extend your USB signal to five times as much, almost 20 meters. This product is subject to custom design. With the help of the USB amplifier selection guide below, please consider all your requirements and reach out to us with your request.

## Main features

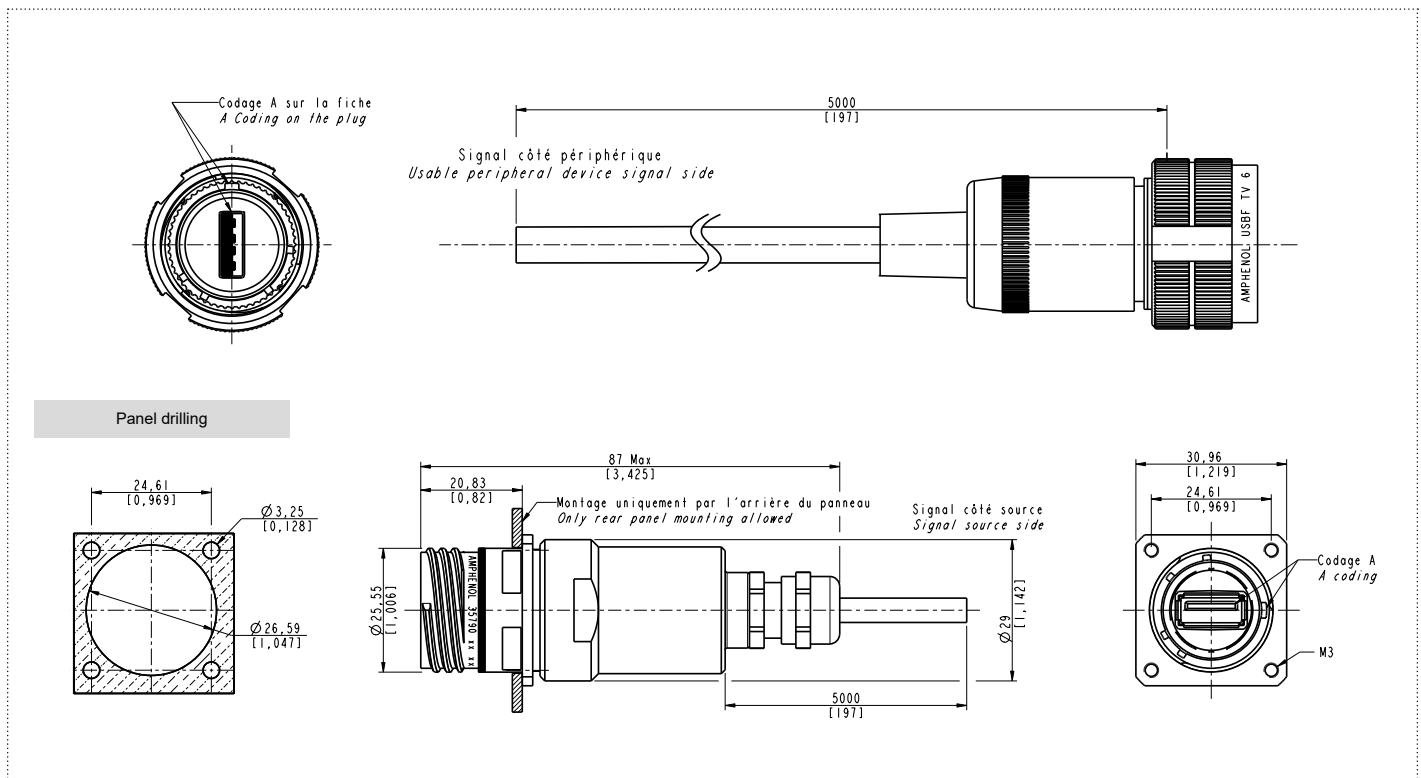
### MAIN CHARACTERISTICS

- Maximum 5 USB2.0 amplifier can be connected in order to reach 20 meters.
- USB2.0 cordset is provided by Amphenol.
- Sealed against fluids and dusts (IP68)
- Improved EMI protection
- Mate with our USBFTV™ series (MIL-DTL-38999 series III type) with anti-decoupling device - Shell size 15

### ENVIRONMENTAL PROTECTION

- Sealing (when mated): IP68 (temporary immersion)
- Salt spray:
  - 48 h with nickel plating ✓
  - 500 h with olive drab cadmium
  - 500 h with black zinc nickel ✓
- Humidity: 21 days, 43°C, 98% humidity
- Temperature range: - 40°C / +85°C

