USB**3**F TV *(USB-A)*
USB connection system for harsh environment

NEW USB3.0

With USB Field, you can insert a standard USB 3.0 cordset into a metallic plug which will protect it from shocks, dust and fluids.
No hazardous on-field cabling and grounding!
Also available a version including plug + cordset: see next page.

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

Applications
- Embedded computers
- Data acquisition and transmission in harsh environment
- Railways
- Battelfield communication systems
- Navy systems

Data transmission
USB specification 3.0
Data rate: up to 5Gb/s for high speed USB

Dataspeed 10 x higher than USB2.0

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
- 2 mechanical coding / polarization possibilities (receptacle insert rotation)
- USB3F TV plug retention in the receptacle: 100 N in the axis
- Mating cycles: 500 minimum

Environmental protection
- Sealing (when mated): IP68 (temporary immersion)
- Salt spray: 48 h with nickel plating
          > 500 h with olive drab cadmium
          500 h with marine bronze shell
- Fire retardant / low smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 1micro s
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature range: - 40°C / +85°C

Part number code: plug and receptacles <u>without cordset</u>.

Series USB**3** Field TV	USB**3**F TV	2	A	G
Shell type **6:** plug (without cordset) - *For cordset solution, see page 88.* **2:** square flange receptacle with female USB3.0 termination - *For cordset solution, see page 90.* **7:** jam nut receptacle with female USB3.0 termination - *For cordset solution, see page 90.*				
Coding (for receptacle only) **A** or **B**				
Shells material & finish **G:** aluminium shell - olive drab cadmium plating **N:** aluminium shell - nickel plating - *ROHS compliant* **ZN:** aluminium shell - black zinc nickel plating - *ROHS compliant*				

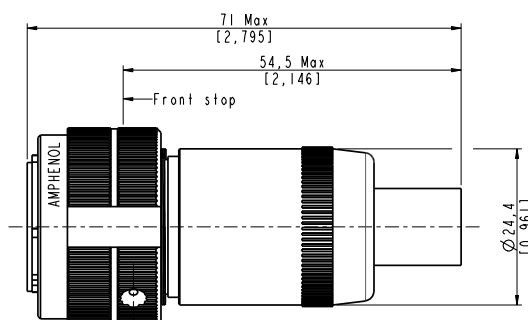*Examples: - plug, olive drab cadmium plating: **USB3F TV 6 G***
*   - jam nut receptacle, coding B, nickel plating: **USB3F TV 7 B N***

