

Amphenol SOCAPEX

# Rugged Digital Networks Solutions











Reinforced Infocom Connectors for Harsh Environment  
RJ Field - USB Field



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### Field installable

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# RUGGED ETHERNET SOLUTION SELECTION GUIDE

	Connectors	Series	Indust. Ethernet Spec.	Coupling Mechanism	Shape	Material	Specification	Prime Market	Page
F I E L D  I N S T A L L A B L E		RJF RB		Reverse Bayonet	Circular	Plastic	N/A	Industrial & Telecom	10
		RJF544	IEC 60603-7 variant 12	Push Pull	Circular	Plastic	N/A	Industrial & Telecom	13
		RJF EZ	IEC 60603-7 variant 13	Lever	Rectangular	Plastic	N/A	Industrial & Telecom	15
		RJF	IEC 60603-7 variant 11	Bayonet	Circular	Metal	MIL-DTL-26482	Industrial Mil/Aero	17
		RJF in line receptacles & PC tails receptacles	IEC 60603-7 variant 11	Bayonet	Circular	Metal	MIL-DTL-26482	Industrial Mil/Aero	20
		RJF receptacles & plugs with 360° EMI backshells		Bayonet	Circular	Metal	MIL-DTL-26482	Industrial Mil/Aero	21
		RJF transversally sealed receptacles		Bayonet	Circular	Metal	MIL-DTL-26482	Mil/Aero & Industrial	22
		RJF hermetic receptacles		Bayonet	Circular	Metal	MIL-DTL-26482	Mil/Aero & Industrial	23
		RJF for big insulation wire up to 1.6mm [0.062 inch]		Bayonet	Circular	Metal	MIL-DTL-26482	Industrial Mil/Aero	24
		RJFTV		Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero & Rail Mass Transit	26
		RJF TV receptacles & plugs with 360° EMI backshells		Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero & Rail Mass Transit	30
		RJF TV through bulkhead receptacles		Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero & Rail Mass Transit	32
		RJF TV stand off receptacles		Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero & Rail Mass Transit	33
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	RJ45/M12 adaptors			Circular	Metal		Industrial & Rail Mass Transit	39	
	Special RJ45 adaptor for Military & Commercial Aeronautics			Circular	Metal		Industrial & Rail Mass Transit	40	

I N S T A L L A B L E	Cables	Series	Indust. Ethernet Spec.	Coupling Mechanism	Shape	Material	Specification	Prime Market	Page	
		High reliability Cat 5E cable and cordsets							Mil/Aero & Industrial	41
		High reliability Cat 6 cable and cordsets							Mil/Aero & Industrial	42
		High reliability Cat 6A cable and cordsets							Mil/Aero & Industrial	43
A S S E M B L I E S	Connectors	Series	Indust. Ethernet Spec.	Coupling Mechanism	Shape	Material	Specification	Prime Market	Page	
		RJ45/M12 Railway cable solution		Bayonet	Circular	Metal	MIL-DTL-26482	Industrial & Rail Mass Transit	46	
		Jumper		Thread	Circular	Metal	MIL-DTL-38999 Series III	Rail Mass Transit	47	


R U G G E D E L E C T R O N I C S	Connectors	Series	Sealing	Type	# of ports	Prime Market	Page
		RES-GMC Media converter with Expanded Beam Tech.	IP67/68	Unmanaged	2 Gb ports	Mil/Aero	50
		RES-GMC Media converter with Butt Joint Fiber connect.	IP67/68	Unmanaged	2 or 4 Gb ports	Mil/Aero	52
		RJS-GMC with Expanded Beam Technology	IP67/68	Unmanaged	2 or 4 or 8 Gb ports	Mil/Aero	54
		RES-GMC-1M-FORC Media converter with Remote Control	IP67/68	Unmanaged	1 Gb port + 1 Fiber port	Mil/Aero	56
		RES-SCE-AC-8US miniature portable switch	IP67/68	Unmanaged	8 Fast ports	Mil/Aero	58
		RES-SCE-AC-8MG miniature portable switch	IP67/68	Managed	8 Gb ports	Mil/Aero	60
		RESMLAC-8US-CAPS military Ethernet switch MIL-DTL-38999 connectors	IP67/68	Unmanaged	8 Fast ports	Mil/Aero	62
		RJSMLAC-8UG-CAPS military Ethernet switch MIL-DTL-38999 connectors	IP67/68	Unmanaged	8 Gb ports	Mil/Aero	64
		RJSMLAC-8MG-CAPS military Ethernet switch RJFTV connectors	IP67/68	Managed	8 Gb ports	Mil/Aero	66
		RESMLAC-8MG-CAPS military Ethernet switch MIL-DTL-38999 connectors	IP67/68	Managed	8 Gb ports	Mil/Aero	68
		RESMLAC-8MG-CAPS-F35 military Ethernet switch MIL-DTL-38999 connectors	IP67/68	Managed	8 Gb ports	Mil/Aero	70
		RESMLAC-28MG military Ethernet switch	IP67/68	Managed	24 Gb + 4 combo 10G ports	Mil/Aero	72
	RJSML-8US1 & RJSML-8UG1 military Ethernet switch	IP67/68	Unmanaged	8 Gb ports	Mil/Aero	73	
	RJSML-MG7F3G military Ethernet switch	IP67/68	Managed	7 fast + 3 Gb ports	Mil/Aero	77	

# RUGGED USB SOLUTION SELECTION GUIDE






	Connectors	Series	Coupling Mechanism	Shape	Material	Specification	Prime Market	Page
F I E L D  I N S T A L L A B L E		USB3FTV (USB-A)	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero, Rail Mass Transit & Industrial	81
		USB3FTV transversally sealed receptacles	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero, Rail Mass Transit & Industrial	86
		USB3FTV hermetic receptacles	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero & Industrial	89
		High reliability USB 3.0 Cordsets					Mil/Aero, Rail Mass Transit & Industrial	92
		USBFTV (USB-A)	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero, Rail Mass Transit & Industrial	93
		USBF TV transversally sealed receptacles	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero, Rail Mass Transit & Industrial	96
		USBF TV hermetic receptacles	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero & Industrial	98
		USBF TV special receptacles with 360° EMI backshells	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero, Rail Mass Transit & Industrial	99
		Special USB through bulkhead receptacles	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero & Industrial	100
		USBF TV stand off receptacles	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero, Rail Mass transit & Industrial	101
		High reliability USB 2.0 Cordsets					Mil/Aero, Rail Mass Transit & Industrial	105
		USBF SC Quick release series	Spring Release	Circular	Metal	N/A	Mil/Aero & Industrial	106
		USBBF TV (USB-B)	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero, Rail Mass Transit & Industrial	108
		USBBF TV stand off receptacles	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero, Rail Mass Transit & Industrial	111
		USBBF TV transversally sealed receptacles	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero, Rail Mass Transit & Industrial	113
		Special USB adaptor for Military & Commercial Aeronautics		Circular	Metal		Aeronautic	116

	Connectors	Series	Coupling Mechanism	Shape	Material	Specification	Prime Market	Page
ASSEMBLIES CABLES		USB-A plastic with Self Closing Cap		Circular	Plastic	N/A	Industrial & Telecom	118
		USB B Field Plastic shell Overmolded cordset plug	Thread	Circular	Plastic	N/A	Industrial & Telecom	121
RUGGED ELECTRONICS		Reinforced USB3FTV & USB 2.0 Memory Keys	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero & industrial	124
		Reinforced USB 2.0 amplifier	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero & Industrial	125

## RUGGED ATEX ZONE 2 SOLUTION GUIDE

	Connectors	Series	Coupling mechanism	Shape	Material	Specification	Prime Market	Page
RUGGED ELECTRONICS		RJFTVX, USBFTVX RJ11FTVX	IP68		Metal		Factory Automation, Video, Oil & Gaz	128

## OTHER RUGGED SOLUTIONS

	Connectors	Series	Coupling Mechanism	Shape	Material	Specification	Prime Market	Page
FIELD INSTALLED ABLE		FWFTV (FireWire)	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero & Video	136
		RJ11F (RJ11)	Bayonet	Circular	Metal	MIL-C-26482	MIL/Aero & Industrial	140
		Special RJ11 adaptor for Military & Commercial Aeronautics		Circular	Metal		Aeronautic	142
		MTRJFTV (MTRJ) Fiber optic solution	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero & Rail Mass Transit	141
		LC Field Fiber optic solution	Thread	Circular	Metal	MIL-DTL-38999 Series III	Mil/Aero & Rail Mass Transit	146





# Rugged Ethernet Solutions



## Field installable

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	RJF: metallic circular shell based on MIL-DTL-26482 H - bayonet coupling .....	17
	RJF special receptacles: inline receptacles & PC tails receptacles .....	20
<b>NEW</b>	RJF receptacles & plugs with 360° EMI backshells .....	21
<b>NEW</b>	RJF transversally sealed receptacles.....	22
	RJF hermetic receptacles .....	23
	RJF for big insulation wire up to 1.6 mm [0.062 inch] .....	24
	Self Closing Cap (SCC) for RJ Field receptacles .....	25
	RJF TV: metallic circular shell based on MIL-DTL-38999 series III - thread coupling with anti-decoupling device .....	26
	Metallic self closing cap (SCC) for RJFTV square flange receptacles.....	29
	RJF TV receptacles and plugs with 360° EMI backshells .....	30
	RJF TV through bulkhead receptacles .....	32
	RJF TV stand off receptacles .....	33
<b>NEW</b>	RJF TV transversally sealed receptacles .....	36
<b>NEW</b>	RJF TV hermetic receptacles .....	37
<b>NEW</b>	RJF TV for big insulation wire up to 1.6 mm .....	38
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	High reliability Cat 5E Ethernet cable & cordsets .....	41
<b>NEW</b>	High reliability Cat 6 Ethernet cable & cordsets .....	42
<b>NEW</b>	High reliability Cat 6A Ethernet cable & cordsets .....	43

# RJF RB

Ethernet connection system for harsh environment – Industrial Ethernet



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

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

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

## Applications

- Telecom equipments
- Video control
- Robotics
- Industrial process control
- CNC machines
- Special machines
- Motion control

## Main characteristics

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

## Environmental protection

- Sealing: IP68
- Salt spray > 1000 h
- Fire retardant / Low smoke: UL94 V0 and NFF 16102, DIN 5510-2
- Operating temperature: - 40°C / +85°C

## Data transmission

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

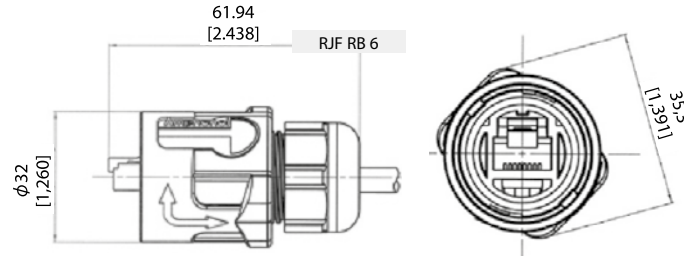
## Part number code

	RJF RB	7	1RA
<b>Shell type</b>			
<b>6:</b> composite reverse bayonet plug, plastic gland			
<b>7:</b> composite jam nut receptacle			
<b>Back terminations (for receptacles only)</b>			
<b>1:</b> female RJ45			
<b>1RA:</b> right angle female RJ45			
<b>2:</b> RJ45 Cordset			
<b>3U:</b> IDC cat6 - unshielded			
<b>3F:</b> IDC cat6 - partial shielding			
<b>3S:</b> IDC cat6 - 100% shielded			
<b>5:</b> straight PCB			
<b>Cordset length (for receptacles with "2" back termination only)</b>			
<b>03 100BTX:</b> 0.3m [11.81 inches]			
<b>05 100BTX:</b> 0.5m [19.68 inches]			
<b>10 100BTX:</b> 1m [39.37 inches]			
<b>15 100BTX:</b> 1.5m [59.05 inches]			
<b>Remark: cabling configuration</b> → 100 BTX = 568B (Ethernet specification)			

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

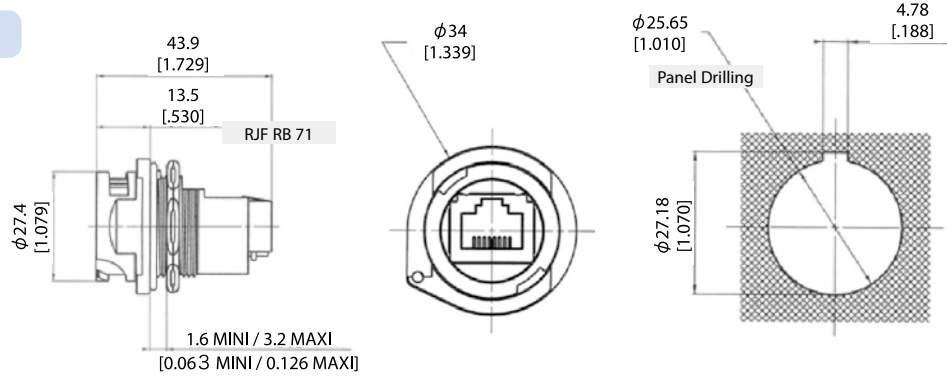
## Plug

- Type 6 shell with plastic gland

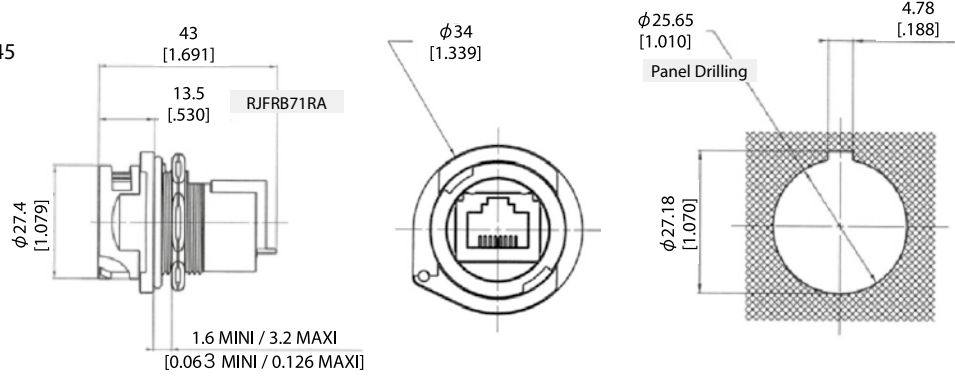


## Receptacles

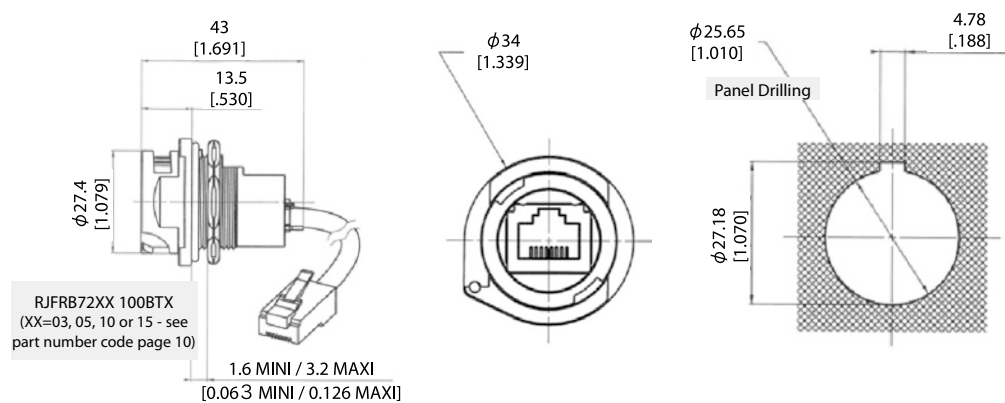
- Type 1: female RJ45 (front mounting)



- Type 1RA: right angle female RJ45 (front mounting)



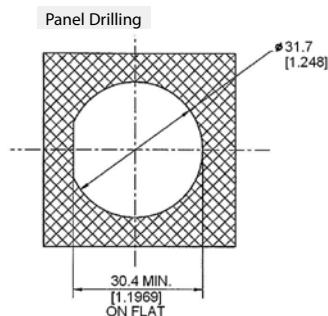
- Type 2: RJ45 cordset (front mounting)



- Type 3: IDC CAT 6 termination (rear mounting)



Unshielded: RJF RB 73U  
Partial shielding RJF RB 73F

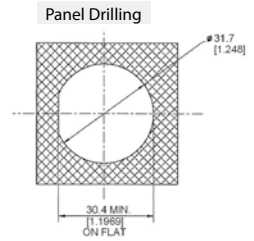
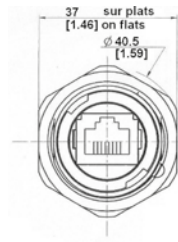
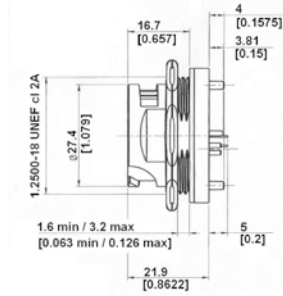


Shielded: RJFRB73S

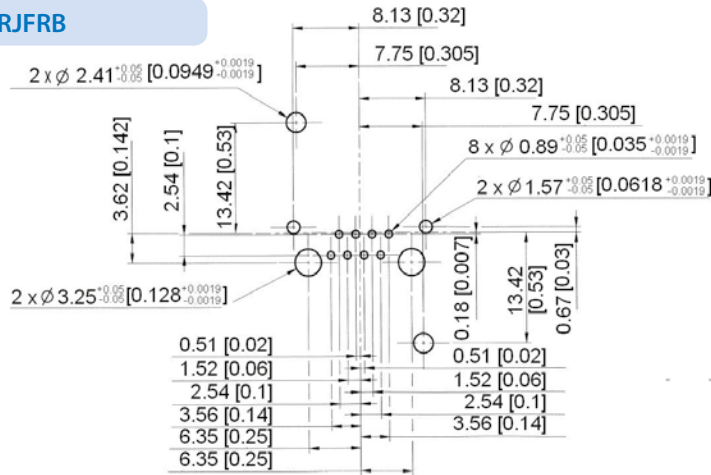
■ Straight PCB termination receptacle:  
(rear mounting)



Part number: RJF RB 75

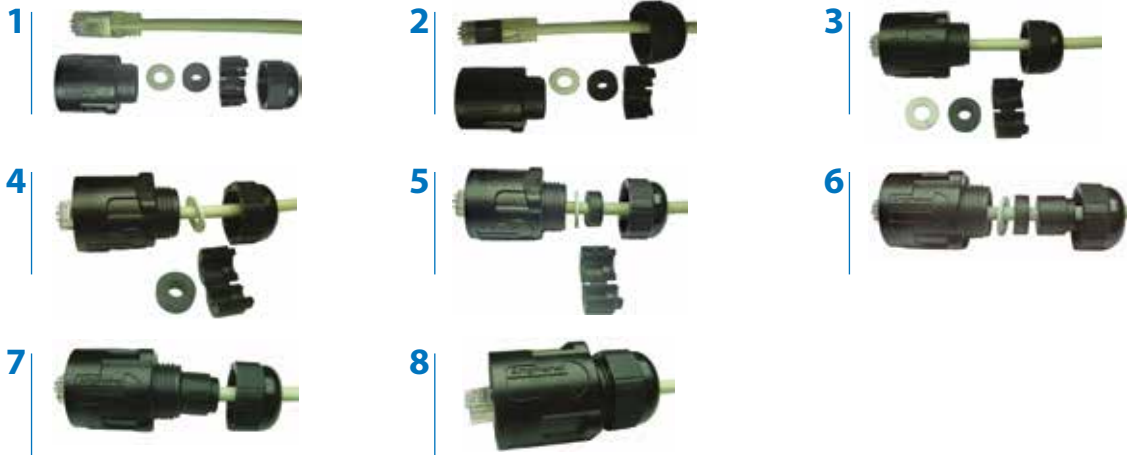


PCB drilling RJFRB



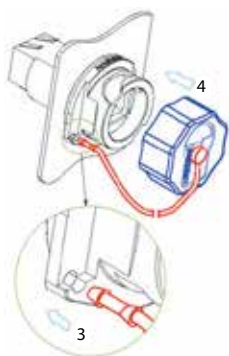
**IMPORTANT NOTE**  
The customer's PCB design will determine the receptacle category.

Assembly instructions

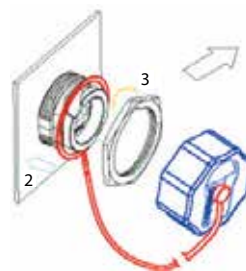


Accessories

■ IP68 Dust caps



**RJF RB C7**  
Cap for receptacles RJFRB71 / 71RA / 72xxx



**RJF RB C75**  
Cap for receptacles RJFRB75 and RJFRB73x

# RJF 544

Ethernet connection system for harsh environment – Industrial Ethernet



RJF544 allows you to use an Ethernet Class D / Cat 5e connection for 10 BaseT, 100 BaseTX or 1000 BaseT networks in harsh environments. With the patented RJStop® system you can use a standard RJ45 cordset in a protective **composite** plug which will protect it from shocks, dust and fluids.

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

## Applications

- Telecom equipment
- Video control
- Robotics
- Industrial process control
- CNC machines
- Special machines
- Motion control
- Tele-maintenance

## Data transmission

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



Now available with transversal sealing\*

\*Seald in unmated condition

## Main characteristics

- Compliant with IEC 60603-7 variante 12
- Shock, vibration and traction resistant
- No cabling operation in field and no tools required
- Sealed against fluids and dust (IP68)
- **Quick push pull coupling**
- RJ45 cordset retention in the plug: 100 N in the axis
- Mating cycles: 500 min
- Improved EMI Protection
- Compatible with cable diameter from 6 mm [0.236 in] to 13 mm [0.512 in]

## Environmental protection

- Sealing: IP68
- Salt spray > 1000 h
- Fire retardant / Low smoke: UL94 V0 and NFF 16102, DIN 5510-2
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 10 nano s.
- Operating temperature: - 40°C / +85°C

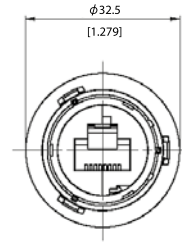
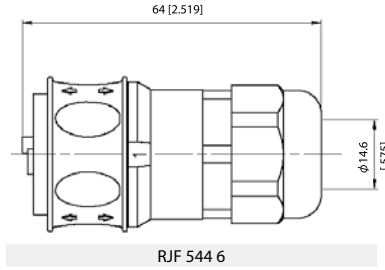
## Part number code

	RJF 544	2	2	03 100BTX
<b>Shell type</b>				
6: composite push pull plug, plastic gland				
2: composite square flange receptacle				
2S: composite square flange receptacle transversally sealed				
2M: metallized (Ni) composite square flange receptacle				
2SM: metallized (Ni) composite square flange receptacle transversally sealed				
<b>Back terminations (for receptacles only)</b>				
1: female RJ45				
1RA: right angle female RJ45				
2: RJ45 cordset				
<b>Cordset length (for receptacles with "2" back termination only) - Other lengths are available on demand</b>				
03 100BTX: 0.3 meters [11.81 inches]				
05 100BTX: 0.5 meters [19.68 inches]				
10 100BTX: 1 meter [39.37 inches]				
15 100BTX: 1.5 meters [59.05 inches]				
00: 8 tinned holes at the rear of the PCB to solder the cable				
<b>Remark: cabling configuration → 100 BTX = 568B (Ethernet specification)</b>				

- Examples:
- Plug: RJF 544 6
  - Square flange receptacle, female RJ45 back termination: RJF 544 21
  - Metallized square flange receptacle, female RJ45 back termination: RJF 544 2M 1
  - Square flange receptacle, 1,5m [59.05"] 100 BTX cordset termination: RJF 544 22 15 100BTX
  - Square flange receptacle, solder termination: RJF 544 22 00
  - Transversally sealed receptacle female RJ45 back termination: RJF544 2S1

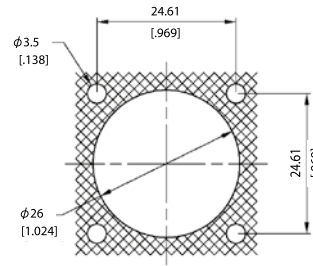
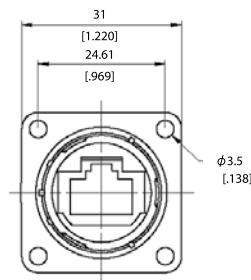
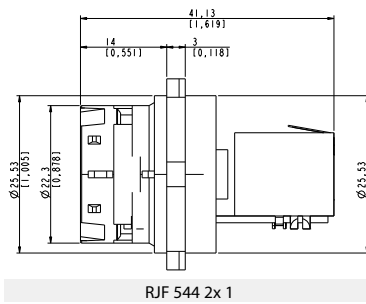
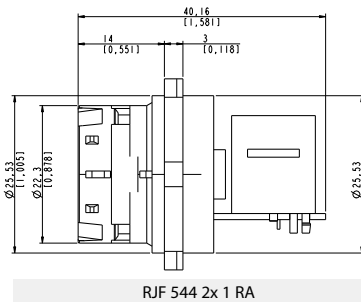
## Plug

- Type 6 shell with plastic gland



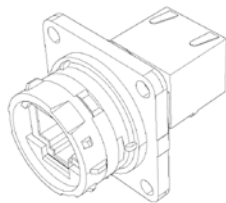
## Receptacle

- Type 2S/2M/2SM shell: square flange receptacle with 4 mounting holes

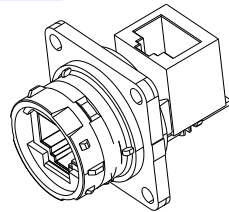


Panel Drilling  
(same as #16 ML-C-5015)

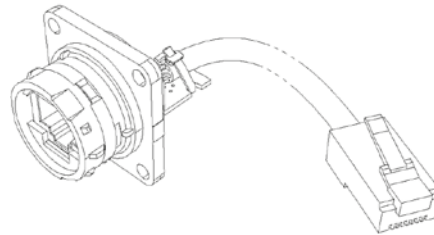
## Back terminations



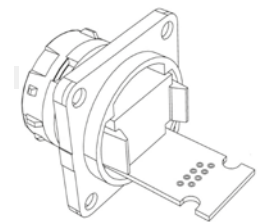
Type1: female RJ45



Type1RA: right angle female RJ45



Type2: RJ45 cordset



Type 2 - 00: solder - 8 tinned holes

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

## Accessories

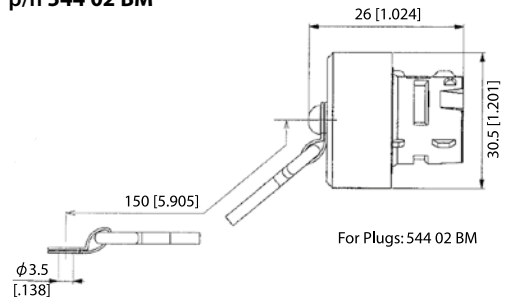
- Rubber IP68 receptacle cap  
p/n RJF 544BESC



- Panel gasket  
p/n RJF 544 02JE



- IP68 caps for plug  
p/n 544 02 BM



For Plugs: 544 02 BM

- Panel gasket (thickness: 0.6mm [0.039]): p/n RJF 544 02 JE
- Plug Insert removal tool: p/n 5440 OT 02

# RJF EZ

Ethernet connection system for harsh environment – Industrial Ethernet



RJFEZ allows you to use an Ethernet Class D / Cat. 5e connection for 10 BaseT, 100 BaseTX or 1000 BaseT networks in harsh environments. With the patented RJStop® system you can use a standard RJ45 cordset in a protective **composite** plug which will protect it from shocks, dust and fluids.

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

## Applications

- Telecom equipment
- Video control
- Robotics
- Industrial process control
- CNC machines
- Special machines
- Motion control
- Tele-maintenance

## Data transmission

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

## Main characteristics

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

## Environmental protection

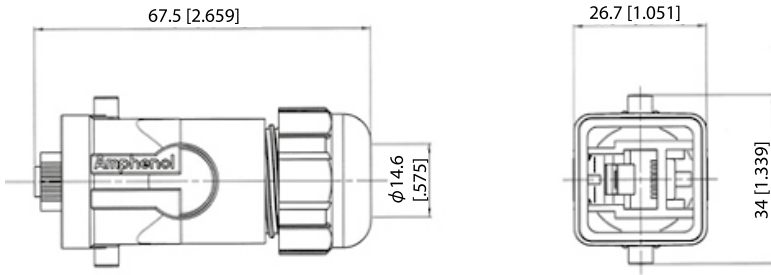
- Sealing: IP68
- Salt spray > 1000 h
- Fire retardant / Low smoke: UL94 V0 and NFF 16102, DIN 5510-2
- Operating temperature: - 40°C / +85°C

## Part number code

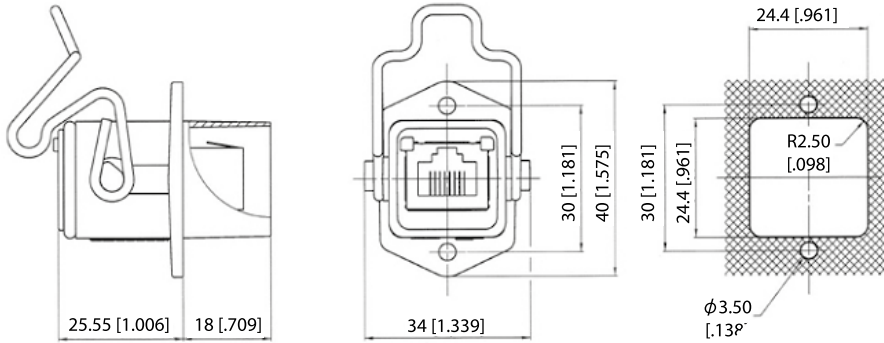
	RJF EZ	2	2	03 100BTX
<b>Shell type</b>				
6: composite lever plug, plastic gland				
2: composite square flange receptacle				
<b>Back terminations (for receptacles only)</b>				
1: female RJ45				
2: RJ45 cordset				
<b>Cordset length (for receptacles with "2" back termination only)</b>				
03 100BTX: 0.3m [11.81 inches]				
05 100BTX: 0.5m [19.68 inches]				
10 100BTX: 1m [39.37 inches]				
15 100BTX: 1.5m [59.05 inches]				
<b>Remark: Cabling configuration</b> → 100 BTX = 568B (Ethernet specification)				

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

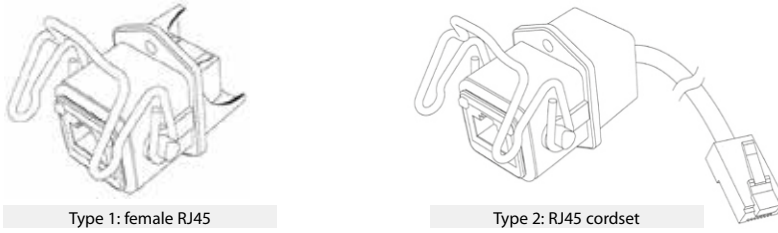
## Plug



## Receptacles



## Back terminations

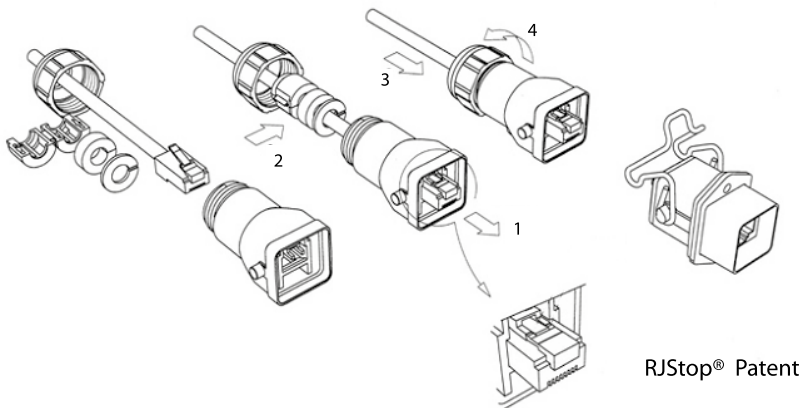


Type 1: female RJ45

Type 2: RJ45 cordset

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

## Assembly instructions



RJStop® Patent

## Accessories

- IP68 dust caps  
For plugs: not available  
For receptacles: RJF EZ BE



- Panel gasket  
Thickness: 1 mm [.039]  
Part No. RJF EZ JE





# RJF

Ethernet connection system for harsh environment – Industrial Ethernet



RJF allows you to use an Ethernet Class D / Cat. 5e connection for 10 BaseT, 100 BaseTX or 1000 BaseT networks in harsh environments. With the patented RJStop® system you can use a standard RJ45 cordset in a **metallic** plug which will protect it from shocks, dust and fluids. **No hazardous on-field cabling and grounding!**

### Applications

- Robotics
- Industrial process control
- CNC machines
- Special machines
- Oil & Gas
- Motion control
- Data acquisition and transmission in harsh environment
- Tele-maintenance

### Data transmission

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

### Main characteristics

- Compliant with IEC 60603-7 variante 11
- **Bayonet coupling** ("Audible & Visual" coupling signal)
- **Robust metallic shells based on MIL-DTL-26482 H - Shell size 18**
- RJ45 cordset retention in the plug: 100 N in the axis
- Mating cycles: 500 min
- Sealed against fluids and dust (IP68)
- Shock, vibration and traction resistant
- No cabling operation in field and no tools required
- Mechanical coding / polarization (4 positions)
- Compatible with cable diameter from 6 mm [0.236 in] to 13 mm [0.512 in]  
For smaller diameters, please consult us.

### Environmental protection

- Sealing: IP68
- Salt spray: 48 h with nickel plating  
> 96 h with black coating  
< 500 h with olive drab cadmium
- Fire retardant/Low smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10-500Hz, 10g, 3 axes: no discontinuity >10 nano s
- Shocks: IK06 ► weight of 250 g drop from 40cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature range: -40°C / +85°C
- Storage temperature:

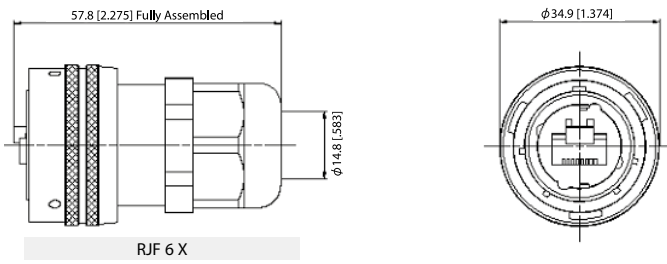
### Part number code

	RJF	2	2	B	03 100BTX
<b>Shell type</b>					
<b>6:</b> plug, plastic gland					
<b>6M:</b> plug, metal gland					
<b>2:</b> square flange receptacle					
<b>2PE:</b> square flange receptacle, IP68 backshell, plastic gland					
<b>2PEM:</b> square flange receptacle, IP68 backshell, metal gland					
<b>7:</b> jam nut receptacle					
<b>7PE:</b> jam nut receptacle, IP68 backshell, plastic gland					
<b>7PEM:</b> jam nut receptacle, IP68 backshell, metal gland					
<i>Nota: also available a transversally sealed receptacle (unmated) ► see page 22</i>					
<b>Back terminations (for receptacles only)</b>					
<b>1:</b> female RJ45					
<b>1RA:</b> right angle female RJ45					
<b>2:</b> RJ45 cordset					
<b>Shell finishes</b>					
<b>B:</b> black Coating - ROHS compliant					
<b>N:</b> nickel - ROHS compliant					
<b>G:</b> olive drab cadmium					
<i>Nota: for N, G, ZN the inserts are metallized.</i>					
<b>ZN:</b> aluminium shell - black zinc nickel plating - ROHS compliant					
<b>Cordset length (for receptacles with "2" back termination only) - Other lengths are available on demand</b>					
<b>03 100 BTX:</b> 0.3m [11.81 inches]					
<b>05 100 BTX:</b> 0.5m [19.68 inches]					
<b>10 100 BTX:</b> 1m [39.37 inches]					
<b>15 100 BTX:</b> 1.5m [59.05 inches]					
<b>00:</b> 8 tinned holes at the rear of the PCB to solder the cable					
<b>xx OPEN:</b> open cable - with no plug at the end (xx to be replaced by the cordset length 03, 05, 10, or 15 - see nearby)					
<b>Remark: cabling configuration</b> → 100 BTX = 568B (Ethernet specification)					

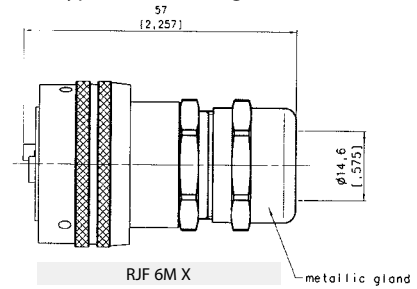
- Examples:**
- Nickel plug: RJF 6 N
  - Black square flange receptacle, female RJ45 back termination: RJF 2 1 B
  - Olive drab cadmium jam nut receptacle, 1.5m [59.05"] 100 BTX cordset termination: RJF 7 2 G 15 100BTX
  - Black in line square flange receptacle, 30cm [11.81"] 100BTX cordset termination: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

## Plug

### Shell type 6 with plastic gland

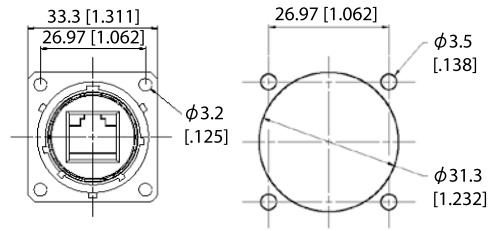
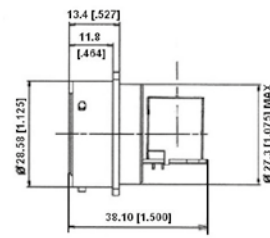
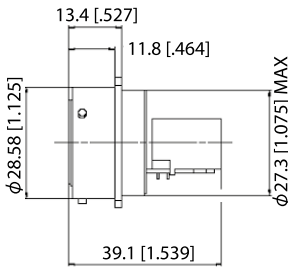


### Shell type 6 with metal gland

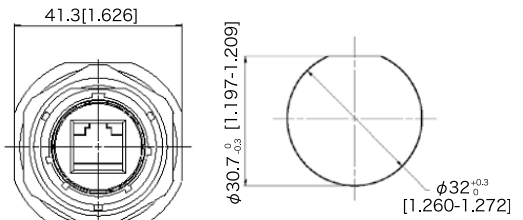
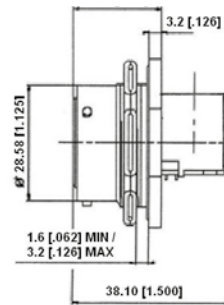
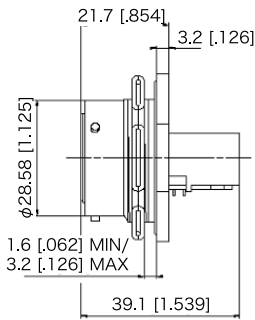


## Receptacles

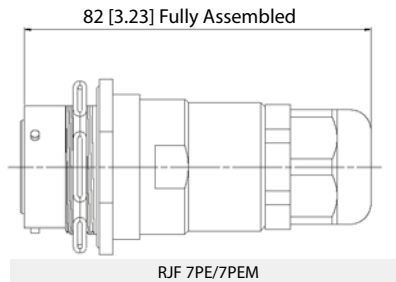
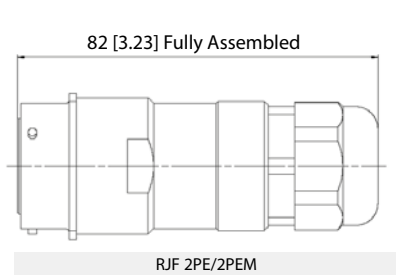
### Square flange receptacle • 4 mounting holes: shell type 2



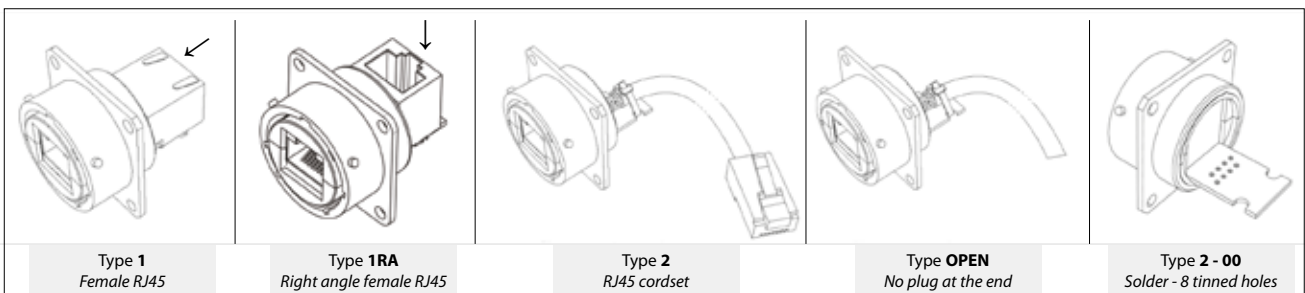
### Jam nut receptacle • Hexagonal nut mounting: shell type 7



### Receptacles with IP68 backshell : shell type 2PE and 7PE with plastic or metal gland



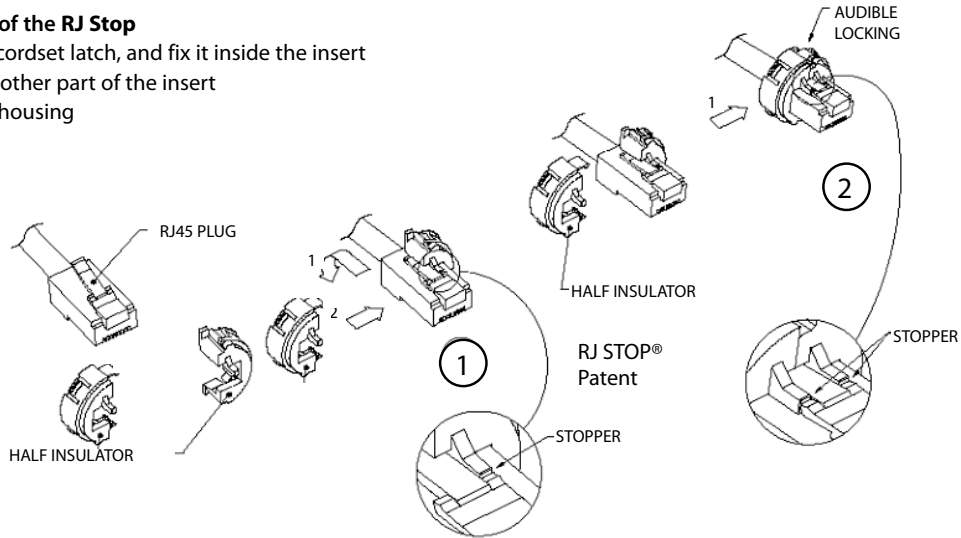
## Back terminations



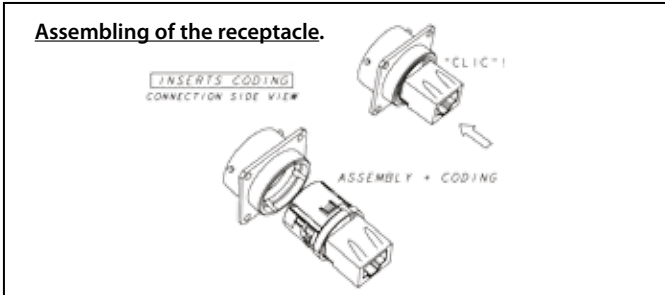
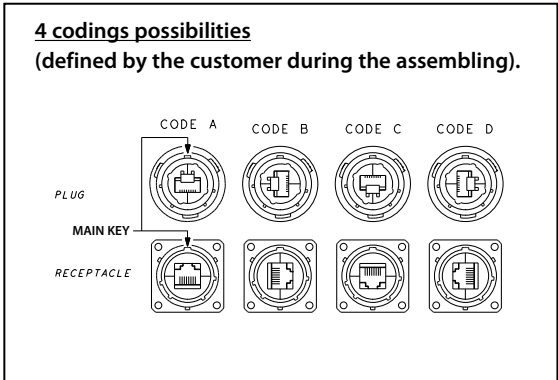
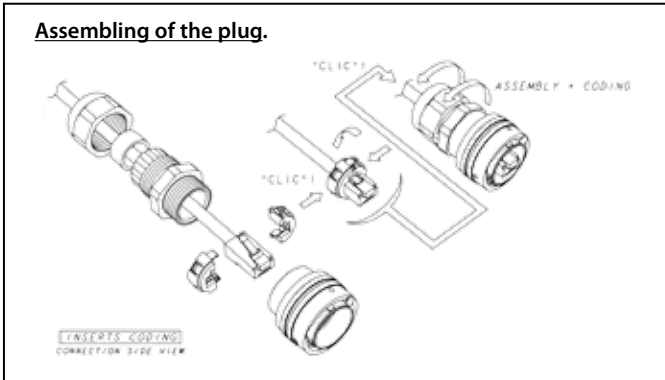
Universal: can be used with all standard RJ45 Cat.5e cordset brands.