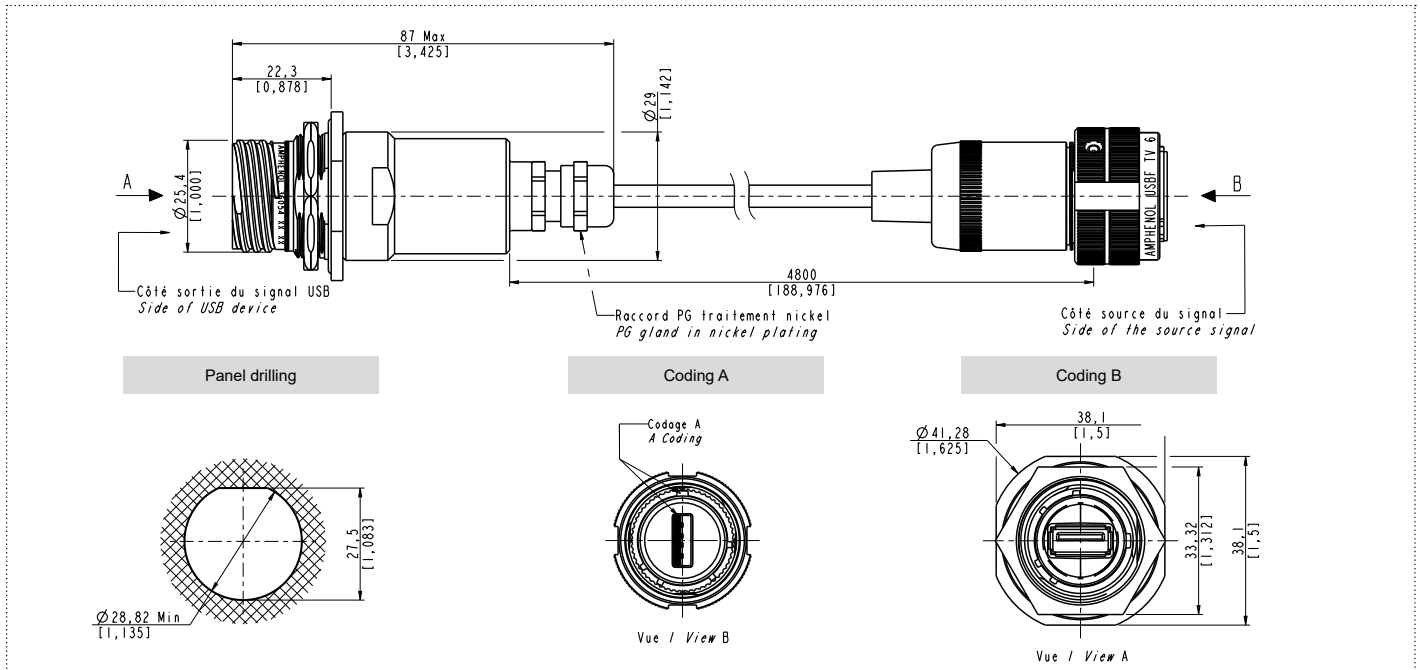
## Example of configurations



✓: RoHS compliant

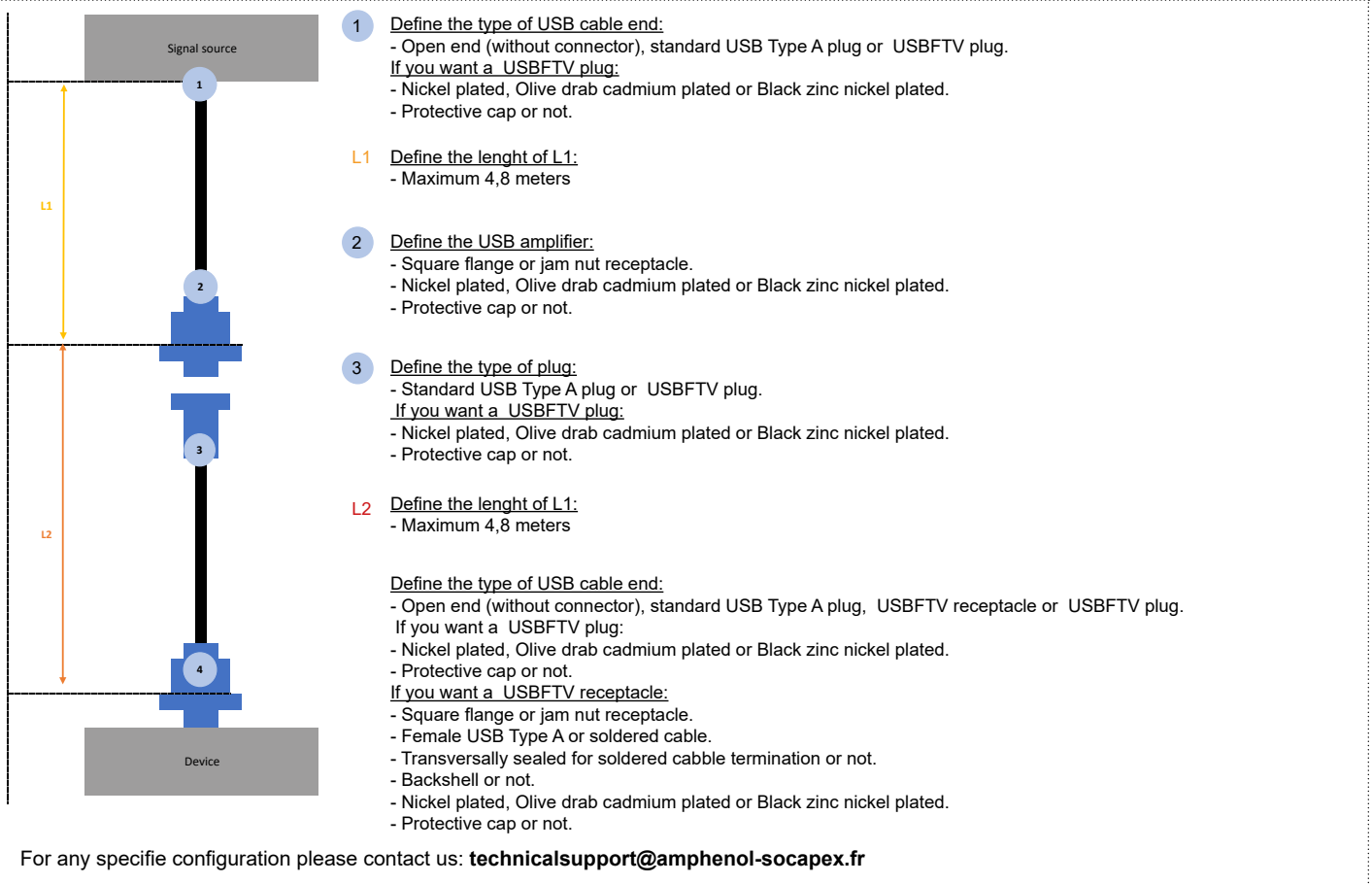
# USBFTV - USB2.0 AMPLIFIER

## Example of configurations

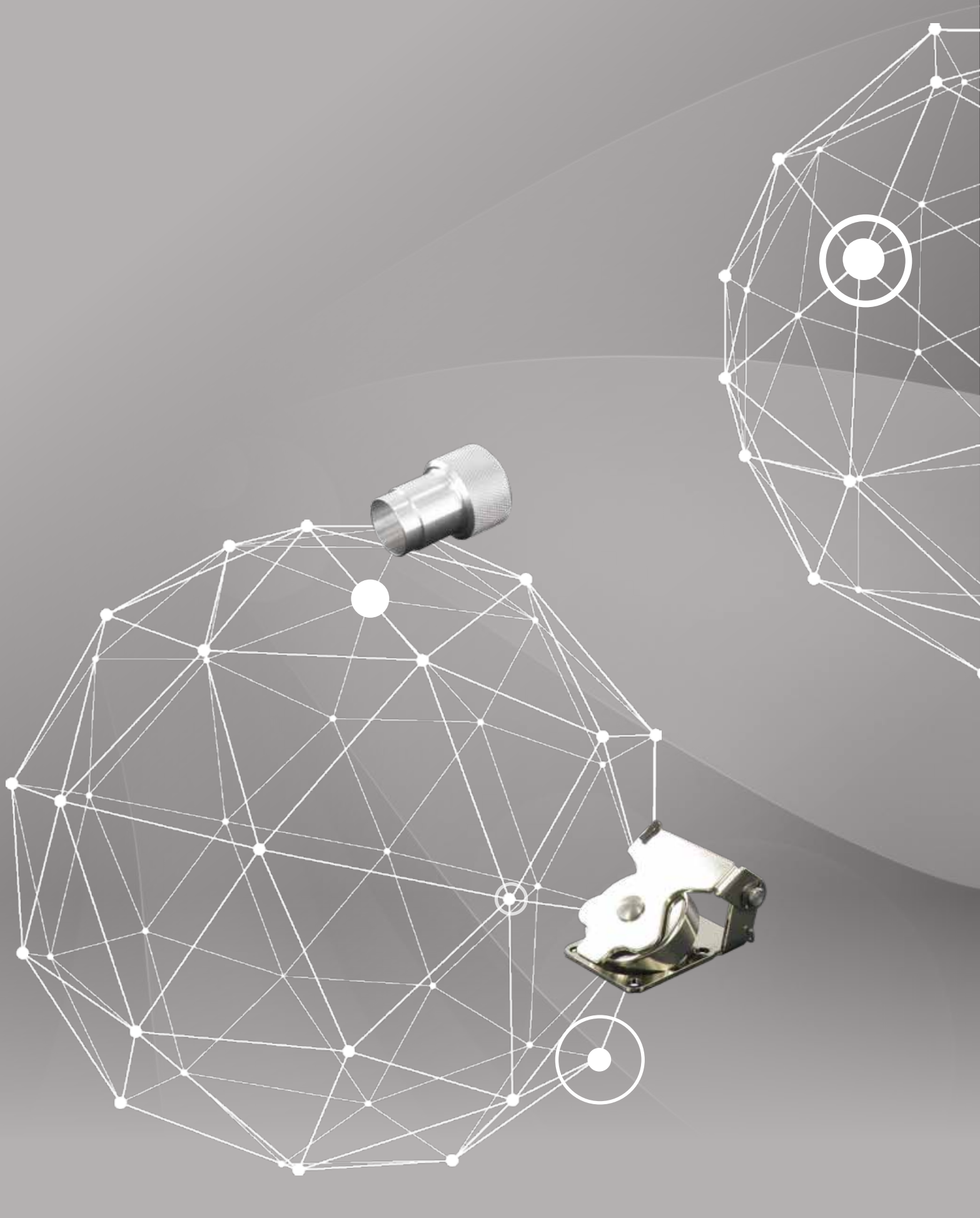


## USB amplifier selection guide

### Define your own solution by selecting options in the scheme below







# ACCESSORIES



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| Self-closing cap - USBFTV™        | 75 |
| Panel gasket and tool             | 76 |

## Compatibility table

|                               | Connectors    |               |            |
|-------------------------------|---------------|---------------|------------|
|                               | USB3FTV™      | USBFTV™       | USBBFTV    |
| STANDARD PROTECTIVE CAP       | USBFTV C      | USBFTV C      | USBFTV C   |
| REDUCED FLANGE PROTECTIVE CAP | USBFTV C F057 | USBFTV C F057 | /          |
| METALLIC SELF-CLOSING CAP     | USBFTV SCC    | USBFTV SCC    | USBFTV SCC |
| PANEL GASKET                  | JE15          | JE15          | JE15       |
| TOOL                          | USBF ODE      | USBF ODE      | /          |
| REDUCED FLANGE TOOL           | 809684        | /             | /          |