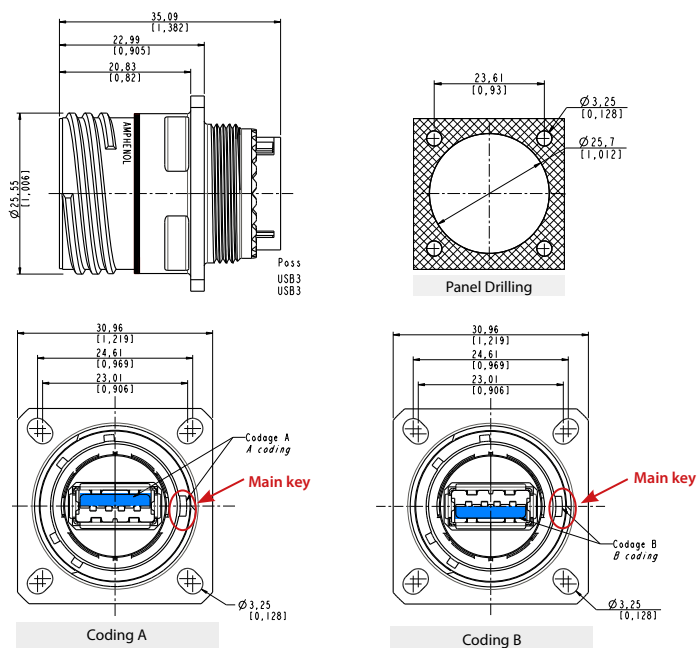### Plug without cordset

- Shell type 6
Part number type: USB3 FTV 6 x
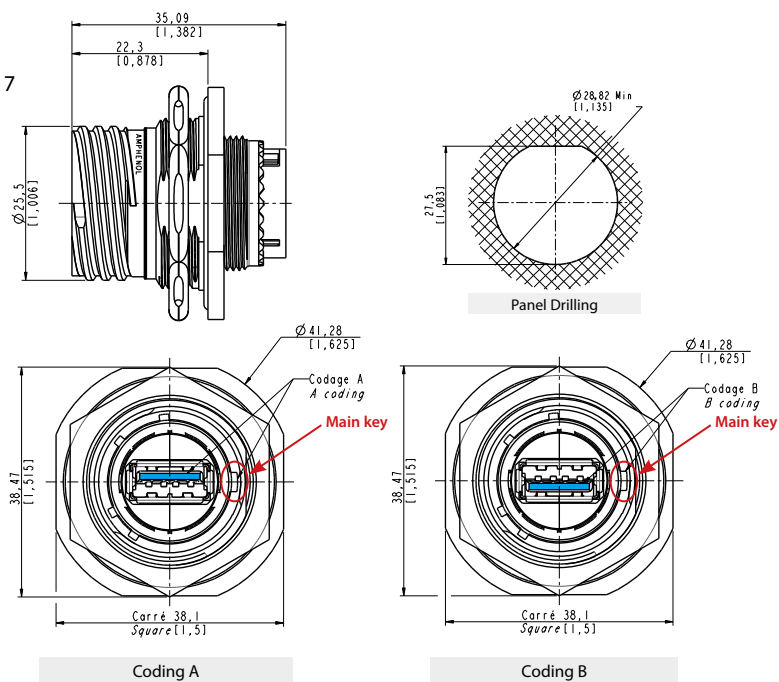<u>*Nota*</u>: *assembling instructions on page 89*

71 Max
[2,795]
54,5 Max
[2,146]
Front stop
AMPHENOL
Ø24,4
[0,961]

■ Square flange receptacle
4 mounting holes - Shell type 2
Part number type: **USB3 FTV 2 x**

Panel Drilling

Coding A

Coding B

Main key

■ Jam nut receptacle
Hexagonal nut mounting - Shell type 7
Part number type: **USB3 FTV 7 x**

Panel Drilling

Coding A

Coding B

Main key

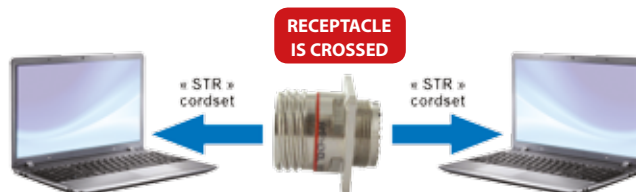**Configuration use**

For PC to peripheral application, use a crossed USB3 cable
« **CROS** » type in the part number code

RECEPTACLE
IS CROSSED

« CROS » cordset
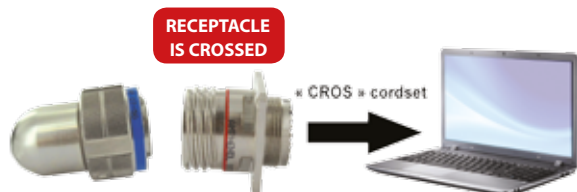
For PC to PC application, use a straight USB3 cable
« **STR** » type in the part number code

RECEPTACLE
IS CROSSED

« STR » cordset

Amphenol

89

Part number code: plugs <u>with cordset</u>.

| Series USB3 Field TV		USB3F TV	6	A	03	G	STR
Shell type **6:** plug (with cordset)							
Coding **A** or **B**							
Cordset length **03:** 0.3 m [11.81 inches] **10:** 1 m [39.37 inches] **05:** 0.5 m [19.68 inches] **15:** 1.5 m [59.05 inches]							
Shells material & finish **G:** aluminium shell - olive drab cadmium plating **N:** aluminium shell - nickel plating - *ROHS compliant* **ZN:** aluminium shell - black zinc nickel plating - *ROHS compliant*							
Type of cable * **CROS:** high reliability USB3 cable crossed **STR:** high reliability USB3 cable straight **OPEN:** high reliabilty USB3 cable open ⇨ *no plug at the end'*	*** IMPORTANT NOTE** • for PC to PC application, use a "**CROS**" type of cable • for PC to peripheral application, use a "**STR**" type of cable *See **Configuration use** on page 87*						