**Assembly instructions of the RJ Stop**

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



Easy and safe - No field cabling tools required for cabling



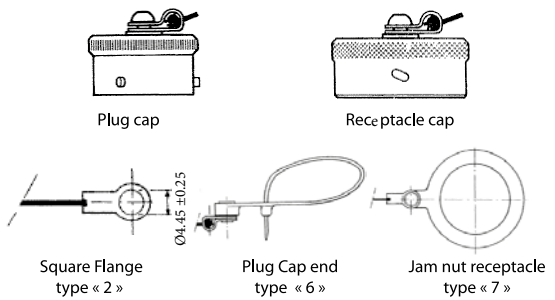
**IMPORTANT NOTE:** to remove the insert, use the  
 ■ Insert removal tool for receptacle and plug  
 P/N: RJF ODE

**Accessories**

■ **Metallic cap**

	RJFC	2	G
<b>Connector type</b>			
6: plug			
2: square Flange Receptacle			
7: jam Nut Receptacle			
<b>Shell material &amp; finish</b>			
B: black coating - ROHS compliant			
N: aluminium shell - nickel plating - ROHS compliant			
G: aluminium shell - olive drab cadmium plating			
ZN: aluminium shell - black zinc nickel plating - ROHS compliant			

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

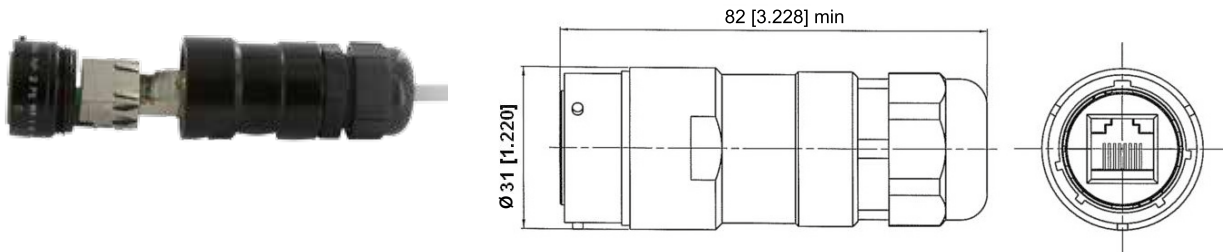


# RJF

## In line receptacles & PC tails receptacles

### In line receptacles

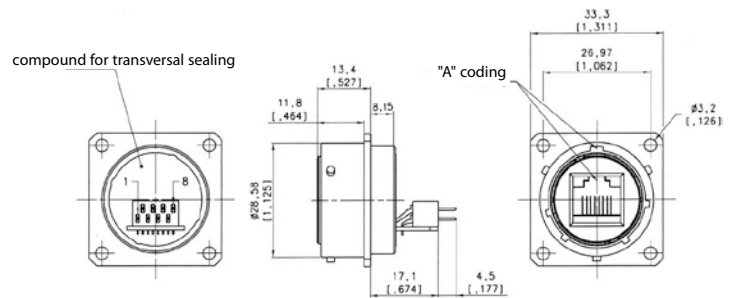
Inline receptacles allow you to make cable extensions in the field by using them with rugged RJ Field series plugs.



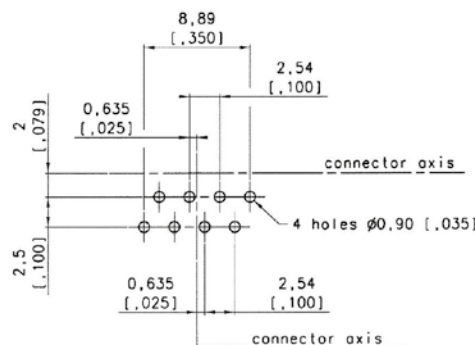
Part number	Plating	Plastic gland	Metallic gland
	Black coating - ROHS compliant	RJF2PEWF1B	RJF2PEMWF1B
	Nickel - ROHS compliant	RJF2PEWF1N	RJF2PEMWF1N
	Olive drab cadmium	RJF2PEWF1G	RJF2PEMWF1G
	Black Zinc Nickel	RJF2PEWF1ZN	RJF2PEMWF1ZN

### PC tails receptacles

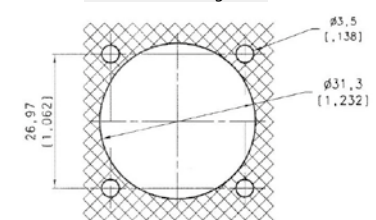
These receptacles can be soldered directly on your PCB. A compound insures a transversal sealing and good performance in high vibration environments. They can be connected with rugged RJField series plugs.



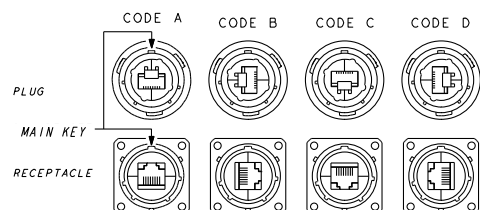
#### PCB LAYOUT - SOLDER FACE VIEW



#### Panel Drilling



Part number	Plating	Part number
	Black coating - ROHS compliant	RJF 2S X 5B
	Nickel - ROHS compliant	RJF 2S X 5N
	Olive drab cadmium	RJF 2S X 5G
	Black zinc Nickel	RJF 2S X 5ZN



X to be replaced by the letter of the coding position you need (A, B, C, or D) ▶

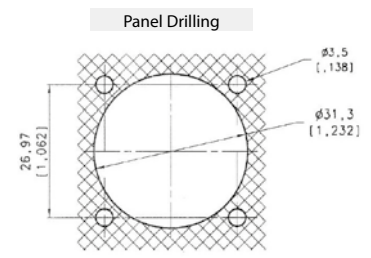
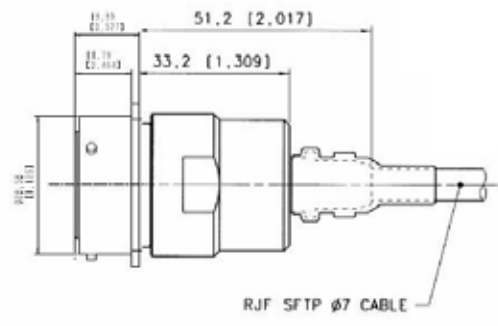


# RJF

## Receptacles & plugs with 360° EMI backshell

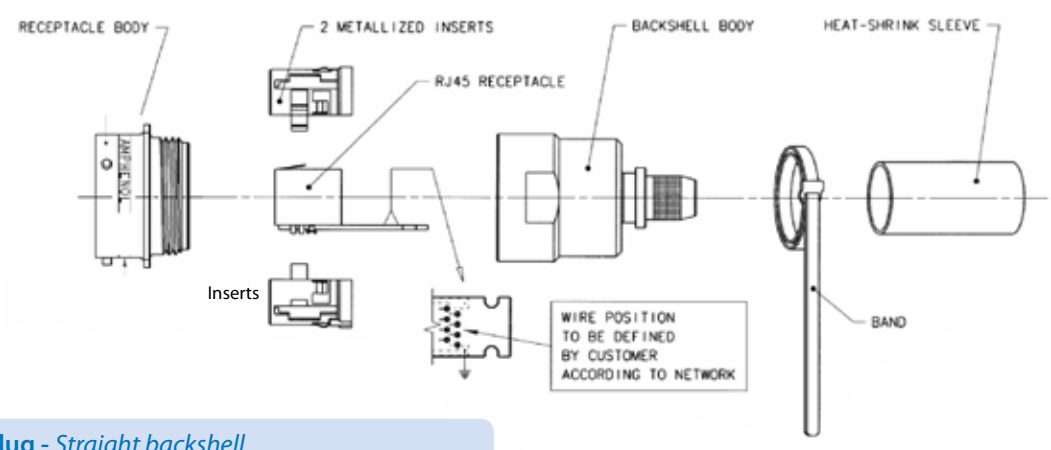
RJF series receptacles and plugs with EMI backshells provide a solution with 360° shielding: same protection than the one proposed by standard MIL-DTL-26482H connectors. With those solutions we recommend using our reinforced and double shielded Cat5E, Cat6, or Cat6A cable ► see pages 41-42-43.

### Square flange receptacle - Straight backshell

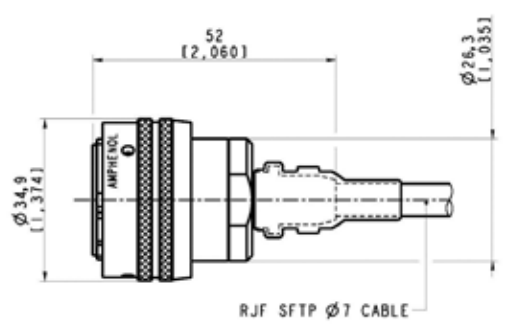


Part number	Plating	Part number
	Nickel - ROHS compliant	Kit30439NI
	Olive drab cadmium	Kit30439
	Black Zinc Nickel	Kit30439ZN

Kit30439 / Kit30439NI & Kit30436 / Kit30436N include:



### Plug - Straight backshell



Part number	Plating	Part number
	Nickel - ROHS compliant	Kit30394NI
	Olive drab cadmium	Kit30394
	Black Zinc Nickel	Kit30394ZN

Kit30394 & Kit30394NI include:



# RJF

## Transversally sealed receptacles



In some applications, a transversal sealing for the receptacle is a « must ». This will prevent fluids and dust from going through the receptacle when plug or cap are not mated to the receptacle. The sealed solution (version "S") has a compound at the rear of the receptacle as shown on the picture.

### Applications

- Outdoor equipment
- Airplanes equipment
- Tactical radios
- Shelters
- Rugged computers
- Data acquisition and transmission in harsh environments

### Data transmission

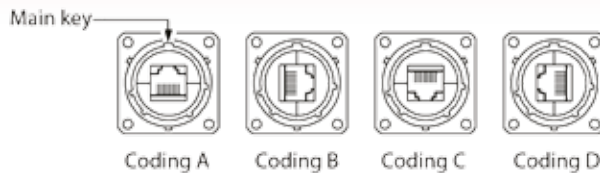
10 BaseT, 100 BaseTX and 1000 BaseT networks  
Cat 5e per TIA/EIA 568B and ClassD per ISO/IEC 11801

### Main characteristics

- Same as the RJF series.
- A complete IP68 sealing of the receptacle (even with no plug or no protective cap mated) is added.
- Outside dimensions are the same as the standard RJF series.

### IMPORTANT NOTE

Due to the compound, the coding of the connector must be done in the factory : use the codes A, B, C or D in the part number: **see below**.



### Part number code

Series	RJF	7S	A	2	G	03 100BTX
<b>RJF:</b> MIL-DTL-26482 H bayonet						
<b>Shell type</b>						
<b>2S:</b> sealed square flange receptacle						
<b>7S:</b> sealed jam nut receptacle						
<b>Coding</b>						
<b>A,B,C,D</b>						
<b>Back terminations</b> (for receptacles only)						
<b>1:</b> female RJ45						
<b>1RA:</b> right angle female RJ45						
<b>2:</b> RJ45 Cordset						
<b>Shell material &amp; finish</b>						
<b>B:</b> aluminium shell - black coating - <i>ROHS compliant</i>						<b>ZN:</b> aluminium shell - black zinc nickel plating - <i>ROHS compliant</i>
<b>N:</b> aluminium shell - nickel plating - <i>ROHS compliant</i>						
<b>G:</b> aluminium shell - olive drab cadmium plating						
<i>Nota: for N, G, ZN, the inserts are metallized.</i>						
<b>Cordset length</b> (For Receptacles with "2" Back Termination only) - Other lengths are available on demand						
<b>03 100 BTX:</b> 0.3m [11.81 inches]						
<b>05 100 BTX:</b> 0.5m [19.68 inches]						
<b>10 100 BTX:</b> 1m [39.37 inches]						
<b>15 100 BTX:</b> 1.5m [59.05 inches]						
<b>xx OPEN:</b> open cable - with no plug at the end (xx to be replaced by the cordset length 03, 05, 10, or 15 - see above)						
<b>Remark: cabling configuration:</b> 100 BTX = 568B (Ethernet specification)						

Examples: - bayonet, sealed jam nut receptacle, A coding, with female RJ45 back termination, olive drab cadmium plating: **RJF 7SA 1 G**  
 - bayonet, sealed square flange receptacle, A coding, with female RJ45 back termination, black plating: **RJF 2SA 1 B**  
 - bayonet, sealed jam nut receptacle, A coding, 1.5m [59.05"] 100 BTX cordset, olive drab cadmium plating: **RJF 7SA 2 G15 100BTX**

# RJF

## 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 as shown on the picture.

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

### Applications

- Outdoor equipment
- Airplanes equipment
- Tactical radios
- Shelters
- Rugged computers
- Data acquisition and transmission in harsh environments

### Data transmission

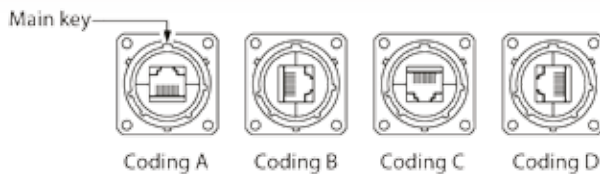
10 BaseT, 100 BaseTX and 1000 BaseT networks  
Cat 5e per TIA/EIA 568B and ClassD per ISO/IEC 11801

### Main characteristics

- Same as the RJF series.
- A complete IP68 sealing of the receptacle (even with no plug or no protective cap mated) is added.
- Outside dimensions are the same as the standard RJF series.

### IMPORTANT NOTE

Due to the compound, the coding of the connector must be done in the factory: use the codes A, B, C or D in the part number: **see below.**



### Part number code

Series	RJF	7H	A	2	G	03 100BTX
<b>RJF:</b> MIL-DTL-26482 H bayonet						
<b>Shell type</b>						
<b>2H:</b> transversally sealed and hermetic square flange receptacle						
<b>7H:</b> transversally sealed and hermetic jam nut receptacle						
<b>Coding</b>						
<b>A,B,C,D</b>						
<b>Back terminations (for receptacles only)</b>						
<b>1:</b> female RJ45						
<b>1RA:</b> right angle female RJ45						
<b>2:</b> RJ45 Cordset						
<b>Shell material &amp; finish</b>						
<b>B:</b> aluminium shell - black coating - ROHS compliant						
<b>N:</b> aluminium shell - nickel plating - ROHS compliant						
<b>G:</b> aluminium shell - olive drab cadmium plating						
<b>Nota:</b> for N, G, ZN plating, the inserts are metallized.						
<b>Cordset length (for receptacles with "2" back termination only) - Other lengths are available on demand</b>						
<b>03 100 BTX:</b> 0.3m [11.81 inches]						
<b>05 100 BTX:</b> 0.5m [19.68 inches]						
<b>10 100 BTX:</b> 1m [39.37 inches]						
<b>15 100 BTX:</b> 1.5m [59.05 inches]						
<b>xx OPEN:</b> open cable - with no plug at the end (xx to be replaced by the cordset length 03, 05, 10, or 15 - see above)						
<b>Remark: cabling configuration:</b> 100 BTX = 568B (Ethernet specification)						

**Examples:**

- bayonet, sealed jam nut receptacle, A coding, with female RJ45 Back termination, olive drab cadmium plating: **RJF 7HA 1 G**
- bayonet, sealed square flange receptacle, A coding, with female RJ45 back termination, black plating: **RJF 2HA 1 B**
- bayonet, sealed jam nut receptacle, A coding, 1.5m [59.05"] 100 BTX cordset, olive drab cadmium plating : **RJF 7HA 2 G15 100BTX**



# RJF

Special plug for big insulation wire up to 1.6 mm [0.062 in]



Rugged plug dedicated to cable with insulation wire from 1,1 to 1,6 mm [from 0.043 in to 0.062 in]

**Remark:**

- Solution compatible with any RJF receptacle
- For cables which are not compatible with standard RJ45 plug.

### Applications

- Robotics
- Industrial process control
- CNC machines
- Special machines
- Oil & Gas
- Motion control
- Data acquisition and transmission in harsh environment
- Tele-maintenance

### Data transmission

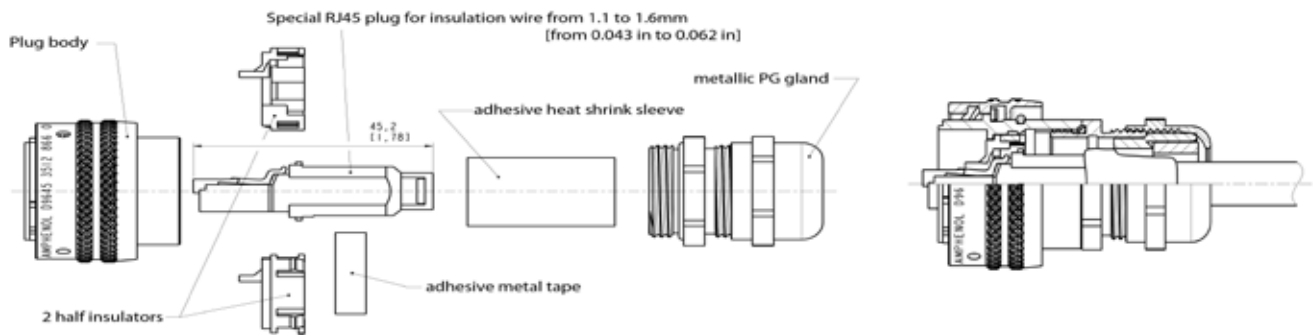
10 BaseT, 100 BaseTX and 1000 BaseT networks  
Cat 5e per TIA/EIA 568B and ClassD per ISO/IEC 11801

### Main characteristics

- Bayonet coupling ("Audible & Visual" coupling signal )
- Robust metallic shells based on MIL-DTL-26482 H - Shell size 18
- RJ45 cordset retention in the plug: 100 N in the axis
- Mating cycles: 500 min
- Sealed against fluids and dust (IP68)
- Shock, vibration and traction resistant
- Mechanical coding / polarization (4 positions)
- Compatible with cable diameter from 6 mm [0.216 in] to 13 mm [0.512 in], for smaller diameters, please consult us

### Environmental protection

- Sealing: IP68
- Salt Spray: 48 h with nickel plating  
> 96 h with black coating  
> 500 h with olive drab cadmium
- Fire retardant/Low smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity >10 nano s.
- Shocks: IK06 ▶ weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature range: - 40°C / +85°C



Part number	Plating	Part number
	Black coating - ROHS compliant	Kit39992B
	Nickel - ROHS compliant	Kit39992NI
	Olive drab cadmium	Kit39992G
	Black Zinc Nickel	Kit39992ZN



# RJ Field receptacle with self closing cap

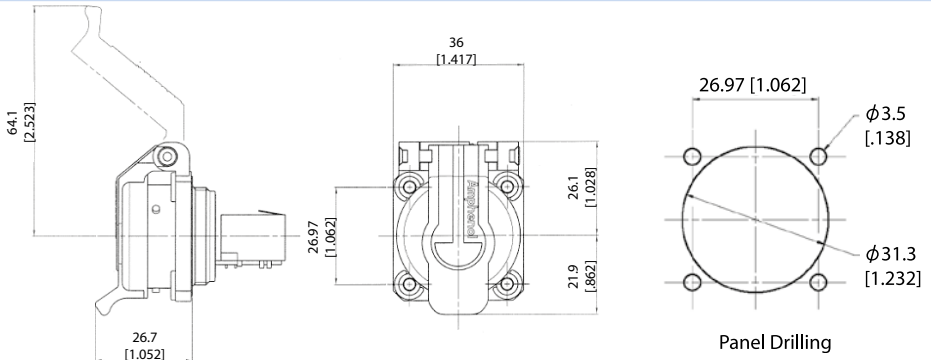


This kit includes a receptacle and a Self Closing Cap which protects the RJ Field square flange receptacles (MIL-C-26482 type). This cap offers a protection against dust and water projections. A spring automatically closes the upper part of the cap when either the RJfield plug or RJ45 cordset are removed from the receptacle.

**Sealing level IP54**  
(Splash and dust Proof)

## RJF 21 X SCC

RJ45 version



Part number *	Plating	Metallized insert (EMI)	Part number
	Black coating - ROHS compliant	No	RJF 21B SCC
	Nickel - ROHS compliant	Yes	RJF 21N SCC
	Olive drab cadmium	Yes	RJF 21G SCC
	Black Zinc Nickel - ROHS compliant	No	RJF 21ZN SCC

\* The part number includes the receptacle + the self closing cap

**Remarks:**

- the back termination is female RJ45
- it could be used with our RJF series plug (part number RJF6xx ▶ see page 17)

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

## USBF 21 x SCC, USBF 21 x SCC, & IEEE1394



**USB2.0 & 3.0 - A version**  
(see pages 94 & 107)



**USB-B version**  
(see page 118)



**IEEE1394 version**  
(see page 143)

# RJF TV

Ethernet connection system for harsh environment



RJF TV allows you to use an Ethernet Class D / Cat. 5e connection for 10 BaseT, 100 BaseTx or 1000 BaseT networks in harsh environments. With the patented RJStop system you can use a standard RJ45 cordset in a **metallic** plug which will protect it from shocks, dust and fluids. **No hazardous on-field cabling and grounding!**

### Applications

- Data acquisition and transmission in harsh environment
- Railways
- Radars
- Shelters
- Battlefield communication
- Systems
- Navy

### Data transmission

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

### Main characteristics

- Sealed against fluids and dusts (IP68)
- Shock, vibration and traction resistant
- No cabling operation in field and no tools required
- Mechanical coding / Polarization (4 positions)
- Improved EMI protection
- **Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device - Shell size 19**
- **Robust metallic shells**
- RJ45 cordset retention in the plug: 100 N in the axis
- Mating cycles: 500 min
- Compatible with cable diameter from 6 mm [0.236 in] to 13 mm [0.512 in], for smaller diameters please consult us

### Environmental protection

- Sealing: IP68
- Salt spray: 48h with aluminium shell  
> 500h with aluminium shell - Olive drab cadmium plating  
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 > 10 nano s.
- Compounded versions tested per NAS 1599 (5-3000 Hz, 20g, 12h)
- Shocks: IK06 ▶ weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature range: -40°C / +85°C

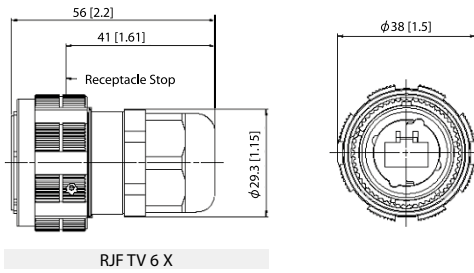
### Part number code

	RJF TV	2	2	G	03 100 BTX
<b>Shell type</b>					
<b>6:</b> plug with plastic gland					
<b>6M:</b> plug with metal gland					
<b>2:</b> square flange receptacle					
<b>2PE:</b> square flange receptacle, IP68 backshell, plastic gland					
<b>2PEM:</b> square flange receptacle, IP68 backshell, metal gland					
<b>7:</b> jam nut receptacle					
<b>7PE:</b> jam nut receptacle, IP68 backshell, plastic gland					
<b>7PEM:</b> jam nut receptacle, IP68 backshell, metal gland					
<i>Nota: also available a transversally sealed receptacle (unmated) ▶ See page 36</i>					
<b>Back terminations (receptacles only)</b>					
<b>1:</b> female RJ45					
<b>1RA:</b> right angle female RJ45					
<b>2:</b> RJ45 Cordset					
<b>Shells material &amp; Finish (inserts are metallized)</b>					
<b>N:</b> aluminium shell - nickel plating - ROHS compliant					
<b>G:</b> aluminium shell - olive drab cadmium plating					
<b>BZ:</b> marine bronze shell - ROHS compliant					
<b>ZN:</b> aluminium shell - black zinc nickel plating - ROHS compliant					
<b>Cordset length (type 2 back termination only) - Other lengths are available on demand</b>					
<b>03 100 BTX:</b> 0.3m [11.81 inches]					
<b>05 100 BTX:</b> 0.5m [19.68 inches]					
<b>10 100 BTX:</b> 1m [39.37 inches]					
<b>15 100 BTX:</b> 1.5m [59.05 inches]					
<b>00:</b> 8 tinned holes at the rear of the PCB to solder the cable					
<b>xx OPEN:</b> open cable - with no plug at the end (xx to be replaced by the cordset length 03, 05, 10, or 15 - see nearby)					
<b>Remark: cabling configuration</b> → 100 BTX = 568B (Ethernet specification)					

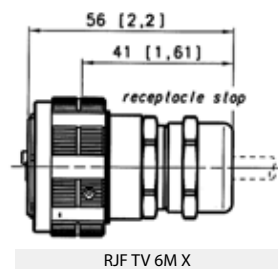
- Examples:**
- Olive drab cadmium plug with plastic gland: RJF TV 6G
  - Olive drab cadmium jam nut receptacle, female RJ45 back termination: RJF TV 71G
  - Nickel jam nut receptacle, 1,5 m 100 BTX cordset back termination: RJF TV 72N 15 100BTX
  - Olive drab cadmium in line square flange recept., 0,3 m 100 BTX cordset back termination: RJF TV 2PE 2 G 03 100BTX
  - Nickel jam nut receptacle solder termination 8 tinned holes: RJF TV 22 N 00

## Plug

### ■ Shell type 6 with plastic or metal gland

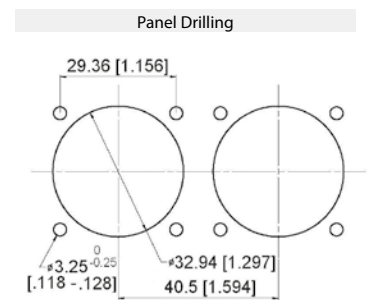
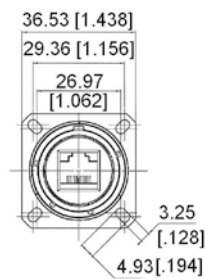
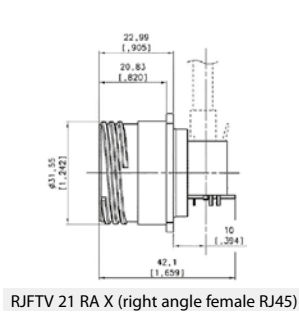
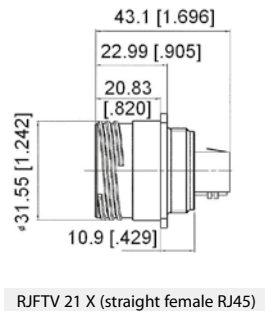


### ■ Shell type 6 with metal gland

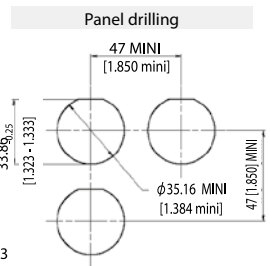
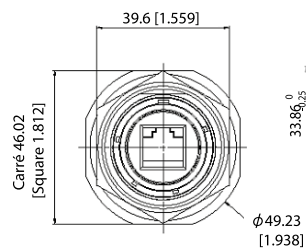
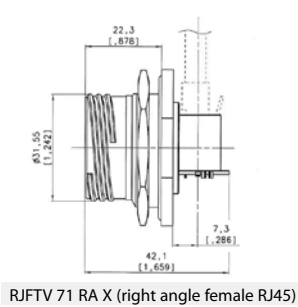
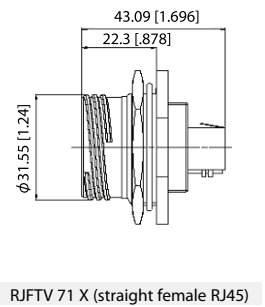


## Receptacles

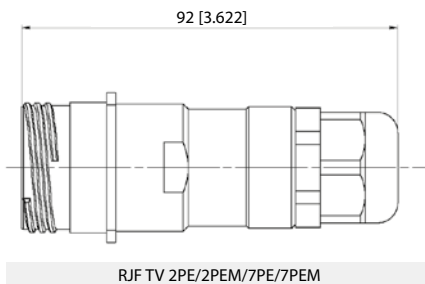
### ■ Square flange receptacle - 4 mounting holes: shell type 2



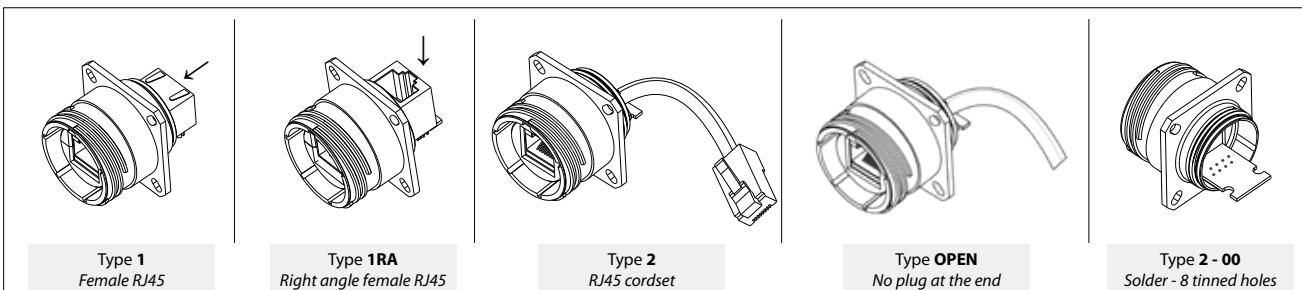
### ■ Jam nut receptacle - Hexagonal nut mounting: shell type 7



### ■ Receptacles with IP68 backshell: Shell type 2PE and 7PE with plastic or metal gland

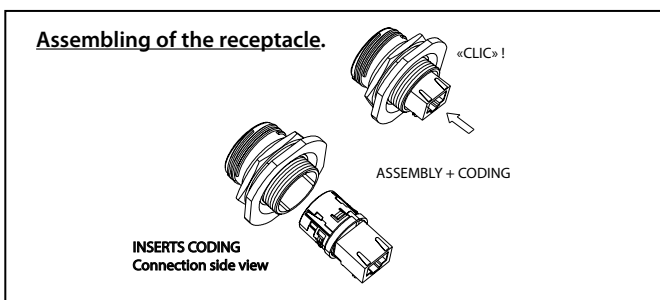
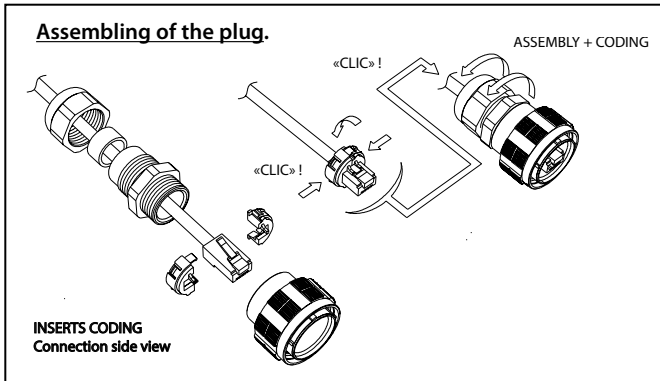


## Back terminations



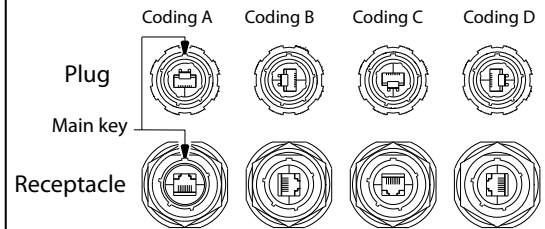
## Assembly instructions

### Insert codings



### 4 codings possibilities

(defined by the customer during the assembling).



### IMPORTANT NOTE: to remove the insert, use the

- Insert removal tool for receptacle and plug

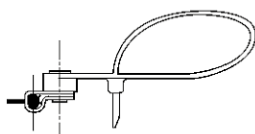
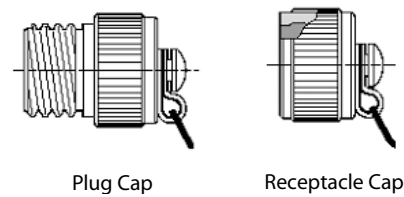
P/N: RJF ODE



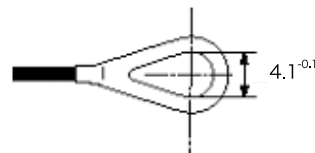
### Accessories

#### ■ Metallic caps

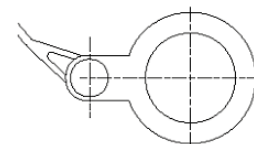
	RJFTVC	2	G
<b>Connector type</b>			
6: plug			
2: square flange receptacle			
7: jam nut receptacle			
<b>Shell material &amp; finish</b>			
N: aluminium shell - nickel plating - ROHS compliant			
G: aluminium shell - olive drab cadmium plating			
BZ: marine bronze shell - ROHS compliant			
ZC: aluminium shell - green zinc cobalt plating - ROHS compliant			
ZN: aluminium shell - black zinc nickel plating - ROHS compliant			



Plug Cap end



Square flange receptacle cap end



Jam Nut receptacle cap end

#### ■ Panel gasket for square flange receptacle

Thickness: 0,8 mm [.031]:

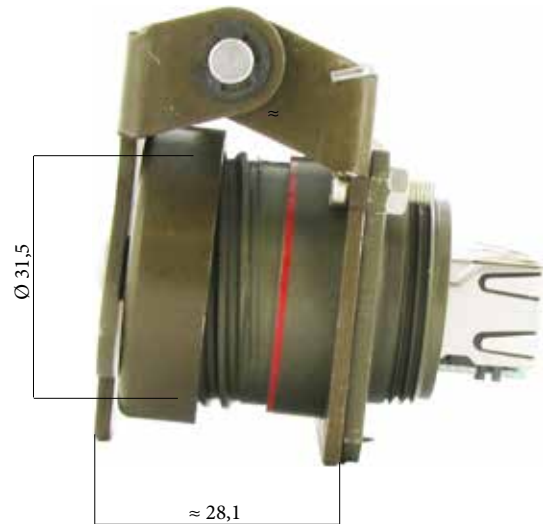
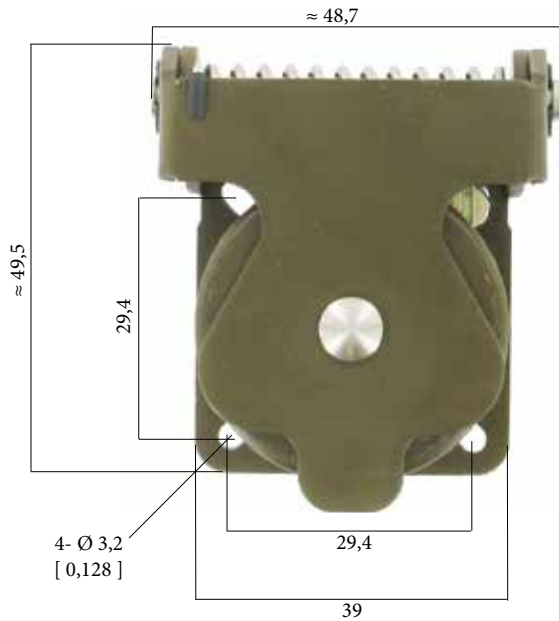
P/n: JE19



# Metallic self closing cap (SCC)

For RJFTV square flange receptacles.

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



## IMPORTANT NOTE

Metal self closing cap are sold separately (without receptacle).