# STANDARD PROTECTIVE CAP - USBFTV™

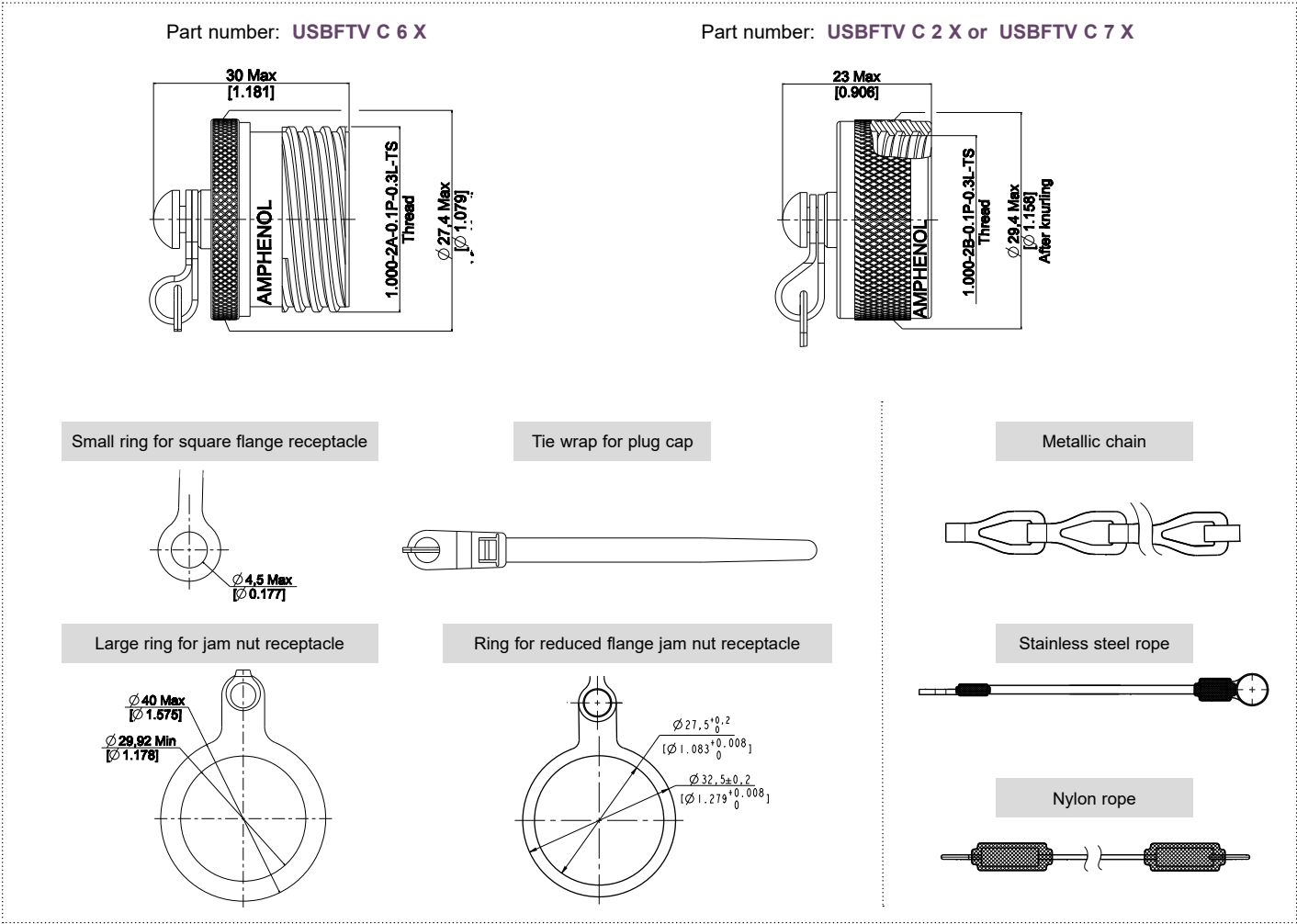


## Standard protective cap

This standard protective cap derivate from MIL-DTL-38999 series III provide you a permanent sealing for plugs or receptacles.

**How to order :** Please refer to page 98

## Overall dimension



| Cap type                | Metallic chain length (mm) | Nylon cord length (mm) | Stainless steel rope length (mm) |
|-------------------------|----------------------------|------------------------|----------------------------------|
| USBFTV C 2 & USBFTV C 7 |                            | 127 (+13,-7)           |                                  |
| USBFTV C 6              |                            | 160±5                  |                                  |

✓: RoHS compliant

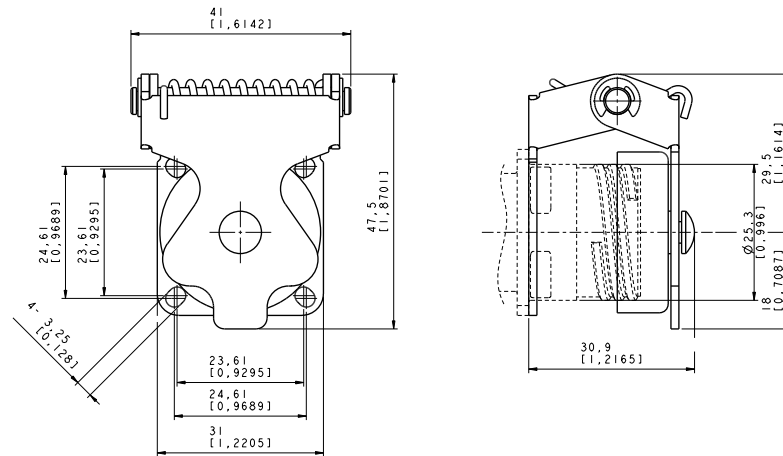
# SELF-CLOSING CAP - USBFTV™



## Metallic Self-Closing cap

With the metallic self-closing cap, your standard receptacles are protected with an IP67 and EMI protection with an integrated self-closing function.

## Overall dimension



| Part number   | Plating             |
|---------------|---------------------|
| USBFTV SCC B  | Black coating ✓     |
| USBFTV SCC N  | Nickel ✓            |
| USBFTV SCC G  | Olive drab cadmium  |
| USBFTV SCC ZN | Black Zinc Nickel ✓ |

✓: RoHS compliant

PANEL GASKET AND TOOL

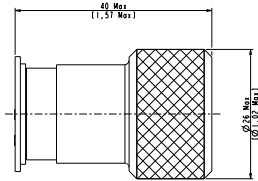


Panel gasket for square flange receptacle

| Part number | Thickness (mm) | Color | Picture |
|-------------|----------------|-------|---------|
| JE15        | 0.6            | Blue  |         |
| JE18        | 0.6            | Black |         |

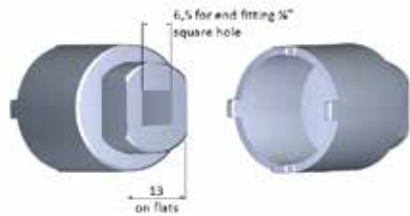
Tool

Part number: USBF ODE



- Important note:**
- USBF ODE is used to remove the module of the receptacle. Insert the slot face part of the USBF ODE part into the front of the receptacle and push.
  - For more details, please refer to “Assembly instructions” page 80 to 82.

Part number: 809684



- Important note:**
- This tool is used to tighten the castle nut of the reduced flange receptacle.
  - Insert the four teeth face of the tool into the castle nut and tighten at the recommended force.
  - For more details, please refer to “Assembly instructions” page 80 to 82.

# NOTES

Notes section with horizontal lines for writing.