Examples: - plug, coding B, with 0.5m length of high reliability USB3 cable crossed, nickel plating: *USB3F TV 6 B 05 N CROS*
        - plug, coding A, with 1m length of high reliability USB3 cable straight, olive drab plating: *USB3F TV 6 A 10 G STR*
        - plug, coding B, with 0.3m length of high reliability USB3 OPEN, nickel plating: *USB3F TV 6 B 03 N OPEN*

Amphenol

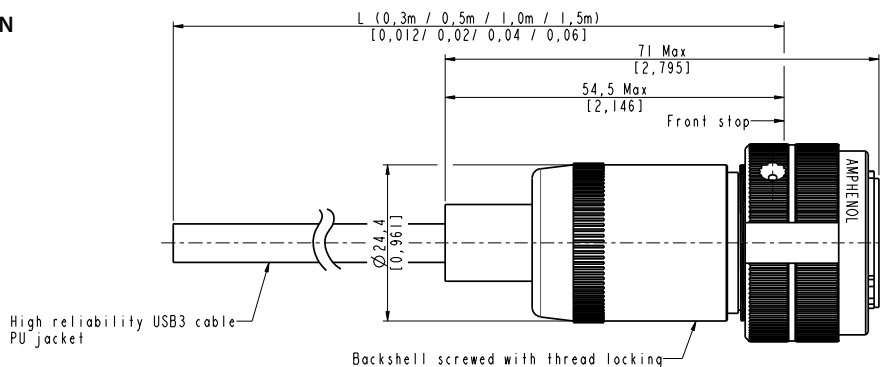## Plug with reinforced USB3.0 cordset

■ Shell type 6

Part number type: **USB3 FTV 6 x xx x CROS**
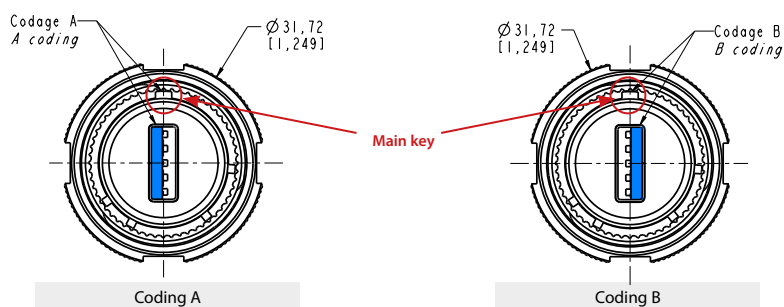   **USB3 FTV 6 x xx x STR**
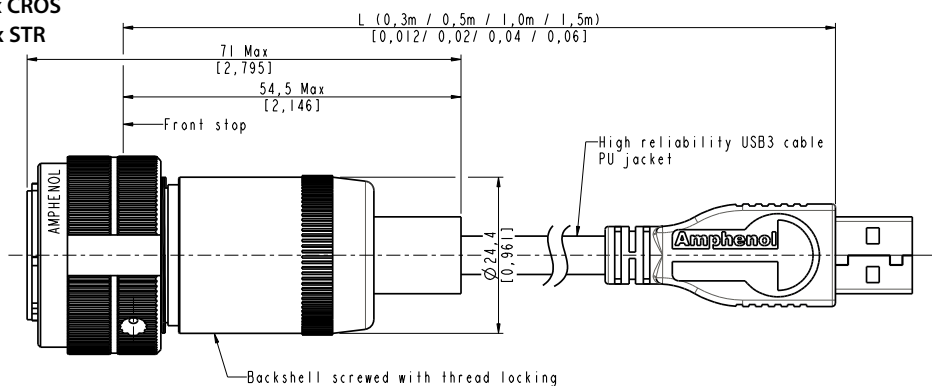
Plug with open reinforced USB3.0 cable