Sealing level IP67

Part number	Plating	Part number
	Black coating - <i>ROHS compliant</i>	RJF TV SCC B
	Nickel - <i>ROHS compliant</i>	RJF TV SCC N
	Olive drab cadmium	RJFTV SCC G
	Black Zinc Nickel - <i>ROHS compliant</i>	RJFTV SCC ZN

**Remark:** compatible with RJFTV square flange receptacle type RJFTV2xxx only (see page 26).

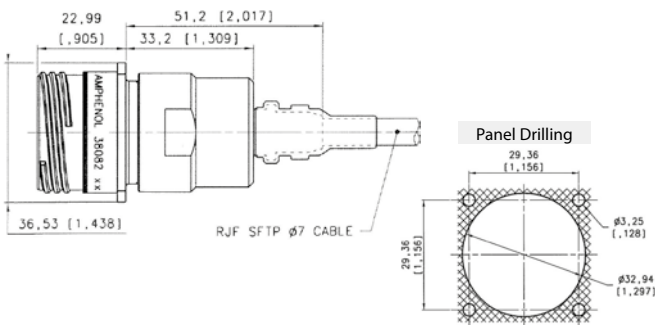
# RJF TV

Receptacles & plugs with 360° EMI backshells



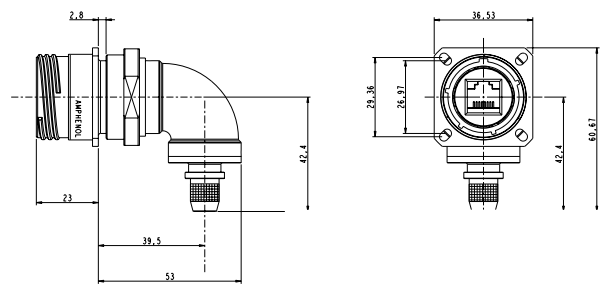
RJF TV series receptacles and plugs with EMI backshells provide a solution with 360° shielding: same protection than the one proposed by standard MIL-DTL-38999 series III connectors. With those solutions we recommend using our reinforced and double shielded Cat5E, Cat6, or Ca6A cable. ► see pages 41-42-43

## Square flange receptacle - Straight backshell



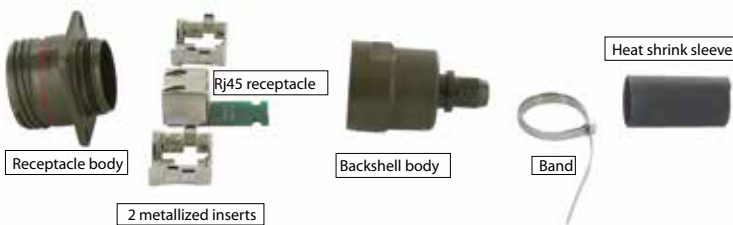
Part number	Plating	P/N
	Nickel - ROHS compliant	Kit38082NI
	Olive drab cadmium	Kit38082
	Black zinc nickel - ROHS compliant	Kit38082ZN

## Square flange receptacle - Right angle backshell



Part number	Plating	P/N
	Nickel - ROHS compliant	Kit40791NI
	Olive drab cadmium	Kit40791
	Black zinc nickel - ROHS compliant	Kit40791ZN

Kit38082 and Kit40791 include:

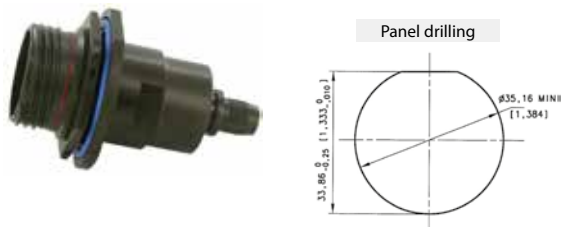


■ Panel gasket for square flange receptacle (thickness: 0,8 mm [.031])

P/n: JE19

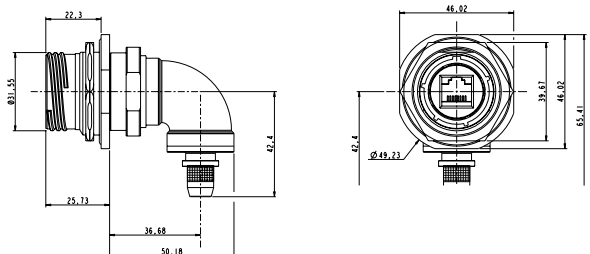


## Jam nut receptacle - Straight backshell



Part number	Plating	P/N
	Nickel - ROHS compliant	Kit38204NI
	Olive drab cadmium	Kit38204
	Black zinc nickel - ROHS compliant	Kit38204ZN

## Jam nut receptacle - Right angle backshell



Part number	Plating	P/N
	Nickel - ROHS compliant	Kit40771NI
	Olive drab cadmium	Kit40771
	Black zinc nickel - ROHS compliant	Kit40771ZN

Kit38204 and Kit40771 include:



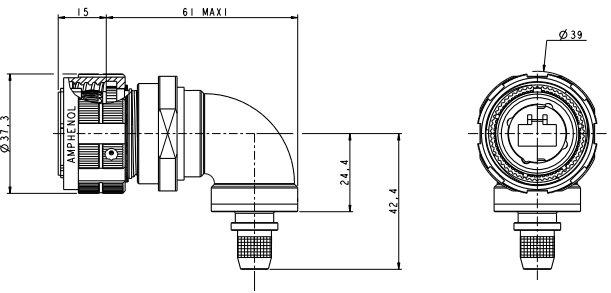
**IMPORTANT NOTE**  
 With these receptacles, you will have to solder your own cable on the PCB. So the wire positions have to be defined according to your network.

WIRE POSITION TO BE DEFINED BY CUSTOMER ACCORDING TO NETWORK

**Plug - Straight backshell**



**Plug - Right angle backshell**



Part number	Plating	P/N
	Nickel - ROHS compliant	Kit38081NI
	Olive drab cadmium	Kit38081
	Black zinc nickel - ROHS compliant	Kit38081ZN

Part number	Plating	P/N
	Nickel - ROHS compliant	Kit40792NI
	Olive drab cadmium	Kit40792
	Black zinc nickel - ROHS compliant	Kit40792ZN

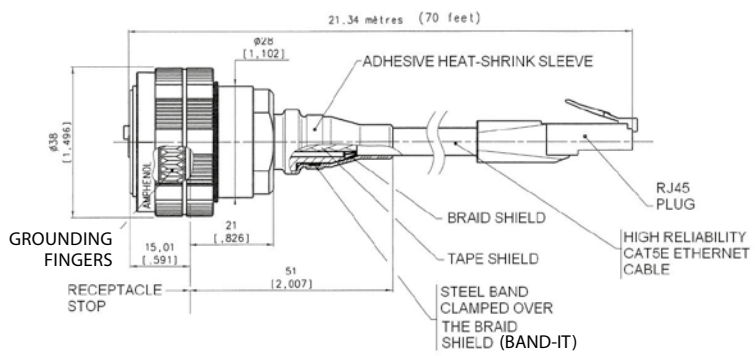
Kit38081 and Kit40792 include:



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

**Remark:** we advise using our double shielded, reinforced Cat5E, Cat6, or Cat6A cables (see pages 41-42-43) with these RJFTV series EMI connectors.  
 If customer wants to use his own cable, please check with us regarding compatibility with our backshells: [contact@rjfield.com](mailto:contact@rjfield.com).  
 We also provide assembled cordsets (**see examples below**).  
 For this type of solution please provide the configuration needed: length, description of second end...

Example of assembled cordset:

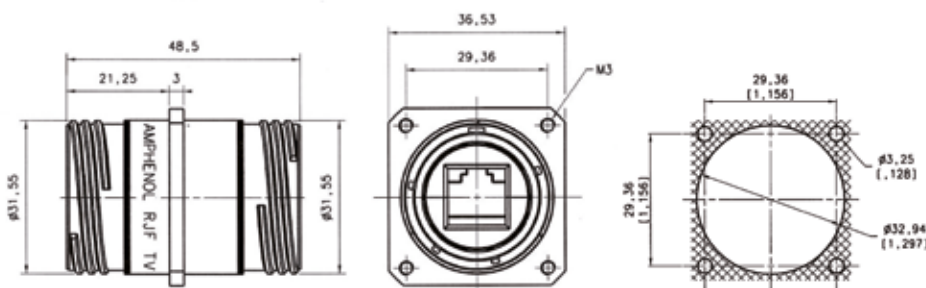


# RJF TV

## Through bulkhead receptacles

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

### Square flange receptacle



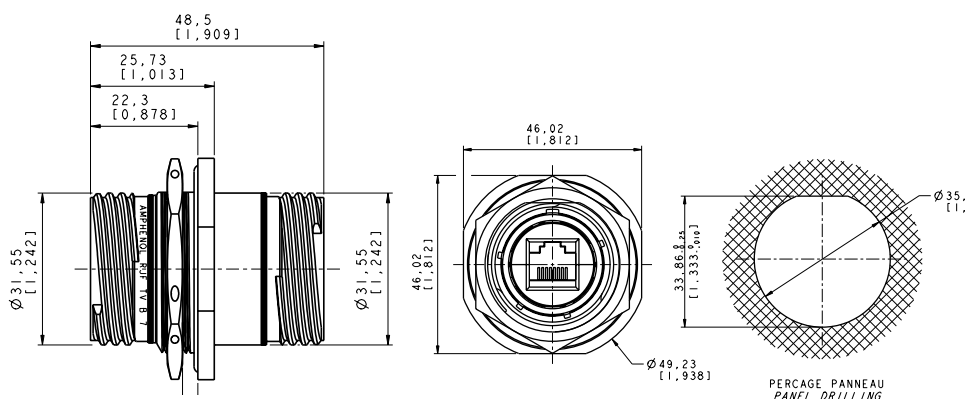
Part number	Plating	Metallized insert	For coding A
	Nickel - ROHS compliant	No	RJF TV B 2 N ISO BRUT *
Nickel - ROHS compliant	Yes	RJF TV B 2 N ISO NI *	
Olive drab cadmium	No	RJF TV B 2 G ISO BRUT *	
Olive drab cadmium	Yes	RJF TV B 2 G ISO NI *	
Black Zinc Nickel - ROHS compliant	No	RJF TV B 2 ZN ISO BRUT *	
Black Zinc Nickel - ROHS compliant	Yes	RJF TV B 2 ZN ISO NI *	

\* ISO BRUT = non conductive insert  
ISO NI = conductive insert

### IMPORTANT NOTE

Possibility of other codings - Please consult us

### Jam nut receptacle



Part number	Plating	Metallized insert	Part number
	Nickel - ROHS compliant	No	RJF TV B 7 N ISO BRUT *
Nickel - ROHS compliant	Yes	RJF TV B 7 N ISO NI *	
Olive drab cadmium	No	RJF TV B 7 G ISO BRUT *	
Olive drab cadmium	Yes	RJF TV B 7 G ISO NI *	
Black Zinc Nickel - ROHS compliant	No	RJF TV B 2 ZN ISO BRUT *	
Black Zinc Nickel - ROHS compliant	Yes	RJF TV B 2 ZN ISO NI *	

\* ISO BRUT = non conductive insert  
ISO NI = conductive insert



# RJF TV

## Stand off receptacles

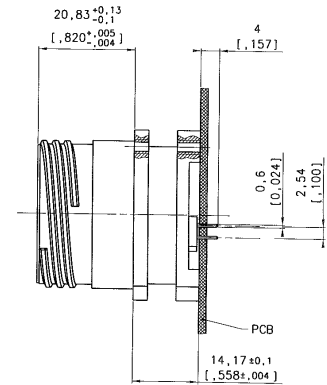
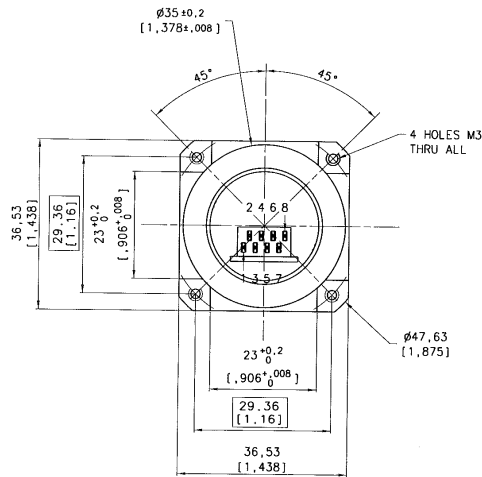
These receptacles can be sold directly to your PCB.

A compound insures a transversal sealing and good performance in high-vibration environments.

The shell of those receptacles are in the "Stand Off" style.

They can be connected with RJFTV series plugs.

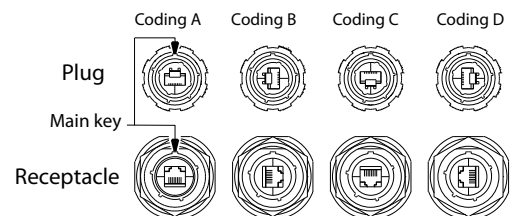
### Square flange receptacle



Part number *	Plating available	Part number
	Nickel - ROHS compliant	RJF TV 2S X 5N F459
	Olive drab cadmium	RJF TV 2S X 5G F459
	Black Zinc Nickel - ROHS compliant	RJF TV 2S X 5ZN F459

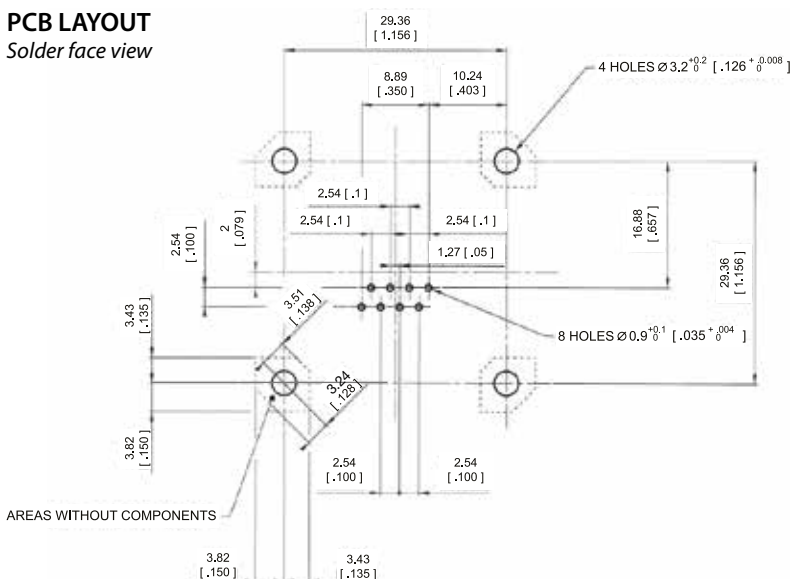
\* new p/n - before it was RJFTV25GF459 or RJFTV25NF459

X to be replaced by the letter of the coding position you need (A, B, C, or D) ▷

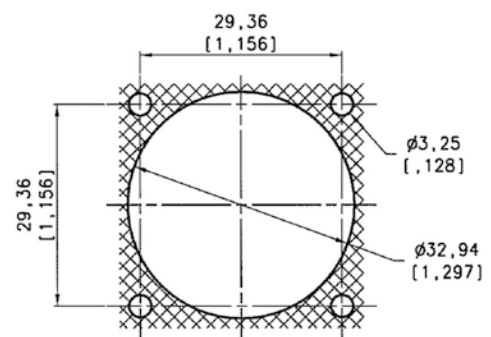


### PCB LAYOUT

Solder face view

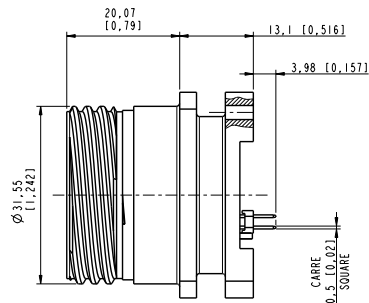
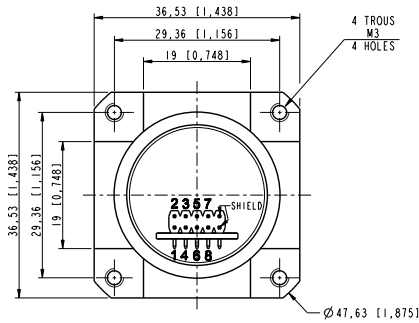


### Panel drilling



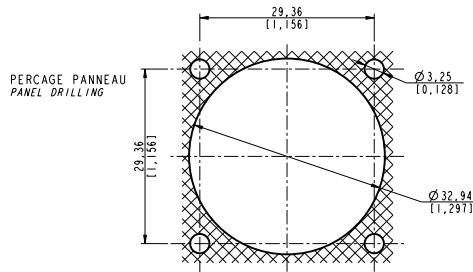
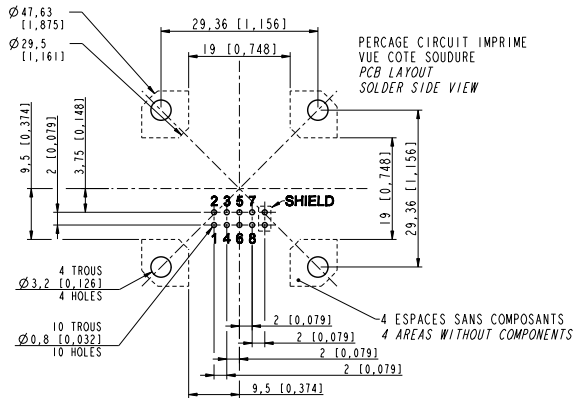


Now available with same distance between flange and PCB than the 38999 stand off one. So you can use a 38999 stand off and a RJ45 stand off in the same implementation.

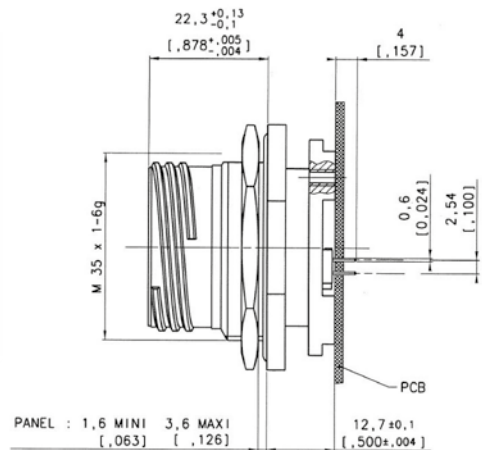
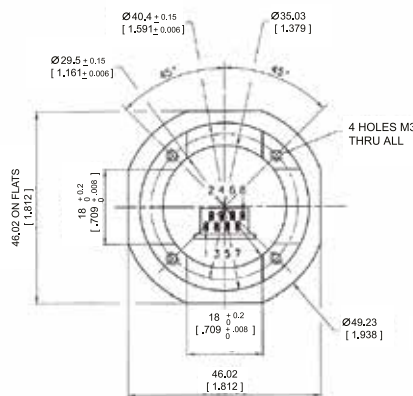


Part number: 36542

Plating: olive drab cadmium

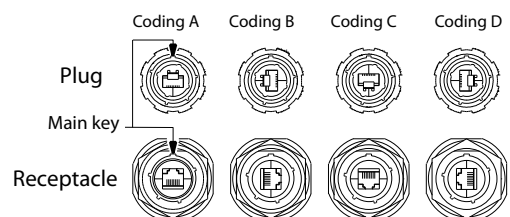


### Jam nut receptacle



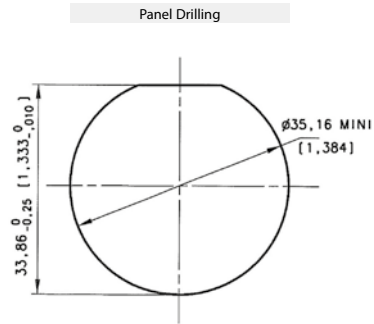
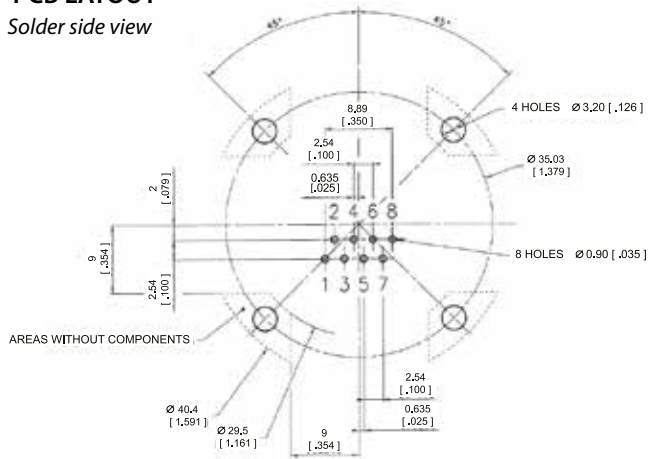
Part number	Plating	Part number
	Nickel - ROHS compliant	RJF TV 75 X 5N F459
	Olive drab cadmium	RJF TV 75 X 5G F459
	Black Zinc Nickel - ROHS compliant	RJF TV 75 X 5ZN F459

X to be replaced by the letter of the coding position you need (A, B, C, or D) ▷

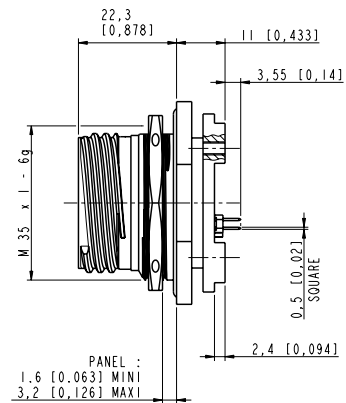
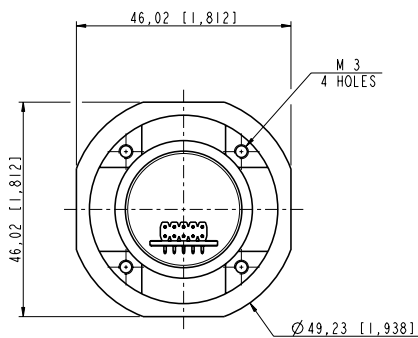


## PCB LAYOUT

Solder side view



Now available with same distance between flange and PCB than the 38999 stand off one. So you can use a 38999 stand off and a RJ45 stand off in the same implementation.

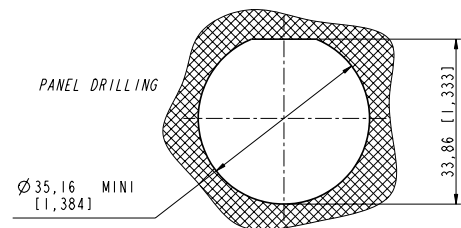
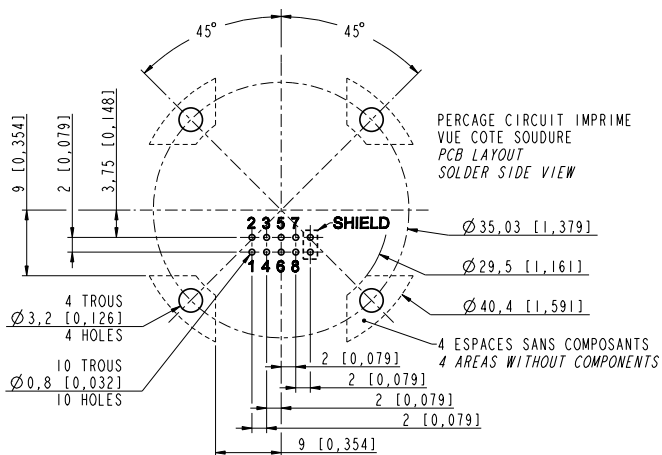


Part number: 36540

Jam nut receptacle, olive drab cadmium plating.

## PCB LAYOUT

Solder side view



# RJF TV

## Transversally sealed receptacles



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

### Applications

- Outdoor equipment
- Airplanes equipment
- Tactical radios
- Shelters
- Rugged computers
- Data acquisition and transmission in harsh environments

### Data transmission

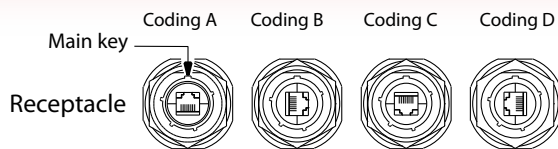
10 BaseT, 100 BaseTX and 1000 BaseT networks  
Cat 5e per TIA/EIA 568B and ClassD per ISO/IEC 11801

### Main characteristics

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

### IMPORTANT NOTE

Due to the compound, the coding of the connector must be done in the factory : use the codes A, B, C or D in the part number : **see below**.



**Example :**  
RJFTV 2S A2 G 15 100BTX

### Part number code

Series	RJF TV	7S	A	2	G	03 100BTX
<b>RJFTV:</b> MIL-DTL-38999 Series III						
Shell type						
<b>2S:</b> sealed square flange receptacle						
<b>7S:</b> sealed jam nut receptacle						
Coding						
<b>A,B,C,D</b>						
Back terminations (for receptacles only)						
<b>1:</b> female RJ45						
<b>1RA:</b> right angle female RJ45						
<b>2:</b> RJ45 Cordset						
Shell material & finish						
<b>N:</b> aluminium shell - nickel plating - ROHS compliant					<b>ZN:</b> aluminium shell - black zinc nickel plating - ROHS compliant	
<b>G:</b> aluminium shell - olive drab cadmium plating						
<b>BZ:</b> marine bronze shell - ROHS compliant						
<i>Nota: receptacle inserts are metallized</i>						
Cordset length (For Receptacles with "2" Back Termination only) - Other lengths are available on demand						
<b>03 100 BTX:</b> 0.3m [11.81 inches]						
<b>05 100 BTX:</b> 0.5m [19.68 inches]						
<b>10 100 BTX:</b> 1m [39.37 inches]						
<b>15 100 BTX:</b> 1.5m [59.05 inches]						
<b>xx OPEN:</b> open cable - with no plug at the end (xx to be replaced by the cordset length 03, 05, 10, or 15 - see above)						
Remark: cabling configuration: 100 BTX = 568B (Ethernet specification)						

**Examples:** - series III, sealed jam nut receptacle, A coding, with female RJ45 back termination, olive drab cadmium plating: **RJF TV 7SA 1 G**  
- series III, sealed jam nut receptacle, A coding, 1.5m [59.05"] 100 BTX cordset, olive drab cadmium plating: **RJF TV 7SA 2 G15 100BTX**

# RJF 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 as shown on the picture.

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

### Applications

- Outdoor equipment
- Airplanes equipment
- Tactical radios
- Shelters
- Rugged computers
- Data acquisition and transmission in harsh environments

### Data transmission

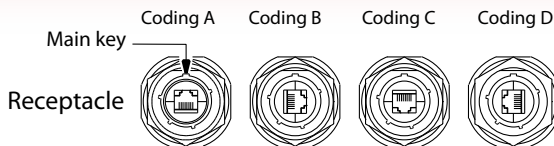
10 BaseT, 100 BaseTX and 1000 BaseT networks  
Cat 5e per TIA/EIA 568B and ClassD per ISO/IEC 11801

### Main characteristics

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

### IMPORTANT NOTE

Due to the compound, the coding of the connector must be done in the factory: use the codes A, B, C or D in the part number: **see below**.



**Example :**  
RJFTV 2H A2 N 15 100BTX

### Part number code

Series	RJF TV	7H	A	2	G	03 100BTX
<b>RJFTV:</b> MIL-DTL-38999 series III						
Shell type	2H: transversally sealed and hermetic square flange receptacle 7H: transversally sealed and hermetic jam nut receptacle					
Coding	A,B,C,D					
Back terminations (for receptacles only)	1: female RJ45 1RA: right angle female RJ45 2: RJ45 Cordset					
Shell material & finish	N: aluminium shell - nickel plating - ROHS compliant G: aluminium shell - olive drab cadmium plating BZ: marine bronze shell - ROHS compliant <i>Nota: receptacle inserts are metallized</i>		ZN: aluminium shell - black zinc nickel plating - ROHS compliant			
Cordset length (for receptacles with "2" back termination only) - Other lengths are available on demand	03 100 BTX: 0.3m [11.81 inches] 05 100 BTX: 0.5m [19.68 inches] 10 100 BTX: 1m [39.37 inches] 15 100 BTX: 1.5m [59.05 inches] xx OPEN: open cable - with no plug at the end (xx to be replaced by the cordset length 03, 05, 10, or 15 - see above)					
Remark: cabling configuration:	100 BTX = 568B (Ethernet specification)					

Examples: - Series III, sealed jam nut receptacle, A coding, with female RJ45 Back termination, olive drab cadmium plating: **RJF TV 7HA 1 G**  
- Series III, sealed jam nut receptacle, A coding, 1.5m [59.05"] 100 BTX cordset, olive drab cadmium plating : **RJF TV 7HA 2 G15 100BTX**



# RJF TV

Special plug for big insulation wire up to 1.6 mm.



Special RJF TV plug dedicated to Ethernet cable with insulation wire from 1,1 to 1,6 mm.

**Remark:**

- compatible with any RJF TV receptacle
- for cables which are not compatible with standard RJ45 plug

### Applications

- Robotics
- Industrial process control
- CNC machines
- Special machines
- Oil & Gas
- Motion control
- Data acquisition and transmission in harsh environment
- Tele-maintenance

### Data transmission

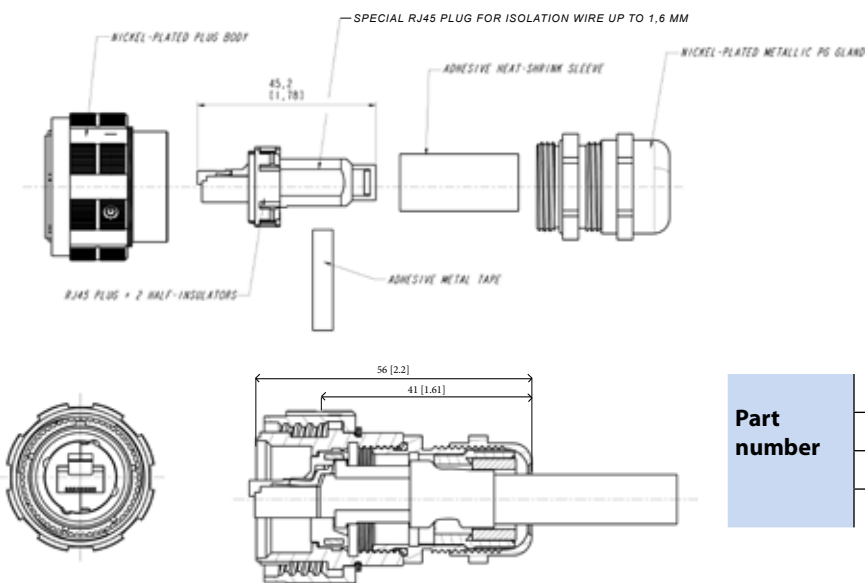
10 BaseT, 100 BaseTX and 1000 BaseT networks  
Cat 5e per TIA/EIA 568B and ClassD per ISO/IEC 11801

### Main characteristics

- Sealed against fluids and dusts (IP68)
- Shock, vibration and traction resistant
- No cabling operation in field and no tools required
- Mechanical coding / Polarization (4 positions)
- Improved EMI protection
- **Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device - Shell size 19**
- **Robust metallic shells**
- RJ45 cordset retention in the plug: 100 N in the axis
- Mating cycles: 500 min
- Compatible with cable diameter from 6 mm [0.236 in] to 13 mm [0.512 in], for smaller diameters please consult us

### Environmental protection

- Sealing: IP68
- Salt spray: 48 h with nickel plating  
> 96 h with black coating  
> 500 h with olive drab cadmium
- Fire retardant/Low smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 10 nano s.
- Shocks: IK06 ► weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature range: - 40°C / +85°C



Part number	Plating	P/N
	Nickel - ROHS compliant	35660
	Olive drab cadmium	35660G
	Black Zinc Nickel - ROHS compliant	35660ZN

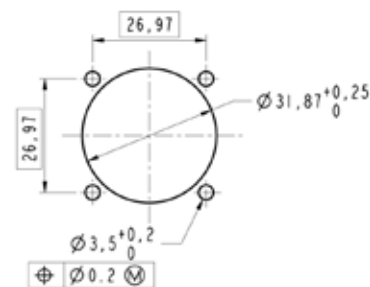
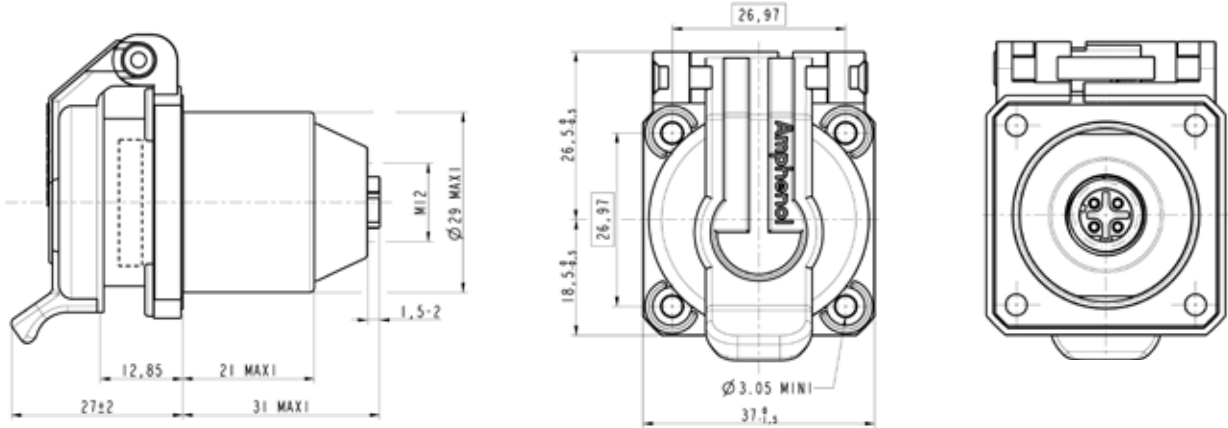


# RJ45/M12 adaptor

RJ45/M12 adaptors allow to give an access point with RJ45 on M12 D coded based networks. Especially used in Railway applications.



**Part number : 35655**  
Nickel plating.



M12-D	RJ45 contact position
1	1
2	3
3	2
4	6

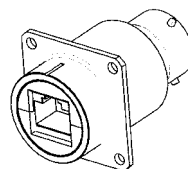
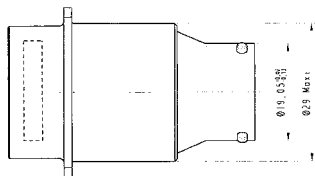
NEW

# Special RJ45 adaptor

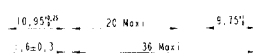
For Military & Commercial Aeronautics

At the rear of the adaptor, the connection is for connectors type EN3646.

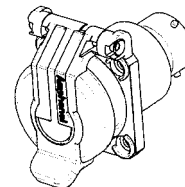
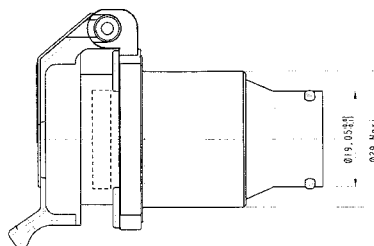
## Adaptor RJ45 only



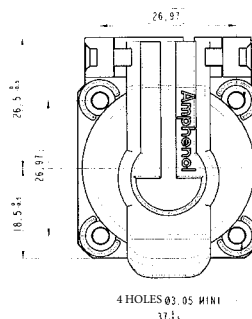
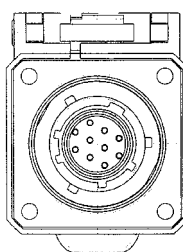
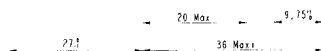
Part number	Coding	
	35629	N
35632	Y	



## Adaptor RJ45 + Self Closing Cap

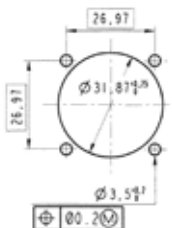


Part number	Coding	
	35630	N
35631	Y	

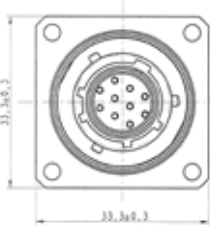


## For all options:

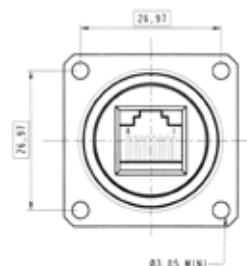
### Panel Drilling



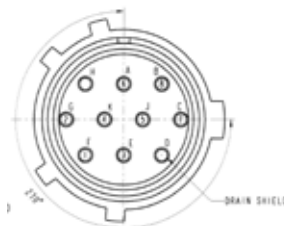
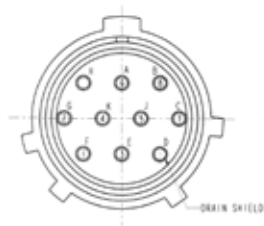
Coding N



12-10 Male contact  
EN3155



Coding Y





# CAT 5E CABLE

High reliability Cat 5e Ethernet cable & cordsets



## Applications

- Robotics
- Motion control
- Railways
- CNC machines
- Battelfield communication
- Industrial process control

## General construction

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

## HFFR: Halogen Free Flame Retardant

Jacket compound specification:

- Halogen free flame retardant polyether-based polyurethane - Glossy finish
  - Excellent hydrolysis resistance - UV resistant
  - Resistance to microbial/fungus growth acc. IEC60068-2-10 - High flexibility
- Environmental Testing – Test J degree of mould growth 1

Datas for  
the cable alone only  
(without RJ45 plug)

## Physical characteristics

<b>CONDUCTORS</b>	24 AWG (0,25 mm <sup>2</sup> ) tinned copper, 7x0.20 mm
<b>INSULATION</b>	Color coded 568-B, linear low Density Polyethylene, Nom. Dia. 0,039" (1mm)
<b>ASSEMBLY</b>	Pairs cabled with Kevlar strength members and separation tape wrapped
<b>SHIELDS</b>	Inner: aluminium mylar 100% coverage Outer: tinned copper braid 80% coverage
<b>JACKET</b>	Black, special PUR compound
<b>WEIGHT</b>	40 lbs / mft (59 kg/km)
<b>OUTSIDE DIAM.</b>	0.28" (7.1 mm) nom.
<b>MIN BEND RADIUS (During installation)</b>	67.5mm (9x O. D.)
<b>MIN BEND RADIUS (During operation)</b>	37.5mm (5 x O.D.)
<b>MIN FLEXES TO FAILURE</b>	Passes IEC 61156-6 requirements
<b>TEMPERATURE</b>	Transport and fixed installation : -50°C (-58°F) up to + 85°C (185°F) Installation and flexible use : -40°C (-40°F) up to + 85°C (185°F)

## Cordsets with a RJ45 plug overmolded on each end

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

## Electrical characteristics (at 20°C - 68°F)

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

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

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



# CAT 6 CABLE

## High reliability Cat 6 Ethernet cable & cordsets



### General construction

A 4 pairs, 26 AWG, 100 Ohm SFTP round patch cable, designed to the ISO / IEC 11801 Category 6 requirements. The cable contains 4 twisted pairs individually shielded, cabled, double shielded with kevlar reinforcement strands, jacketed in black UV resistant Polyurethane HFFR. Designed for fixed or portable applications in harsh environments.

### HFFR: Halogen Free Flame Retardant

Jacket compound specification:

- Halogen free flame retardant polyether-based polyurethane
  - Excellent hydrolysis resistance
  - Resistance to microbial/fungus growth acc. IEC60068-2-10
  - Glossy finish
  - UV resistant
  - High flexibility
- Environmental Testing – Test J degree of mould growth 1

### Applications

- Robotics
- Motion control
- Railways
- CNC machines
- Battlefield communication
- Industrial process control

### Electrical characteristics (at 20°C - 68°F)

<b>DC Resistance</b>	290 Ohm/Km
<b>Impedance (100 MHz)</b>	100 +/- 5 Ohm

Frequency	Insertion loss (dB/100m)	N.E.X.T. (Near-End Crosstalk Loss)
1 MHz	3.1 dB	75.3 dB min.
4 MHz	5.8 dB	66.3 dB min.
8 MHz	8.0 dB	61.8 dB min.
10 MHz	9.0 dB	60.3 dB min.
16 MHz	11.4 dB	57.2 dB min.
20 MHz	12.8 dB	55.8 dB min.
25 MHz	14.1 dB	54.3 dB min.
31.25 MHz	16.1 dB	52.8 dB min.
62.5 MHz	23.2 dB	48.4 dB min.
100 MHz	29.9 dB	45.3 dB min.
200 MHz	43.7 dB	40.8 dB min.
250 MHz	49.7 dB	39.3 dB min.

<b>Capacitance (1 kHz)</b>	50nF/km nom.
<b>Capacitance unbalance</b>	1600 pF/km max.
<b>Insulation resistance</b>	5 GOhm/km
<b>Voltage rating (peak)</b>	230 V
<b>Dielectric strength</b>	VAC/1 min - 700 V/Min
<b>Propagation delay</b>	4.6 ns/m
<b>Skew</b>	45 ns/100m
<b>Resistance unbalance</b>	2%
<b>Return loss (250 MHz)</b>	15.6dB
<b>Velocity of propagation</b>	72% nom.