USB3.0

USB2.0

Cables and  
cordsets

Adapters and  
access point

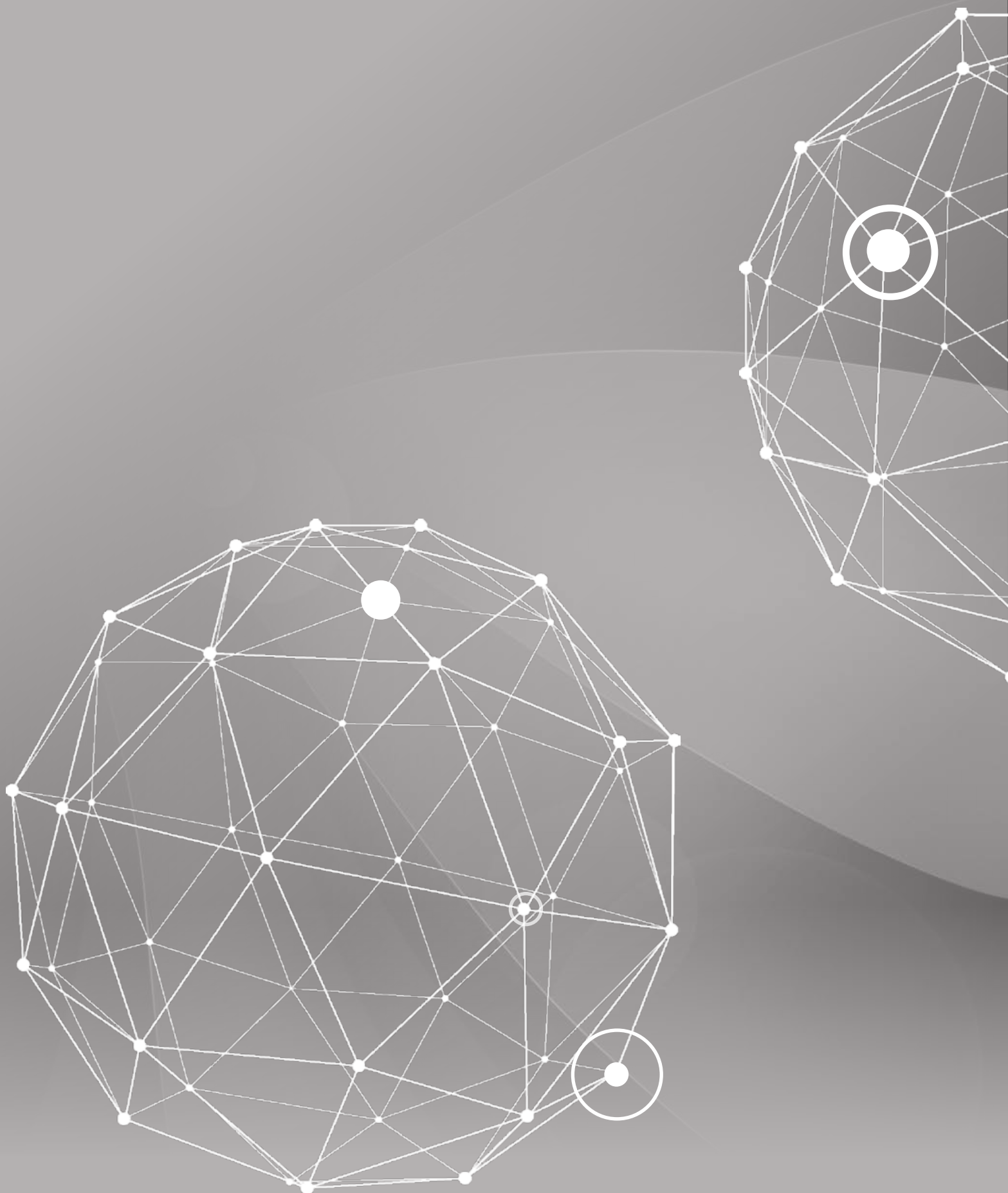
Rugged  
electronics

Accessories

Assembly  
instructions

How to order





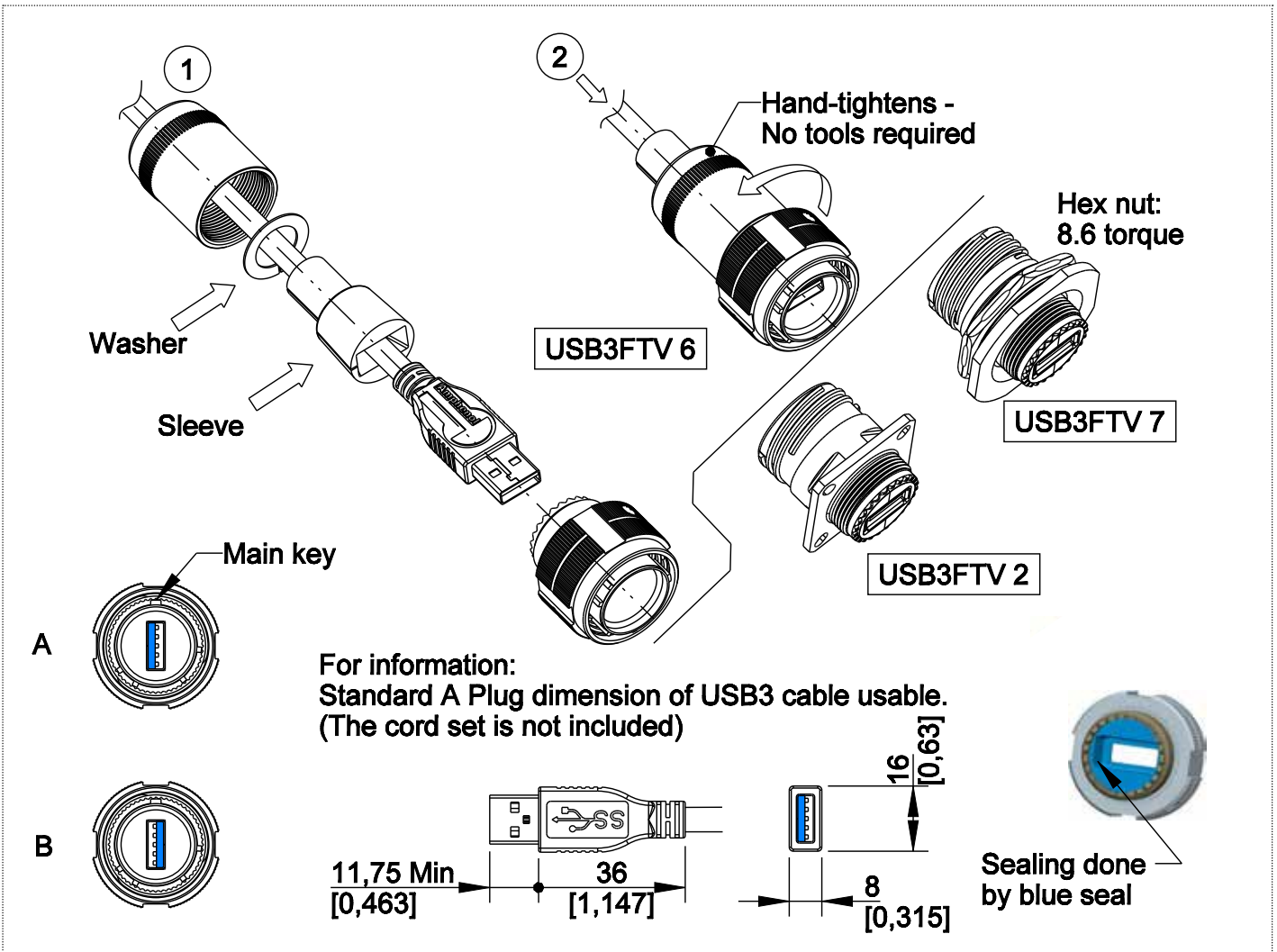
# ASSEMBLY INSTRUCTIONS

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| USBFTV™ and USBBF TV         | 82        |

|                              |
|------------------------------|
| USB3.0                       |
| USB2.0                       |
| Cables and cordsets          |
| Adapters and access points   |
| Rugged electronics           |
| Accessories                  |
| <b>Assembly instructions</b> |
| How to order                 |

# ASSEMBLY INSTRUCTION - USB3FTV™



## Notes:

- Can be assemble with all standard USB cordset.
- No tool required.

## Recommend Torque value:

|            |               | Body   | Gland                            | Hex-nut |
|------------|---------------|--------|----------------------------------|---------|
| Plug       | USB3FTV 6     | /      | Hand-tightens - No tool required | /       |
|            | USB3FTV 2 PE  | /      | Hand-tightens - No tool required | /       |
| Receptacle | USB3FTV 2 PEM | 7.5 Nm | 2.5 to 6.5 Nm                    | /       |
|            | USB3FTV 7     | /      | /                                | 86Nm    |
|            | USB3FTV 7 PE  | /      | Hand-tightens - No tool required | 86Nm    |
|            | USB3FTV 7 PEM | 7.5 Nm | 2.5 to 6.5 Nm                    | 86Nm    |

## Assembly video

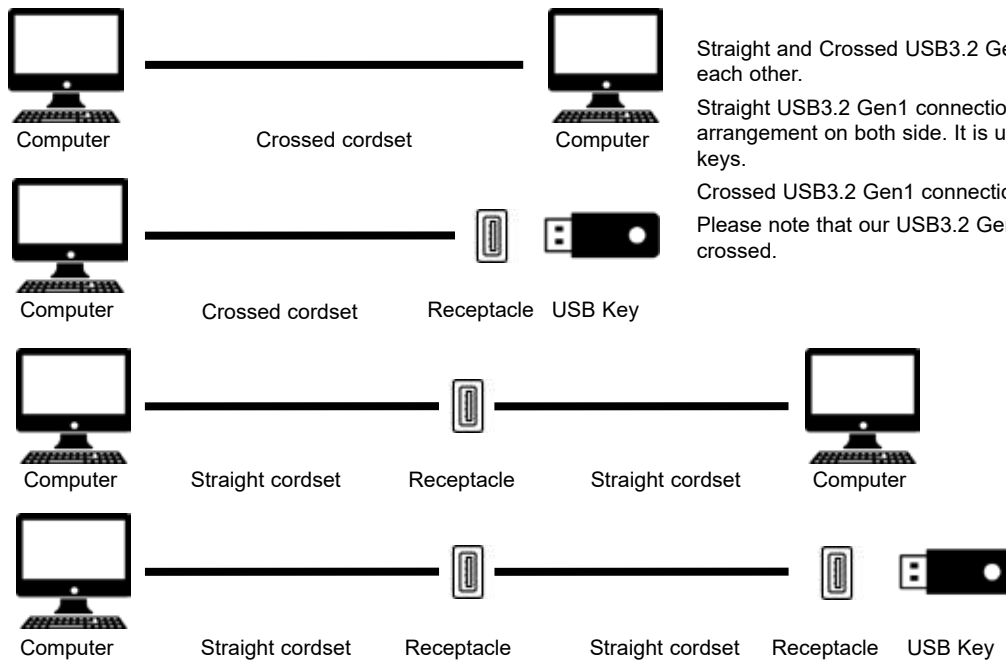


See our assembly video on youtube :  
[www.youtube.com/AmphenolSocapex](http://www.youtube.com/AmphenolSocapex)

- Amphenol USBFIELD assembly - Rugged USB connector

# ASSEMBLY INSTRUCTION - USB3FTV™

## Crossed or straight



Straight and Crossed USB3.2 Gen1 cables are wired differently from each other.

Straight USB3.2 Gen1 connection has the exact same wire arrangement on both side. It is used to connect computers to USB keys.

Crossed USB3.2 Gen1 connection is used to connect two computers. Please note that our USB3.2 Gen1 receptacle are, by conception, crossed.