■ Shell type 6

Part number type: **USB3 FTV 6 x xx x OPEN**

2 codings available for plugs

Assembly instructions

Can be used with most the USB3.0 cordset brands : No tools required!
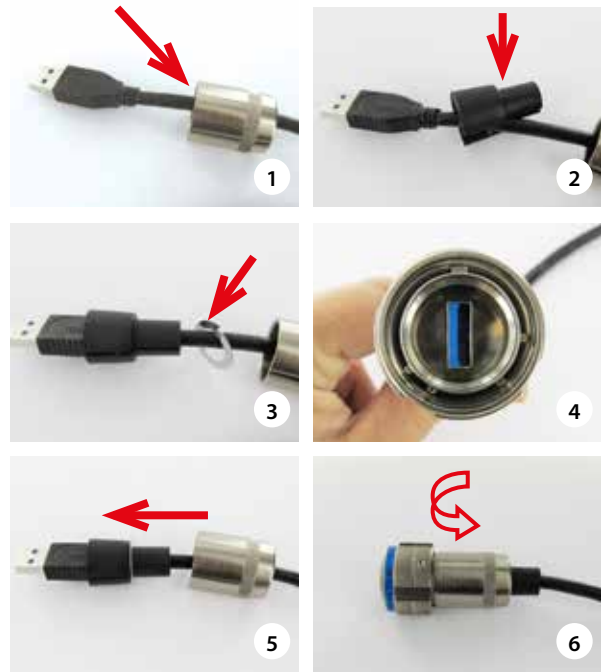
Plug assembly

1. Insert the USB3 cordset into the metallic backshell

2. Insert the retention spacer laterally to the cable (this spacer is soft, in order to adapt to different shapes of overmolding) and slide the overmolding of the USB3-A plug into this retention spacer

3. Insert the friction ring laterally to the cable

4. Choose the right coding (2 positions) and insert the USB-A plug into the protective plug.Note at this step, the main key is used for polarization through the blue seal.
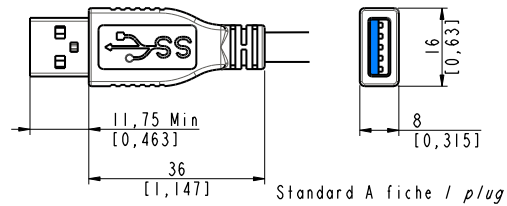
MAIN KEY

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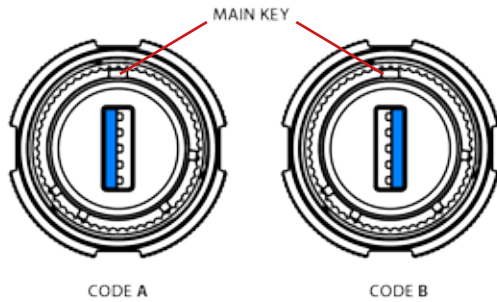
7. Screw the backshell on the plug body. A wrench can be necessary to fully tighten it, and the connection to the receptacle can help

1

2

3

4

5

6

IMPORTANT NOTE
The sealing is done by the blue seal.

USB3 cordset usable - *Not provided*

Standard A fiche / *plug*

11,75 Min [0,463]
36 [1,147]
16 [0,63]
8 [0,315]

Accessories

■ **Metallic caps**

	USBF TVC	2	G
Connector type **6:** plug **2:** square flange receptacle **7:** jam nut eceptacle			
Shells material & finish **N:** aluminium shell - nickel - *ROHS compliant* **G:** aluminium shell - olive drab cadmium **BZ:** marine bronze shell - *ROHS compliant*			
ZN: aluminium shell - black zinc nickel plating - *ROHS compliant*			

Plug Cap   Receptacle Cap

Plug Cap end   Square flange receptacle cap end   Jam Nut receptacle cap end

■ Panel gasket for square flange receptacle
Thickness: 0,8 mm [.031]
P/n: **JE15**
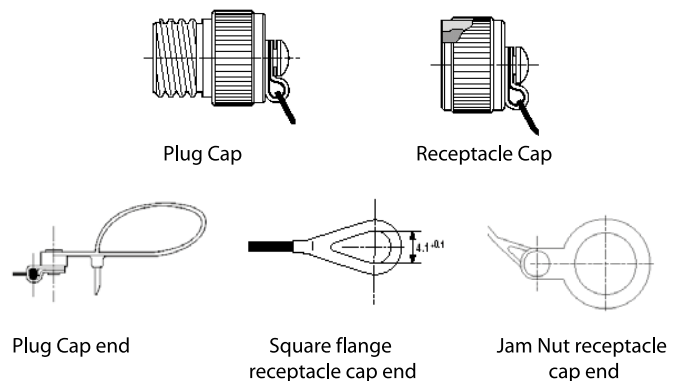
USB3F TV *(USB-A)*
Transversally sealed receptacles

NEW USB3.0

ROHS COMPLIANT
N & BZ

In some applications, a transversal sealing for the receptacle is a « must ». This will prevent fluids and dust from going through the receptacle when plug or cap are not mated to the receptacle. The sealed solution (version "S") has a compound at the rear of the receptacle below. In addition, the Sealed USB3F TV has been successfully tested in very high vibration corresponding to airplane applications.