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

Length (m / ft)	Part number
100 m / ~328 ft	191-031179-00
300 m / ~984 ft	191-031179-01

### Physical characteristics

Datas for the cable alone only (without RJ45 plug)

<b>Conductors</b>	26 AWG (0,14 mm <sup>2</sup> ) tinned copper
<b>Insulation</b>	Polyethylene Nom. Dia. 0,039" (1mm)
<b>Assembly</b>	Pairs cabled with Kevlar strength members and separation tape wrapped
<b>Shields</b>	Inner: aluminium mylar 100% coverage Outer: tinned copper braid 80% coverage
<b>Jacket</b>	Black, special PUR compound
<b>Weight</b>	36.9 lbs / mft (55 kg/km)
<b>Outside diam.</b>	0.272" (6.9 mm) nom.
<b>Min bend radius (During installation)</b>	72mm (10x O. D.)
<b>Min bend radius (During operation)</b>	36mm (5 x O.D.)
<b>Min flexes to failure</b>	Passes IEC 61156-6 requirements
<b>Temperature</b>	Transport and fixed installation : -50°C (-58°F) up to + 85°C (185°F) Installation and flexible use : -40°C (-40°F) up to + 85°C (185°F)

### Cordsets with a RJ45 plug overmolded on each end

Length (m/ft)	Part number
0,75 m / 2,46 ft	RJF SFTP 6 0075
1,00 m / 3,28 ft	RJF SFTP 6 0100
1,50 m / 4,92 ft	RJF SFTP 6 0150
2,00 m / 6,56 ft	RJF SFTP 6 0200
2,50 m / 8,20 ft	RJF SFTP 6 0250
3,00 m / 9,84 ft	RJF SFTP 6 0300
3,50 m / 11,48 ft	RJF SFTP 6 0350
4,00 m / 13,12 ft	RJF SFTP 6 0400
4,50 m / 14,76 ft	RJF SFTP 6 0450
5,00 m / 16,40 ft	RJF SFTP 6 0500
6,00 m / 19,68 ft	RJF SFTP 6 0600
7,00 m / 22,96ft	RJF SFTP 6 0700
8,00 m / 26,24 ft	RJF SFTP 6 0800
9,00 m / 29,52 ft	RJF SFTP 6 0900
10,00 m / 32,80 ft	RJF SFTP 6 1000
15,00 m / 49,20 ft	RJF SFTP 6 1500
20,00 m / 65,60 ft	RJF SFTP 6 2000
25,00 m / 82,00 ft	RJF SFTP 6 2500
30,00 m / 98,40 ft	RJF SFTP 6 3000
35,00 m / 114,80 ft	RJF SFTP 6 3500
40,00 m / 131,20 ft	RJF SFTP 6 4000
45,00 m / 147,60 ft	RJF SFTP 6 4500
50,00 m / 164,00 ft	RJF SFTP 6 5000
60,00 m / 196,80 ft	RJF SFTP 6 6000



# CAT 6A CABLE

High reliability Cat 6A Ethernet cable & cordsets



### General construction

A 4 pairs, 26 AWG, 100 Ohm SFTP round patch cable, designed to the ISO / IEC 11801 Category 6A requirements. The cable contains 4 twisted pairs individually shielded, cabled, double shielded with kevlar reinforcement strands, jacketed in black UV resistant Polyurethane HFFR. Designed for fixed or portable applications in harsh environments.

### HFFR: Halogen Free Flame Retardant

Jacket compound specification:

- Halogen free flame retardant polyether-based polyurethane
  - Excellent hydrolysis resistance
  - Resistance to microbial/fungus growth acc. IEC60068-2-10
  - Glossy finish
  - UV resistant
  - High flexibility
- Environmental Testing – Test J degree of mould growth 1

### Applications

- Robotics
- Motion control
- Railways
- CNC machines
- Battlefield communication
- Industrial process control

**Datas for the cable alone only (without RJ45 plug)**

### Electrical characteristics (at 20°C - 68°F)

<b>DC Resistance</b>	290 Ohm/Km
<b>Impedance (100 MHz)</b>	100 +/- 5 Ohm

Frequency	Insertion loss (dB/100m)	N.E.X.T. (Near-End Crosstalk Loss)
1 MHz	3.1 dB	75.3 dB min.
4 MHz	5.7 dB	66.3 dB min.
8 MHz	8.0 dB	61.8 dB min.
10 MHz	8.9 dB	60.3 dB min.
16 MHz	11.2 dB	57.2 dB min.
20 MHz	12.6 dB	55.8 dB min.
25 MHz	14.1 dB	54.3 dB min.
31.25 MHz	15.8 dB	52.8 dB min.
62.5 MHz	22.5 dB	48.4 dB min.
100 MHz	28.7 dB	45.3 dB min.
200 MHz	41.4 dB	40.8 dB min.
250 MHz	46.6 dB	39.3 dB min.
300 MHz	51.4 dB	38.1 dB min.
400 MHz	60.1 dB	36.3 dB min.
500 MHz	67.9 dB	34.8 dB min.

<b>Capacitance (1 kHz)</b>	50nF/km nom.
<b>Capacitance unbalance</b>	1600 pF/km max.
<b>Insulation resistance</b>	5 GOhm/km
<b>Voltage rating (peak)</b>	230 V
<b>Dielectric strength</b>	VAC/1 min - 700 V/Min
<b>Propagation delay</b>	4.6 ns/m
<b>Skew</b>	45 ns/100m
<b>Resistance unbalance</b>	2%
<b>Return loss (500 MHz)</b>	15.6dB
<b>Velocity of propagation</b>	72% nom.

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

Length (m / ft)	Part number
100 m / ~328 ft	191-031190-00
300 m / ~984 ft	191-031190-01

### Physical characteristics

<b>Conductors</b>	26 AWG (0,14 mm <sup>2</sup> ) tinned copper
<b>Insulation</b>	Density Polyethylene, Nom. Dia. 0,039" (1mm)
<b>Assembly</b>	Pairs cabled with Kevlar strength members and separation tape wrapped
<b>Shields</b>	Inner: aluminium mylar 100% coverage Outer: tinned copper braid 80% coverage
<b>Jacket</b>	Black, special PUR compound
<b>Weight</b>	36.9 lbs / mft (55 kg/km)
<b>Outside diam.</b>	0.272" (6.9 mm) nom.
<b>Min bend radius (During installation)</b>	72mm (10x O. D.)
<b>Min bend radius (During operation)</b>	36mm (5 x O.D.)
<b>Min flexes to failure</b>	Passes IEC 61156-6 requirements
<b>Temperature</b>	Transport and fixed installation : -50°C (-58°F) up to + 85°C (185°F) Installation and flexible use : -40°C (-40°F) up to + 85°C (185°F)

### Cordsets with a RJ45 plug overmolded on each end

Length (m/ft)	Part number
0,75 m / 2,46 ft	RJF SFTP 6A 0075
1,00 m / 3,28 ft	RJF SFTP 6A 0100
1,50 m / 4,92 ft	RJF SFTP 6A 0150
2,00 m / 6,56 ft	RJF SFTP 6A 0200
2,50 m / 8,20 ft	RJF SFTP 6A 0250
3,00 m / 9,84 ft	RJF SFTP 6A 0300
3,50 m / 11,48 ft	RJF SFTP 6A 0350
4,00 m / 13,12 ft	RJF SFTP 6A 0400
4,50 m / 14,76 ft	RJF SFTP 6A 0450
5,00 m / 16,40 ft	RJF SFTP 6A 0500
6,00 m / 19,68 ft	RJF SFTP 6A 0600
7,00 m / 22,96 ft	RJF SFTP 6A 0700
8,00 m / 26,24 ft	RJF SFTP 6A 0800
9,00 m / 29,52 ft	RJF SFTP 6A 0900
10,00 m / 32,80 ft	RJF SFTP 6A 1000
15,00 m / 49,20 ft	RJF SFTP 6A 1500
20,00 m / 65,60 ft	RJF SFTP 6A 2000
25,00 m / 82,00 ft	RJF SFTP 6A 2500
30,00 m / 98,40 ft	RJF SFTP 6A 3000
35,00 m / 114,80 ft	RJF SFTP 6A 3500
40,00 m / 131,20 ft	RJF SFTP 6A 4000
45,00 m / 147,60 ft	RJF SFTP 6A 4500
50,00 m / 164,00 ft	RJF SFTP 6A 5000
60,00 m / 196,80 ft	RJF SFTP 6A 6000



# Rugged Ethernet Solutions



## Cable assemblies

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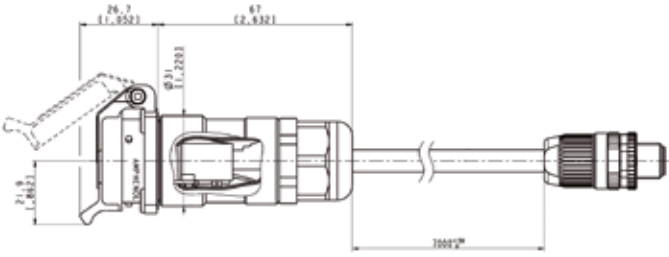
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JUMPER railway intercoach .....	47

NEW

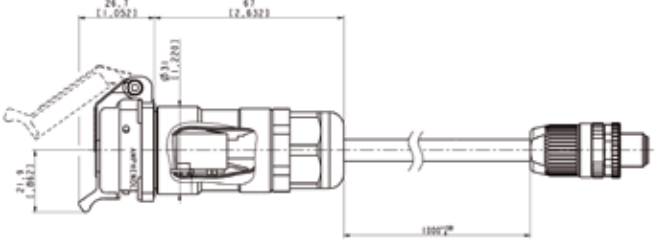
# RJ45/M12: Ethernet railway cable solution



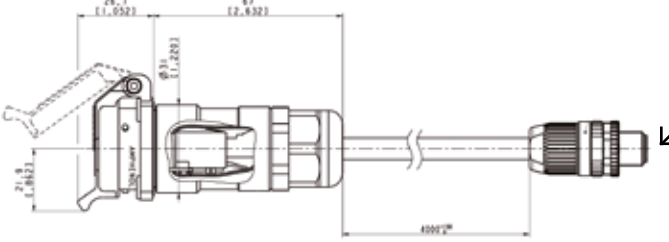
Part number: **Kit 36516** - Length 7 m [22.96 ft]



Part number: **Kit 36520** - Length 1 m [3.28 ft]

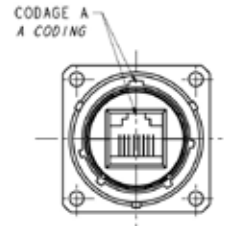
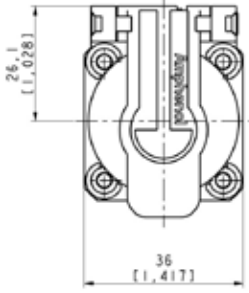
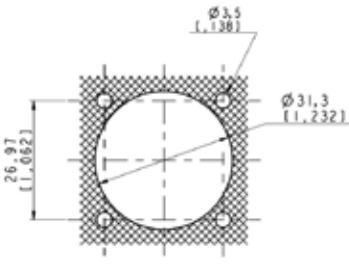


Part number: **Kit 36530** - Length 4 m [13.12 ft]



M12 D Coding

For all options:





# JUMPER railway intercoach

Derived from RJFTV Series

Note: for technical characteristics, please refer to RJFTV page 26.

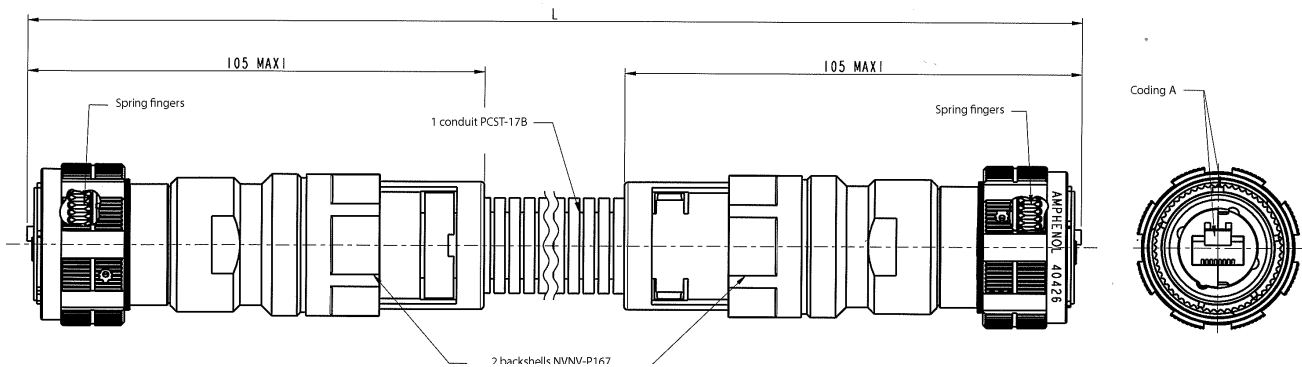
**Kit 40426 includes:**

- 2 RJF TV plugs with EMI backshell assembled (coding A)
- 1 RJF SFTP cable cat 5E high reliability
- 1 conduit PCST-17B
- 2 PMAFIX straight, PG metal thread



Part number	$L \begin{smallmatrix} +100 \\ 0 \end{smallmatrix}$	P/N
		2465
	3010	Kit 40426 Rep 102

For any other lenght, please consult us: [contact@rjfield.com](mailto:contact@rjfield.com)







# Rugged Ethernet solutions



## Rugged electronics

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# RES-GMC with Expanded Beam technology Military Ethernet media converter

For harsh environment - Fully MIL-STD compliant

Amphenol's RES-GMC is a MIL-STD rugged, unmanaged-military-grade security gateway, offering up to 2 Gigabit security gateways per device for unidirectional and data diodes solution for total isolation between two network with different security classification. The unit supports PoE on 2 ports (IEEE802.3af and IEEE802.3at).

Developed for military and harsh environment applications, the RES-GMC features mechanical packaging enhancements designed for MIL-STD-810F airborne and ground environmental compliance and high reliability.

The unit has been especially hardened to improve ingress, impact, and shock/vibration protection, as well as eliminate all moving parts through passive cooling, and interface through sealed MIL-D-38999 circular connectors.

Leveraging best-in-class switching technology, the RES-GMC series serves as a robust solution to extend your Tactical Gigabit Ethernet network connectivity of up to 120Km over fiber. Compact in size, the RES-GMC is particularly useful for remote and space-constrained locations either on ground vehicle environments or airborne.

## Military applications

- Data acquisition & transmission
- Battlefield communication C4ISR
- Rugged Networks
- Combat vehicles
- Avionic & shipboard systems



## Key features

### ■ Ethernet ports

- 1 or 2 ports 10/100/1000 or 10/100 Base TX
- 1 or 2 ports 1000 or 100 Base FX/SX/LX or WDM single fiber
- Version 2x2 ports: total isolation between the 2 networks

### ■ Networking

- Full wire-speed forwarding rate
- Option for Up to 2 ports PoE - IEEE802.3af, IEEE802.3at
- Store-and-forward or Pass through mechanism
- Auto MDI-II, MDI-X, FDX, HDX, Flow control
- Auto-negotiation and fixed settings via DIP switch
- Jumbo frame support
- Link loss forwarding mechanism

### ■ Connectors

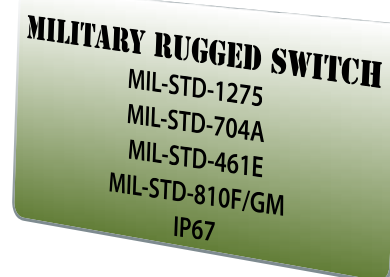
- LAN connector type:
  - Models 1x1 ports: RJ45
  - Models 2x2 ports: D38999/24WB35SN
- Fiber connector type: CTOS 77PC or TACBeam EB4H8000. 2 fibers are used for 1x1 ports versions. 4 fibers are used for 2x2 ports versions.

### ■ Chassis

- Low profile rugged aluminium extrusion
- Conductively cooled w/custom internal heat-sinks
- Ingress protection against sand, dust and moisture
- Epoxy-Polyamide Paint, Per MIL-C-83286, matt texture, color: Nato green

### ■ Standards

- MIL-STD-1275, MIL-STD-704A, MIL-STD-461E,
- MIL-STD-810F GM, IP67/68



## Product specifications

### Performance

- 26.8 Mpps wire speed forwarding rate
- 2 Gbps maximum forwarding bandwidth
- 4K MAC address
- 2 LED indication (Speed, Link/Activity) per port
- Wire-speed reception and transmission

### Standards compliance

- IEEE 802.3, 10 Mbps 10BASE-T (Ethernet)
- IEEE 802.3u, 100 BASE-TX 100 Mbps (Fast Ethernet)
- IEEE 802.3ab, 1000Base-TX
- IEEE 802.3z, 1000Base-FX Gigabit
- IEEE 802.3x Flow control

### Voltage input

- VDC versions: 24VDC nominal (18-32VDC)
- VAC versions: 90-265 VAC / 47-65 Hz
- PoE versions: 48VDC

### Electromagnetic

- MIL-STD-461E Electromagnetic compatibility
- CE-102, CS-114, CS-115, CS-116, RE-102, RS-103

### Environmental : shock/vibration/humidity

- MIL-STD-810F, 501.4I, 501.4II, 502.4I, 502.4II, 507.4, 500.4II, 514, 516I, 516VI, 514.5, 512.4
- IP67/68

### Physical

- Dimensions: 210mm (L) x 151mm (W) x 59mm (H), including connectors & hardware
- Weight: 1.260 kg

### Installation

- Set of Four 4x4.5 mounting holes on bottom for mounting to any flat surface.
- Carrying handles - Optional

### Cooling

- No moving parts. Passive cooling.

### Operating temp

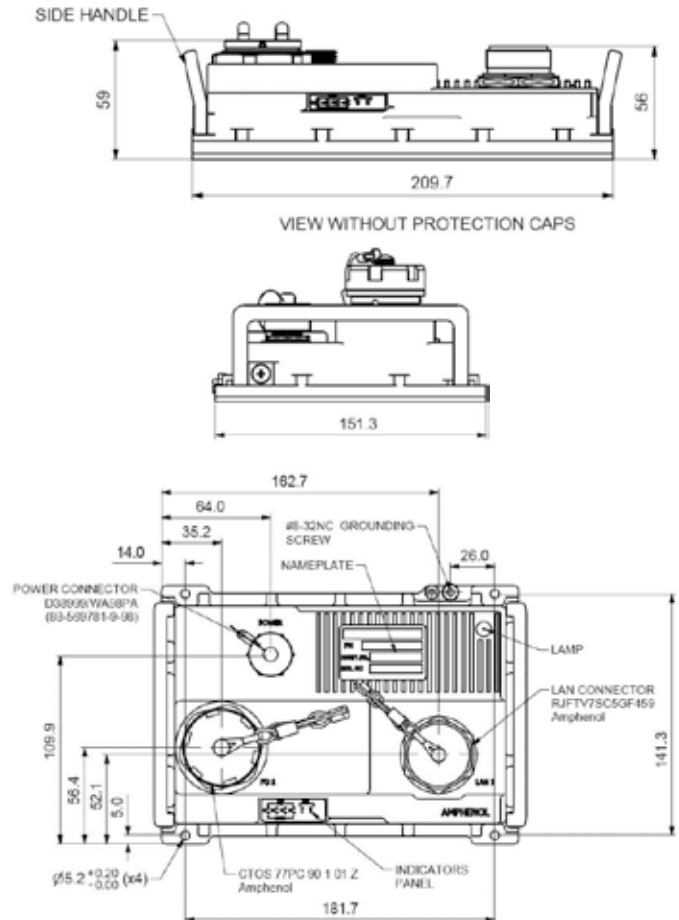
- -35°C to +75°C (-31°F to +167°F) / -35°C Cold start-up

### Storage temp

- -45°C to +85°C (-49°F to +185°F)

## Dimensional line drawing

All measurements are in millimeters



## Part number code

	RESGMC	1M	G	RJF	1CTOS	OD	DC
<b>Ports and type of optical fiber</b>							
1M		1 copper port and 1 optical fiber port, Multimode					
1S		1 copper port and 1 optical fiber port, Singlemode					
2M		2 copper port and 2 optical fiber port, Multimode					
2S		2 copper port and 2 optical fiber port, Singlemode					
<b>Datarate</b>							
G		10/100/1000TX to 1000 Mbps on fiber side					
100		10/100TX to 100 Mbps on fiber side					
<b>Copper LAN connectors</b>							
RJF		RJ45 connector, RJ45 with MIL-DTL-38999 III Thread coupling mechanism (for 1x1 ports versions)					
TV		MIL-DTL-38999 III connector, arrangement 11-35S (for 1x1 ports versions)					
2TV		MIL-DTL-38999 III connector, arrangement 11-35S (for 2x2 ports versions)					
<b>Optical fiber connectors</b>							
1CTOS		CTOS connector with expanded beam, for intensive use in harsh environments, STANAG 4290					
1TACB		TACBEAM connector with expanded beam, M83526/20&21					
<b>Protection of connectors</b>							
OD		All connectors and caps are plated with Olive drab Cadmium					
NI		All connectors and caps are plated with Nickel (RoHs compliant MC)					
<b>Voltage input</b>							
DC		Unit powered with 18-36VDC					
VAC		Unit powered with 90-265 VAC / 47-65 Hz					
PoE		Unit powered with Power over Ethernet					

► For specific cable harnesses, please consult us.

# RES-GMC with butt joint fiber connector Military Ethernet media converter

For harsh environment - Fully MIL-STD compliant

Amphenol's RES-GMC is a MIL-STD rugged, unmanaged-military-grade security gateway, offering up to 2 Gigabit security gateways per device for unidirectional and data diodes solution for total isolation between two network with different security classification. The unit supports PoE on 2 ports (IEEE802.3af and IEEE802.3at).

Developed for military and harsh environment applications, the RES-GMC features mechanical packaging enhancements designed for MIL-STD-810F airborne and ground environmental compliance and high reliability.

The unit has been especially hardened to improve ingress, impact, and shock/vibration protection, as well as eliminate all moving parts through passive cooling, and interface through sealed MIL-D-38999 circular connectors.

Leveraging best-in-class switching technology, the RES-GMC series serves as a robust solution to extend your Tactical Gigabit Ethernet network connectivity of up to 120Km over fiber. Compact in size, the RES-GMC is particularly useful for remote and space-constrained locations either on ground vehicle environments or airborne.

## Military applications

- Data acquisition & transmission
- Battlefield communication C4ISR
- Rugged Networks
- Combat vehicles
- Avionic & shipboard systems

## Key features

### ■ Ethernet ports

- 1 or 2 ports 10/100/1000 or 10/100 Base TX
- 1 or 2 ports 1000 or 100 Base FX/SX/LX or WDM single fiber
- Version 2x2 ports: total isolation between the 2 networks

### ■ Networking

- Full wire-speed forwarding rate
- Option for Up to 2 ports PoE - IEEE802.3af, IEEE802.3at
- Auto MDI-II, MDI-X, FDX, HDX, Flow control
- Auto-negotiation and fixed settings via DIP switch
- Jumbo frame support
- Option for one way fiber security

### ■ Connectors

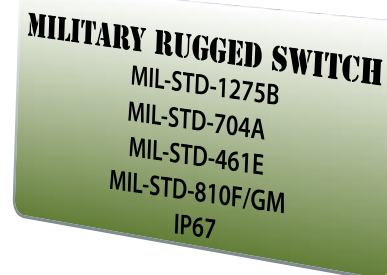
- LAN connector type:
  - Models 1x1 ports: RJFTV
  - Models 2x2 ports: D38999/24WB35SN
- Fiber connector type: TVOP arrangement 11-02. 2 fibers are used for 1x1 ports versions. 4 fibers are used for 2x2 ports versions.

### ■ Chassis

- Low profile rugged aluminium extrusion
- Conductively cooled w/custom internal heat-sinks
- Ingress protection against sand, dust and moisture
- Epoxy-Polyamide Paint, Per MIL-C-83286, matt texture, color: Nato green

### ■ Standards

- MIL-STD-1275, MIL-STD-704A, MIL-STD-461E,
- MIL-STD-810F GM, IP67/68



## Product specifications

### Performance

- 26.8 Mpps wire speed forwarding rate
- 20 Gbps maximum forwarding bandwidth
- 4K MAC address
- 2 LED indication (Speed, Link/Activity) per port
- Wire-speed reception and transmission

### Standards compliance

- IEEE 802.3, 10 Mbps 10BASE-T (Ethernet)
- IEEE 802.3u, 100 BASE-TX 100 Mbps (Fast Ethernet)
- IEEE 802.3ab, 1000Base-TX
- IEEE 802.3z, 1000Base-FX Gigabit
- IEEE 802.3af, IEEE802.3at

### Voltage input

- VDC versions: 24VDC nominal (18-32VDC)
- VAC versions: 90-265 VAC / 47-65 Hz
- PoE versions: 48VDC

### Electromagnetic

- MIL-STD-461E Electromagnetic compatibility
- CE-102, CS-114, CS-115, CS-116, RE-102, RS-103

### Environmental : shock/vibration/humidity

- MIL-STD-810F, 501.4I, 501.4II, 502.4I, 502.4II, 507.4, 500.4II, 514, 516I, 516VI, 514.5, 512.4
- IP67/68

### Physical

- Dimensions: 170mm(L) x 150(W) x 65(H), including connectors & hardware
- Weight: 1 kg

### Installation

- Set of Four 4x4.5 mounting holes on bottom for mounting to any flat surface.
- Carrying handles - Optional

### Cooling

- No moving parts. Passive cooling.

### Operating temp

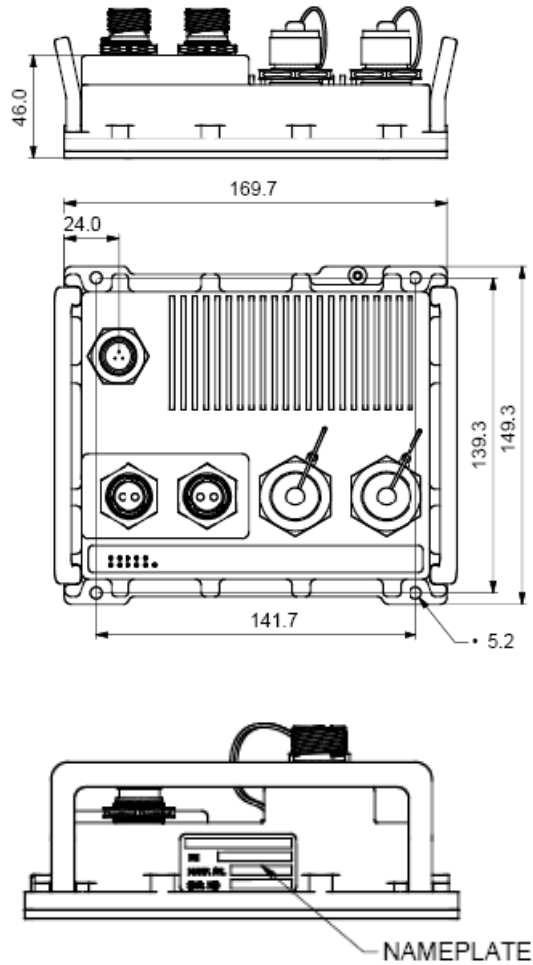
- -35°C to +75°C (-31°F to +167°F) / -35°C Cold start-up

### Storage temp

- -45°C to +85°C (-49°F to +185°F)

## Dimensional line drawing

All measurements are in millimeters



## Part number code

	RESGMC	1M	G	RJF	1TVOP	OD	DC
<b>Ports and type of optical fiber</b>							
1M		1 copper port and 1 optical fiber port, Multimode					
1S		1 copper port and 1 optical fiber port, Singlemode					
2M		2 copper port and 2 optical fiber port, Multimode					
2S		2 copper port and 2 optical fiber port, Singlemode					
<b>Datarate</b>							
G		10/100/1000TX to 1000 Mbps on fiber side					
100		10/100TX to 100 Mbps on fiber side					
<b>Copper LAN connectors</b>							
RJF		RJ45 connector, RJ45 with MIL-DTL-38999 III Thread coupling mechanism (for 1x1 ports versions)					
TV		MIL-DTL-38999 III connector, arrangement 11-355 (for 1x1 ports versions)					
2TV		MIL-DTL-38999 III connector, arrangement 11-355 (for 2x2 ports versions)					
<b>Optical fiber connectors</b>							
1TVOP		1x TVOP connector with butt joint, arrangement 11-02 (for 1x1 ports versions)					
2TVOP		2x TVOP connectors with butt joint, arrangement 11-02 (for 2x2 ports versions)					
<b>Protection of connectors</b>							
OD		All connectors and caps are plated with Olive drab Cadmium					
NI		All connectors and caps are plated with Nickel (RoHS compliant MC)					
<b>Voltage input</b>							
DC		Unit powered with 18-36VDC					
VAC		Unit powered with 90-265 VAC / 47-65 Hz					
PoE		Unit powered with Power over Ethernet					

► For specific cable harnesses, please consult us.

# RJS-GMC with Expanded Beam technology Military Ethernet Media Converter

For harsh environment - with industrial EMI compliancy

Amphenol's RJS-GMC is a rugged, military-grade Ethernet media converter.

Developed for military and harsh environment applications, the RJS-GMC features mechanical packaging enhancements designed for MIL-STD-810F ground environmental compliance and high reliability.

The unit has been especially hardened to improve ingress, impact, and shock/vibration protection, as well as eliminate all moving parts through passive cooling. The interfaces are protected through sealed RJFTV MIL-D-38999 circular connectors and CTOS expanded beam fiber optics connectors.

The conductive cadmium plating is suitable for most demanding EMI-RFI environments. Black paint is also offered when RoHS is required (other colors available).

Leveraging industrial grade switching technology, the RJS-GMC series serves as a robust and cost efficient solution to extend your Tactical Gigabit Ethernet network connectivity over fiber optics.

The RJS-GMC is already widely use for training and combat simulation of troops.

## Military applications

- Battlefield communication C4ISR
- Rugged Networks
- Combat simulation & training of troops
- Combat vehicles

## Key features

### ■ Ethernet ports

- 1, 2 or 4 ports 10/100/1000 BaseTX
- 1, 2 or 4 ports 1000 Base FX/SX/LX
- Versions 2x2 and 4x4 ports: total isolation between the networks

### ■ Networking

- Full wire-speed forwarding rate
- Store-and-forward or Pass through mechanism
- Auto MDI-II, MDI-X, FDX, HDX, Flow control
- Auto-negotiation
- Jumbo frame support
- Link loss forwarding mechanism

### ■ Connectors

- POWER connector : MIL-DTL-38999 III
- LAN connectors: MIL-DTL-38999 III RJFTV
- Fiber optic connectors: CTOS expanded beam

### ■ Chassis

- Rugged molded aluminium
- Cadmium or paint protection
- Conductively cooled with internal heat-sinks
- Ingress protection against sand, dust and moisture
- IP65/IP68 rated

### ■ IEEE Ethernet standards

- IEEE 802.3/u : 10 Mbps & 100 Mbps Fast Ethernet
- IEEE 802.3ab : 1000 Mbps Gigabit Ethernet
- IEEE 802.3x : Full-Duplex with Flow Control

### ■ Environmental specifications

- EMI emissions : FCC Class A, CE, UL, CSA
- Operating Temperature: 0°C to +50°C
- Storage Temperature: -20°C to +60°C



## MIL POWER PROTECTION FOR MODELS DC-704

MIL-STD-461E

DEF-STAN-59-41

DEF-STAN-61-5

MIL-STD-704A

MIL-STD-1275A

CE102

CE03 600V spike

DCE01/DCE02

Pt 6, Iss. 5

600V input transient

Spikes: +/- 250 V for 100µs

Surges: 100 V for 50 ms at 0.5mΩ

Ripple: 14VAC pk-pk

## Product specifications

### Ethernet features

- 1, 2 or 4 shielded RJ45 ports 10/100/1000 BaseT(X)
- RJFTV connectors: jam nut receptacle based on MIL-DTL-38999 III
- Full / Half Duplex, Automatic or Configurable
- RJ45 MDI/MDIX Auto-crossover
- RJ45 TD and RD Auto-polarity

### Dimensions

- Version 1x1: 220 x 122 x 80 mm without connectors and caps
- Version 2x2: 220 x 122 x 80 mm without connectors and caps
- Version 4x4: 360 x 160 x 90 mm without connectors and caps

### Weight

- Version 1x1: approx 1.9 kg
- Version 2x2: approx 2.5 kg
- Version 4x4: approx 4.5 kg

### Installation

- All versions: Set of 4 mounting holes fixed on the bottom
- Version 4x4: carrying handles fixed on the top

### Power supply

#### Input voltage

- DC : 9-36 VDC
- DC-704 : 9-33 VDC, reverse voltage protection
- VAC : 85/264 VAC, 47/63 Hz

#### Input power

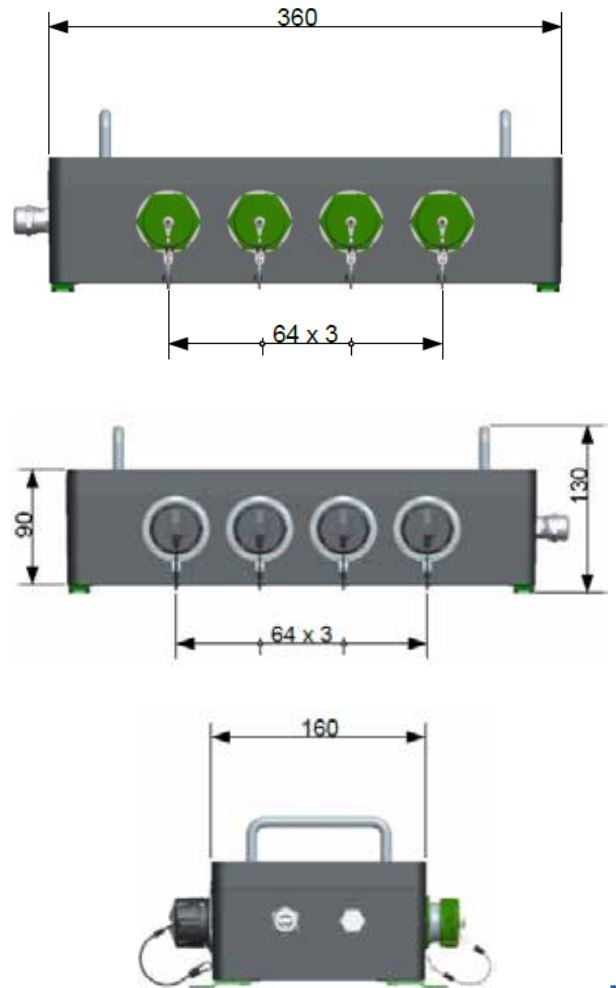
- Version 1x1: 3W
- Version 2x2: 6W
- Version 4x4: 12W

#### Connectors for power

- MIL-DTL-38999 III jam nut receptacle, olive drab cadmium or nickel
- DC & DC-704 TVx07xx0998PA: 3 cts # 20 (wire AWG 24 to 20)
- VAC TVx07xx0998P

### Dimensional line drawing

All measurements are in millimeters



### Part number code

	RJS-GMC	ML	1CTOS	MG	OD	DC-CAPS
<b>Protection and color</b>						
<b>ML:</b> Olive Drab Cadmium Plating on enclosure and receptacles						
<b>BKN:</b> RAL 9005 (Jet Black) Paint on enclosure, Nickel plated receptacles, ROHS compliant						
<b>ML1019:</b> RAL 1019 (Sand) Paint on enclosure, Olive Drab Cadmium plated receptacles						
<b>BKN9010:</b> RAL 9010 (White) Paint on enclosure, Nickel plated receptacles, ROHS compliant						
<b>Number of ports</b>						
<b>1CTOS:</b> 1 port LAN to 1 port fiber optics, 1 RJFTV and 1 CTOS connector						
<b>2CTOS:</b> 2 ports LAN to 2 ports fiber optics, 2 RJFTV and 2 CTOS connectors						
<b>4CTOS:</b> 4 ports LAN to 4 ports fiber optics, 4 RJFTV and 4 CTOS connectors						
<b>Type of fiber and datarate</b>						
<b>MG:</b> Multimode, 50/125, Gigabit Ethernet						
<b>SG:</b> Singlemode, 9/125, Gigabit Ethernet						
<b>MF:</b> Multimode, 50/125, Fast Ethernet						
<b>Protection of LAN and Power connectors and caps</b>						
<b>OD:</b> Olive drab cadmium plating						
<b>ZN:</b> Black Zinc Nickel (RoHS compliant)						
<b>NI:</b> Nickel plating, bright (RoHS compliant)						
<b>Power supply and caps</b>						
<b>DC-CAPS:</b> 24VDC powered, attached caps on all receptacles						
<b>DC-704-CAPS:</b> 24VDC powered, with 704 filtering option, attached caps on all receptacles						
<b>VAC-CAPS:</b> 85-264 VAC, 47-63 Hz, attached caps on all receptacles						

► For specific cable harnesses, please consult us.

# RES-GMC-1M-FORC Military Ethernet Media Converter with Remote Control

For fiber extension of existing systems on the Field

Amphenol's RES-GMC-1M-FORC is a MIL-STD rugged, unmanaged-military-grade Media converter, offering Gigabit communication. Developed for network deployment in harsh environment applications, the RES-GMC-1M-FORC series serves as a robust solution to extend your Tactical Gigabit Ethernet network over fiber. The fiber interface is a CTOS connector with expanded beam, designed for intensive use in severe environments.

Combining the 2 units of RES-GMC-1M-FORC with a fiber drum, your network will be extended on the field and remote controlled from safe area through fiber optics.

> Simply add 2 media converters unit 1 and unit 2 + a fiber drum

Due to extreme low consumption of unit 2 in STANDBY mode, your battery on the field will operate longer.

Operation:

- Connect the unit 1 to a command or control post in a safe area.
- Install the unit 2 together with the deployed system directly on the field, powered by battery through DC IN.
- Link the 2 units with an optical fiber harness.
- The unit 2 is remote controlled by unit 1. Once unit 1 is powered, it will wake up the unit 2.
- The deployed system will be powered from the battery, through DC OUT connector of the unit 2.
- Up to 100A can be provided to the deployed system!



Unit 1



Fiber drum



Unit 2

## Military applications

- Data acquisition & transmission
- Battlefield communication C4ISR
- Rugged Networks
- Combat vehicles

Where your system can be extended through network.