USB3.0

USB2.0

Cables and cordsets

Adapters and access points

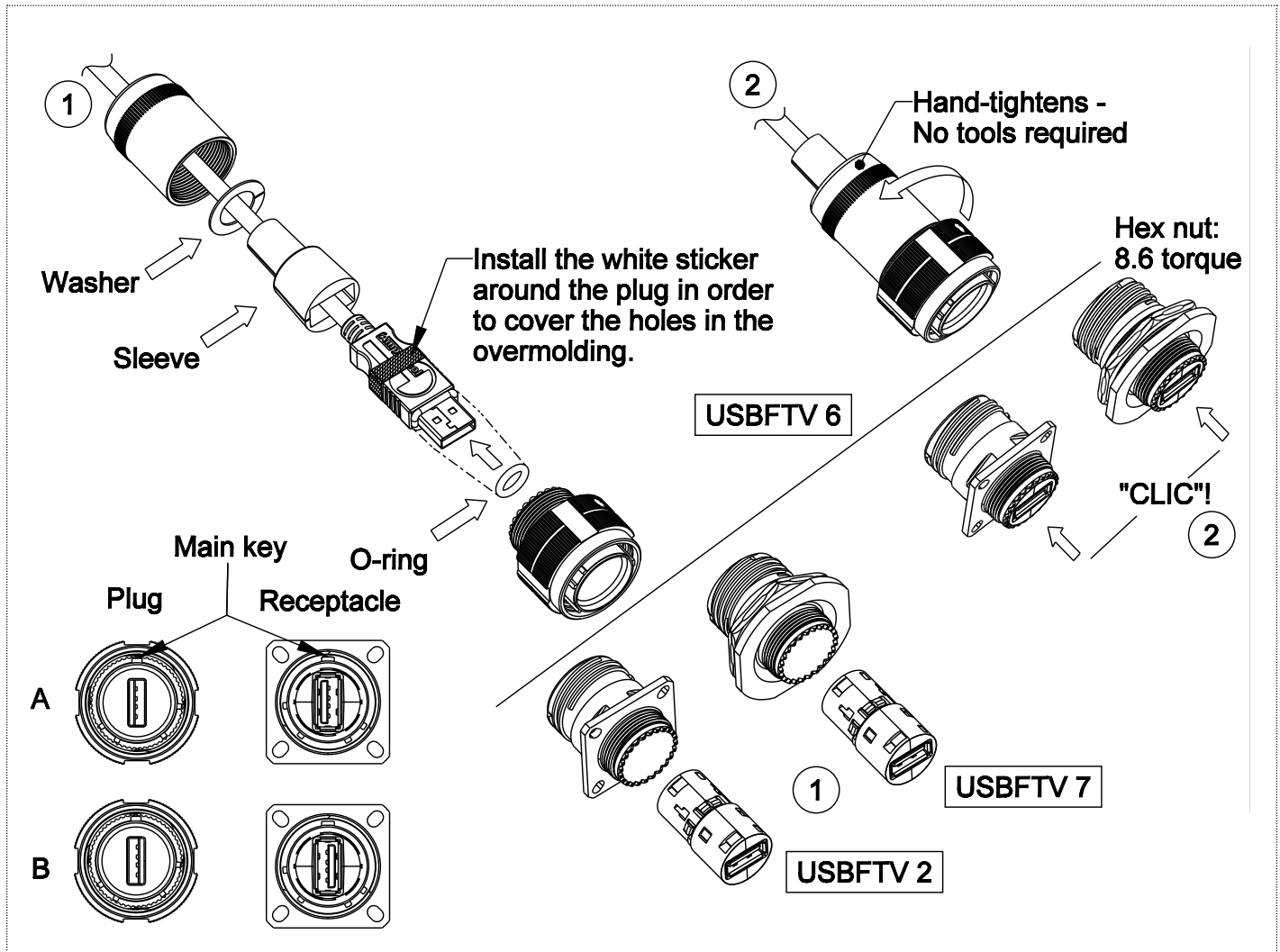
Rugged electronics

Accessories

Assembly instructions

How to order

# ASSEMBLY INSTRUCTION - USBFTV™ AND USBBFTV



## Notes:

- Can be assemble with all standard USB cordset.
- No tool required.

## Recommend Torque value:

|            |              | Body   | Gland                            | Hex-nut |
|------------|--------------|--------|----------------------------------|---------|
| Plug       | USBFTV 6     | /      | Hand-tightens - No tool required | /       |
|            | USBFTV 2 PE  | /      | Hand-tightens - No tool required | /       |
| Receptacle | USBFTV 2 PEM | 7.5 Nm | 2.5 to 6.5 Nm                    | /       |
|            | USBFTV 7     | /      | /                                | 8.6 Nm  |
|            | USBFTV 7 PE  | /      | Hand-tightens - No tool required | 8.6 Nm  |
|            | USBFTV 7 PEM | 7.5 Nm | 2.5 to 6.5 Nm                    | 8.6 Nm  |

## Assembly video



See our assembly video on youtube :  
[www.youtube.com/AmphenolSocapex](http://www.youtube.com/AmphenolSocapex)

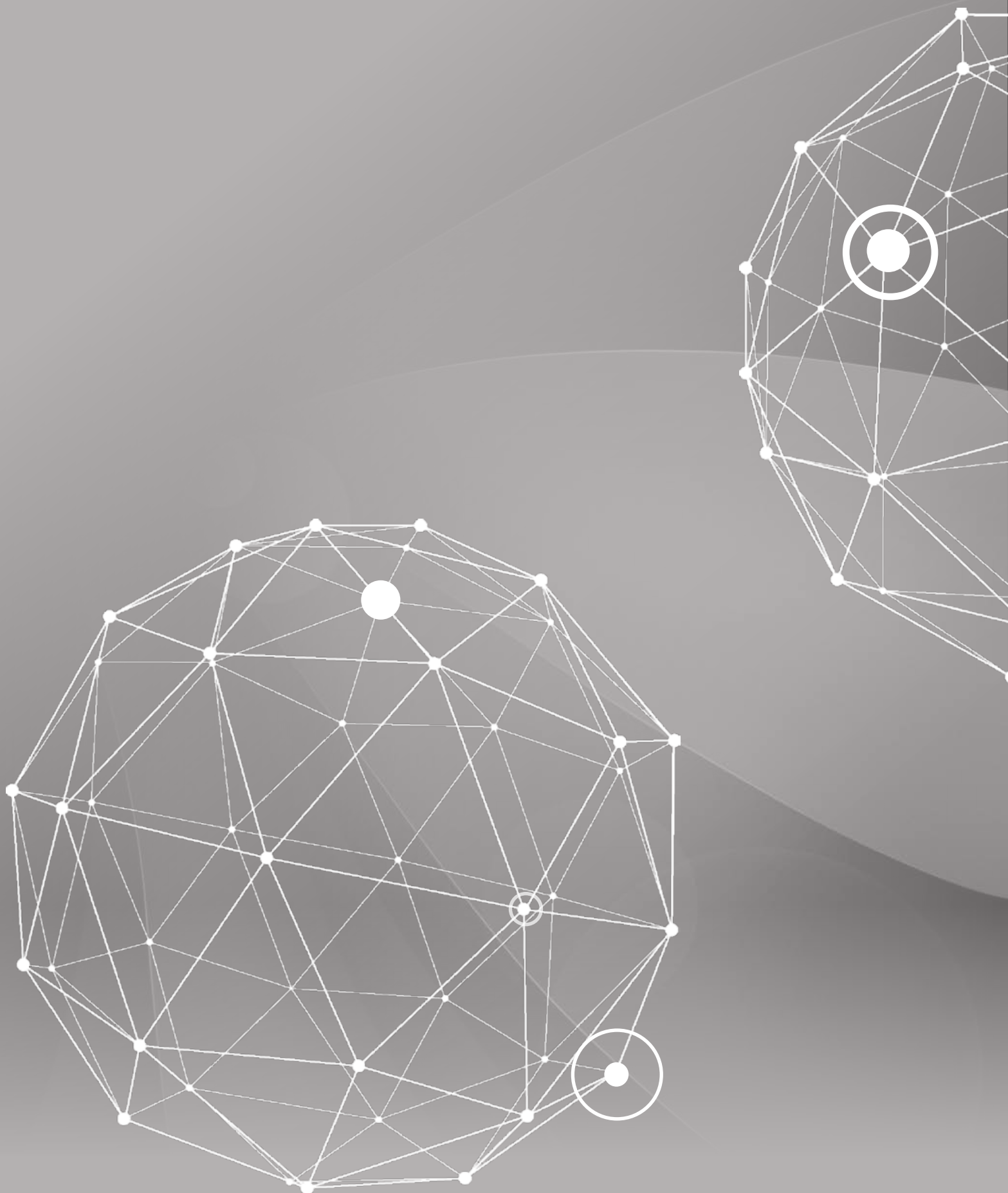
- Amphenol USBFIELD assembly - Rugged USB connector

NOTES

Notes area with horizontal lines for writing.