Applications
- Embedded computers
- Data acquisition and transmission in harsh environment
- Railways
- Battelfield communication systems
- Navy systems

Data transmission
USB specification 3.0
Data rate: up to 5Gb/s for high speed USB

Main characteristics
- Sealed against fluids and dusts (IP68)
- Shock, vibration and traction resistant
- No cabling operation in field and no tools required
- Improved EMI protection
- Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device - Shell size 15
- 2 mechanical coding/polarization possibilities by the user (receptacle insert rotation)
- USB3F TV plug retention in the receptacle: 100 N in the axis
- Mating cycles: 500 minimum

Environmental protection
- Sealing (when mated): IP68 (temporary immersion)
- Salt spray: 48 h with nickel plating
          > 500 h with olive drab cadmium
          500 h with marine bronze shell
- Fire retardant / Low smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 1micro s
- Shocks: IK06 ► weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature range: - 40°C / +85°C

Part number code

Series USB3 Field TV	USB3F TV	2 S	A	03	G	STR
Shell type **2S:** square flange receptacle **7S:** jam nut receptacle						
Coding **A** or **B**						
USB cable length **03:** 0.3 m [11.81 inches] **05:** 0.5 m [19.68 inches] **10:** 1 m [39.37 inches] **15:** 1.5 m [59.05 inches]						
Shells material & finish **G:** aluminium shell - olive drab cadmium plating **N:** aluminium shell - nickel plating - *ROHS compliant* **ZN:** aluminium shell - black zinc nickel plating - *ROHS compliant*						
Type of cable * **ACROS:** high reliability crossed USB3 cable with plug at the end **ASTR:** high reliability straight USB3 cable with plug at the end **OPEN:** high reliability cable open = no plug at the end						

* IMPORTANT NOTE
- for PC to PC application, use a "**CROS**" type of cable
- for PC to peripheral application, use a "**STR**" type of cable
*See **Configuration use** on page 87*

Examples:
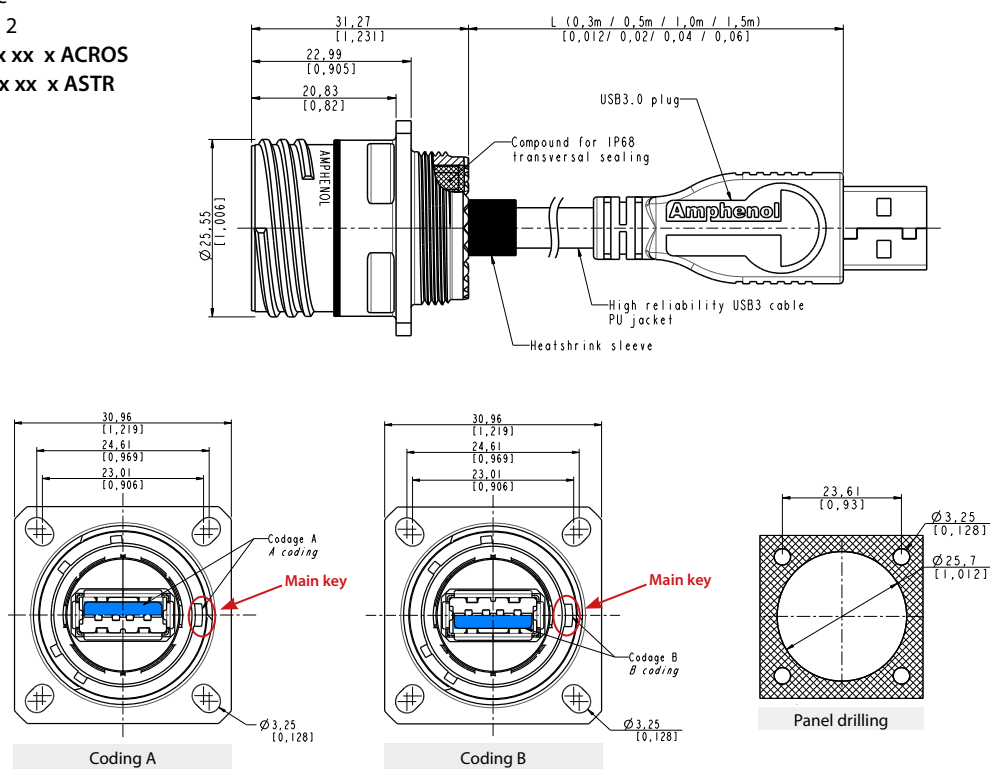- square flange receptacle, with 0.5m length of high reliability USB3 cable crossed, coding B, nickel plating: ***USB3F TV 2 S B 05 N ACROS***
- jam nut receptacle, with 1m length of high reliability USB3 cable straight, coding A, olive drab cadmium plating: ***USB3F TV 7 S A 10 G ASTR***
- jam nut receptacle, with 0.3m length of high reliability USB3 cable open, coding B, olive drab cadmium plating: ***USB3F TV 7 S B 03 G OPEN***