## Key features

- **Ethernet ports**
  - 10/100/1000 Base TX to 100/1000 Base SX-(MM) Media converter
- **Networking**
  - Full wire-speed forwarding rate
  - Store-and-forward or Pass through mechanism
  - Auto MDI-II, MDI-X, FDX, HDX, Flow control
  - Auto-negotiation and fixed settings via DIP switch
  - Jumbo frame support
  - Link loss forwarding mechanism
- **Connectors**
  - MIL-D-38999 (Power & Ethernet signals)
  - Fiber connector type: CTOS 77 PC (2 fibers for Ethernet, 1 fiber for remote control)
  - Protective caps over each connector
- **Chassis**
  - Low profile rugged aluminium extrusion
  - Conductively cooled w/custom internal heat-sinks
  - Ingress protection against sand, dust and moisture
  - Epoxy-Polyamide Paint, Per MIL-C-83286, semi-gloss
  - Color: sand mate
- **Standards**
  - MIL-STD-1275, MIL-STD-704A, MIL-STD-461E,
  - MIL-STD-810F GM, IP67/68

**MILITARY RUGGED SWITCH**  
MIL-STD-1275B  
MIL-STD-704A  
MIL-STD-461E  
MIL-STD-810F/GM  
IP67



## Product specifications

### Performance

- 26.8 Mpps wire speed forwarding rate
- 2 Gbps maximum forwarding bandwidth
- 4K MAC address
- 2 LED indication (Speed, Link/Activity) per port
- Wire-speed reception and transmission

### Standards compliance

- IEEE 802.3, 10 Mbps 10BASE-T (Ethernet)
- IEEE 802.3u, 100 BASE-TX 100 Mbps (Fast Ethernet)
- IEEE 802.3ab, 1000Base-TX
- IEEE 802.3z, 1000Base-FX Gigabit
- IEEE 802.3x Flow control

### Power

- MIL-STD-1275B & MIL-STD-704A Surge and Spike protection
- Voltage input: 24Vdc nominal (18-36V)
- Power switching of the external DC input of unit 2 upon ON/OFF command from unit 1
- Maximum power consumption: 5W for unit 1, 10W for unit 2
- Standby consumption of unit 2: <0.1W
- Chassis grounding
- Max power at output of unit 2 (relay) : 100A

### Electromagnetic

- MIL-STD-461E Electromagnetic compatibility

### Environmental : shock/vibration/humidity

- MIL-STD-810F, 501.4I, 501.4II, 502.4I, 502.4II, 507.4, 500.4II, 514, 516I, 516VI, 514.5, 512.4
- IP67/68

### Physical

- Dimensions: 170mm(L) x 140(W) x 110(H), including connectors & hardware
- Weight: 1.55kg for unit 1, 1.80kg for unit 2

### Installation

- Set of Four 4x4.3 mounting holes on bottom for mounting to any flat surface

### Cooling

- No moving parts. Passive cooling

### Operating temp

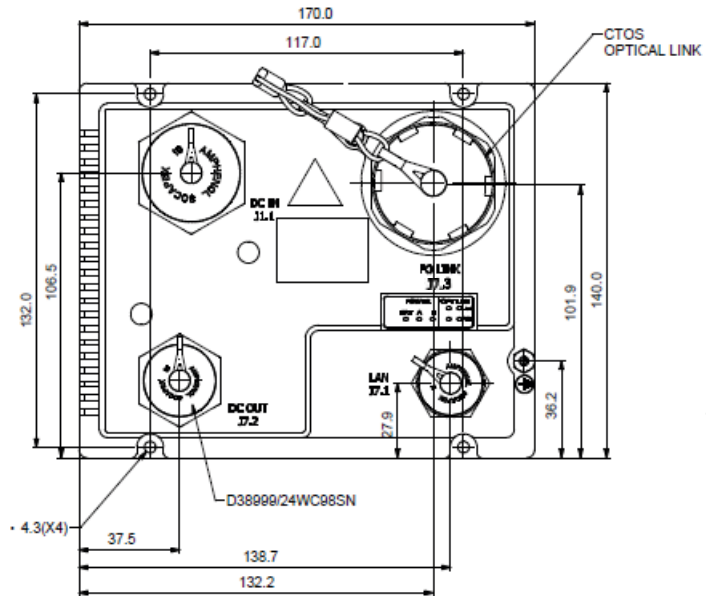
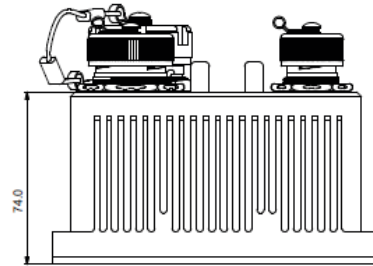
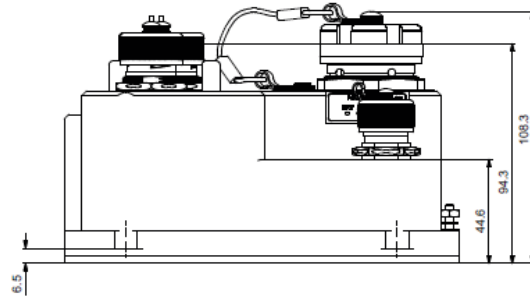
- -35°C to +75°C (-31°F to +167°F) / -35°C Cold start-up

### Storage temp

- -45°C to +85°C (-49°F to +185°F)

## Dimensional line drawing

All measurements are in millimeters



		Description
Part number	RES-GMC-1M-FORC-1	MIL-STD Rugged Gigabit Media Converter unit 1, 1x RJF connector, 1x fiber CTOS connector, MM, SX
	RES-GMC-1M-FORC-2	MIL-STD Rugged Gigabit Media Converter unit 2, 1x RJF connector, 1x fiber CTOS connector, MM, SX, remote controlled by unit 1
	CTOS drum	Please consult us

► For specific cable harnesses, please consult us.

# RES-SCE-AC-8US

## Unmanaged miniature portable Ethernet switch - 8 fast ports

Military ethernet switch for harsh environment - Fully MIL-STD compliant

Amphenol's RES-SCE-AC-8US is a MIL-STD rugged, unmanaged-military-grade Ethernet switch, offering 8 Fast Ethernet 10/100 Ports. The portable rugged Ethernet switch is intended for unmanned vehicles or man packable command post.

Developed for SWaP (Size Weight and Power) and mobile portable military applications, the RES-SCE-AC-8US features mechanical packaging enhancements designed for MIL-STD-810F airborne and ground environmental compliance and high reliability. The unit has been especially hardened to improve ingress, impact, and shock/vibration protection, as well as eliminate all moving parts through passive cooling, and interface through sealed MIL-SCE circular connectors.

Leveraging best-in-class switching technology, the RES-SCE-AC-8US serves as a robust solution for providing local area network (LAN) connectivity to IP-enabled computing and net-centric devices. Compact in size, the RES-SCE-AC-8US is particularly useful for expanding port density in space-constrained airborne and ground vehicle environments.

### Military applications

- Unmanned Vehicles
- Battlefield communication C4ISR
- Mobile communications
- Avionic & shipboard systems



SWaP

### Key features

- **Ethernet ports**
  - 8 x switched 10/100 (Fast Ethernet) ports
- **Networking**
  - Full wire-speed forwarding rate
  - Store-and-forward mechanism
  - Auto MDI-II, MDI-X
  - Auto-negotiation protocol
  - Address look-up
- **Connectors**
  - Power + LAN connector : SCE2-B-76A06-07SN-001
- **Chassis**
  - Low profile rugged aluminium extrusion
  - Conductively cooled w/ custom internal heat-sinks
  - Ingress protection against sand, dust and moisture
  - Epoxy-Polyamide Paint, Per MIL-C-83286, matt texture, color: Nato green
- **Standards**
  - MIL-STD-461E, MIL-STD-810F/G/GM, IP67/68
- **Voltage operation**
  - 5VDC (USB) INPUT, shared with LAN Port Number 1
- **Activity status**
  - Indicators for Power and LAN activity (light off by default)
  - STATUS pushbutton to turn on the indicators

**MILITARY RUGGED SWITCH**  
MIL-STD-461E  
MIL-STD-810F/G/GM  
IP68

## Product specifications

### Performance

- 128K byte of SRAM for frame buffering
- 2.0 Gbps high-performance memory bandwidth
- LED indication (speed, link/activity) per port - Optional
- Wire-speed reception and transmission
- Integrated address look-up engine
- Automatic address learning

### Standards compliance

- IEEE 802.3 10 Mbps 10BASE-T (Ethernet)
- IEEE 802.3u 100BASE-TX 100 Mbps (Fast Ethernet)
- IEEE 802.3x flow control

### Power

- Voltage input: 5Vdc nominal - Optional USB sourcing
- Power consumption: 2W typical
- Chassis grounding

### Electromagnetic

- MIL-STD-461E electromagnetic compatibility
- CE-102, CS-114, CS-115, CS-116, RE-102, RS-103

### Environmental

- MIL-STD-810F/G/GM
- Random vibration (514.5I), Bench handling (516.6VI), High temp (501.5I, II), Low temp (502.5I), Humidity (507.5II), Air pressure (500.5I, II), Blowing rain (506.5I), Immersion (512.5I), Salt atmosphere (509.5I), Blowing dust (510.5I), Loose cargo vibration (514.6II), Wind analysis
- IP67/68

### Physical

- Dimensions: 82.2mm (L) x 61.4 (W) x 26 (H), Not including connectors Dust Caps.
- Weight: 140g - Not including dust caps

### Installation

- Portable, flat for mounting to any flat surface.

### Cooling

- No moving parts. Passive cooling.

### Operating temp

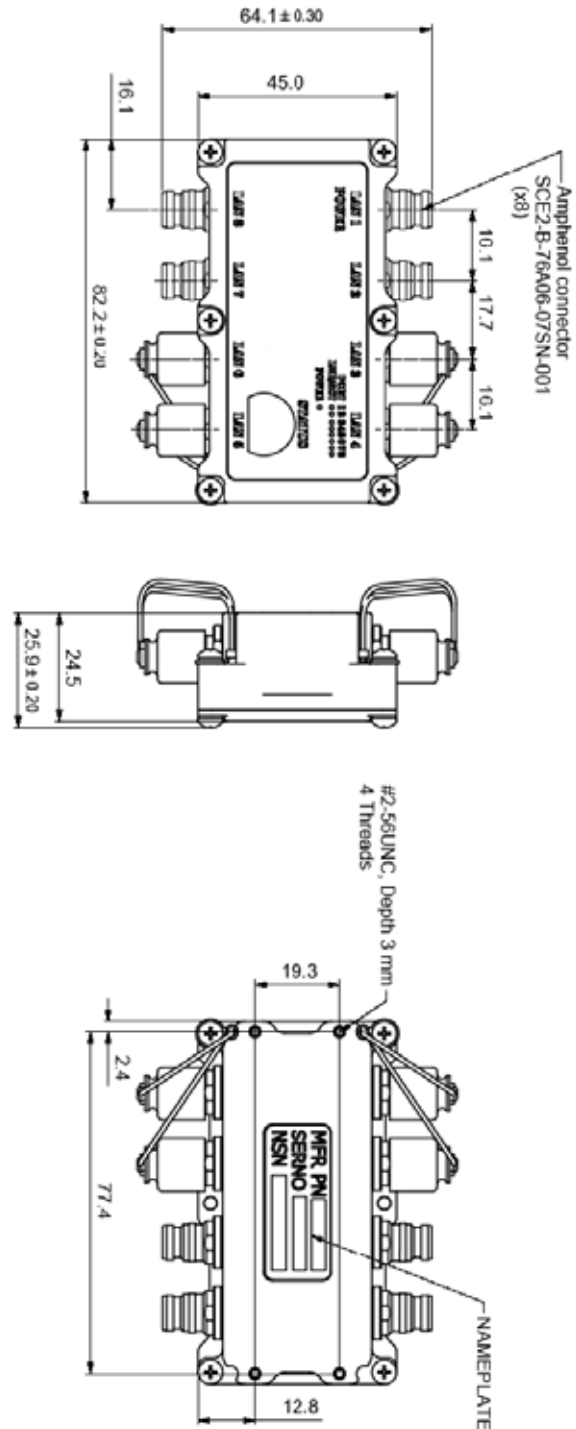
- -35°C to +75°C (-31°F to +167°F) / -35°C Cold start-up

### Storage temp

- -45°C to +85°C (-49°F to +185°F)

## Dimensional line drawing

All measurements are in millimeters



Part number code	Description
RES-SCE-AC-8BUS	MIL-STD Portable Unmanaged Ethernet switch with 8 ports 10/100TX
RES-SCE-8US-CBL-PWR-2M	Power cordset for RES-SCE-AC-8BUS, 1 side with SCE2B-L1K-0607-PN Latch release, 1 side with 1 USB civilian for power supply, cable 2m long
RES-SCE-8US-CBL-LAN-2M	LAN cordset for RES-SCE-AC-8BUS, valid for LAN 2 to 8, 1 side with SCE2B-L1K-0607-PN Latch release, 1 side with RJ45 civilian, cable RJ45FTP5E cat 5E, 2m long

► For specific cable harnesses, please consult us.

# RES-SCE-8MG

## Managed miniature portable Ethernet switch - 8 Gigabit ports

Military ethernet switch for harsh environment - Fully MIL-STD compliant

Amphenol's RES-SCE-8MG is a MIL-STD rugged, managed-military-grade Ethernet switch, offering 8 Gigabit Ethernet 10/100/1000 Ports. The portable rugged Ethernet switch is intended for unmanned vehicles or man packable command post.

Developed for SWaP (Size Weight and Power) and mobile portable military applications, the RES-SCE-8MG features mechanical packaging enhancements designed for MIL-STD-810F airborne and ground environmental compliance and high reliability. The unit has been especially hardened to improve ingress, impact, and shock/vibration protection, as well as eliminate all moving parts through passive cooling, and interface through sealed miniature circular connectors.

Leveraging best-in-class switching technology, the RES-SCE-8MG serves as a robust solution for providing local area network (LAN) connectivity to IP-enabled computing and net-centric devices. Compact in size, the RES-SCE-8MG is particularly useful for expanding port density in space-constrained airborne and ground vehicle environments.

### Military applications

- Unmanned Vehicles
- Battlefield communication C4ISR
- Mobile communications
- Avionic & shipboard systems

### Key features

- **Ethernet ports**
  - Managed 8 x switched 10/ 100/ 1000 ports
- **Networking**
  - Spanning Tree (802.1d), RSTP (802.1w) and multiple Spanning Tree (802.1S) for fast recovery rings
  - Security via Radius Authentication 802.1x, Port Security, Port Mirroring
  - Multicasting (IGMP Snooping), GARP, GMRP, and GVRP Broadcasting and flooding Control up to 8K Groups
  - 802.1q Tagged based VLAN up to 4K VLAN groups
  - QoS Multi-Layer Classifier, 802.1p, ToS/DSCP traffic classification. WFQ, Strict Queuing.
  - Bridge support for Q-in-Q
  - Link Aggregation 802.3AD
  - WEB, CLI, Telnet Management
- **Connectors**
  - Power connector type: SCE2-B-76A06-07SN
  - LAN connector type: SCE2-B-76A07-14SN-001
  - LED indication per port (speed, link/activity)
- **Chassis**
  - Low profile rugged aluminium extrusion
  - Conductively cooled w/ custom internal heat-sinks
  - Ingress protection against sand, dust and moisture
  - Epoxy-Polyamide Paint, Per MIL-C-83286, matt texture, color: Nato green
- **Standards**
  - MIL-STD-1275, MIL-STD-704A, MIL-STD-461E, MIL-STD-810F GM, IP67/68
- **Performance**
  - 26.8 Mpps wire speed forwarding rate
  - 20 Gbps maximum forwarding bandwidth
  - 8K MAC address
- **Activity status**
  - Indicators for Power and LAN activity (light off by default)
  - STATUS pushbutton to turn on the indicators



SWaP

**MILITARY RUGGED SWITCH**  
MIL-STD-1275B  
MIL-STD-704A  
MIL-STD-461E  
MIL-STD-810F/GM  
IP67

## Product specifications

### Standards compliance

- IEEE 802.1x MAC based Authentication
- IEEE 802.1Q Vlan Tagging
- IEEE 802.1P QoS
- IEEE 802.1S Multiple STP
- IEEE 802.1W Rapid STP
- IEEE 802.3 AD Link Aggregation

### Power

- Exceed MIL-STD-1275B Surge and Spike protection
- Voltage Input: 24Vdc Nominal (16-36 VDC)
- Power Consumption: 7.2W Max - 5W Typical
- Chassis grounding

### Electromagnetic

- MIL-STD-461E Electromagnetic compatibility
- CE-102, CS-114, CS-115, CS-116, RE-102, RS-103

### Environmental

- MIL-STD-810F/G/GM
- Random vibration (514.5I), Bench handling (516.6VI), High temp (501.5I, II), Low temp (502.5I), Humidity (507.5II), Air pressure (500.5I, II), Blowing rain (506.5I), Immersion (512.5I), Salt atmosphere (509.5I), Blowing dust (510.5I), Loose cargo vibration (514.6II), Wind analysis
- IP67/68
- RTCA/DO-160F, Low temperature 2 hours @ -55°C, operating, chap 4, cat B2
- RTCA/DO-160F, Vibrations, section 8, cat. S, curve M
- RTCA/DO-160F Shocks, cat. A, 6g, 11ms

### Physical

- Dimensions: 100mm (L) x 89 (W) x 36 (H), including connectors & hardware.
- Weight: 390g

### Installation

- Set of Four 4-40 threads on bottom for mounting to any flat surface

### Cooling

- No moving parts. Passive cooling.

### Operating temp

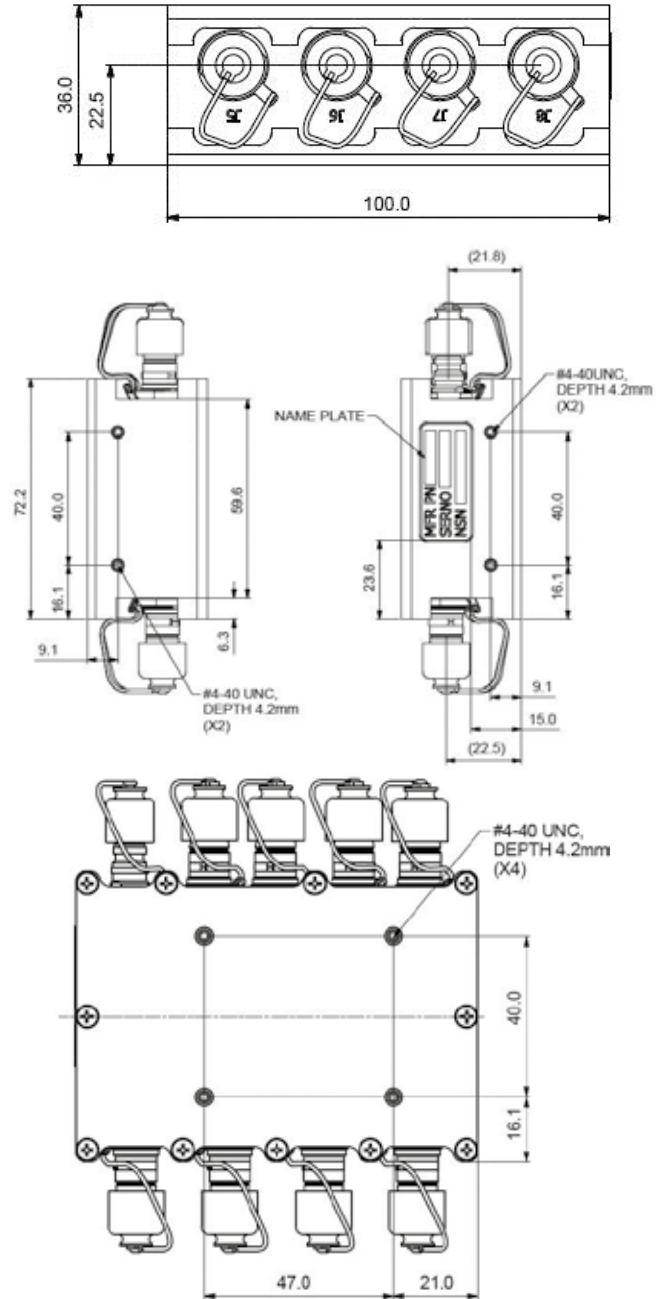
- -35°C to +75°C (-31°F to +167°F) / -35° C Cold start-up

### Storage temp

- -45°C to +85°C (-49°F to +185°F)

## Dimensional line drawing

All measurements are in millimeters



Part number code	Description
RES-SCE-8MG	MIL-STD Portable Managed Ethernet switch with 8 ports 10/100/1000TX
RES-SCE-8MG-CBL-PWR-2M	Power cordset for RES-SCE-8MG, 1 side with SCE2B-L1K-0607-PN Latch release, 1 side with 4mm plugs for power supply, cable 2m long
RES-SCE-8MG-CBL-LAN-2M	LAN cordset for RES-SCE-8MG, valid for LAN 1 to 8, 1 side with SCE2B-L1K-0714-PN Latch release, 1 side with RJ45 civilian, cable RJ45FTP5E cat 5E, 2m long

► For specific cable harnesses, please consult us.

# RESMLAC-8US-CAPS

## Unmanaged military Ethernet switch, MIL-DTL-38999 connectors 8 fast ports

Military ethernet switch for harsh environment - Fully MIL-STD compliant

Amphenol's RESMLAC-8US-CAPS is a MIL-STD rugged, unmanaged-military-grade Ethernet switch, offering 8 Fast Ethernet 10/100 Ports.

Developed for military and harsh environment applications, the RESMLAC-8US-CAPS features mechanical packaging enhancements designed for MIL-STD-810F airborne and ground environmental compliance and high reliability. The unit has been especially hardened to improve ingress, impact, and shock/vibration protection, as well as eliminate all moving parts through passive cooling, and interface through sealed MIL-D-38999 circular connectors.

Leveraging best-in-class switching technology, the RESMLAC-8US-CAPS serves as a robust solution for providing local area network (LAN) connectivity to IP-enabled computing and net-centric devices. Compact in size, the RESMLAC-8US-CAPS is particularly useful for expanding port density in space-constrained airborne and ground vehicle environments.

### Military applications

- Data acquisition & transmission
- Battlefield communication C4ISR
- Rugged Networks
- Mobile communications
- Combat vehicles
- Avionic & shipboard systems



### Key features

- **Ethernet ports**
  - 8 x switched 10/100 (Fast Ethernet) ports
- **Networking**
  - Full wire-speed forwarding rate
  - Store-and-forward mechanism
  - Auto MDI-II, MDI-X
  - Auto-negotiation protocol
  - Address look-up
- **Connectors**
  - MIL-D-38999 (Power & Ethernet signals)
  - Power connector type: D38999/24WA98PA
  - LAN connector type: D38999/24WA35SN
- **Chassis**
  - Low profile rugged aluminium extrusion
  - Conductively cooled w/ custom internal heat-sinks
  - Ingress protection against sand, dust and moisture
  - Epoxy-Polyamide Paint, Per MIL-C-83286, matt texture, color: Nato green
- **Standards**
  - MIL-STD-1275, MIL-STD-704A, MIL-STD-461E, MIL-STD-810F GM, IP67/68
- **Voltage operation**
  - 24VDC (18VDC – 32VDC)

**MILITARY RUGGED SWITCH**  
MIL-STD-1275  
MIL-STD-704A  
MIL-STD-461E  
MIL-STD-810F/GM  
IP67  
STANAG 4370  
STANAG 2895

## Product specifications

### Performance

- 128K byte of SRAM for frame buffering
- 2.0 Gbps high-performance memory bandwidth
- 2 LED indication (speed, link/activity) per port
- Wire-speed reception and transmission
- Integrated address look-up engine
- Automatic address learning

### Standards compliance

- IEEE 802.3 10 Mbps 10BASE-T (Ethernet)
- IEEE 802.3u 100BASE-TX 100 Mbps (Fast Ethernet)
- IEEE 802.3x flow control

### Power

- MIL-STD-1275B & MIL-STD 704A surge and spike protection
- Voltage input: 24Vdc nominal (18-32V)
- Power consumption: 2.8W typical
- Chassis grounding

### Electromagnetic

- MIL-STD-461E electromagnetic compatibility
- CE-102, CS-114, CS-115, CS-116, RE-102, RS-103

### Environmental

- MIL-STD-810F, 501.4I, 501.4II, 502.4I, 502.4II, 507.4, 500.4II, 514, 516I, 516Vi, 514.5, 512.4
- IP67/68
- STANAG 4370, vibrations AECTP 400, method 401; cannon fire shocks, 6666 shocks up to 8.6g, half sine shape
- STANAG 2895, altitude 10.000m, temperature -21°C / 71°C

### Physical

- Dimensions: 269mm(L) x 133(W) x 65(H), including connectors & hardware
- Weight: 1.5 kg

### Installation

- Set of four 4x4.5 mounting holes on bottom for mounting to any flat surface.

### Cooling

- No moving parts. Passive cooling.

### Operating temp

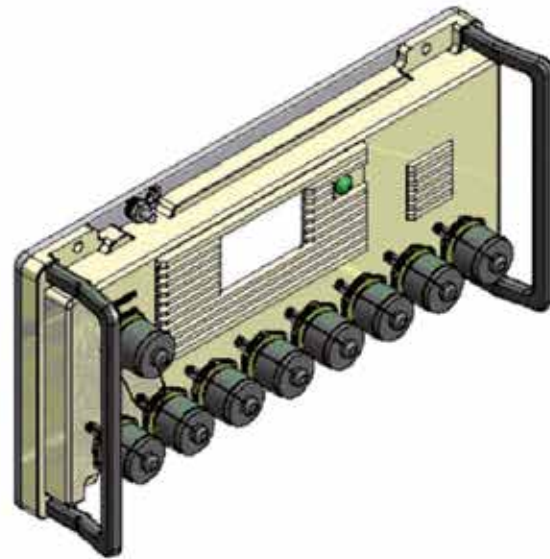
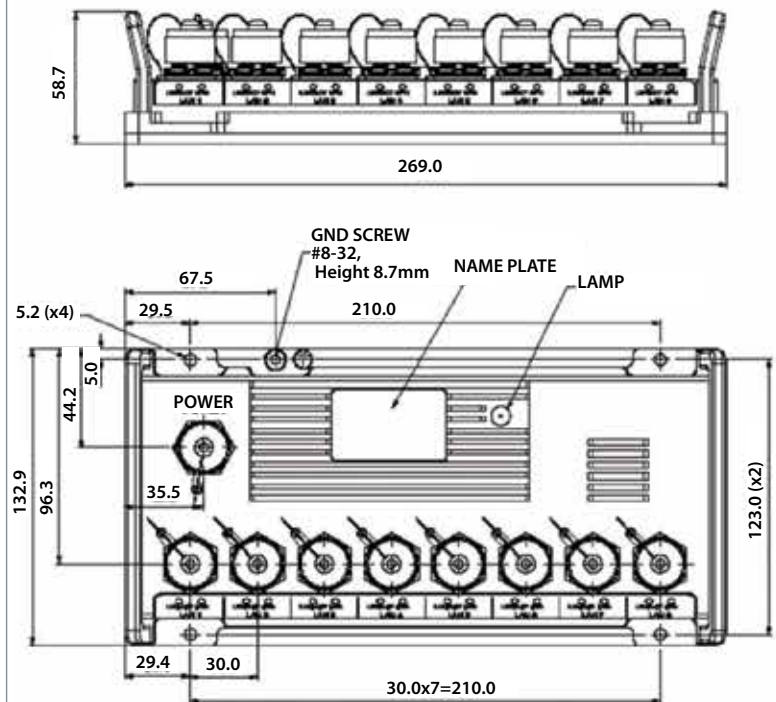
- -35°C to +75°C (-31°F to +167°F) / -35°C Cold start-up

### Storage temp

- -45°C to +85°C (-49°F to +185°F)

## Dimensional line drawing

All measurements are in millimeters



Part number code	Description
RESMLAC-8US-CAPS	MIL-STD Rugged Unmanaged Ethernet switch with 8 ports 10/100TX, color dark green
RESMLAC-8US-CAPS-SX	MIL-STD Rugged Unmanaged Ethernet switch with 8 ports 10/100TX, color black
RESMLAC-8US-CBL-PWR-2M	Power cordset for RESMLAC-8US-CAPS, 1 side with MIL-DTL-38999 plug, 1 side with 4mm plugs for power supply, cable 2m long
RESMLAC-8US-CBL-LAN-2M	LAN cordset for RESMLAC-8US-CAPS, valid for LAN 1 to 8, 1 side with MIL-DTL-38999 plug, 1 side with RJ45 civilian, cable RJFSFTP5E cat 5E, 2m long

► For specific cable harnesses, please consult us.

# RJSMLAC-8UG-CAPS

## Unmanaged military Ethernet switch, MIL-DTL-38999 connectors 8 Gigabit ports

Military ethernet switch for harsh environment - Fully MIL-STD compliant

Amphenol's RESMLAC-8UG-CAPS is a MIL-STD rugged, unmanaged-military-grade Ethernet switch, offering 8 triple speed Ethernet (10/100/1000) ports. Ethernet connectors are RJFTV, using RJField patented system that allows easy and quick assembly of any standard RJ45 cordset without any tool.

Developed for military and harsh environment applications, the RJSMLAC features mechanical packaging enhancements designed for MIL-STD-810F airborne and ground environmental compliance and high reliability. The unit has been especially hardened to improve ingress, impact, and shock/vibration protection, as well as eliminate all moving parts through passive cooling.

Leveraging best-in-class switching technology, the RJSMLAC serves as a robust solution for providing local area network (LAN) connectivity to IP-enabled computing and net-centric devices. Compact in size, the RJSMLAC is particularly useful for expanding port density in space-constrained airborne and ground vehicle environments.

### Military applications

- Data acquisition & transmission
- Battlefield communication C4ISR
- Rugged Networks
- Mobile communications
- Combat vehicles
- Avionic & shipboard systems



### Key features

- **Ethernet ports**
  - 8 x switched 10/100/1000 (Gigabit Ethernet) ports on RJFTV connectors
- **Networking**
  - Full wire-speed forwarding rate
  - Store-and-forward mechanism
  - Auto MDI-II, MDI-X
  - Auto-negotiation protocol
  - Address look-up
- **Connectors**
  - Power connector type: MIL-DTL-38999/24WA98PA
  - LAN connector type: RJFTV (coupling mechanism from MIL-DTL-38999)
  - LED indication per port (speed, link/activity)
- **Chassis**
  - Low profile rugged aluminium extrusion
  - Conductively cooled w/ custom internal heat-sinks
  - Ingress protection against sand, dust and moisture
  - Finish of epoxy-polyamide paint per MIL-C-83286, matt texture, color: Nato green
- **Standards**
  - MIL-STD-1275, MIL-STD-704A, MIL-STD-461E, MIL-STD-810F GM, IP67/68
- **Voltage operation**
  - 24VDC (18VDC – 32VDC)

**MILITARY RUGGED SWITCH**  
MIL-STD-1275  
MIL-STD-704A  
MIL-STD-461E  
MIL-STD-810F/GM  
IP67



## Product specifications

### Performance

- 128K byte of SRAM for frame buffering
- 2.0 Gbps high-performance memory bandwidth
- 2 LED indication (speed, link/activity) per port
- Wire-speed reception and transmission
- Integrated address look-up engine
- Automatic address learning

### Standards compliance

- IEEE 802.3 10BASE-T (Ethernet)
- IEEE 802.3u 100BASE-T (Fast Ethernet)
- IEEE 802.3ab 1000BASE-T (Gigabit Ethernet)
- IEEE 802.3x flow control

### Power

- MIL-STD-1275B & MIL-STD 704A surge and spike protection
- Voltage input: 24Vdc nominal (18-32V)
- Power consumption: 7W typical
- Chassis grounding

### Electromagnetic

- MIL-STD-461E electromagnetic compatibility
- CE-102, CS-114, CS-115, CS-116, RE-102, RS-103

### Environmental

- MIL-STD-810F, 501.4I, 501.4II, 502.4I, 502.4II, 507.4, 500.4II, 514, 516I, 516Vi, 514.5, 512.4
- IP67/68

### Physical

- Dimensions: 269mm(L) x 133(W) x 65(H), including connectors & hardware
- Weight: 1.8kg

### Installation

- Set of four 4x4.5 mounting holes on bottom for mounting to any flat surface.

### Cooling

- No moving parts. Passive cooling.

### Operating temp

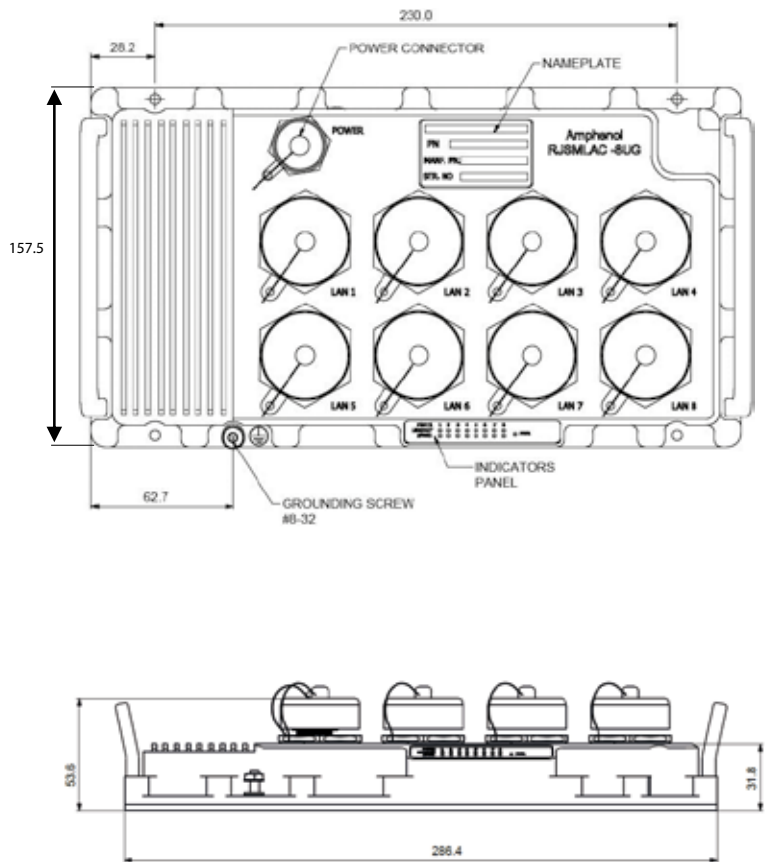
- -35°C to +75°C (-31°F to +167°F) / -35°C Cold start-up

### Storage temp

- -45°C to +85°C (-49°F to +185°F)

## Dimensional line drawing

All measurements are in millimeters



Part number code	Description
RJSM-LAC-8UG-CAPS	MIL-STD Rugged Unmanaged Ethernet switch with 8 ports 10/100/1000TX, powered with 18-32VDC
RJSM-LAC-8UG-CAPS-VAC	MIL-STD Rugged Unmanaged Ethernet switch with 8 ports 10/100/1000TX, powered with 90-265 VAC / 47-65 Hz
RJSM-LAC-8UG-CBL-PWR-2M	Power cordset for RJSM-LAC-8UG-CAPS, 1 side with MIL-DTL-38999 plug, 1 side with 4mm plugs for power supply, cable 2m long
RJSM-LAC-8UG-CBL-LAN-2M	LAN cordset for RJSM-LAC-8UG-CAPS, valid for LAN 1 to 8, 1 side with RJFTV6MG plug, 1 side with RJ45 civilian, cable RJFSFTP5E cat 5E, 2m long

► **For specific cable harnesses, please consult us.**

# RJSMLAC-8MG-CAPS

## Managed military Ethernet switch, RJFTV connectors - 8 Gigabit ports

Military ethernet switch for harsh environment - Fully MIL-STD compliant

Amphenol's RJSMLAC-8MG-CAPS is a MIL-STD Fully managed Military-grade network switch offering 8 triple speed (10/100/1000) ports. Ethernet connectors are RJFTV, using RJField patented system that allows easy and quick assembly of any standard RJ45 cordset without any tool.

Developed for military and harsh environment applications, the RJSMLAC-8MG-CAPS features mechanical packaging enhancements designed for MIL-STD-810F airborne and ground environmental compliance and high reliability. The unit has been especially hardened to improve ingress, impact, and shock/vibration protection, as well as eliminate all moving parts through passive cooling, and interface through sealed MIL-DTL-38999 circular connectors.

Leveraging best-in-class switching technology, the RJSMLAC-8MG-CAPS serves as a robust solution for providing local area network (LAN) connectivity to IP-enabled computing and net-centric devices. Compact in size, the RJSMLAC-8MG-CAPS is particularly useful for expanding port density in space-constrained airborne and ground vehicle environments.

### Military applications

- Data acquisition & transmission
- Battlefield communication C4ISR
- Industrial Rugged Networks
- Mobile communications
- Combat vehicles
- Avionic & shipboard systems



### Key features

- **Ethernet ports**
  - Managed 8 x switched 10/100/1000 ports on RJFTV connectors
- **Networking**
  - Spanning tree (802.1d), RSTP (802.1w) and multiple
  - Spanning tree (802.1S) for fast recovery rings
  - Security via Radius Authentication 802.1x, port security, port mirroring
  - Multicasting (IGMP Snooping), GARP, GMRP, and GVRP, Broadcasting and flooding control up to 8K groups.
  - 802.1q tagged based VLAN up to 4K VLAN groups.
  - QoS multi-layer classifier, 802.1p, ToS/DSCP traffic classification. WFQ, Strict Queuing.
  - Bridge support for Q-in-Q.
  - Link aggregation 802.3AD.
  - WEB, CLI, Telnet management.
- **Connectors**
  - Power connector type: MIL-DTL-38999/24WA98PA
  - LAN connector type: RJFTV (coupling mechanism from MIL-DTL-38999)
  - Management connector type: SCE2B 76 A 06 07 SN 001
  - LED indication per port (Speed, Link/Activity)
- **Chassis**
  - Low profile rugged aluminium extrusion
  - Conductively cooled w/custom internal heat-sinks
  - Ingress protection against sand, dust and moisture
  - Epoxy-Polyamide Paint, Per MIL-C-83286, matt texture, color: Nato green
- **Standards**
  - MIL-STD-1275, MIL-STD-704A, MIL-STD-461E,
  - MIL-STD-810F GM, IP67/68

**MILITARY RUGGED SWITCH**  
MIL-STD-1275  
MIL-STD-704A  
MIL-STD-461E  
MIL-STD-810F/GM  
IP68  
MIL-F-18870-E  
MIL-STD-167-1A  
MIL-S-901D

## Product specifications

### Voltage operation

- Standard model: 24VDC (18VDC ~ 32VDC)
- VAC model : 90-265 VAC / 47-65 Hz powered

### Performance

- 26.8 Mpps wire speed forwarding rate
- 20 Gbps maximum forwarding bandwidth
- 8K MAC address

### Standards compliance

- IEEE 802.1x MAC based authentication
- IEEE 802.1Q Vlan tagging
- IEEE 802.1P QoS
- IEEE 802.1S Multiple STP
- IEEE 802.1W Rapid STP
- IEEE 802.3AD Link aggregation

### Power

- Exceed MIL-STD-1275B surge and spike protection
- Power consumption: 7W typical
- Chassis grounding

### Electromagnetic

- MIL-STD-461E electromagnetic compatibility
- CE-102, CS-114, CS-115, CS-116, RE-102, RS-103

### Environmental : shock/vibration/humidity

- MIL-STD-810F, 501.4I, 501.4II, 502.4I, 502.4II, 507.4, 500.4II, 514, 516I, 516VI, 514.5, 512.4
- IP67/68
- MIL-F-18870-E, Temperature shock test 72 hours @ -55°C, Storage
- MIL-STD-167-1A Low frequencies Vibrations
- MIL-S-901D Lightweight shocks

### Physical

- Dimensions: 287mm(L) x 147(W) x 50(H), including connectors & hardware
- Weight: 1.8 kg

### Installation

- Set of four 4.5 mounting holes on bottom for mounting to any flat surface.
- Carrying handles

### Cooling

- No moving parts. Passive cooling.

### Operating temp

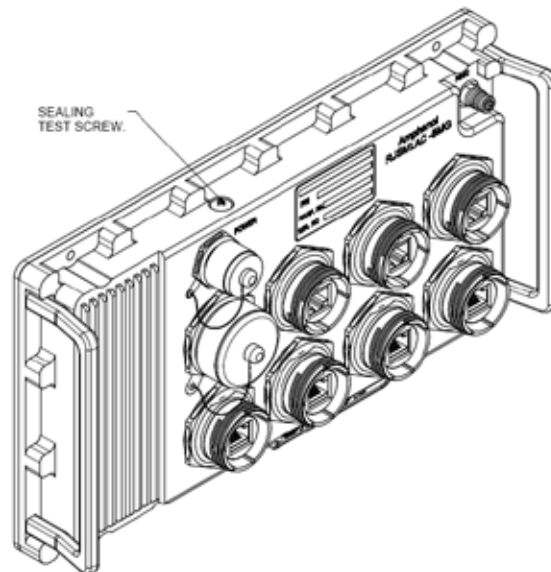
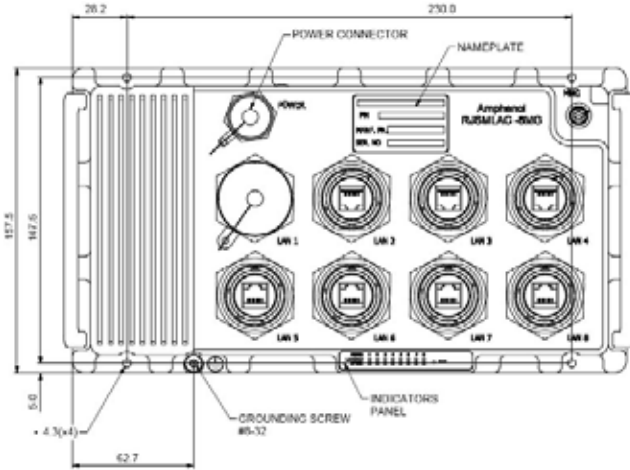
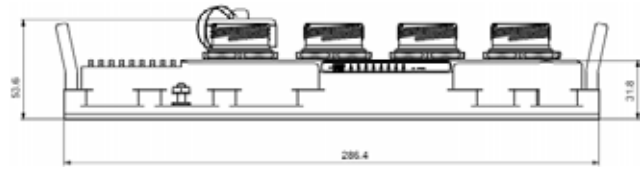
- -35°C to +75°C (-31°F to +167°F) / -35°C Cold start-up

### Storage temp

- -45°C to +85°C (-49°F to +185°F)

## Dimensional line drawing

All measurements are in millimeters



Part number code	Description
RJSMLAC-8MG-CAPS	MIL-STD Rugged Managed Ethernet switch with 8 ports 10/100/1000TX, powered with 18-32VDC
RJSMLAC-8MG-CAPS-VAC	MIL-STD Rugged Managed Ethernet switch with 8 ports 10/100/1000TX, powered with 90-265 VAC / 47-65 Hz
RJSMLAC-8MG-CBL-PWR-2M	Power cordset for RJSMLAC-8MG-CAPS, 1 side with MIL-DTL-38999 plug, 1 side with 4mm plugs for power supply, cable 2m long
RJSMLAC-8MG-CBL-LAN-2M	LAN cordset for RJSMLAC-8MG-CAPS, 1 side with RJFTV6MG plug, 1 side with RJ45 civilian, cable RJFSFTP5E cat 5E, 2m long
RJSMLAC-8MG-CBL-MNG-2M	Management cordset for RJSMLAC-8MG-CAPS, 1 side with SCE2BL1K0607PN plug, 1 side with DB-9 civilian, cable 2m long

► For specific cable harnesses, please consult us.