- USB3.0
- USB2.0
- Cables and cordsets
- Adapters and access points
- Rugged electronics
- Accessories
- Assembly instructions
- How to order





# HOW TO ORDER

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USB3.0

USB2.0

Cables and  
cordsetsAdapters and  
access pointRugged  
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How to order

# HOW TO ORDER - USB3FTV™ PLUG AND RECEPTACLE

| 1.      | 2.         | 3.                                  | 4.                                          | 5.                              | 6.                       | 7.                                         |
|---------|------------|-------------------------------------|---------------------------------------------|---------------------------------|--------------------------|--------------------------------------------|
| Series  | Shell type | Coding (for plug with cordset only) | Cordset lenght (for plug with cordset only) | Backshell (for receptacle only) | Shells material & finish | Type of cable (for plug with cordset only) |
| USB3FTV | 6          | A                                   | 03                                          |                                 | G                        | ACROS                                      |

| 1. Series |                                  |
|-----------|----------------------------------|
| USB3FTV   | USB3.2 Gen1 Field Series (USB-A) |

| 2. Shell type |                          |
|---------------|--------------------------|
| 6             | Plug                     |
| 2             | Square flange receptacle |
| 7             | Jam nut receptacle       |

| 3. Coding (avoid for plug without cordset) |          |
|--------------------------------------------|----------|
| A                                          | Coding A |
| B                                          | Coding B |

| 4. Cordset lenght (for plug with cordset only) |                      |
|------------------------------------------------|----------------------|
| 03                                             | 0,3 m [11.81 inches] |
| 05                                             | 0,5 m [19.68 inches] |
| 10                                             | 1,0 m [39.37 inches] |
| 15                                             | 1,5 m [59.05 inches] |

| 5. Backshell (for receptacle only) |                   |
|------------------------------------|-------------------|
|                                    | Without backshell |
| PE                                 | Metal backshell   |

| 6. Shell material and finish |                       |                             |
|------------------------------|-----------------------|-----------------------------|
| G                            |                       | Olive Drab Cadmium plating  |
| N                            | Aluminium shell       | Nickel plating ✓            |
| ZN                           |                       | Black Zinc Nickel plating ✓ |
| BZ                           | Marine bronze shell ✓ |                             |

| 7. Type of cable (for plug with cordset only) |                                           |
|-----------------------------------------------|-------------------------------------------|
| ACROS                                         | Crossed USB3.0 cable - USB-A plug         |
| ASTR                                          | Straight USB3.0 cable - USB-A plug        |
| OPEN                                          | Open USB3.0 cable without plug at the end |

## Examples :

| Part number      | Description                                                                                  |
|------------------|----------------------------------------------------------------------------------------------|
| USB3FTV6A10GOPEN | USB3FTV, plug, coding A, olive drab cadmium plating, 1,0m cordset with open end              |
| USB3FTV2APEG     | USB3FTV, square flange receptacle with metal backshell, coding A, olive drab cadmium plating |
| USB3FTV7AZN      | USB3FTV, jam nut receptacle, coding A, black zinc nickel plating                             |

✓ : RoHS compliant

# HOW TO ORDER - USB3FTV™ - TRANSVERSALLY SEALED AND HERMETIC RECEPTACLE

| 1.      | 2.         | 3.     | 4.             | 5.                       | 6.            |
|---------|------------|--------|----------------|--------------------------|---------------|
| Series  | Shell type | Coding | Cordset lenght | Shells material & finish | Type of cable |
| USB3FTV | 2S         | A      | 03             | G                        | ACROS         |

## 1. Series

|         |                                  |
|---------|----------------------------------|
| USB3FTV | USB3.2 Gen1 Field Series (USB-A) |
|---------|----------------------------------|

## 2. Shell type

| 2S | 2H                       | 7S | 7H                   |
|----|--------------------------|----|----------------------|
|    | Square flange receptacle |    | Jam nut receptacle   |
|    | Transversally sealed     |    | Transversally sealed |
|    | Hermetic                 |    | Hermetic             |

## 3. Coding

| A        | B        |
|----------|----------|
| Coding A | Coding B |

## 4. Cordset lenght

| 03                   | 05                   | 10                   | 15                   |
|----------------------|----------------------|----------------------|----------------------|
| 0,3 m [11.81 inches] | 0,5 m [19.68 inches] | 1,0 m [39.37 inches] | 1,5 m [59.05 inches] |

## 5. Shell material and finish

| G | N                           | ZN | BZ                    |
|---|-----------------------------|----|-----------------------|
|   | Aluminium shell             |    | Marine bronze shell ✓ |
|   | Olive Drab Cadmium plating  |    |                       |
|   | Nickel plating ✓            |    |                       |
|   | Black Zinc Nickel plating ✓ |    |                       |

## 6. Type of cable

| ACROS                             | ASTR                               | OPEN                                      |
|-----------------------------------|------------------------------------|-------------------------------------------|
| Crossed USB3.0 cable - USB-A plug | Straight USB3.0 cable - USB-A plug | Open USB3.0 cable without plug at the end |

## Examples :

| Part number        | Description                                                                                                                       |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| USB3FTV2SA03ZNOPEN | USB3FTV, transversally sealed square flange receptacle, coding A, black zinc nickel plating, 0,3m cable with open end             |
| USB3FTV7HA05GASTR  | USB3FTV, hermetic jam nut receptacle, coding A, olive drab cadmium plating, 0,5m straight USB3.0 cable with USB-A plug at the end |
| USB3FTV2HA15NACROS | USB3FTV, hermetic square flange receptacle, coding A, nickel plating, 1,5m crossed USB3.0 cable with USB-A plug at the end        |

✓: RoHS compliant

## HOW TO ORDER - USB3FTV™ - VG96949

1.

2.

3.

4.

5.

| Series     | Shell type | Shell size | Coding | Shell material & finish |
|------------|------------|------------|--------|-------------------------|
| VG96949-03 | A          | 15         | A      | HI                      |

## 1. Series

VG96949-03 VG96949-03 standard

## 2. Shell type

|   |                          |
|---|--------------------------|
| C | Plug                     |
| A | Square flange receptacle |
| B | Jam nut receptacle       |

## 3. Shell size

15 Shell size 15

## 4. Coding

N Coding N

## 5. Shell material and finish

|    |                       |                             |
|----|-----------------------|-----------------------------|
| A  |                       | Olive Drab Cadmium plating  |
| HI | Aluminium shell       | Black Zinc Nickel plating ✓ |
| J  |                       | Tin Zinc plating ✓          |
| B  | Marine bronze shell ✓ |                             |

## Examples :

| Part number     | Description                                                                         |
|-----------------|-------------------------------------------------------------------------------------|
| VG96949-03C15NJ | VG96949-03 USB3FTV, plug, coding N, tin zinc plating                                |
| VG96949-03A15NA | VG96949-03 USB3FTV, square flange receptacle , coding N, olive drab cadmium plating |
| VG96949-03B15NB | VG96949-03 USB3FTV, jam nut receptacle, coding N, marine bronze shell               |

✓: RoHS compliant

# HOW TO ORDER - USBFTV™ - PLUG AND RECEPTACLE

| 1.     | 2.         | 3.                          | 4.                                  | 5.                       |
|--------|------------|-----------------------------|-------------------------------------|--------------------------|
| Series | Shell type | Backshell (receptacle only) | Back terminations (receptacle only) | Shells material & finish |
| USBFTV | 7          | PEM                         | 2                                   | G                        |

## 1. Series

|        |                             |
|--------|-----------------------------|
| USBFTV | USB2.0 Field Series (USB-A) |
|--------|-----------------------------|

## 2. Shell type

|   |                          |
|---|--------------------------|
| 6 | Plug                     |
| 2 | Square flange receptacle |
| 7 | Jam nut receptacle       |

## 3. Backshell (receptacle only)

|     |                                                          |
|-----|----------------------------------------------------------|
|     | Without backshell                                        |
| PE  | Plastic gland                                            |
| PEM | Metal backshell<br>Metal gland (back termination 2 only) |

## 4. Back terminations (receptacle only)

|   |                         |
|---|-------------------------|
| 1 | Female USB-A            |
| 2 | Solder (4 tinned holes) |

## 5. Shell material & finish

|    |                       |                            |
|----|-----------------------|----------------------------|
| G  |                       | Olive Drab Cadmium plating |
| N  | Aluminium shell       | Nickel plating ✓           |
| ZN |                       | Black Zinc Nickel ✓        |
| BZ | Marine bronze shell ✓ |                            |