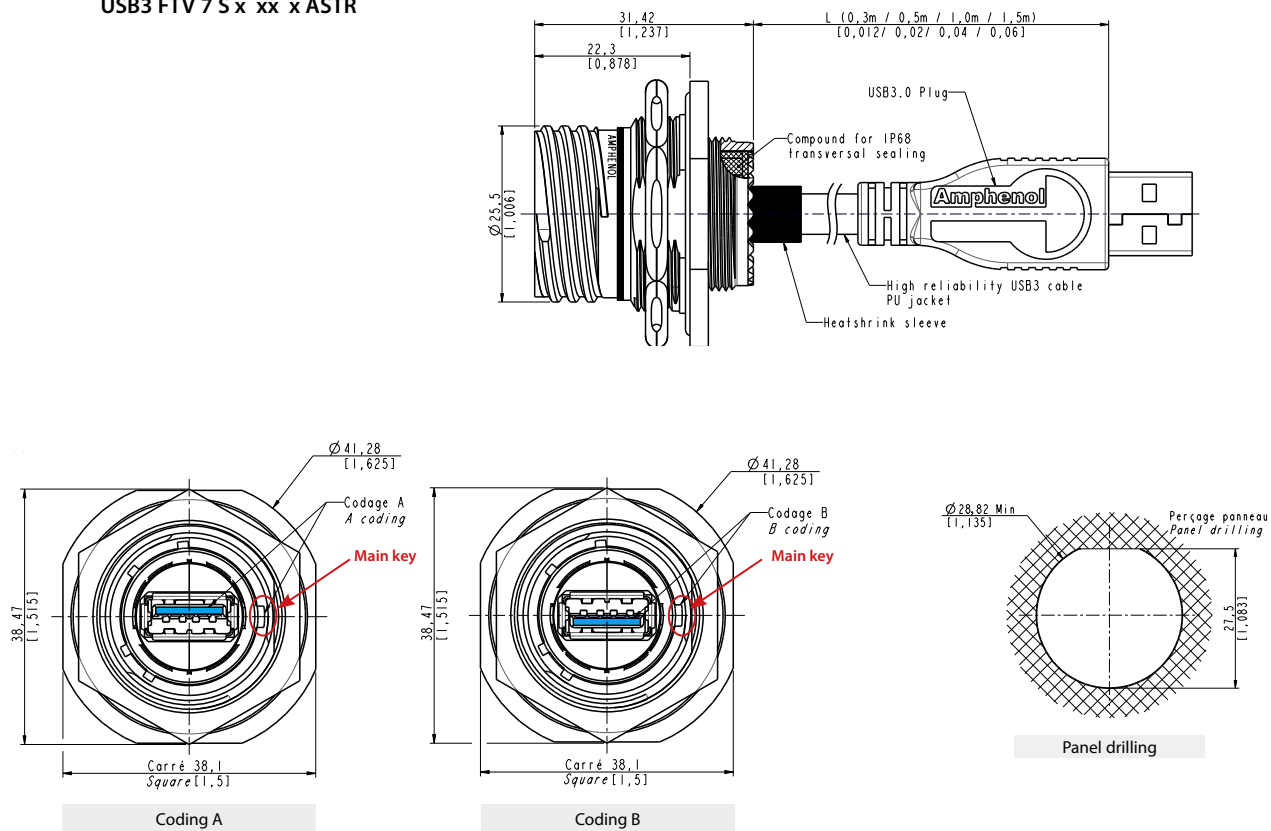## Receptacles with USB-A cordset

■ Square flange receptacle
4 mounting holes: shell type 2
Part number: **USB3 FTV 2 S x xx x ACROS**
USB3 FTV 2 S x xx x ASTR