# RESMLAC-8MG-CAPS

## Managed military Ethernet switch, MIL-DTL-38999 connectors 8 Gigabit ports

Military ethernet switch for harsh environment - Fully MIL-STD-compliant

Amphenol's RESMLAC-8MG-CAPS is a MIL-STD fully managed Military-grade network switch offering 8 triple speed (10/100/1000) ports. Developed for military and harsh environment applications, the RESMLAC-8MG-CAPS features mechanical packaging enhancements designed for MIL-STD-810F airborne and ground environmental compliance and high reliability. The unit has been especially hardened to improve ingress, impact, and shock/vibration protection, as well as eliminate all moving parts through passive cooling, and interface through sealed MIL-DTL-38999 circular connectors.

Leveraging best-in-class switching technology from Amphenol, the RESMLAC-8MG-CAPS serves as a robust solution for providing local area network (LAN) connectivity to IP-enabled computing and net-centric devices. Compact in size, the RESMLAC-8MG-CAPS is particularly useful for expanding port density in space-constrained airborne and ground vehicle environments.

### Military applications

- Data acquisition & transmission
- Battlefield communication C4ISR
- Rugged Networks
- Mobile communications
- Combat vehicles
- Avionic & shipboard systems



### Key features

- **Ethernet ports**
  - Managed 8 x switched 10/100/1000 ports
- **Networking**
  - Spanning tree (802.1d), RSTP (802.1w) and multiple
  - Spanning tree (802.1S) for fast recovery rings
  - Security via Radius authentication 802.1x, port security, port mirroring
  - Multicasting (IGMP Snooping), GARP, GMRP, and GVRP, Broadcasting and flooding control up to 8K groups.
  - 802.1q tagged based VLAN up to 4K VLAN groups.
  - QoS multi-layer classifier, 802.1p, ToS/DSCP traffic classification. WFQ, Strict Queuing.
  - Bridge support for Q-in-Q.
  - Link aggregation 802.3AD.
  - WEB, CLI, Telnet management.
- **Connectors**
  - Power connector type: MIL-DTL-38999/24WA98PA
  - LAN connector type: MIL-D-38999/24WB35SN
  - LED indication per port (Speed, Link/Activity)
- **Chassis**
  - Low profile rugged aluminium extrusion
  - Conductively cooled w/custom internal heat-sinks
  - Ingress protection against sand, dust and moisture
  - Epoxy-Polyamide Paint, Per MIL-C-83286, semi-gloss
- **Standards**
  - MIL-STD-1275, MIL-STD-704A, MIL-STD-461E,
  - MIL-STD-810F GM, IP67/68
- **Voltage operation**
  - 24VDC (18VDC ~ 32VDC)

**MILITARY RUGGED SWITCH**  
MIL-STD-1275  
MIL-STD-704A  
MIL-STD-461E  
MIL-STD-810F/GM  
IP67

## Product specifications

### Performance

- 26.8 Mpps wire speed forwarding rate
- 20 Gbps maximum forwarding bandwidth
- 8K MAC address

### Standards compliance

- IEEE 802.1x MAC based authentication
- IEEE 802.1Q Vlan Tagging
- IEEE 802.1P QoS
- IEEE 802.1S Multiple STP
- IEEE 802.1W Rapid STP
- IEEE 802.3AD Link aggregation

### Power

- Exceed MIL-STD-1275B surge and spike protection
- Voltage input: 24Vdc nominal (18-32V)
- Power consumption : 7W typical
- Chassis grounding

### Electromagnetic

- MIL-STD-461E electromagnetic compatibility
- CE-102, CS-114, CS-115, CS-116, RE-102, RS-103

### Environmental : shock/vibration/humidity

- MIL-STD-810F, 501.4I, 501.4II, 502.4I, 502.4II, 507.4, 500.4II, 514, 516I, 516VI, 514.5, 512.4
- IP67/68

### Physical

- Dimensions: 269mm(L) x 133(W) x 79(H), including connectors & hardware
- Weight: 1.5 kg

### Installation

- Set of four 4.5 mounting holes on bottom for mounting to any flat surface.
- Carrying handles

### Cooling

- No moving parts. Passive cooling.

### Operating temp

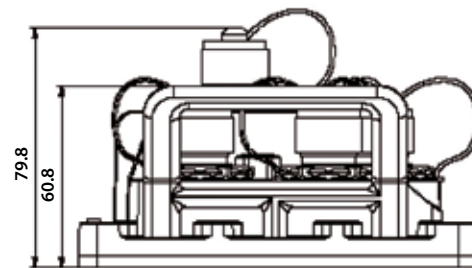
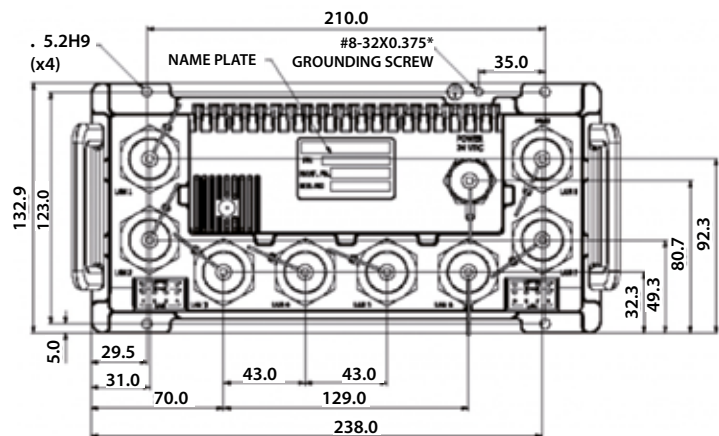
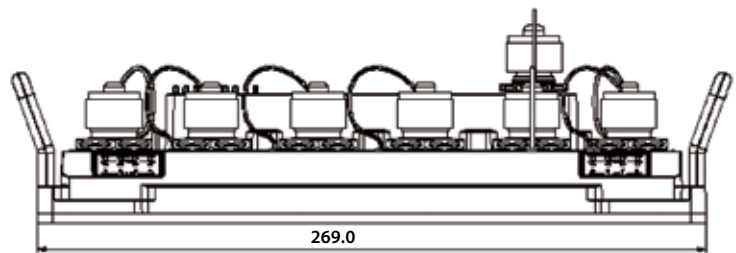
- -35°C to +75°C (-31°F to +167°F) / -35°C Cold start-up

### Storage temp

- -45°C to +85°C (-49°F to +185°F)

## Dimensional line drawing

All measurements are in millimeters



Part number code	Description
RESMLAC-8MG-CAPS	MIL-STD Rugged Managed Ethernet switch with 8 ports 10/100/1000TX, powered with 18-32VDC
RESMLAC-8MG-CBL-PWR-2M	Power cordset for RESMLAC-8MG-CAPS, 1 side with MIL-DTL-38999 plug, 1 side with 4mm plugs for power supply, cable 2m long
RESMLAC-8MG-CBL-LAN-2M	LAN cordset for RESMLAC-8MG-CAPS, 1 side with MIL-DTL-38999 plug, 1 side with RJ45 civilian, cable RJFSFTP5E cat 5E, 2m long
RESMLAC-8MG-CBL-MNG-2M	Management cordset for RESMLAC-8MG-CAPS, 1 side with MIL-DTL-38999 plug, 1 side with DB-9 civilian, cable 2m long

► For specific cable harnesses, please consult us.

# RESMLAC-8MG-CAPS-F35

## Managed military Ethernet switch, MIL-DTL-38999 connectors 8 Gigabit ports

Military ethernet switch for harsh environment - Fully MIL-STD-compliant

Amphenol's RESMLAC 8MG CAPS F35 is a MIL-STD fully managed Military-grade network switch offering 8 triple speed (10/100/1000) ports.

Developed for military and harsh avionic applications, the RESMLAC 8MG CAPS F35 features mechanical packaging enhancements designed for MIL-STD-810F airborne and ground environmental compliance and high reliability. The unit has been especially hardened to improve ingress, impact, and shock/vibration protection, as well as eliminate all moving parts through passive cooling, and interface through sealed MIL-DTL-38999 circular connectors.

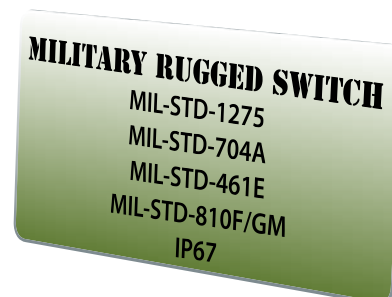
Leveraging best-in-class switching technology from Amphenol, the RESMLAC 8MG CAPS F35 serves as a robust COTS solution for providing local area network (LAN) connectivity to IP-enabled computing and net-centric devices. Compact in size, the RESMLAC 8MG CAPS F35 is particularly useful for expanding port density to tactical IP routers in space-constrained airborne and ground vehicle environments.

### Military applications

- Data acquisition & transmission
- Battlefield communication C4ISR
- Rugged Networks
- Mobile communications
- Combat vehicles
- Avionic & shipboard systems

### Key features

- **Ethernet ports**
  - Managed 8 x switched 10/100/1000 ports
- **Networking**
  - Spanning tree (802.1d), RSTP (802.1w) and multiple
  - Spanning tree (802.1S) for fast recovery rings
  - Security via Radius authentication 802.1x, port mirroring
  - Multicasting (IGMP Snooping), GARP, GMRP, and GVRP, Broadcasting and flooding control up to 8K groups.
  - 802.1q tagged based VLAN up to 4K VLAN groups.
  - QoS multi-layer classifier, 802.1p, ToS/DSCP traffic classification. WFQ, Strict Queuing.
  - Bridge support for Q-in-Q.
  - Link aggregation 802.3AD.
  - WEB, CLI, Telnet management.
- **Connectors**
  - Power connector type: MIL-DTL-38999/24WB35PN
  - LAN connector type: MIL-D-38999/24WF35PN
  - LED indication per port (Speed, Link/Activity)
- **Chassis**
  - Low profile rugged aluminium extrusion
  - Conductively cooled w/custom internal heat-sinks
  - Ingress protection against sand, dust and moisture
  - Epoxy-Polyamide Paint, Per MIL-C-83286, semi-gloss
- **Standards**
  - MIL-STD-1275B, MIL-STD-704A, MIL-STD-461A,
  - MIL-STD-810F GM, IP67/68
- **Voltage operation**
  - Nominal 24VDC



## Product specifications

### Performance

- 26.8 Mpps wire speed forwarding rate
- 20 Gbps maximum forwarding bandwidth
- 8K MAC address

### Standards compliance

- IEEE 802.1x MAC based authentication
- IEEE 802.1Q Vlan Tagging
- IEEE 802.1P QoS
- IEEE 802.1S Multiple STP
- IEEE 802.1W Rapid STP
- IEEE 802.3AD Link aggregation

### Power

- Exceed MIL-STD-1275B surge and spike protection
- Voltage input: 24Vdc nominal (18-32V)
- Power consumption : 7W typical
- Chassis grounding

### Electromagnetic

- Exceed MIL-STD-461A electromagnetic compatibility
- RE-02, RS-03

### Environmental : shock/vibration/humidity

- MIL-STD-810F, 501.4I, 501.4II, 502.4I, 502.4II, 507.4, 500.4II, 514, 516I, 516VI, 514.5, 512.4

### Physical

- Dimensions: 209.6mm(L) x 136(W) x 44.4(H), including connectors
- Weight: 1.1 kg

### Installation

- Set of four #10-32 captive screws for mounting to any flat surface

### Cooling

- No moving parts. Passive cooling.

### Operating temp

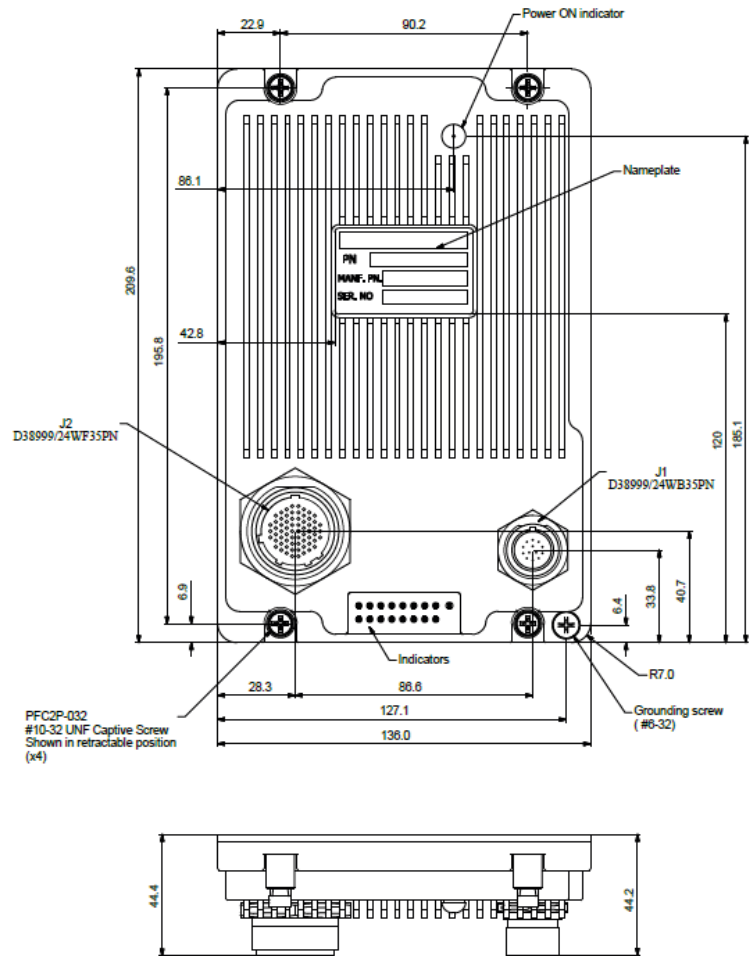
- -35°C to +75°C (-31°F to +167°F) / -35°C Cold start-up

### Storage temp

- -45°C to +85°C (-49°F to +185°F)

## Dimensional line drawing

All measurements are in millimeters



Part number code	Description
RESMLAC-8MG-CAPS-F35	MIL-STD Rugged Managed Ethernet switch with 8 ports 10/100/1000TX, powered with 18-32VDC
RESMLAC-F35-CBL-PWR-2M	Power cordset for RESMLAC-8MG-CAPS-F35, 1 side with MIL-DTL-38999 plug, 1 side with 4mm plugs for power supply, cable 2m long

► [For specific cable harnesses, please consult us.](#)

# RESMLAC-28MG

## Managed military Ethernet switch - 24 Gigabit + 4 combo 10G ports

Military ethernet switch for harsh environment - Fully MIL-STD compliant

The RESMLAC-28MG is a MIL-STD Fully managed Military-grade network switch offering 24 triple speed (10/100/1000) ports + 4 x 10G fiber ports.

The RESMLAC-28MG is compatible with all the newest military industry network protocols for redundant link topology, security, multi-cast and management requirements.

Developed specifically for military and harsh mobile applications, the RESMLAC-28MG features mechanical packaging enhancements designed for MIL-STD-810F airborne and ground environmental compliance and high reliability. The unit has been especially hardened to improve ingress, impact, and shock/vibration protection, as well as eliminate all moving parts through passive cooling, and interface through sealed MIL-D-38999 circular connectors and SCE.

Leveraging best-in-class switching technology, the RESMLAC-28MG serves as a robust COTS solution for providing local area network (LAN) connectivity to IP-enabled computing and net-centric devices. Compact in size, the RESMLAC-28MG is particularly useful for expanding port density to tactical IP routers in space-constrained airborne and ground vehicle environments.

### Military applications

- Data acquisition & transmission
- Battlefield communication C4ISR
- Rugged Networks
- Mobile communications
- Combat vehicles
- Avionic & shipboard systems



### Features

#### ■ Ethernet ports

- Managed 24 x switched 10/100/1000 ports (including 4 Combo ports) + 4x10Gbps Fiber ports - Total of 28 ports.
- The 4 Combo ports provide alternative 4 ports 100/1000Base-FX ports

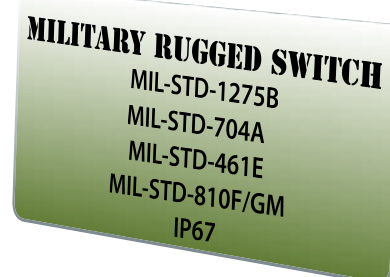
#### ■ Networking

##### General

- Wire-speed hardware-based 28 ports gigabit ethernet switch
- Multicasting (IGMP Snooping), GARP, GMRP, MLD and GVRP
- Multicast groups up to 8K for both IPv4 and IPv6
- Broadcasting and flooding control up to 8K groups
- 802.1q tagged based VLAN up to 4K VLAN groups
- Link Aggregation 802.3ad, up to 16 members in group
- Link Aggregation mechanism based on L2/ L3/ L4 parameters
- Jumbo Frame support up to 10K
- WEB, CLI, Telnet Management

##### Quality of service

- QoS Multi-Layer Classifier: 802.1p, EtherType, VLAN-ID, IPv4/ 6 DSCP/ ToS, and UDP/TCP ports & ranges traffic classification
- Per port WFQ and Strict Queuing scheduling
- DSCP remarking for both IPv4 and IPv6 frames
- Ingress policer and ingress shaper per port with 500Kbps granularity
- Egress shaper per port with 500Kbps granularity
- Full-duplex flow control (IEEE802.3X) and half-duplex backpressure, symmetric and asymmetric.





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### Security

- Security via Radius authentication 802.1x, Port/MAC access control
- Port security
- Per port ingress and egress port mirroring
- Mirroring per VLAN and per content awareness match
- Private VLAN support per VLAN (Isolated and Promiscuous ports)
- Content Aware Policers:
  - 128 Content Aware Policers
  - 16 Content Aware rate policers with rates from 1fps to 32 million fps
  - 8 UDP/TCP port range policers
  - Advanced ACL through hardware based match patterns
  - Content Aware Policers for generic MAC, ARP, IPv4, IPv6 protocols
  - No restriction on any mix of entries to Content Aware Policers
  - Content Aware Policers actions are permit/deny, police, count, snoop and mirror
  - Special support for IP fragments, UDP/TCP port ranges and ARP
  - Extensive CPU DoS prevention
  - Surveillance functions by Content Aware Policers counters
  - Multiple ACLs per port for optimal usage of Content Aware Policers
- Storm controllers for flooded broadcast, multicast and unicast

### Redundancy and ring protection

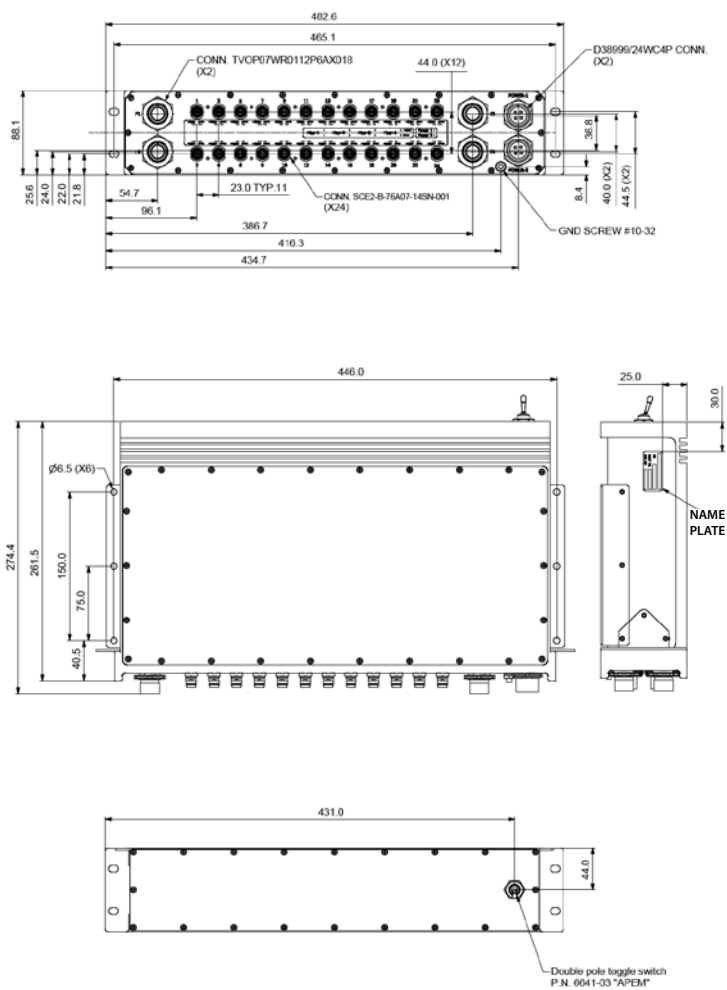
- Spanning tree (802.1d), RSTP (802.1w) and multiple Spanning tree (802.1s) for fast recovery rings
- RPR for up to 30 units per ring with recovery time <50ms hardware based
- RPR for up to 30 units per ring with recovery time <50ms hardware
- 20-Gbps bandwidth for ring topology
- QoS consistency across stack / ring
- Mirroring across stack / ring
- Link aggregation groups spanning multiple switches in stack/ring

### Connectors

- 2 x Power connector type: MIL-DTL-38999/24WC4P (1 optional)
- 24 x LAN connector type: SCE2-B-76A07-14SN-001 (4 ports are Gigabit Combo ports - 10/100/1000 or 1000FX fiber)
- Optional fiber optic connectors: TVOP (MIL-D-38999), or CTOS (STANAG 4290), or TACBEAM (M83526/20&21)
- 1 x Serial interface, shared with LAN port #1
- LED indication per Port (Speed, Link/Activity) per Unit (Power A, Power B)

### Dimensional line drawing

All measurements are in millimeters



#### ■ Chassis

- Low profile rugged aluminium extrusion
- Conductively cooled w/custom internal heat-sinks
- Ingress protection against sand, dust and moisture
- Epoxy-Polyamide Paint, Per MIL-C-83286, semi-gloss

#### ■ Standards

- MIL-STD-1275B, MIL-STD-704A, MIL-STD-461E, MIL-STD-810F GM, IP67
- Support up to 50ms holdup time, and 6VDC drops

#### ■ Performance

- 96.8 Mbps wire speed forwarding rate
- 56 Gbps maximum forwarding bandwidth
- 8K MAC address

#### ■ Power

- Exceed MIL-STD-1275B and MIL-STD-704A Surge and Spike protection with 50ms holdup time and 6VDC drops
- Voltage input:
  - VDC versions: 24VDC nominal (18-32VDC)
  - VAC versions: 90-265 VAC / 47-65 Hz
- Power consumption: 20W typical
- Chassis grounding

#### ■ Electromagnetic

- MIL-STD-461E Electromagnetic compatibility
- CE-102, CS-114, CS-115, CS-116, RE-102, RS-103

#### ■ Shock / Vibration / Humidity

- MIL-STD-810F, 501.4I, 501.4II, 502.4I, 502.4II, 507.4, 500.4II, 514, 516I, 516VI, 514.5, 512.4

#### ■ Physical

- Dimensions: 440mm (L) x 200mm (W) x 88(H), including connectors & hardware, 2U, 19" rack
- Weight: 5.6 kg

#### ■ Installation

- Set of four 4.5mm mounting holes on bottom for mounting to any flat surface
- 19" standard mounting ears

#### ■ Cooling

- No moving parts. Passive cooling.

#### ■ Operating temp

- -35°C to +75°C (-31°F to +167°F) / -35°C cold start-up

#### ■ Storage temp

- -45°C to +85°C (-49°F to +185°F)

#### Part number code

	RESMLAC-28MG	-	M	TVOP	10G	DC
<b>Fiber optic ports</b>						
(empty)	No fiber optic ports					
2	2 fiber optic ports					
4	4 fiber optic ports					
<b>Type of fiber optic</b>						
M	Multimode fiber optic, 2 ways, 50/125µm					
S	Singlemode fiber optic, 2 ways, 9/125µm					
WDM	WDM Singlemode fiber optic, 1 single way (10G only), 9/125µm					
<b>Fiber optic connectors</b>						
TVOP	TVOP connector with butt joint, MIL-D-38999					
CTOS	CTOS connector with expanded beam, for intensive use in harsh environments, STANAG 4290					
TACB	TACBEAM connector with expanded beam, M83526/20&21					
<b>Datarate for fiber optic ports</b>						
G	1000 Mbps					
10G	10G					
<b>Voltage input</b>						
DC	Unit powered with 18-36VDC					
VAC	Unit powered with 90-265 VAC / 47-65 Hz					

#### Part number code

#### Description

RESMLAC-28MG-CBL-PWR-2M	Power cordset for RESMLAC-28MG, 1 side with MIL-DTL-38999 plug, 1 side with 4mm plugs for power supply, cable 2m long
RESMLAC-28MG-CBL-MNG-2M	Management Cordset for RESMLAC-28MG, SCE2B-L1K-0714PN on one side, DB-9 female plug on the other side, length 2m
RESMLAC-28MG-CBL-LAN-2M	LAN Cordset for RESMLAC-28MG, 1 termination with SCE2B-L1K-0714PN, 1 termination with RJ45, RJFSFTP5E cat 5E cable 2m

► **For specific cable harnesses, please consult us.**

# RJSML-8US1 & RJSML-8UG1

## Unmanaged military Ethernet switch - Fast or Gigabit

Military ethernet switch for harsh environment with industrial EMI compliancy

### Sealed, rugged & unmanaged switch

Amphenol offers an unmanaged Ethernet switch with 8 gigabit ports RJSML-8UG1.

The switch can withstand a variety of extreme conditions. Whatever the situation - high temperatures, extreme shocks & vibrations, dust particles or even liquid immersion- there is a solution available.

The switch electronics are sealed within a waterproof IP68 metallic enclosure.

The conductive cadmium plating is suitable for most demanding EMI-RFI environments. Black paint is also offered when RoHS is required (other colors available).

The I/O interface includes redundant power inputs as well as waterproof rugged RJ45 connectors from the RJFTV FIELD threaded product series based on MIL-DTL-38999 (Series III) metallic shell size 19. This serie enables the transformation without tooling of any standard RJ45 cordset into a robust and waterproof connection system.

### Military applications

- Battlefield communication C4ISR
- Rugged Networks
- Mobile communications
- Avionic & shipboard systems

### Key features

- **Rugged environmental feature**
  - Rugged metal packaging with cadmium or paint protection
  - Mil-DTL-38999 III connectors for both power and Ethernet ports
  - IP65/IP68 rated when mated
  - Power filtering and protection (-704 option)
    - MIL-STD-461E (CE03) 600V spike suppressor
    - MIL-STD-704A
    - MIL-STD-1275A
    - RT CA/DO-160B
  - MIL-STD-810F shocks
  - RTCA/DO-160C Vibrations
  - Full-Duplex operation with flow control (no collisions!)
  - MIL STD 810F altitude 50,000 ft (15,000 m)
  - Auto-detecting, auto-crossover and auto-polarity
  - Broadcast storm protection
- **Models 8US1**
  - 8 ports 10/100-BaseT(X)
  - Wide operating temperature range of -40°C to 70°C
- **Models 8UG1**
  - 8 ports 10/100/1000-BaseT(X)
  - Wide operating temperature range of -10°C to 60°C
  - Supports Jumbo frame transmission up to 9kbytes
- **Models 8UG1-ET**
  - 8 ports 10/100/1000-BaseT(X)
  - Wide operating temperature range of -40°C to 70°C
  - Supports Jumbo frame transmission up to 9kbytes



## IEEE Ethernet standards

Models	Features	802.3/u	802.3x	802.3ab
RJS XX 8US1 XX	Unmanaged - Fast	●	●	X
RJS XX 8UG1 XX	Unmanaged - Gigabit	●	●	●

IEEE 802.3/u	10 Mbps & 100 Mbps fast Ethernet
IEEE 802.3x	Full-Duplex with flow control
IEEE 802.3ab	1000 Mbps Gigabit Ethernet

## Ethernet features

<b>RJ45 Ports</b>	8 shielded RJ45 ports 10/100 BaseT(X) or 1000 Base T(X)
<b>Connectors for RJ45 ports</b>	RJFTV: jam nut receptacle based on MIL-DTL-38999 III Olive drab cadmium or nickel plated
<b>RJ45 speed</b>	10, 100 or 1000 Mbps auto -negotiation
<b>Full / Half duplex</b>	Automatic
<b>MDI/MDIX</b>	Auto-crossover

## Environmental specifications

<b>Safety</b>	UL 60950-1, CAN/CSA-C22.2 No.60950
<b>EMI emissions</b>	U.S.A.: FCC Part 15 CISPR 22 U.E. EN55011, EN61000-6-4, EN55022 Class A, EN61000-3-2/3, EN55024, IEC61000-4-2/3/4/5/6/8, EN61000-6-2
<b>Shocks</b>	MIL-STD-810F: 40g, 11 ms, 18 saw tooth shocks
<b>Vibrations</b>	RTCA/DO-160C sinusoidal vibrations 5-55 Hz: 0.01 inch: 55-500 Hz : 1.5 g
<b>Altitude</b>	MIL-STD-810F: 50.000 ft - 15.000 m
<b>Temperature</b>	Operating models 8UG1: -10°C to +60°C models 8US1: -40°C to +70°C models 8UG1-ET: -40°C to +70°C Storage all models: -40°C to +85°C

<b>Weight</b>	approx 2.8 kg
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## Power supply

<b>Input voltage</b>	8US1, 8UG1, & 8UG1-ET: 12-48 VDC, redundant power input (P1 and P2) 8US1-704 & 8UG1-704: 12-33 VDC, single power input (P1 only) 8US1-PSM & 8UG1-PSM: 85-264 VAC single power input
<b>Input power</b>	5 W max
<b>Connectors for power</b>	MIL-DTL-38999 III jam nut receptacle, olive drab cadmium or nickel plated 1 connector TVx07xx0935P: 6 cts # 22D (wire 0.38 mm <sup>2</sup> maxi) 1 connector TVx07xx0935PA (for PSM option)
<b>"OK" contact output</b>	Sourcing power ; maximum current: 1 A @ 24VDC Not available for -704 and -PSM options

## Additional power protection for models MG7F3G-704 (option-704)

MIL-STD-461E	CE102 conducted emission
DEF-STAN-59-41	DCE01/DCE02
DEF-STAN-61-5	Pt 6
MIL-STD-704A	600V input transient, applied for 10us
MIL-STD-1275A	Spikes: +/- 250 V for 100us Surges: 100 V for 50 ms at 0.5 mohm Ripple: 14VAC pk-pk

## Description

- 1 IP68 aluminium enclosure with cadmium conductive plating or black paint (RoHS)
- 2 Redundant power inputs
- 3 Balance pressure vent
- 4 8 rugged IP68 RJ45 Ethernet ports
- 5 Fixture for vertical mounting

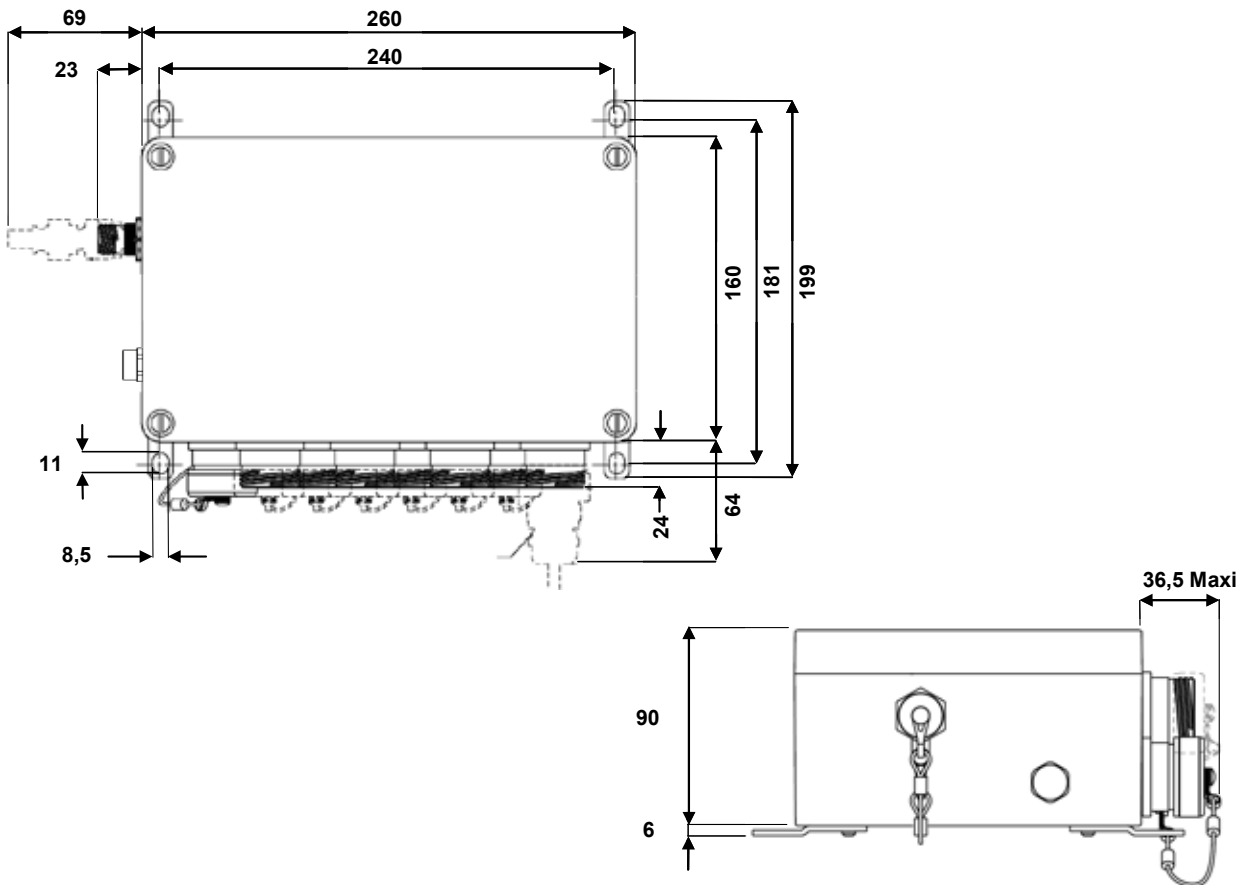
Optional caps available

### IMPORTANT NOTE

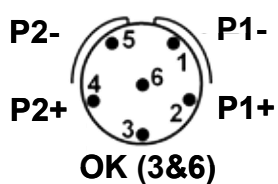
This model has no LED indicator.



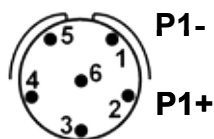
## Description (in mm)



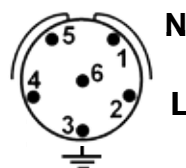
## Pin-out for the power connector



8US1, 8UG1, & 8UG1-ET  
P1 and/or P2: 12-48 VDC



8US1-704 & 8UG1-704  
P1: 12-33VDC  
3, 4, 5, 6: not connected



8US1-PSM & 8UG1-PSM  
L: 85-264 VAC  
4, 5, 6: not connected

## Part number code

Series	RJS	ML	8US1	-	-	-
<b>Type of Enclosure</b>						
<b>ML:</b> MIL-DTL-38999 (series III) Receptacles, OD Cadmium Plating						
<b>BKN:</b> RAL 9005 (Jet black) Paint on Aluminium box, Nickel plated 38999 (series III) Receptacles, ROHS compliant						
<b>Type of Electronics</b>						
<b>8US1:</b> unmanaged 8 ports 10/100 Base T(X), wide temperature range						
<b>8UG1:</b> unmanaged 8 ports 10/100/1000 Base T(X)						
<b>8UG1-ET:</b> unmanaged 8 ports 10/100/1000 Base T(X), wide temperature range						
<b>Optional: transient suppression module; 600V spike suppressor</b>						
<b>(Blank):</b> no transient suppression module						
<b>704:</b> switch equipped with additional transient suppression module						
<b>Optional: AC power supply</b>						
<b>(Blank):</b> DC powered						
<b>PSM:</b> switch powered with 85-264 VAC instead of DC power						
<b>Optional: Caps for receptacles fixed with cord directly to the receptacle</b>						
<b>(Blank):</b> no caps included. The Ethernet ports are still sealed but the contacts are not protected.						
<b>CAPS:</b> attached caps for both power and data included						

**Example:** RJS ML 8UG1 704 CAPS: unmanaged switch in an aluminum enclosure with olive drab green conductive cadmium plating, 8 gigabit ports, RJFTV threaded coupling receptacles, additional transient suppression module, caps are added to the switch

**Remark:** All BKN Ethernet switches and nickel plated accessories are RoHs compliant.

-704- and -PSM- options can not be selected together.

With the -704- option, a filter module is included inside the switch allowing to meet MIL-STD-461 and other aircraft standards.

With the -CAPS- option, all the receptacles come pre-equipped with a cap.

## Accessories

Plugs for Ethernet ports  
 RJF TV 6 M G: cadmium OD plating  
 RJF TV 6 M N: nickel plating  
 Based on MIL-DTL-38999  
 No tool required !!!



Caps for Ethernet ports  
 RJSML C7G: cadmium OD plating  
 RJSML C7N: nickel plating  
 A simple screwdriver is needed!



Plugs for I/O ports:  
 MIL-DTL-38999,  
 cadmium plated, crimp contacts  
 Two plugs (6 cts # 22D)  
 TV 06 RW 0935 S: cadmium OD plating  
 TV S06 RF 0935 S: nickel plating



Backshells for I/O plugs  
 We suggest to use MIL-DTL-38999 III backshells.  
 Consult the dedicated catalog (E118) for details.  
 Examples:  
 TVNSA 09 014 : shielding backshell, cadmium OD plating  
 TVNSA 09 023: shielding backshell, nickel plating  
 + 804221 straight heat shrink for sealing



**Example:** RJS ML 8UG1 704 CAPS

with an RJSML 8UG1 704 CAPS switch, we suggest to use hereafter accessories:

RJF TV 6 M G (up to 8) for Ethernet ports

TV 06 RW 0935 S + TVNSA 09 014 + 804221 for power port

# RJSML-8MF

## Managed military Ethernet switch - Fast

Military Ethernet switch for harsh environment with industrial EMI compliancy

### Sealed, rugged & managed switch

Amphenol offers a managed Ethernet switch with 8 fast ports RJSML-8MF1.

The switch can withstand a variety of extreme conditions. Whatever the situation - high temperatures, extreme shocks & vibrations, dust particles or even liquid immersion- there is a solution available.

The switch electronics are sealed within a waterproof IP68 metallic enclosure.

The conductive cadmium plating is suitable for most demanding EMI-RFI environments. Black paint is also offered when RoHS is required (other colors available).

The I/O interface includes redundant power inputs as well as waterproof rugged RJ45 connectors from the RJFTV FIELD threaded product series based on MIL-DTL-38999 (Series III) metallic shell size 19. This serie enables the transformation without tooling of any standard RJ45 cordset into a robust and waterproof connection system.