## Examples :

| Part number  | Description                                                                                                      |
|--------------|------------------------------------------------------------------------------------------------------------------|
| USBFTV6G     | USBFTV, plug, olive drab cadmium plating                                                                         |
| USBFTV2PE2N  | USBFTV, square flange receptacle with metal backshell and plastic gland, solder back termination, nickel plating |
| USBFTV7PEM2N | USBFTV, jam nut receptacle with metal backshell and metal gland, solder back termination, nickel plating         |

✓: RoHS compliant



# HOW TO ORDER - USBFTV™ - TRANSVERSALLY SEALED AND HERMETIC RECEPTACLE

| 1.     | 2.         | 3.        | 4.           | 5.     | 6.                | 7.                         | 8.             | 9.            |
|--------|------------|-----------|--------------|--------|-------------------|----------------------------|----------------|---------------|
| Series | Shell type | Backshell | Sealing type | Coding | Back terminations | Shells material and finish | Cordset lenght | USB Cable end |
| USBFTV | 2          | PE        | S            | A      | 2                 | G                          | 03             | OPEN          |

## 1. Series

USBFTV      USB2.0 Field Series (USB-A)

## 2. Shell type

2      Square flange receptacle

7      Jam nut receptacle

## 3. Backshell

Without backshell

PE      Metal backshell      Plastic gland

PEM      Metal gland

## 4. Sealing type

S      Transversally sealed receptacle

H      Hermetic receptacle

## 5. Coding

A      Coding A

B      Coding B

## 6. Back terminations

2      USB2.0 cable

## 7. Shell material & finish

G      Olive Drab Cadmium plating

N      Aluminium shell      Nickel plating ✓

ZN      Black Zinc Nickel ✓

BZ      Marine bronze shell ✓

## 8. Cordset lenght

03      0,3 m [11.81 inches]

05      0,5 m [19.68 inches]

10      1,0 m [39.37 inches]

15      1,5 m [59.05 inches]

## 9. USB Cable end

A      USB-A plug

OPEN      Open USB2.0 cable without plug at the end

### Examples :

| Part number       | Description                                                                                                                                                          |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| USBFTV2SA2G03OPEN | USBFTV, transversally sealed square flange receptacle, coding A, olive drab cadmium plating, 0,3m USB2.0 cable with open end                                         |
| USBFTV2PESA2N05A  | USBFTV, transversally sealed square flange receptacle with metal backshell and plastic gland, coding A, nickel plating, 0,5m USB2.0 cable with USB-A plug at the end |
| USBFTV2PEMSA2N03A | USBFTV, transversally sealed square flange receptacle with metal backshell and metal gland, coding A, nickel plating, 0,3m USB2.0 cable with USB-A plug at the end   |

✓ : RoHS compliant

# HOW TO ORDER - USBFTV™ - ATEX ZONE 2

| 1.      | 2.         | 3.                              | 4.                                         | 5.                           | 6.                                      | 7.                                     |
|---------|------------|---------------------------------|--------------------------------------------|------------------------------|-----------------------------------------|----------------------------------------|
| Series  | Shell type | Coding<br>(for receptacle only) | Back terminations<br>(for receptacle only) | Shell material and<br>finish | Cordset lenght (for<br>receptacle only) | USB Cable end (for<br>receptacle only) |
| USBFTVX | 2S         | A                               | 2                                          | G                            | 03                                      | A                                      |

## 1. Series

**USBFTVX** USB2.0 Field Series (USB-A) for Atex Zone 2

## 2. Shell type

|    |                          |                      |
|----|--------------------------|----------------------|
| 6  | Plug                     | Transversally sealed |
| 2S | Square flange receptacle |                      |
| 7S | Jamp nut receptacle      |                      |

## 3. Coding (for receptacle only)

|   |          |
|---|----------|
| A | Coding A |
| B | Coding B |

## 4. Back terminations (for receptacle only)

|   |              |
|---|--------------|
| 2 | USB2.0 cable |
|---|--------------|

## 5. Shell material & finish

|    |                       |                            |
|----|-----------------------|----------------------------|
| G  | Aluminium shell       | Olive Drab Cadmium plating |
| N  |                       | Nickel plating ✓           |
| ZN |                       | Black Zinc Nickel ✓        |
| BZ | Marine bronze shell ✓ |                            |

## 6. Corset lenght (for receptacle only)

|    |                      |
|----|----------------------|
| 03 | 0,3 m [11.81 inches] |
| 05 | 0,5 m [19.68 inches] |
| 10 | 1,0 m [39.37 inches] |
| 15 | 1,5 m [59.05 inches] |

## 7. USB Cable end (for receptacle only)

|      |                                            |
|------|--------------------------------------------|
| A    | USB-A plug                                 |
| OPEN | Open USB 2.0 cable without plug at the end |

## Examples :

| Part number        | Description                                                                                                                                         |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| USBFTVX6G          | USBFTV for atex zone 2, plug, olive drab cadmium plating                                                                                            |
| USBFTVX7SA2G03A    | USBFTV for atex zone 2, transversally sealed jam nut receptacle, coding A, olive drab cadmium plating, 0,3m USB2.0 cable with USB-A plug at the end |
| USBFTVX7SA2N03OPEN | USBFTV for atex zone 2, transversally sealed jam nut receptacle, coding A, nickel plating, 0,3m USB2.0 cable with open end                          |

✓: RoHS compliant

# HOW TO ORDER - USBBFTV - PLUG AND RECEPTACLE

1.

2.

3.

4.

5.

| Series   | Shell type | Backshell (receptacle only) | Back terminations (receptacle only) | Shell material & finish |
|----------|------------|-----------------------------|-------------------------------------|-------------------------|
| USB BFTV | 7          | PEM                         | 2                                   | G                       |

## 1. Series

|          |                             |
|----------|-----------------------------|
| USB BFTV | USB2.0 Field Series (USB-B) |
|----------|-----------------------------|

## 2. Shell type

|   |                          |
|---|--------------------------|
| 6 | Plug                     |
| 2 | Square flange receptacle |
| 7 | Jam nut receptacle       |

## 3. Backshell (receptacle only)

|     |                   |                                       |
|-----|-------------------|---------------------------------------|
|     | Without backshell |                                       |
| PE  | Metal backshell   | Plastic gland                         |
| PEM |                   | Metal gland (back termination 2 only) |

## 4. Back terminations (receptacle only)

|   |                         |
|---|-------------------------|
| 1 | Female USB-A            |
| 2 | Solder (4 tinned holes) |

## 5. Shell material and finish

|    |                       |                            |
|----|-----------------------|----------------------------|
| G  | Aluminium shell       | Olive Drab Cadmium plating |
| N  |                       | Nickel plating ✓           |
| ZN |                       | Black Zinc Nickel ✓        |
| BZ | Marine bronze shell ✓ |                            |

## Examples :

| Part number   | Description                                                                                                              |
|---------------|--------------------------------------------------------------------------------------------------------------------------|
| USB BFTV6ZN   | USB BFTV, plug, black zinc nickel plating                                                                                |
| USB BFTV2PE1N | USB BFTV, square flange receptacle with metal backshell and plastic gland, female USB-A back termination, nickel plating |
| USB BFTV22N   | USB BFTV, square flange receptacle, solder back termination, nickel plating                                              |

✓: RoHS compliant

# HOW TO ORDER - USBBFTV - TRANSVERSALLY SEALED RECEPTACLE

| 1.       | 2.         | 3.        | 4.           | 5.                | 6.                         | 7.             | 8.            |
|----------|------------|-----------|--------------|-------------------|----------------------------|----------------|---------------|
| Series   | Shell type | Backshell | Sealing type | Back terminations | Shells material and finish | Cordset lenght | USB Cable end |
| USB BFTV | 2          | PE        | S            | 2                 | G                          | 03             | A             |

## 1. Series

|          |                             |
|----------|-----------------------------|
| USB BFTV | USB2.0 Field Series (USB-B) |
|----------|-----------------------------|

## 2. Shell type

|   |                          |
|---|--------------------------|
| 2 | Square flange receptacle |
| 7 | Jam nut receptacle       |

## 3. Backshell

|     |                   |               |
|-----|-------------------|---------------|
|     | Without backshell |               |
| PE  | Metal backshell   | Plastic gland |
| PEM |                   | Metal gland   |

## 4. Sealing type

|   |                                 |
|---|---------------------------------|
| S | Transversally sealed receptacle |
|---|---------------------------------|

## 5. Back terminations

|   |              |
|---|--------------|
| 2 | USB2.0 cable |
|---|--------------|

## 6. Shell material & finish

|    |                       |                            |
|----|-----------------------|----------------------------|
| G  | Aluminium shell       | Olive Drab Cadmium plating |
| N  |                       | Nickel plating ✓           |
| ZN |                       | Black Zinc Nickel ✓        |
| BZ | Marine bronze shell ✓ |                            |

## 7. Corset lenght

|    |                      |
|----|----------------------|
| 03 | 0,3 m [11.81 inches] |
| 05 | 0,5 m [19.68 inches] |
| 10 | 1,0 m [39.37 inches] |
| 15 | 1,5 m [59.05 inches] |