31,27
[1,231]
22,99
[0,905]
20,83
[0,82]
Ø25,55
[1,006]
AMPHENOL
L (0,3m / 0,5m / 1,0m / 1,5m)
[0,012/ 0,02/ 0,04 / 0,06]
USB3.0 plug
Compound for IP68 transversal sealing
Amphenol
High reliability USB3 cable PU jacket
Heatshrink sleeve

30,96
[1,219]
24,61
[0,969]
23,01
[0,906]
Codage A
A coding
Main key
Ø3,25
[0,128]

Coding A

30,96
[1,219]
24,61
[0,969]
23,01
[0,906]
Main key
Codage B
B coding
Ø3,25
[0,128]

Coding B

23,61
[0,93]
Ø3,25
[0,128]
Ø25,7
[1,012]

Panel drilling

■ Jam nut receptacle hexagonal nut mounting: shell type 7
Part number: **USB3 FTV 7 S x xx x ACROS**
USB3 FTV 7 S x xx x ASTR

31,42
[1,237]
22,3
[0,878]
Ø25,5
[1,006]
AMPHENOL
L (0,3m / 0,5m / 1,0m / 1,5m)
[0,012/ 0,02/ 0,04 / 0,06]
USB3.0 Plug
Compound for IP68 transversal sealing
Amphenol
High reliability USB3 cable PU jacket
Heatshrink sleeve

Ø41,28
[1,625]
Codage A
A coding
Main key
38,47
[1,515]
Carré 38,1
Square [1,5]

Coding A

Ø41,28
[1,625]
Codage B
B coding
Main key
38,47
[1,515]
Carré 38,1
Square [1,5]

Coding B

Ø28,82 Min
[1,135]
Perçage panneau
Panel drilling
27,5
[1,083]

Panel drilling

Amphenol

Receptacles with open reinforced USB3.0 cable

■ Square flange receptacle - 4 mounting holes: shell type 2
Part number type: **USB3F TV 2 S A xx x OPEN**
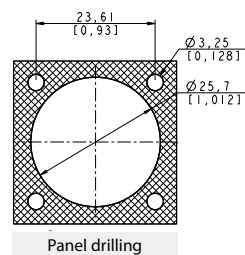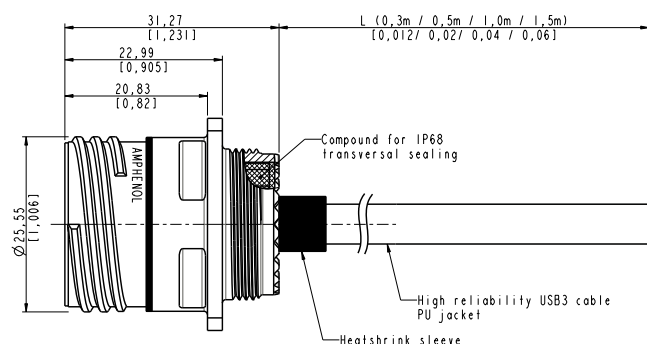
```
31,27
[1,231]
22,99
[0,905]
20,83
[0,82]
L (0,3m / 0,5m / 1,0m / 1,5m)
[0,012/ 0,02/ 0,04 / 0,06]

AMPHENOL
Ø 25,55
[1,006]

Compound for IP68
transversal sealing

High reliability USB3 cable
PU jacket

Heatshrink sleeve
```

```
23,61
[0,93]
Ø 3,25
[0,128]
Ø 25,7
[1,012]
```
Panel drilling

■ Jam nut receptacle hexagonal nut mounting: shell type 7
Part number type: **USB3F TV 7 S A xx x OPEN**

```
31,42
[1,237]
22,3
[0,878]
L (0,3m / 0,5m / 1,0m / 1,5m)
[0,012/ 0,02/ 0,04 / 0,06]

AMPHENOL
Ø 25,5
[1,006]

Compound for IP68
transversal sealing

High reliability USB3 cable
PU jacket

Heatshrink sleeve
```

```
Ø 28,82 Min
[1,135]
Perçage panneau
Panel drilling
27,5
[1,083]
```
Panel drilling