### Military applications

- Data Acquisition & Transmission
- Battlefield communication C4ISR
- Rugged Networks
- Mobile communications
- Test Equipment

### Key features

- 8 Fast Ethernet (10/100 Mbps) ports
- Rugged environmental feature
  - Rugged metal packaging with cadmium or paint protection
  - MIL-DTL-38999 III connectors for power
  - MIL-DTL-38999 III RJFTV connectors for Ethernet ports
  - IP65/IP68 rated when mated
- Power filtering and protection (-704 option only)
  - MIL-STD-461E (CE03) 600V spike suppression
  - MIL-STD-704A
  - MIL-STD-1275A
  - RTCA/DO-160B
- MIL-STD-810F shocks
- RTCA/DO-160C Vibrations
- Wide operating temperature range of -40°C to +70°C
- MIL-STD-810F Altitude 50,000 ft (15.000 m)

### Ethernet features

- Full-Duplex operation with flow control (no collisions!)
- Auto-detecting, auto-crossover and auto polarity
- RSTP redundant rings, Couple rings
- QoS and CoS priority queuing
- SNMP v1/V2C authentication
- IGMP for multicast filtering
- VLAN for traffic segregation
- And much more!



### IEEE Ethernet standards

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

### Ethernet features

- RJ45 Ports 8 shields RJ45 ports 10/100 BaseT(X)
- Connectors for RJ45 ports RJFTV: jam nut receptacle based on MIL-DTL-38999 III  
Olive drab cadmium or Nickel plated
- RJ45 speed 10 or 100 Mbps auto -negotiation
- Full / Half Duplex Automatic or Configurable
- RJ45 MDI/MDIX Auto-crossover
- RJ45 TD and RD polarity Auto-polarity
- Memory bandwidth 1.6 Gbps (backplane)
- Ethernet isolation 1500 Vrms 1 minute
- Ring features Advantech X-Ring Pro, Dual Homing, Couple Ring

### Environmental specifications

- EMI emissions EN55022 class A, FCC part 15, IC ES-003
- EMC immunity EN 61000-4-2  
EN 61000-4-3  
EN 61000-4-4  
EN 61000-4-5  
EN 61000-4-6  
EN 61000-4-8
- Shocks MIL-STD-810F: 40g, 11ms, 18 saw tooth shocks
- Vibrations RTCA/DO-160C Sinusoidal vibrations 5-55 Hz: 0.01 inch ; 55-500 Hz: 1.5 g
- Altitude MIL-STD-810F: 50.000 ft - 15.000 m
- Temperature Operating -40°C to +70°C  
Storage -40°C to +85°C

### Weight

Approx 2.8 kg

### Power supply

- Input voltage 8MF1 12-48 VDC, redundant power input (P1 and P2)  
8MF1-704 12-33 VDC, single power input (P1 only)  
8MF1-PSM 85-264 VAC single power input
- Input power 7.6 W max
- Connectors for power MIL-DTL-38999 III jam nut receptacle, olive drab cadmium or nickel  
1 connector TVx07xx0935P: 6 cts # 22D (wire 0.38 mm2 maxi)
- "OK" contact output Sourcing power ; Maximum current: 1 A @ 24VDC  
Not available for -704 and -PSM options

### Additional power protection for models 8MF1-704 (option-704)

- MIL-STD-461E CE102 Conducted emission
- DEF-STAN-59-41 DCE01/DCE02
- DEF-STAN-61-5 Pt 6
- MIL-STD-704A 600V input transient, applied for 10us
- MIL-STD-1275A Spikes: +/- 250 V for 100us  
Surges: 100 V for 50 ms at 0.5 mohm  
Ripple: 14VAC pk-pk



## Description

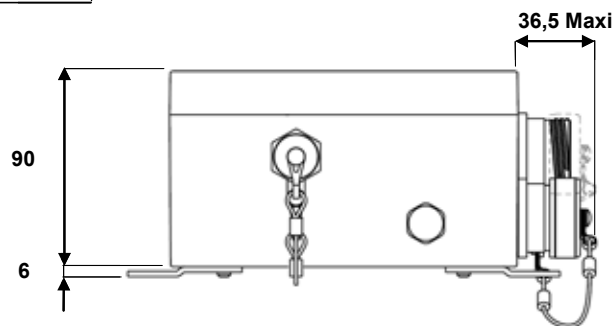
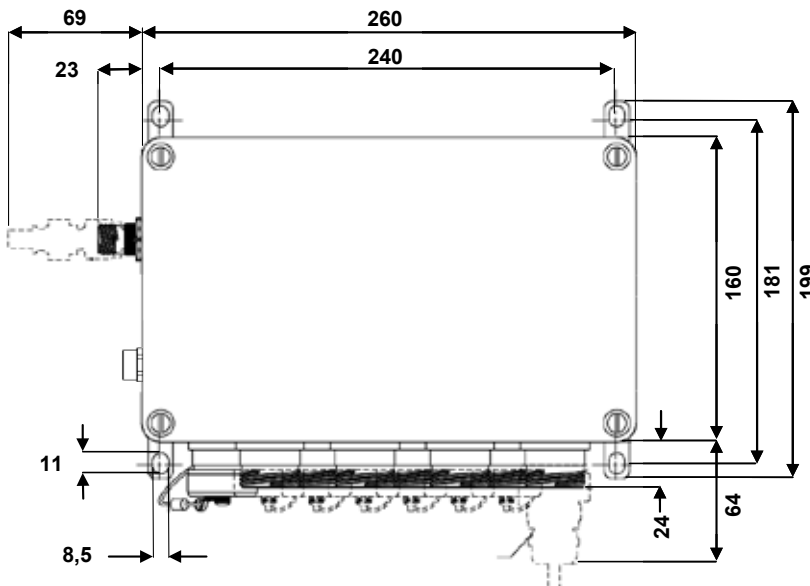
- ① IP68 Aluminum enclosure
- ② Redundant power inputs
- ③ Balance pressure vent
- ④ 8 Rugged IP68 RJ45 Ethernet ports
- ⑤ Fixture for vertical mounting
- ⑥ Optional caps available



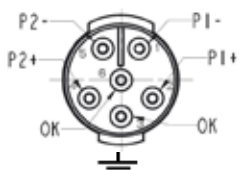
### IMPORTANT NOTE

This model has no LED indicator.  
Management is done through a web browser

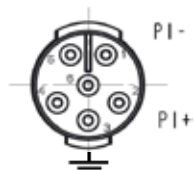
## Dimensions (in mm)



## Pin-out for the power connector



P1 and/or P2: 12-48VDC



P1: 12-48VDC  
3, 4, 5, 6: Not connected



L: 85-264 VAC  
4, 5, 6: Not connected

## Part number code

Series	RJS	ML	8MF1	-	-	CAPS
<b>Protection and color</b>						
<b>ML:</b> Olive Drab Cadmium Plating on enclosure and receptacles						
<b>BKN:</b> RAL 9005 (Jet Black) Paint on enclosure, Nickel plated receptacles, ROHS compliant						
<b>ML1019:</b> RAL 1019 (Sand) Paint on enclosure, Olive Drab Cadmium plated receptacles						
<b>BKN9010:</b> RAL 9010 (White) Paint on enclosure, Nickel plated receptacles, ROHS compliant						
<b>Type of Electronics</b>						
<b>8MF1:</b> managed 8 ports 10/100 BaseT(X) Ethernet switch						
<b>Optional: transient suppression module; 600V spike suppressor</b>						
<b>(Blank):</b> no transient suppression module (standard model)						
<b>704:</b> switch equipped with additional transient suppression module						
<b>Optional: AC power supply</b>						
<b>(Blank):</b> (standard model)						
<b>PSM:</b> switch powered with 85-264 VAC instead of DC power						
<b>Optional: Caps for receptacles fixed with cord directly to the receptacle</b>						
<b>(Blank):</b> no caps included. The Ethernet ports are still sealed but the contacts are not protected. Caps can be ordered separately.						
<b>CAPS:</b> attached caps for both power and Ethernet ports included (standard model)						

**Example:** RJS ML 8MF1 CAPS      Managed Ethernet switch in an aluminum enclosure with olive drab green conductive cadmium plating over enclosure and receptacles, 8 ports 10/100 BaseT(X) RJFTV threaded coupling receptacles, caps screwed to the switch.

### Remark:

All BKN and BKN9010 switches and nickel plated accessories are RoHS compliant.  
704 and PSM options can not be selected together.  
With the -704 option, a filter module is included inside the switch allowing to meet MIL-STD-461 and other airborne standards.  
With the -CAPS option, all the receptacles comes pre-equipped with a cap.

## Accessories

Plugs for Ethernet ports  
RJF TV 6 M G: cadmium OD plating  
RJF TV 6 M N: nickel plating  
Based on MIL-DTL-38999  
No tool required !!!



Caps for Ethernet ports  
RJSML C7G: cadmium OD plating  
RJSML C7N: Nickel plating  
A simple screwdriver is needed!



Plugs for I/O ports  
MIL-DTL-38999,  
cadmium plated, crimp contacts  
two plugs (6cts # 22D)  
TV 06 RW 0935 S: cadmium OD plating  
TV S06 RF 0935 S: nickel plating



Backshells for I/O plugs  
We suggest to use MIL-DTL-38999 III  
backshells  
Consult the dedicated catalog (E118) for  
details



**Examples:**  
TVNSA 09 014: shielding backshell, cadmium OD plating  
TVNSA 09 023: shielding backshell, nickel plating + 804221 straight heat shrink for sealing

**Example:** RJS ML 8MF1 CAPS      With a RJSML 8MF1 CAPS Ethernet switch, we suggest to use hereafter accessories:  
RJF TV 6 MG (up to 8) for Ethernet ports  
TV 06 RW 0935S + TVNSA 09 014 + 804221 heatshrink for power ports

# RJSML-MG7F3G

## Managed military Ethernet switch - 7 fast ports + 3 Gigabit ports

Military ethernet switch for harsh environment with industrial EMI compliancy

### Sealed, rugged & managed switch

Amphenol offers a 10 ports managed Ethernet switch RJSML-MG-7F3G.

Note: this model replaces the RJSML-9MG1 and the RJSML-9RG1.

The switch can withstand a variety of extreme conditions: whatever the situation - high temperatures, extreme shocks and vibrations, dust particles or even liquid immersion there is a solution available.

The switch electronics are sealed within a waterproof IP68 metallic enclosure.

The conductive cadmium plating is suitable for most demanding EMI-RFI environments. Black paint is also offered when RoHs is required (others colors available).

The I/O interface includes redundant power inputs as well as waterproof rugged RJ45 connectors from the RJF TV FIELD threaded product series based on MIL-DTL-38999 (Series III) metallic shell size 19.

This serie enables the transformation without tooling of any standard RJ45 cordset into a robust and waterproof connection system.

### Military applications

- Data acquisition & transmission
- Battlefield communication C4ISR
- Rugged Networks
- Mobile communications
- Test equipment
- Avionic & shipboard systems

### Key features

- **Rugged environmental feature**
  - Rugged metal packaging with cadmium or paint protection
  - Mil-DTL-38999 III connectors for both power and Ethernet ports
  - IP65/IP68 rated when mated
  - Power filtering and protection (-704 option)
    - MIL-STD-461E (CE03) 600V spike suppressior
    - MIL-STD-704A
    - MIL-STD-1275A
    - RTCA/DO-160B
  - MIL-STD-810F shocks
  - RTCA/DO- 160C Vibrations
  - Wide operating temperature range of -40°C to 70°C
  - MIL-STD-810F Altitude 50,000 ft 15,000 m
- **Ethernet features**
  - 3 ports 10/100/1000-BaseT(X) + 7 ports 10/100-BaseT(X)
  - Full-Duplex operation with flow control (no collisions!)
  - Auto-detecting, auto-crossover and auto-polarity
  - MIL-STD-810F shocks
  - RSTP for redundant rings
  - QoS and CoS priority queuing
  - SNMPv3 authentication and encryption
  - IGMP for multicast filtering
  - VLAN for traffic segregation
  - And much more !



## IEEE Ethernet standards

Models	Features	802.3/u	802.3x	802.3z	802.1p	802.1D	802.1w	802.1Q
RJS XX MG 7F3G XX	Managed - Gigabit	●	●	●	●	●	●	●
IEEE 802.3/u	10 Mbps & 100 Mbps fast Ethernet			IEEE 802.1p	Priority queuing - QoS, CoS, ToS/DS			
IEEE 802.3x	Full-Duplex with flow control			IEEE 802.1D/w	Rapid spanning tree for redundant rings			
IEEE 802.3ab	1000 Mbps Gigabit Ethernet			IEEE 802.1Q	VLAN for traffic segregation			

### Ethernet features

<b>RJ45 ports</b>	10 shields RJ45 ports 10/100 BaseT(X) or 1000 Base T(X)
<b>Connectors for RJ45 ports</b>	RJFTV: jam nut receptacle based on MIL-DTL-38999 III Olive drab cadmium or Nickel plated
<b>RJ45 speed</b>	10 or 100 Mbps auto-negotiation
<b>Typical latency</b>	16 us + frame time @ 10 Mbps (varies on load and settings) 5 us + frame time @ 100 Mbps
<b>Full / Half Duplex</b>	Automatic or configurable
<b>RJ45 MDI/MDIX</b>	Auto-crossover
<b>RJ45 TD and RD polarity</b>	Auto-polarity
<b>MAC addresses supported</b>	8192
<b>Memory bandwidth</b>	32 Gbps (gigabit) ; 3.2 Gbps for all other models
<b>Ring features</b>	Link loss recovery time: 30 ms plus 5 ms per hop
<i>(for Ring model only)</i>	Maximum switches in ring: 50+ Dual Ring support

### Environmental specifications

<b>EMI emissions</b>	EN55022 class A, FCC part 15, IC ES-003
<b>EMC immunity</b>	IEC61326-1, IEEE C37.90
<b>Shocks</b>	MIL-STD-810F: 40g, 11ms, 18 saw tooth shocks
<b>Vibrations</b>	RTCA/DO-160C sinusoidal vibrations 5-55 Hz: 0.01 inch ; 55-500 Hz: 1.5 g
<b>Altitude</b>	MIL-STD-810F: 50.000 ft - 15.000 m
<b>Temperature</b>	Operating -40°C to +70°C Storage -40°C to +85°C

**Weight** approx 2.8 kg

### Power supply

<b>Input voltage</b>	MG7F3G: 10-30 VDC, redundant power input (P1 and P2) MG7F3G-704: 10-30 VDC, single power input (P1 only) MG7F3G-PSM: single power input AC or DC <ul style="list-style-type: none"> <li>- AC voltage: 85-264 VAC/Frequency 47-63 Hz</li> <li>- DC voltage: 120-370 VDC</li> </ul>
<b>Input power</b>	5 W typical (all ports active)
<b>Connectors for power</b>	MIL-DTL-38999 III jam nut receptacle, olive drab cadmium or nickel plated 1 connector TVx07xx0935P: 6 cts # 22D (wire 0.4 mm <sup>2</sup> maxi)
<b>"OK" contact output</b>	Sourcing power ; Maximum current : 0.5 A MG7F3G: ON if P1 and P2 have power and switch software is running MG7F3G-704: ON when software is running MG7F3G-PSM: ON when software is running; output power: 24VDC

### Additional power protection for models MG7F3G-704 (option-704)

MIL-STD-461E	CE102 Conducted emission
DEF-STAN-59-41	DCE01/DCE02
DEF-STAN-61-5	Pt 6
MIL-STD-704A	600V input transient, applied for 10us
MIL-STD-1275A	Spikes: +/- 250 V for 100us Surges: 100 V for 50 ms at 0.5 mohm Ripple: 14VAC pk-pk

## Description

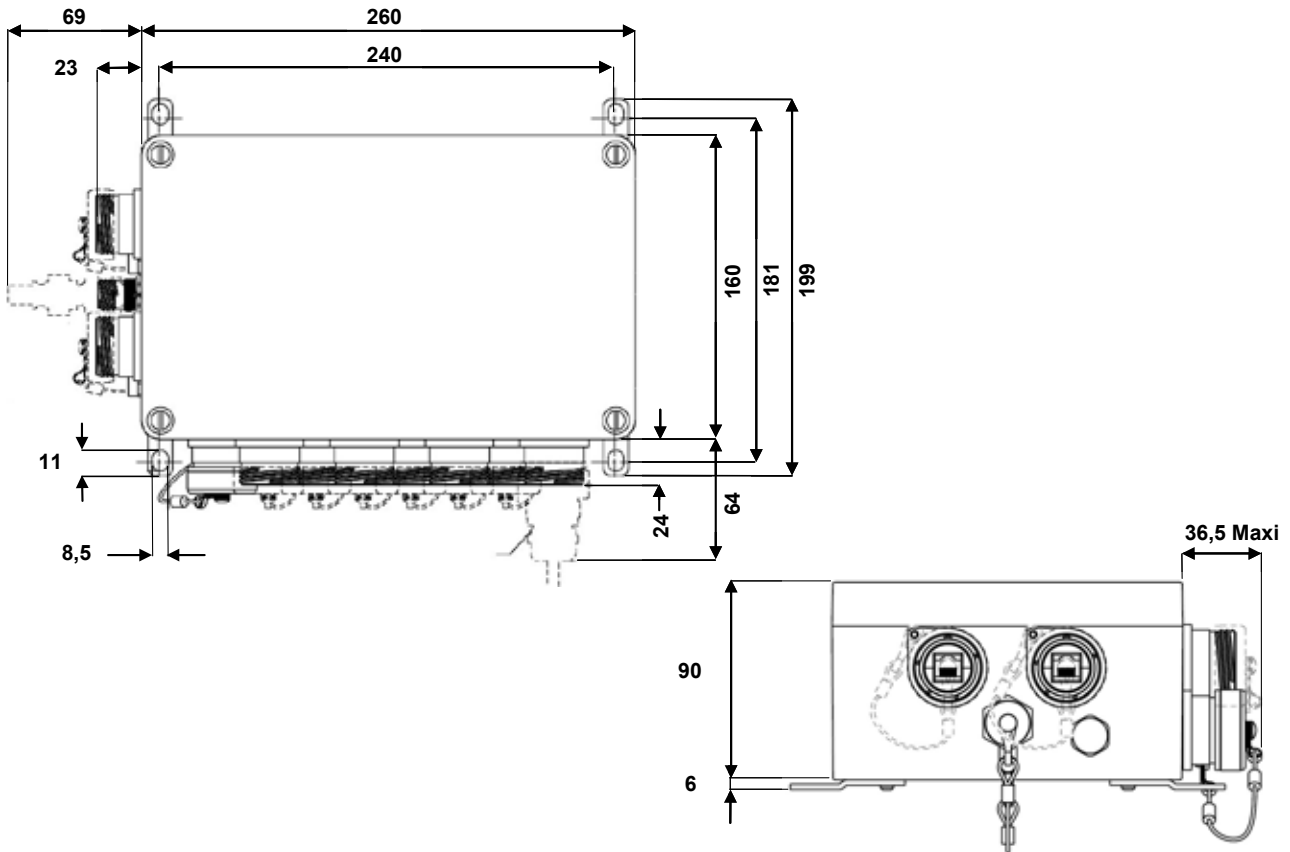
- 1 IP68 aluminium enclosure with cadmium conductive plating or black paint (RoHS)
- 2 Redundant power inputs
- 3 Balance pressure vent
- 4 10 rugged IP68 RJ45 Ethernet ports
- 5 Fixture for vertical mounting
- 6 Optional caps available



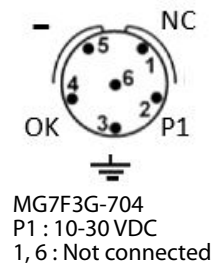
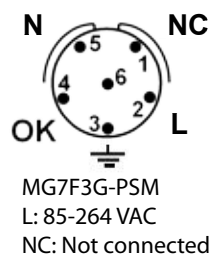
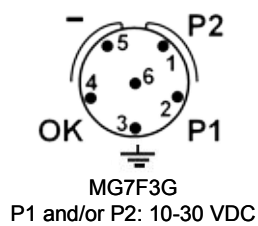
### IMPORTANT NOTE

This model has no LED indicator.  
Management is done through a web browser

## Description (in mm)



## Pin-out for the power connector



## Part number code

Series	RJS	ML	MG7F3G	-	-	-
<b>Type of Enclosure</b>						
<b>ML:</b> MIL-DTL-38999 (series III) receptacles, OD Cadmium plating						
<b>BKN:</b> RAL 9005 (jet black) paint on aluminium box, nickel plated 38999 (series III) receptacles, ROHS compliant						
<b>Type of Electronics</b>						
<b>MG7F3G:</b> managed 7 ports 10/100 Base T(X) + 3 ports 10/100/1000 BaseT(X)						
<b>Optional: transient suppression module; 600V spike suppressor</b>						
<b>(Blank):</b> no transient suppression module						
<b>704:</b> switch equipped with additional transient suppression module						
<b>Optional: AC power supply</b>						
<b>(Blank):</b> DC powered						
<b>PSM:</b> switch powered with 85-264 VAC instead of DC power						
<b>Optional: Caps for receptacles fixed with cord directly to the receptacle</b>						
<b>(Blank):</b> no caps included. The Ethernet ports are still sealed but the contacts are not protected.						
<b>CAPS:</b> attached caps for both power and data included						

**Example:** RJS ML MG7F3G 704 CAPS Managed switch in an aluminium enclosure with olive drab green conductive cadmium plating, 7 ports 10/100 Base T(X) + 3 gigabit ports, RJF TV threaded coupling receptacles, additional transient suppression module, caps are added to the switch.

**Remark:** All BKN Ethernet switches and nickel plated accessories are RoHs compliants.  
 704 and PSM options can not be selected together.  
 With the -704 option, a filter module is included inside the switch allowing to meet MIL-STD-461 and other aircraft standards.  
 With the -CAPS option, all the receptacles comes pre-equipped with a cap.

## Accessories

Plugs for Ethernet ports  
 RJF TV 6 M G: cadmium OD plating  
 RJF TV 6 M N: nickel plating  
 Based on MIL-DTL-38999  
 No tool required !!!



Caps for Ethernet ports  
 RJSML C7G: cadmium OD plating  
 RJSML C7N: Nickel plating  
 A simple screwdriver is needed!



Plugs for I/O ports:  
 MIL-DTL-38999,  
 cadmium plated, crimp contacts  
 Two plugs (6 cts # 22D)  
 TV 06 RW 0935 S: cadmium OD plating  
 TV S06 RF 0935 S: nickel plating



Backshells for I/O plugs  
 We suggest to use MIL-DTL-38999 III backshells.  
 Consult the dedicated catalog (E118) for details.  
 Examples:  
 TVNSA 09 014 : shielding backshell,  
 cadmium OD plating  
 TVNSA 09 023: shielding backshell, nickel plating  
 + 804221 straight heat shrink for sealing



**Example:** RJS ML MG7F3G 704 CAPS With a RJSML MG7F3G 704 CAPS switch, we suggest to use hereafter accessories :  
 RJF TV 6 M G (up to 10 ) for Ethernet ports  
 TV 06 RW 0935S + TVNSA 09 014 + 804221 for power ports

# Rugged USB Solutions

NEW

## USB3.0 & USB2.0



Field installable

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# USB3F TV (USB-A)

USB connection system for harsh environment



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

### 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
- 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



Amphenol

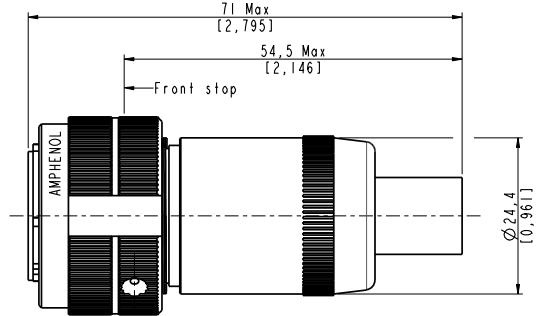
### Part number code: plug and receptacles without cordset.

Series USB3 Field TV	USB3FTV	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

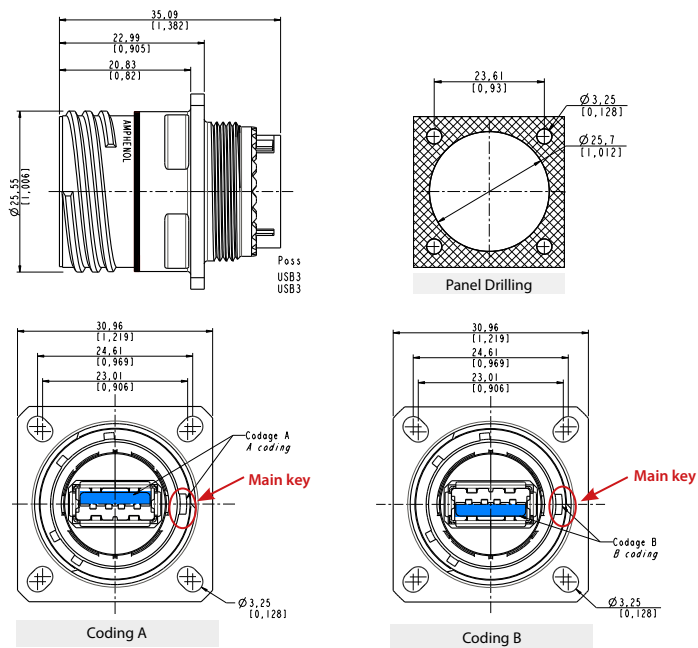
- Shell type 6
- Part number type: **USB3 FTV 6 x**
- Nota:** assembling instructions on page 89



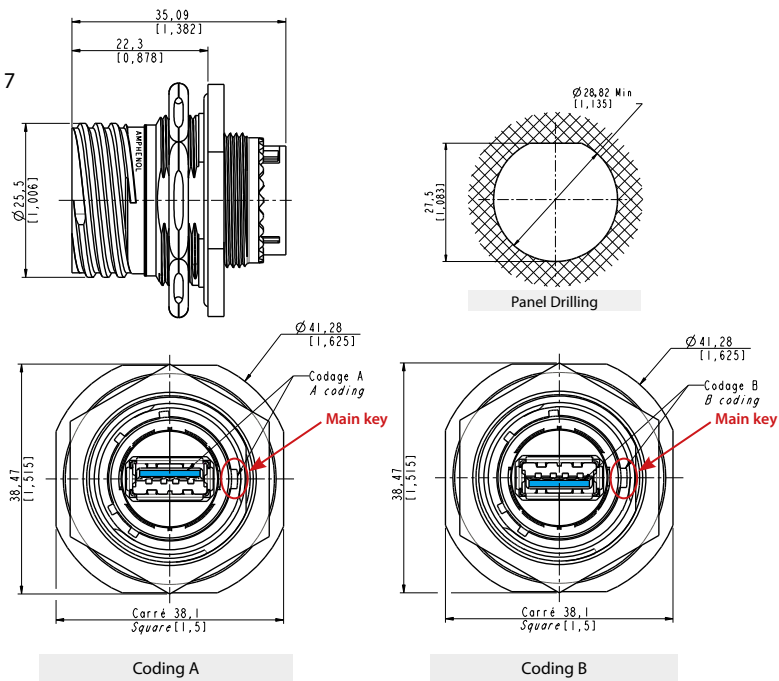


## Receptacles

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

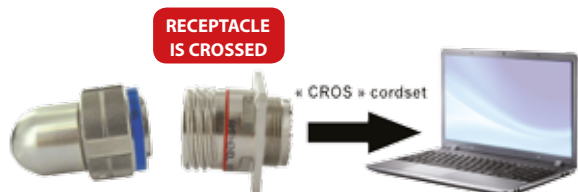


- Jam nut receptacle  
Hexagonal nut mounting - Shell type 7  
Part number type: **USB3 FTV 7 x**

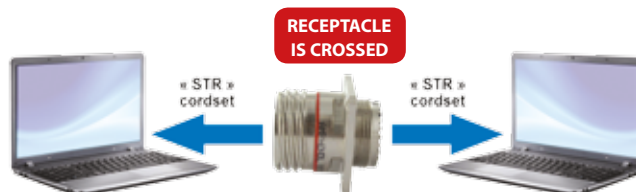


### Configuration use

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



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



## Part number code: plugs with cordset.

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 reliability 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*

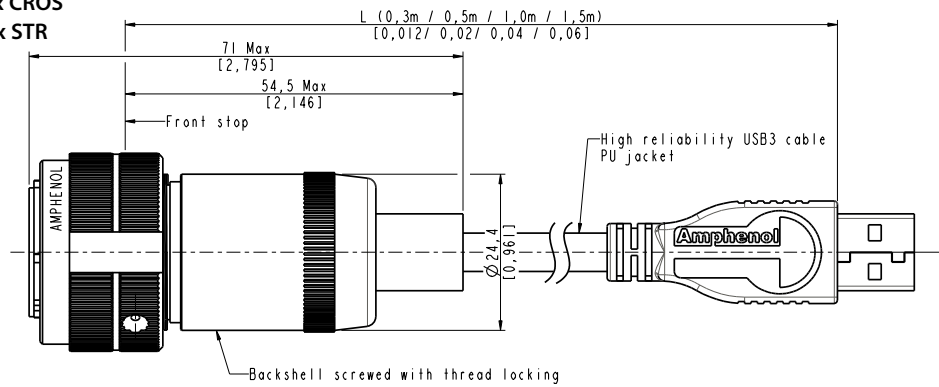
Examples:

- 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**

### Plug with reinforced USB3.0 cordset

■ Shell type 6

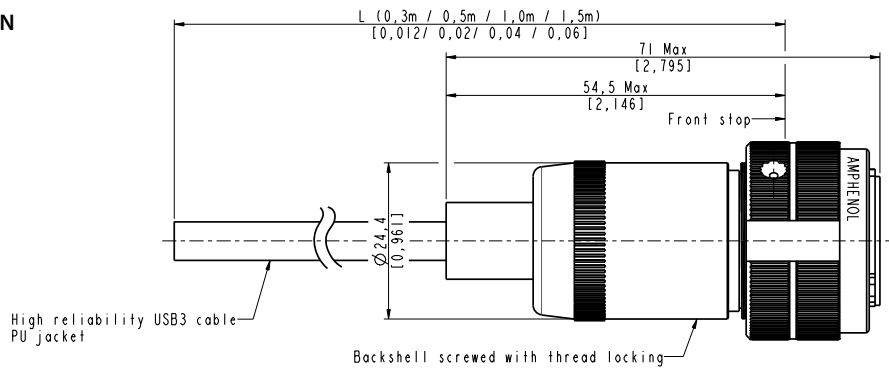
Part number type: **USB3 FTV 6 x xx x CROS**  
**USB3 FTV 6 x xx x STR**



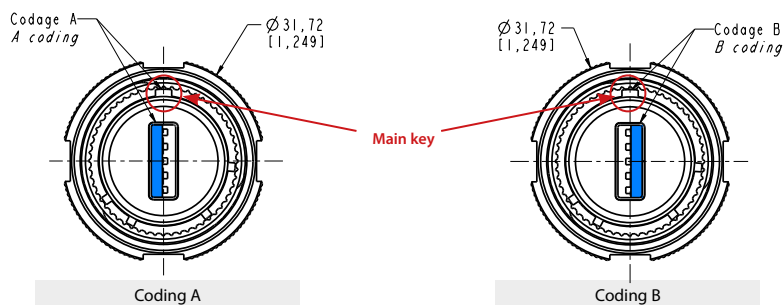
### Plug with open reinforced USB3.0 cable

■ Shell type 6

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



### 2 codings available for plugs

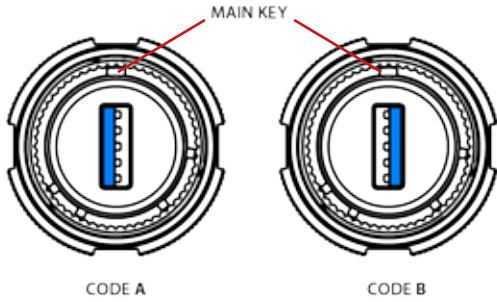


## Assembly instructions

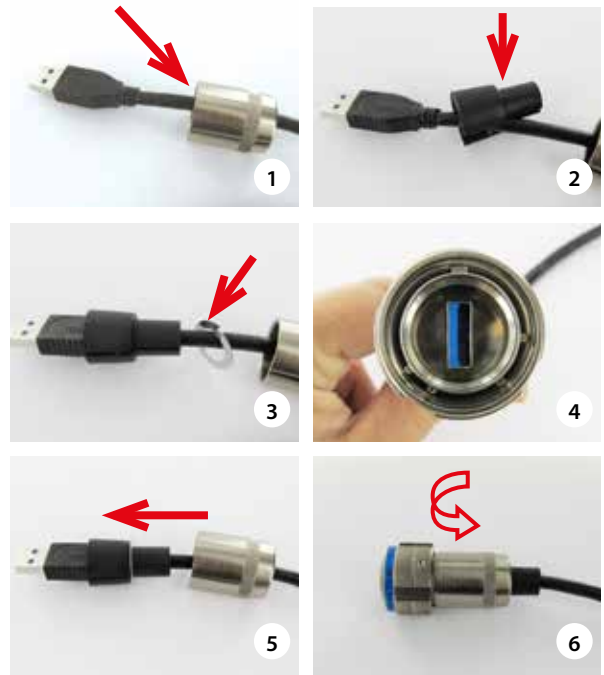
Can be used with most the USB3.0 cordset brands : No tools required!

### 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.



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

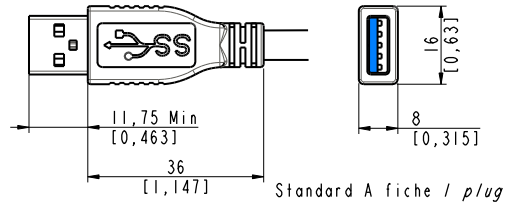


**IMPORTANT NOTE**

The sealing is done by the blue seal.



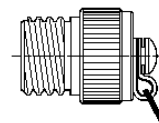
### USB3 cordset usable - Not provided



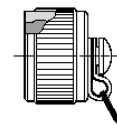
### Accessories

#### ■ Metallic caps

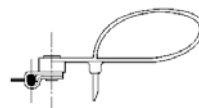
	USBF TVC	2	G
<b>Connector type</b>			
6: plug			
2: square flange receptacle			
7: jam nut receptacle			
<b>Shells material &amp; finish</b>			
N: aluminium shell - nickel - ROHS compliant			
G: aluminium shell - olive drab cadmium			
BZ: marine bronze shell - ROHS compliant			
ZN: aluminium shell -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



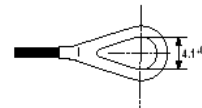
Plug Cap



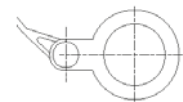
Receptacle Cap



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



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 > 1 micro s
- Shocks: IK06 ► weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature range: - 40°C / +85°C

### Part number code

Series 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

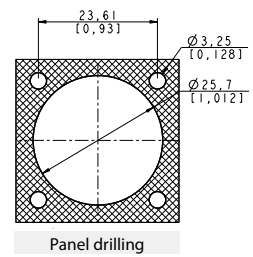
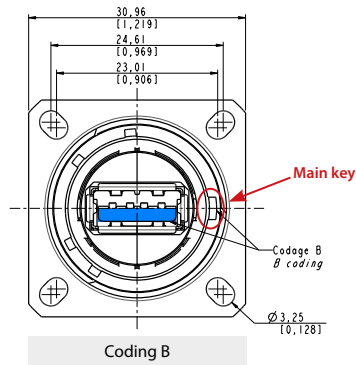
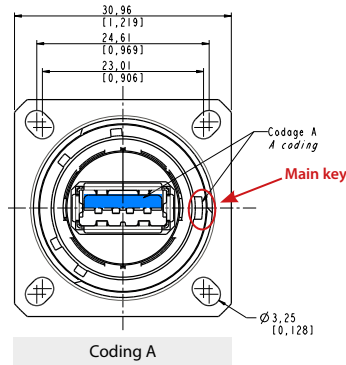
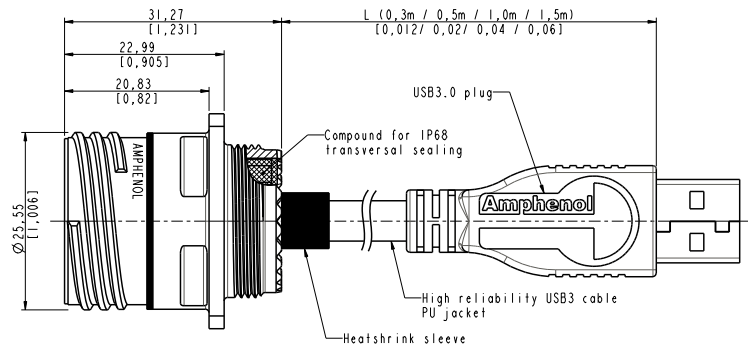
Examples: - square flange receptacle, with 0.5m length of high reliability USB3 cable crossed, coding B, nickel plating: **USB3F TV 2 S B 05 N ACROS**  
 - jam nut receptacle, with 1m length of high reliability USB3 cable straight, coding A, olive drab cadmium plating: **USB3F TV 7 S A 10 G ASTR**  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

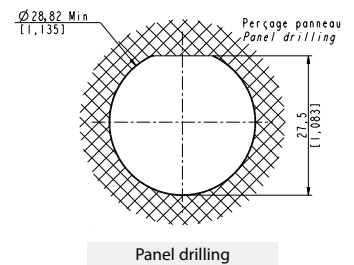
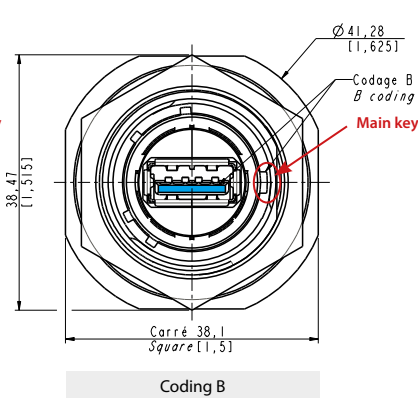
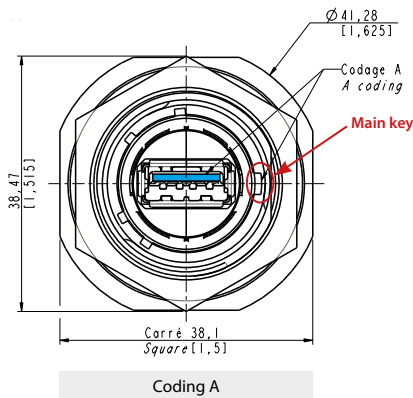
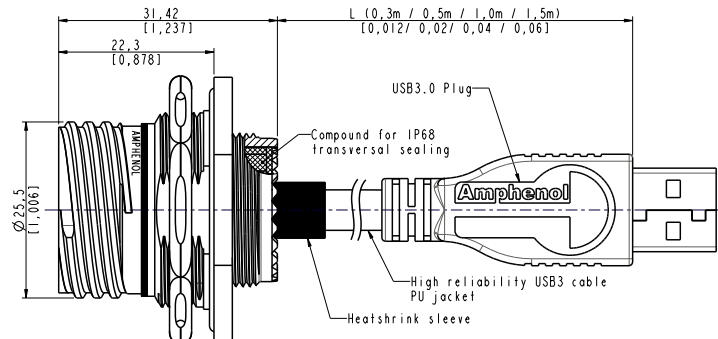
4 mounting holes: shell type 2

Part number: **USB3 FTV 2 S xx x ACROS**  
**USB3 FTV 2 S xx x ASTR**



### ■ Jam nut receptacle hexagonal nut mounting: shell type 7

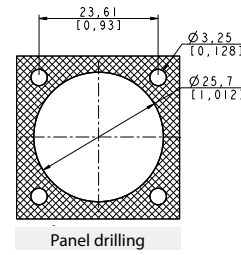
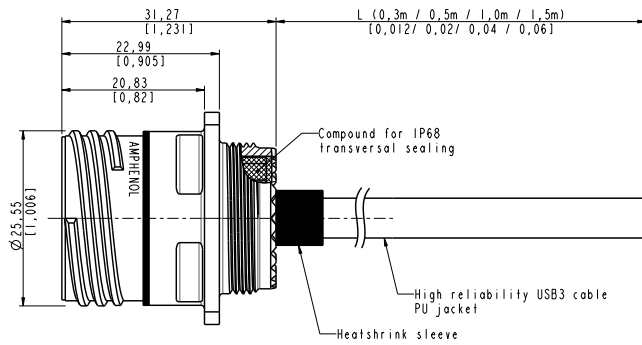
Part number: **USB3 FTV 7 S x xx x ACROS**  
**USB3 FTV 7 S x xx x ASTR**



## Receptacles with open reinforced USB3.0 cable

### ■ Square flange receptacle - 4 mounting holes: shell type 2

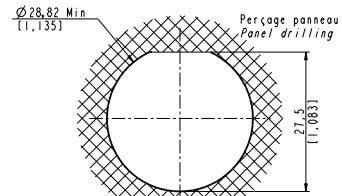
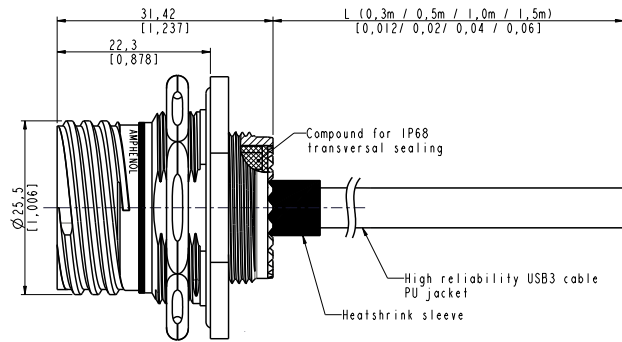
Part number type: **USB3F TV 2 S A xx x OPEN**



Panel drilling

### ■ Jam nut receptacle hexagonal nut mounting: shell type 7

Part number type: **USB3F TV 7 S A xx x OPEN**



Panel drilling



# 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<sup>3</sup> 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

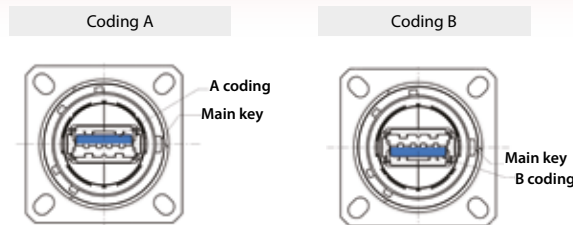
### Main characteristics

- 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



Same for jam nut receptacle.