## 8. USB Cable end

|      |                                            |
|------|--------------------------------------------|
| A    | USB-A plug                                 |
| OPEN | Open USB 2.0 cable without plug at the end |

## Examples :

| Part number        | Description                                                                                                                 |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------|
| USB BFTV7S2N03A    | USB BFTV, transversally sealed jam nut receptacle, nickel plating, 0,3m USB2.0 cable with USB-A plug at the end             |
| USB BFTV2S2G05OPEN | USB BFTV, transversally sealed square flange receptacle, olive drab cadmium plating, 0,5m USB2.0 cable with open end        |
| USB BFTV7S2G10A    | USB BFTV, transversally sealed jam nut receptacle, olive drab cadmium plating, 1,0m USB2.0 cable with USB-A plug at the end |

✓: RoHS compliant

# HOW TO ORDER - CABLE

- USB3.0
- USB2.0
- Cables and cordsats
- Adapters and access point
- Rugged electronics
- Accessories
- Assembly instructions
- How to order

| Part number   | USB         | Lenght |
|---------------|-------------|--------|
| 191-030943-00 | USB3.2 Gen1 | 300m   |
| 190-040567-00 | USB2.0      | 300m   |

✓: RoHS compliant

# HOW TO ORDER - CORDSET

| 1.     | 2.   | 3.            | 4.     | 5.        |
|--------|------|---------------|--------|-----------|
| Series | Type | USB3.0 wiring | Lenght | Mandatory |
| USB3   | AA   | CROSSED       | 050    | PU HFFR   |

## 1. Series

|      |                     |
|------|---------------------|
| USB3 | USB3.2 Gen1 Cordset |
| USB2 | USB2.0 Cordset      |

## 2. Shell type

|    |                                                      |
|----|------------------------------------------------------|
| AA | Cordset with overmoldded USB type A plug on each end |
|----|------------------------------------------------------|

## 3. Wiring (USB3.0 cordset only)

|          |                 |
|----------|-----------------|
| CROSSED  | Crossed wiring  |
| STRAIGHT | Straight wiring |

## 4. Lenght

|      |                   |
|------|-------------------|
| 050  | 0.5 m / 1.64 ft   |
| 100  | 1 m / 3.28 ft     |
| 150  | 1.50 m / 4.92 ft  |
| 180  | 1.80 m / 5.91 ft  |
| 200  | 2 m / 6.56 ft     |
| 250  | 2.50 m / 8.2 ft   |
| 300  | 3 m / 9.84 ft     |
| 350  | 3.50 m / 11.48 ft |
| 400  | 4 m / 13.12 ft    |
| 450  | 4.5 m / 14.76 ft  |
| 500  | 5 m / 16.40 ft    |
| 600  | 6 m / 19.68 ft    |
| 700  | 7 m / 22.96 ft    |
| 800  | 8 m / 26.24 ft    |
| 900  | 9 m / 29.52 ft    |
| 1000 | 10 m / 32.80 ft   |

## 5. Mandatory

|         |                           |
|---------|---------------------------|
| PU HFFR | Black polyurethane jacket |
|---------|---------------------------|

### Important note:

- Cordsets are with USB-A plug overmolded on each end.
- To define a crossed or straight USB3.2 Gen1 cordset, please refer to page 81.
- Crossed cordset will have a black overmolding while straight cordset will have a blue overmolding.
- **USB3.2 Gen1 cordset will be out of his specification over 3,00m lenght.**
- **USB2.0 cordset will be out of his specification over 4,80m lenght.**

### Examples :

| Part number             | Description                                                                                        |
|-------------------------|----------------------------------------------------------------------------------------------------|
| USB2AA450PUHFFR         | USB2.0 cordset with overmoldded USB type A plug on each end, 4,5m lenght                           |
| USB3AACROSSED150PUHFFR  | USB3.2 Gen1 cordset with overmoldded USB type A plug on each end, 1,5m lenght with crossed wiring  |
| USB3AASTRAIGHT200PUHFFR | USB3.2 Gen1 cordset with overmoldded USB type A plug on each end, 2,0m lenght with straight wiring |

✓: RoHS compliant



## HOW TO ORDER - USB3FTV™ MEMORY KEYS

1.

2.

3.

4.

5.

6.

| Series      | Coding | Capacity | Shells material and finish | Protective cap | Mandatory |
|-------------|--------|----------|----------------------------|----------------|-----------|
| USB3FTVKEY6 | A      | 64       | G                          | CAP            | APA UV    |

## 1. Series

USB3FTVKEY6 USB3.2 Gen1 Memory Keys

## 2. Coding

A Coding A  
B Coding B

## 3. Capacity

32 32 Gb  
64 64 Gb  
128 128 Gb  
256 256 Gb

## 4. Shell material and finish

G Olive Drab Cadmium plating  
N Aluminium shell Nickel plating ✓  
ZN Black Zinc Nickel ✓  
BZ Marine bronze shell ✓

## 5. Cap

Without protective cap  
CAP With protective cap

## 6. Mandatory

APA UV Mandatory

## Examples :

| Part number               | Description                                                                                  |
|---------------------------|----------------------------------------------------------------------------------------------|
| USB3FTVKEY6A64GCAPAPAUV   | USB3FTV memory key, coding A, 64Gb capacity, olive drab cadmium plating, with protective cap |
| USB3FTVKEY6A128NAPAUV     | USB3FTV memory key, coding A, 128Gb capacity, nickel plating, without protective cap         |
| USB3FTVKEY6A256ZNCAPAPAUV | USB3FTV memory key, coding A, 256Gb capacity, black zinc nickel plating, with protective cap |

✓: RoHS compliant

# HOW TO ORDER - ROK - RUGGED OVAL KEY

| 1.       | 2.       | 3.      |
|----------|----------|---------|
| Series   | Capacity | Plating |
| USB3FKEY | 16       | B       |

| 1. Series                      |
|--------------------------------|
| USB3FKEY ROK - Rugged Oval Key |

| 3. Series        |
|------------------|
| B Black painting |

| 2. Shell type |
|---------------|
| 16 16 Gb      |
| 32 32 Gb      |
| 64 64 Gb      |
| 128 128 Gb    |
| 256 256 Gb    |

Examples :

| Part number  | Description                                     |
|--------------|-------------------------------------------------|
| USB3FKEY16B  | Rugged Oval Key, 16Gb capacity, black painting  |
| USB3FKEY64B  | Rugged Oval Key, 64Gb capacity, black painting  |
| USB3FKEY256B | Rugged Oval Key, 256Gb capacity, black painting |

## HOW TO ORDER - STANDARD PROTECTIVE CAP

1.

2.

3.

4.

5.

| Series   | Connector type | Rope type | Shells material and finish | Deviation |
|----------|----------------|-----------|----------------------------|-----------|
| USBFTV C | 7              |           | G                          | F057      |

## 1. Series

|         |                                |
|---------|--------------------------------|
| USBFTVC | USBFTV standard protective cap |
|---------|--------------------------------|

## 2. Connector type

|   |                          |
|---|--------------------------|
| 6 | Plug                     |
| 2 | Square flange receptacle |
| 7 | Jam nut receptacle       |

## 3. Rope type

|     |                                                  |
|-----|--------------------------------------------------|
|     | Nylon cord                                       |
| M   | Metallic chain                                   |
| MR  | Stainless Steel rope - Transparent teflon jacket |
| BMR | Stainless Steel rope - Black teflon jacket       |

## 4. Shell material and finish

|    |                             |
|----|-----------------------------|
| N  | Nickel plating ✓            |
| G  | Olive drab cadmium          |
| ZN | Black zinc nickel plating ✓ |

## 5. Deviation

|      |                     |
|------|---------------------|
| F057 | Reduced flange ring |
|------|---------------------|

## Examples :

| Part number | Description                                                                                                 |
|-------------|-------------------------------------------------------------------------------------------------------------|
| USBFTVC2N   | USBFTV protective cap for square flange receptacle, nylon cord, nickel plating                              |
| USBFTVC2MRN | USBFTV protective cap for square flange receptacle, stainless steel rope with teflon jacket, nickel plating |
| USBFTVC6ZN  | USBFTV protective cap for plug, nylon cord, black zinc nickel plating                                       |

✓: RoHS compliant

NOTES

Handwriting practice area with 20 horizontal dotted lines.



NOTES

Notes section with horizontal lines for writing.

## NOTES

Handwritten notes area with horizontal lines.



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Founded in 1932, **Amphenol** is one of the largest manufacturers of interconnect products in the world. The company designs, manufactures, and markets electrical, electronic, and fiber optic connectors, interconnect systems, and coaxial and specialty cables.

**Amphenol** has a diversified presence as a leader in high growth areas of the interconnect industry and provides solutions for customers in the automotive, broadband, industrial, information technology and data communications, military and aerospace, mobile devices, and mobile networks markets.

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