Amphenol
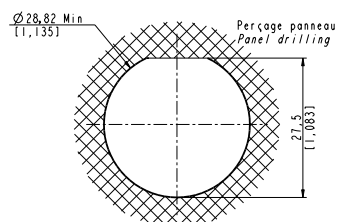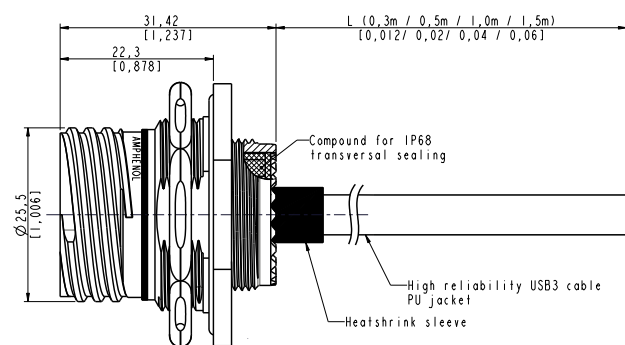
USB3F TV
Hermetic receptacles

In some applications, a transversal hermiticity for the receptacle is a « must ». This will prevent gas from going through the receptacle when plug or cap are not mated to the receptacle.

The hermetic solution (version "H") has a compound at the rear of the receptacle.

Helium leakage is less than 1.10^{-6} cm^3 per second [0.1 micron cubit ft per hour] at one bar [15 psi] pressure differential.

Applications
- Embedded computers
- Data acquisition and transmission in harsh environment
- Railways
- Battelfield communication systems
- Navy systems

Data transmission
USB specification 3.0
Data rate: up to 5Gb/s for high speed USB

Main characteristics
- Same as the USB3F TV (see page 76)... a complete IP68 sealing of the receptacle is added (even with no plug or no protective cap mated).
- Outside dimensions are the same as the standard USB3F TV (USB-A).
- Vibrations : the compounded version of the USBF TV has been tested in vibration following the NAS 1599 aeronautic specification (ambient temperature):
5 - 3000 Hz, 20g, 2.5 mm [.1 inch] double amplitude, 3 axes, 12 hours
Note: this specification exceeds MIL-C-26500 requirements.

IMPORTANT NOTE
Due to the compound, the coding of the connector must be done in the factory: use the codes A or B in the part number.

Example: USBF3TV 2H **A** 03 G ACROS

Coding A	Coding B

A coding
Main key

Main key
B coding
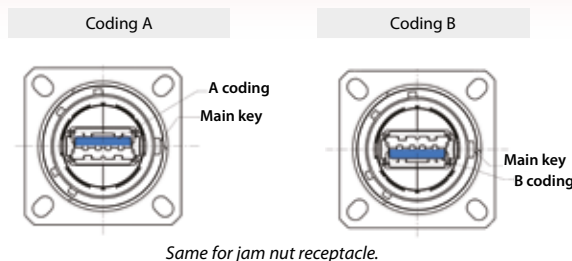
Same for jam nut receptacle.

Part number code

Series USB3 Field TV	USB3F TV	2 H	A	03	G	STR

Shell type
2H: square flange receptacle
7H: jam nut receptacle

Coding
A or **B**

USB cable length
03: 0.3 m [11.81 inches]
05: 0.5 m [19.68 inches]
10: 1 m [39.37 inches]
15: 1.5 m [59.05 inches]

Shells material & finish
G: aluminium shell - olive drab cadmium plating
N: aluminium shell - nickel plating - *ROHS compliant*
ZN: aluminium shell - black zinc nickel plating - *ROHS compliant*

Type of cable *
ACROS: high reliability crossed USB3 cable with plug at the end
ASTR: high reliability straight USB3 cable with plug at the end
OPEN: high reliability cable open = no plug at the end

> *** IMPORTANT NOTE**
> • for PC to PC application, use a "**CROS**" type of cable
> • for PC to peripheral application, use a "**STR**" type of cable
> *See **Configuration use** on page 87*

Examples:
- square flange receptacle, with 0.5m length of high reliability USB3 cable crossed, coding B, nickel plating: **USB3F TV 2 H B 05 N ACROS**
- jam nut receptacle, with 1m length of high reliability USB3 cable straight, coding A, ODC plating: **USB3F TV 7 H A 10 G ASTR**
- jam nut receptacle, with 0.3m length of high reliability USB3 cable open, coding B, ODC plating: **USB3F TV 7 H B 03 G OPEN**

Amphenol