### Part number code

Series USB3 Field TV	<b>USB3F TV</b>	<b>2 H</b>	<b>A</b>	<b>03</b>	<b>G</b>	<b>STR</b>
Shell type						
<b>2H:</b> square flange receptacle						
<b>7H:</b> jam nut receptacle						
Coding						
<b>A or B</b>						
USB cable length						
<b>03:</b> 0.3 m [11.81 inches]						
<b>05:</b> 0.5 m [19.68 inches]						
<b>10:</b> 1 m [39.37 inches]						
<b>15:</b> 1.5 m [59.05 inches]						
Shells material & finish						
<b>G:</b> aluminium shell - olive drab cadmium plating						
<b>N:</b> aluminium shell - nickel plating - <i>ROHS compliant</i>						
<b>ZN:</b> aluminium shell - black zinc nickel plating - <i>ROHS compliant</i>						
Type of cable *						
<b>ACROS:</b> high reliability crossed USB3 cable with plug at the end						
<b>ASTR:</b> high reliability straight USB3 cable with plug at the end						
<b>OPEN:</b> 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**



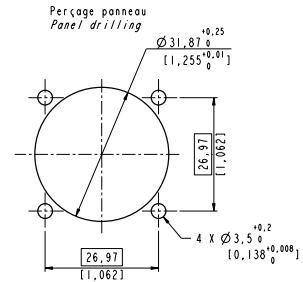
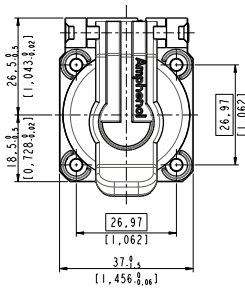
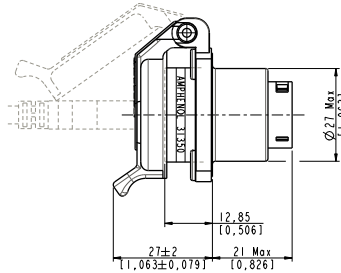
# USB3 Receptacle with Self Closing Cap

Sealing level IP54  
(Splash and dust Proof)



This Self Closing Cap automatically protects the USB3 square flange receptacles (MIL-C-26482 type), protecting your system from dust and water projections.  
A spring automatically closes the upper part of the cap when either the USB or USB key are removed from the receptacle.

## USB3F 21 X SCC

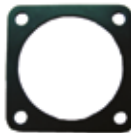


Version: USB-A (front and back termination)

Part number *	Plating	Metallized inserts (EMI)
USB3F 2B SCC	Black coated	No
USB3F 2N SCC	Nickel plated	Yes
USB3F 2G SCC	Olive drab cadmium plated	Yes
USB3F 2ZN SCC	Black Zinc Nickel	No

\* The part number includes the receptacle + the self closing cap

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



## RJF 21 X SCC, USBF 21 X SCC, USBBF 21 X SCC, & IEEE1394



RJ45 version  
(see page 25)



USB2.0-A version  
(see page 107)



USB-B version  
(see page 118)



IEEE1394 version  
(see page 143)

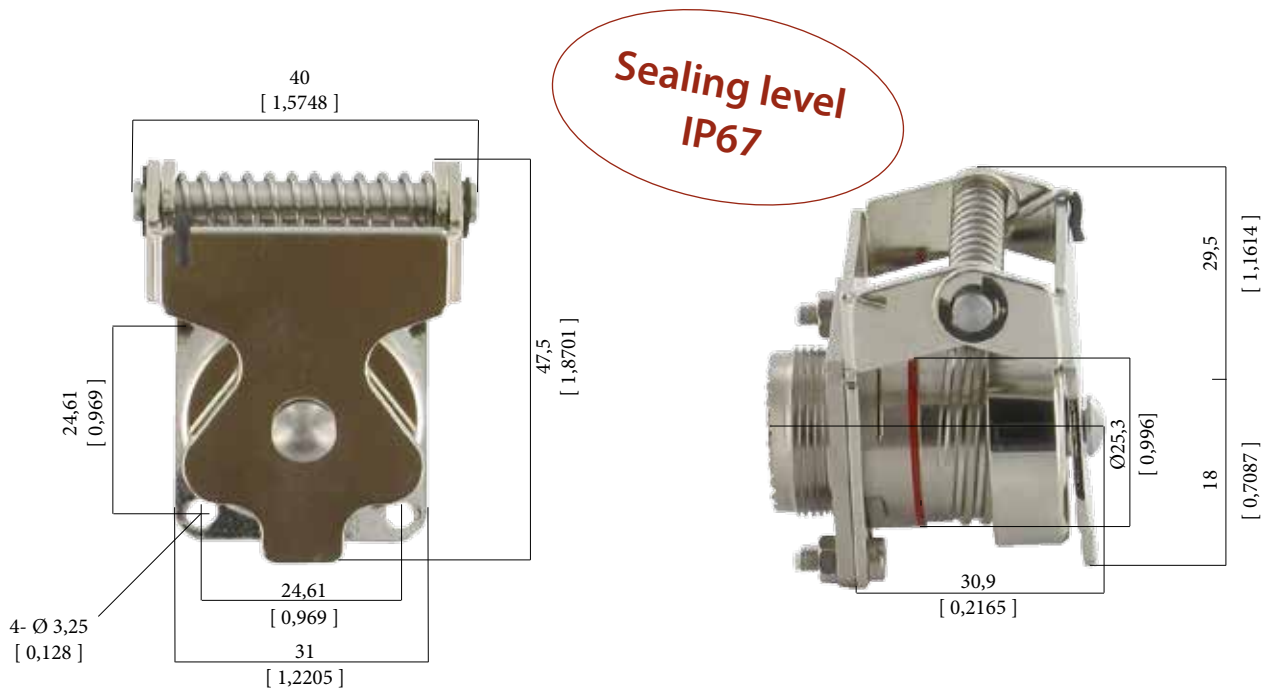


# Metallic Self Closing Cap (SCC)

For USB3F TV square flange receptacles.

This Self Closing cap automatically protects the USB3F TV (type A) square flange receptacles (MIL-DTL-38999 type), protecting your system from dust and water projection.

A spring automatically closes the upper part of the cap when the USB plug is removed from the receptacle.



## IMPORTANT NOTE

Metal Self Closing caps are sold separately (without receptacle).



Part number	Plating	P/N
	Black - ROHS compliant	<b>USBFTVSCCB</b>
	Nickel - ROHS compliant	<b>USBFTVSCCN</b>
	Olive drab cadmium	<b>USBFTVSCCG</b>
	Black Zinc Nickel	<b>USBFTVSCCZN</b>

**Remark:** also compatible with USBFTV 2.0 (type A) & USBBFTV (type B) square flange receptacles.

USBFTV2XX (see page 106)

USBBFTV2XX (see page 110)

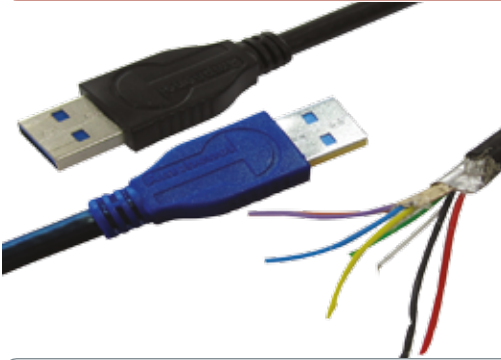
■ Panel gasket for square flange receptacle (thickness: 0,8 mm [.031]):

Part number: **JE15**





# High Reliability USB 3.0 Cordsets



General construction: this is a USB-3.0 cable containing two 28 AWG 90Ω USB3.0 parallel shielded pair, one 28 AWG USB2.0 pair, and two 24 AWG power conductors, overall SFTP shields (SFTP = double shielding, braid and foil), jacketed in black UV resistant Polyurethane HFFR\*. Designed for fixed or portable applications in industrial and harsh environments.  
\*HFFR: Halogen Free Flame Retardant.

**Jacket compound specification:**  
Halogen Free Flame Retardant Polyether-based Polyurethane. Glossy finish. Excellent hydrolysis resistance. High microbial resistance. UV resistant. High flexibility.

- Applications**
- Robotics
  - Railways
  - Battelfield communication
  - Motion control
  - CNC machines
  - Industrial process

PHYSICAL CHARACTERISTICS	
<b>DATA CONDUCTORS</b>	Tinned stranded copper, 7/0.13 mm nom (28 AWG)
<b>DATA INSULATION</b>	1 mm nom
<b>COLOR DATA PAIR</b>	Green & white (USB2.0) Yellow & blue, orange & violet (USB3.0)
<b>POWER CONDUCTORS</b>	Tinned copper, 7/0.2 mm (24 AWG)
<b>POWER INSULATION</b>	1.1 mm nom
<b>COLOR POWER WIRE</b>	Red & Black
<b>SHIELDS</b>	USB 3.0 pair: foil + stranded tinned copper drain wire. Overall: foil + shield braiding of tinner copper wires (coverage 85%).
<b>JACKET</b>	PU compound
<b>COLOR JACKET</b>	Black
<b>WEIGHT</b>	31 lbs/1000ft (46 kg/km)
<b>OUTSIDE DIAM.</b>	0.20 inch (5.7 mm nom. +/- 0.2)
<b>MIN BEND RADIUS (During operation)</b>	57 mm (10 x O. D.)
<b>MIN BEND RADIUS (During installation)</b>	28.5mm (5 x O.D.)
<b>TEMPERATURE installation &amp; operational</b>	Plus 85°C, minus 40°C

ELECTRICAL CHARACTERISTICS			
<b>USB3.0 Parallel pair</b>			
<b>Conductor resistance</b>	≤ 210 Ohm/km		
<b>Insulation resistance</b>	≥ 200 MOhm/km		
<b>Capacitance (1 kHz)</b>	nom. 43 nF/km		
<b>Time delay</b>	nom. 5.0 ns/m		
<b>Time delay skew</b>	≤ 150 ps/10m		
<b>Operating voltage (peak)</b>	≤ 100 V		
<b>Impedance</b>	90 ±7 Ohm		
<b>Test voltage</b>	500 V		
<b>USB2.0 Pair</b>			
Electrical requirements acc. to USB2.0			
<b>Impedance</b>	90 ±15 Ohm		
<b>Test voltage</b>	500 V		
<b>Attenuation</b>			
<b>USB3.0 pair-db/10m</b>		<b>USB2.0 pair-db/100m</b>	
<b>625 MHZ</b>	10	<b>1 MHZ</b>	4
<b>1250 MHZ</b>	15	<b>4 MHZ</b>	7.8
<b>2500 MHZ</b>	25	<b>8 MHZ</b>	11.4
<b>5000 MHZ</b>	36	<b>12 MHZ</b>	13.4
<b>7000 MHZ</b>	47	<b>24 MHZ</b>	19
Datas for cable alone only (without USB plug)		<b>48 MHZ</b>	27
		<b>96 MHZ</b>	38
		<b>200 MHZ</b>	64
		<b>400 MHZ</b>	116

Amphenol

	CORDSETS WITH A USB3 PLUG OVERMOLDED ON EACH END		
	Length (m/ft)	CROSSED wiring part number	STRAIGHT wiring part number
		<i>Black overmolding</i>	
<b>IMPORTANT NOTE</b> ⇒for PC to PC application, use a CROSSED cable ⇒for PC to peripheral application use a STRAIGHT cable <i>see page 87</i>	0.5 m / 1.64 ft	USB 3 A A CROSSED 50 PU HFFR	USB 3 A A STRAIGHT 50 PU HFFR
	1 m / 3.28 ft	USB 3 A A CROSSED 100 PU HFFR	USB 3 A A STRAIGHT 100 PU HFFR
	1.5 m / 4.92 ft	USB 3 A A CROSSED 150 PU HFFR	USB 3 A A STRAIGHT 150 PU HFFR
	1.8 m / 5.91 ft	USB 3 A A CROSSED 180 PU HFFR	USB 3 A A STRAIGHT 180 PU HFFR
<b>UNDER USB3 SPECIFICATION</b> ≤1.8 M	2 m / 6.56 ft	USB 3 A A CROSSED 200 PU HFFR	USB 3 A A STRAIGHT 200 PU HFFR
	2.5 m / 8.20 ft	USB 3 A A CROSSED 250 PU HFFR	USB 3 A A STRAIGHT 250 PU HFFR
	3 m / 9.84 ft	USB 3 A A CROSSED 300 PU HFFR	USB 3 A A STRAIGHT 300 PU HFFR
	3.5 m / 11.48 ft	USB 3 A A CROSSED 350 PU HFFR	USB 3 A A STRAIGHT 350 PU HFFR
	4 m / 13.12 ft	USB 3 A A CROSSED 400 PU HFFR	USB 3 A A STRAIGHT 400 PU HFFR
	4.5 m / 14.76 ft	USB 3 A A CROSSED 450 PU HFFR	USB 3 A A STRAIGHT 450 PU HFFR
	5 m / 16.40 ft	USB 3 A A CROSSED 500 PU HFFR	USB 3 A A STRAIGHT 500 PU HFFR
<b>OUT OF USB3 SPECIFICATION</b> >1.8 M			

# USBF TV (USB-A)

USB connection system for harsh environment



## Applications

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

## Data transmission

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

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

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

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

## 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)
- USBF 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  
1000 h with marine bronze shell
- Fire retardant / low smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 1 micro s
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature range: - 40°C / +85°C

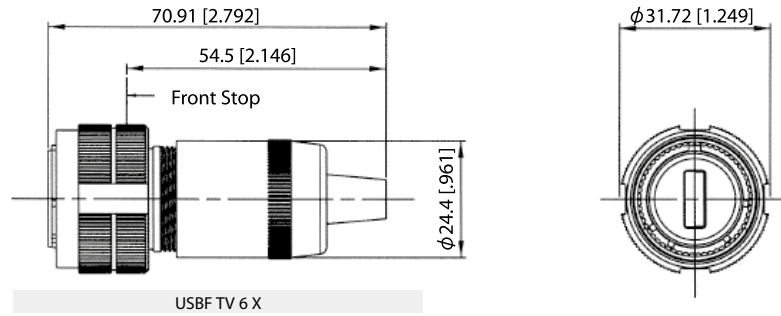
## Part number code

Series	USBF TV	2	1	G
USB Field TV				
Shell type				
6: plug				
2: square flange receptacle				
2PE: square flange receptacle with metal backshell (type 1) & with metal backshell + plastic gland (type 2)				
2PEM: square flange receptacle with backshell + metal gland (only for back termination type 2 = Solder)				
7: jam nut receptacle				
7PE: jam nut receptacle with metal backshell (type 1) & with metal backshell + plastic gland (type 2)				
7PEM: jam nut receptacle with backshell + metal gland (only for back termination type 2 = Solder)				
Back terminations (receptacles only)				
1: female USB-A				
2: solder (4 tinned holes)				
Shells material & finish				
N: aluminium shell - nickel plating - ROHS compliant				
G: aluminium shell - olive drab cadmium plating				
BZ: marine bronze shell - ROHS compliant				
ZN: aluminium shell - black zinc nickel plating - ROHS compliant				

- Examples:
- Olive drab cadmium plug: USBF TV 6G
  - Olive drab cadmium square flange receptacle, USB-A back terminat°: USBF TV 21G
  - Olive drab cadmium jam nut receptacle, USB-A receptacle back terminat°: USBF TV 71G
  - Nickel jam nut receptacle, solder back termination: USBF TV 72N

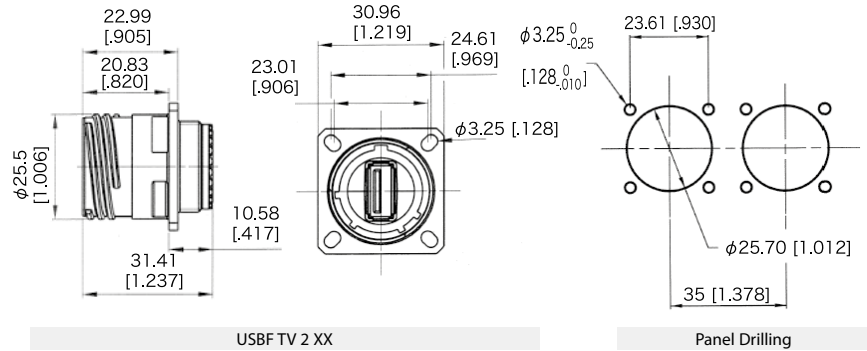
## Plug

- Shell type 6

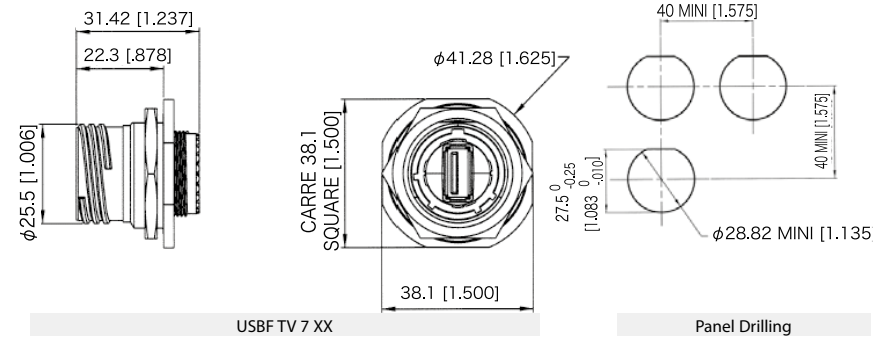


## Receptacles

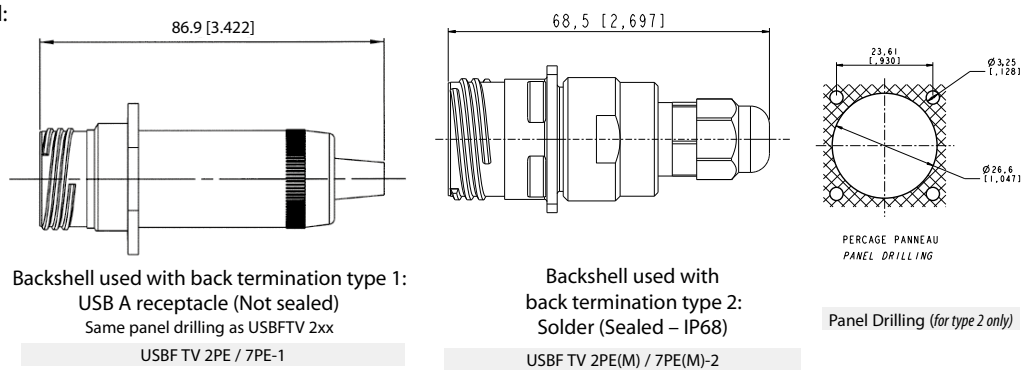
- Square flange receptacle
- 4 mounting holes: shell type 2



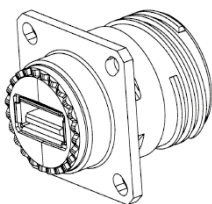
- Jam nut receptacle
- Hexagonal nut mounting: shell type 7



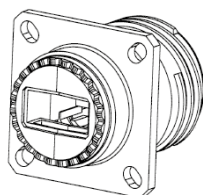
- Receptacles with backshell:
- Shell type 2PE and 7PE



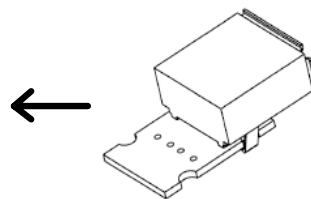
## Back terminations



Type 1: female USB-A



Type 2: solder 4 Tinned holes to solder your cable



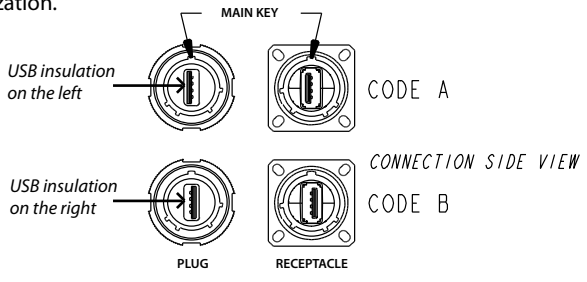
View of the PCB of the Type 2 version with 4 tinned holes for solder termination

## Assembly instructions

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

### Plug assembly

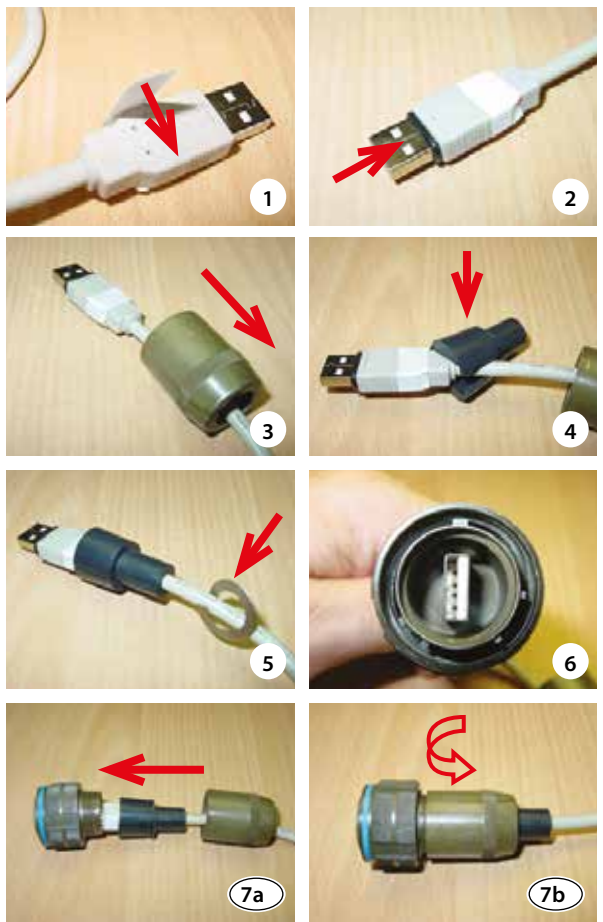
1. Only if you need a full sealing (IP68): Install the white sticker around the plug, covering the 4 little holes of the overmolding
2. Insert the black O Ring around the front face of the USB A plug. This O Ring will ensure connection sealing
3. Insert the USB cordset into the metallic backshell
4.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



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

**IMPORTANT NOTE**

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

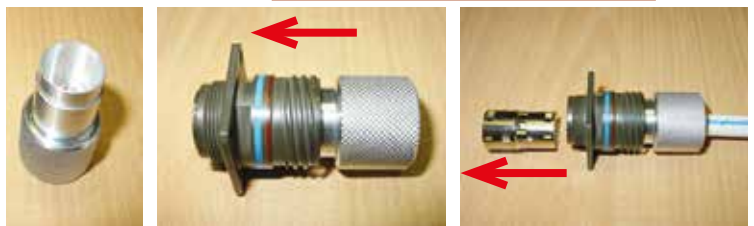


### Receptacle assembly

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



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



### Accessories

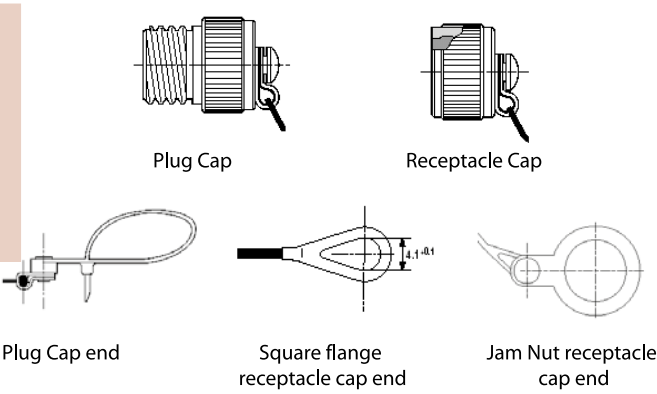
#### ■ Metallic caps

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

- Panel gasket for square flange receptacle  
Thickness: 0,8 mm [.031]  
P/n: **JE15**



- Receptacle insert removal tool: p/n **USBF ODE**



# USBF TV

Transversally sealed receptacles



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

### Applications

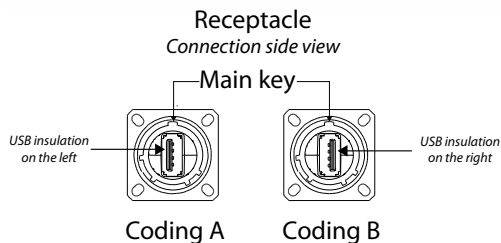
- Embedded computers
- Data acquisition and transmission in harsh environment
- Railways
- Battelfield communication systems
- Navy systems

### Data transmission

USB specification 2.0  
Data rate: up to 480 Mb/s for high speed USB

### 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:** USBFTV 2S A 2 N 03 A



### 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)
- USBF 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  
1000 h with marine bronze shell
- Fire retardant / Low smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 1 micro s
- Shocks: IK06 ► weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature range: - 40°C / +85°C

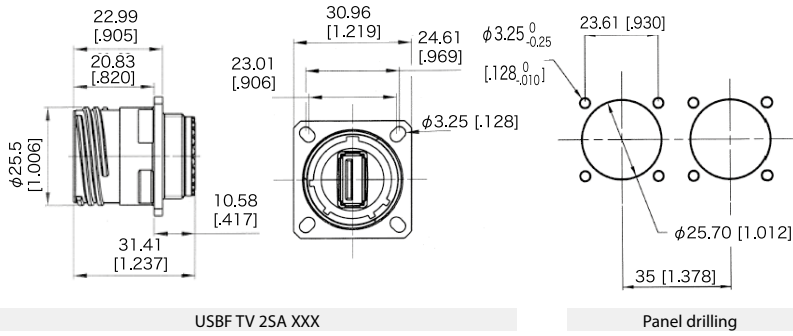
### Part number code

Series	USBF TV	2PES	A	2	N	03	A
USB Field TV							
Shell Type							
2S : square flange receptacle							
2PES: square flange receptacle + backshell + plastic gland							
2PEMS: square flange receptacle + backshell + metal gland							
7S: jam nut receptacle							
7PES: jam nut receptacle + backshell + plastic gland							
7PEMS: jam nut receptacle + backshell + metal gland							
Coding							
"A" (Standard) or "B"							
Back terminations							
2: rugged USB cable (see corresponding datasheet page 109)							
Shells plating							
N: nickel							
G: olive drab cadmium							
ZN: aluminium shell - black zinc nickel plating - ROHS compliant							
USB cable length							
03: 30 cm [11.81 inches]							
05: 50 cm [19.68 inches]							
10: 1 meter [39.37 inches]							
USB cable end							
A: standard USB-A plug							
OPEN: open cable (no connector)							

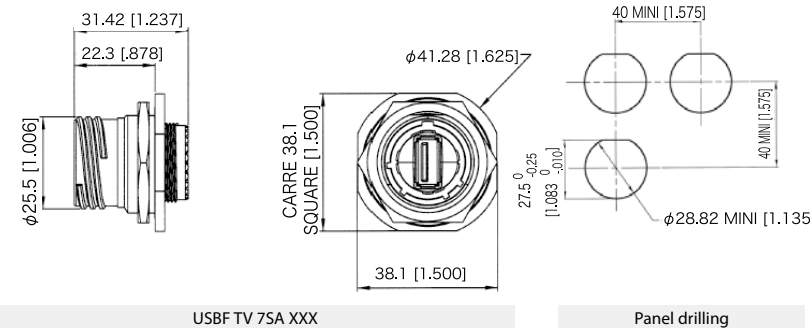
Examples: - Olive drab cadmium square flange receptacle with 30 cm of USB cable and standard USB-A plug: USBF TV 2S G 03 A  
- Nickel jam nut receptacle + backshell + plastic gland, with 1 meter of USB cable, and a standard USB-A plug: USBF TV 7PES N10 A

## Receptacles

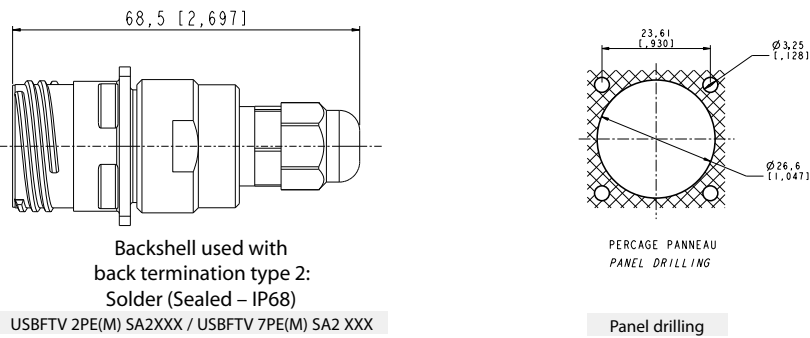
- Square flange receptacle 4 mounting holes: shell type 2



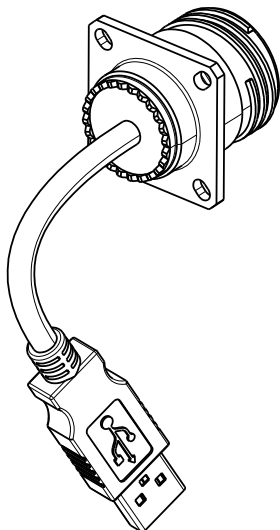
- Jam nut receptacle hexagonal nut mounting: shell type 7



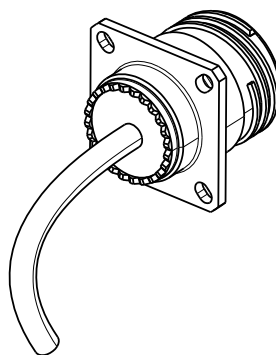
- Jam nut receptacle hexagonal nut mounting: shell type 7



## Cordset end



USB cable end type "A"



USB cable type "OPEN"



# USBF 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<sup>3</sup> 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

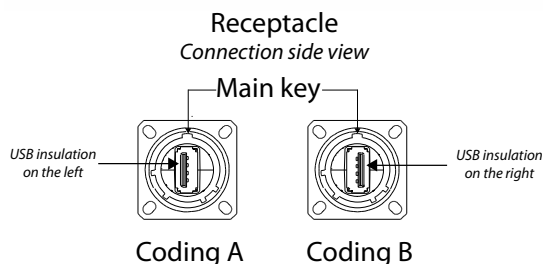
USB specification 2.0  
Data rate: up to 480 Mb/s for high speed USB

### Main characteristics

- Same as the USBF 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 USBF 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:** USBFTV 2H A 2 N 03 A



### Part number code

Series	USBF TV	2H	A	2	N	03	A
USB Field TV							
Shell type							
2H	hermetic square flange receptacle						
2PEH	hermetic square flange receptacle + backshell + plastic gland						
2PEMH	hermetic square flange receptacle + backshell + metal gland						
7H	hermetic jam nut receptacle						
7PEH	hermetic jam nut receptacle + backshell + plastic gland						
7PEMH	hermetic jam nut receptacle + backshell + metal gland						
Coding							
"A" (standard) or "B"							
Back terminations							
2	rugged USB cable (see corresponding datasheet page 109)						
Shells plating							
N	nickel						
G	olive drab cadmium						
ZN	aluminium shell - black zinc nickel plating - ROHS compliant						
USB cable length							
03	30 cm [11.81 inches]						
05	50 cm [19.68 inches]						
10	1 meter [39.37 inches]						
USB cable end							
A	standard USB-A plug						
OPEN	open cable (no connector)						

Examples: - Olive drab cadmium hermetic square flange receptacle with 30 cm of USB cable and standard USB-A plug: USBF TV 2H G 03 A  
- Nickel hermetic jam nut receptacle + backshell + plastic gland, with 1 meter of USB cable, and a standard USB-A plug: USBF TV 7PEH N10 A





# USBFTV

Receptacles with 360° EMI backshells

USBFTV receptacles series with EMI backshells provide 360° shielding; same protection than the one proposed per standard MIL-DTL-38999 serie III connectors. We offer these EMI backshells with square flange and jam nut receptacles.

The available platings are nickel or olive drab cadmium.

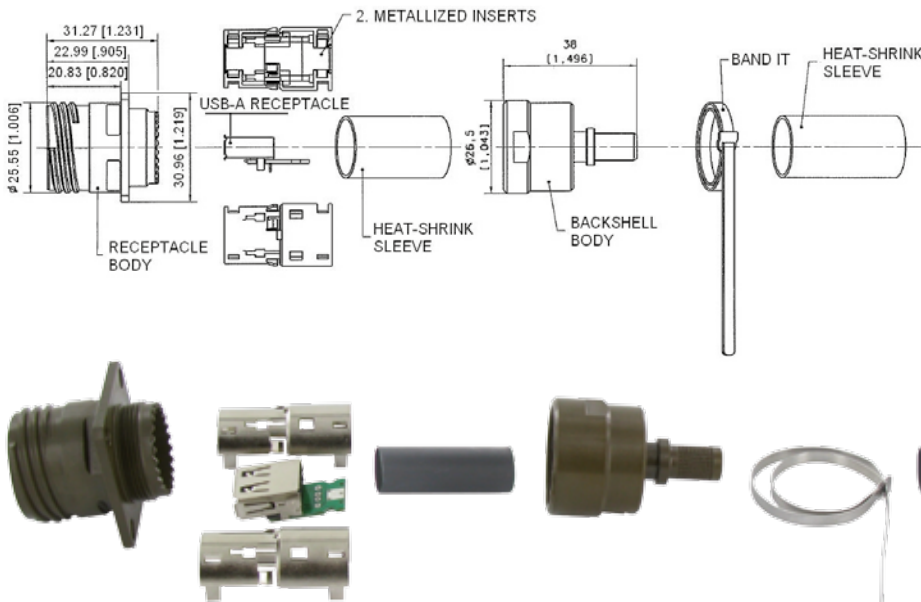
With those solutions we suggest using our reinforced USB cable (shielded – zero halogen jacket) ► see page 109

We can provide those receptacles:

- with cordset already soldered
- without cordset

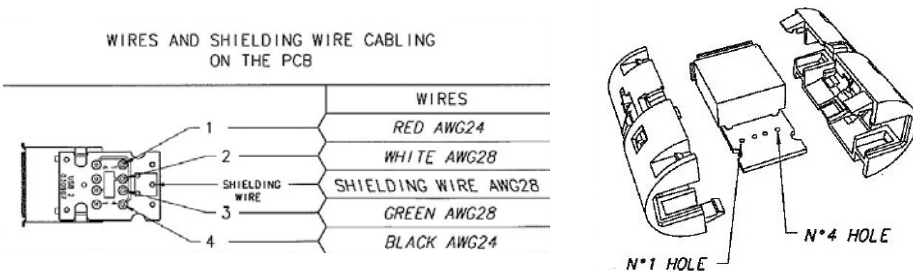


### Example with a square flange receptacle (provided without cable)



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

**IMPORTANT NOTE**  
 With receptacles provided without cable, customer will have to solder his cable on the PCB ; please find below the cabling specification.  
 If customer prefers to use his cable, please check with us compatibility with our EMI backshells: [www.usbfield.com](http://www.usbfield.com)

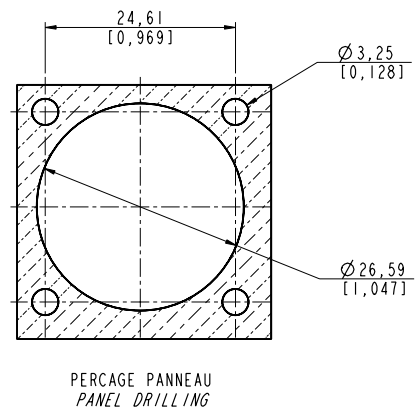
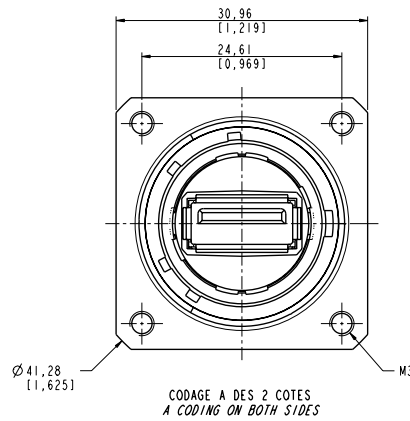
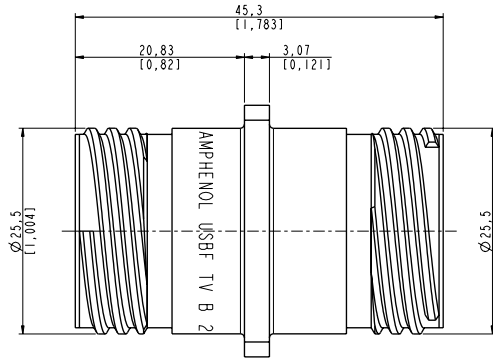




# USBF TV

Through bulkhead

## Receptacle



Part number	Plating	P/N
	Nickel - ROHS compliant	USBF TV B 2 N
	Olive drab cadmium	USBF TV B 2 G
	Black zinc nickel - ROHS compliant	USBF TV B 2 ZN

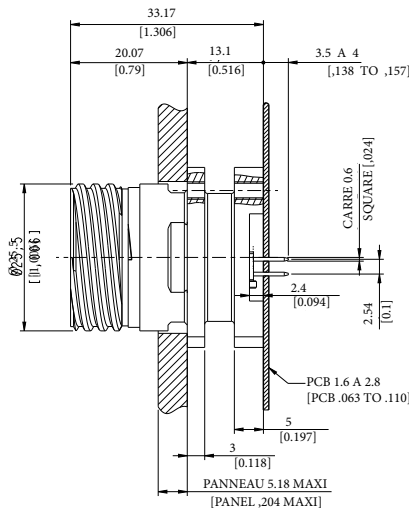
Nota : could be used with plug USBFTV, nickel and olive drab cadmium. See page 97.

# USBF TV

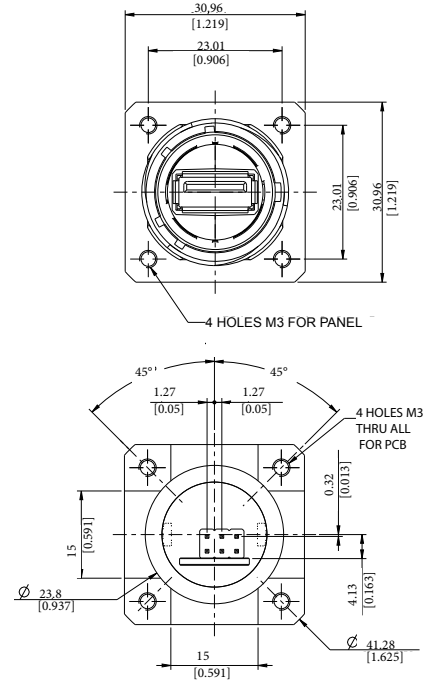
## Stand off receptacles

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

### Square flange receptacle

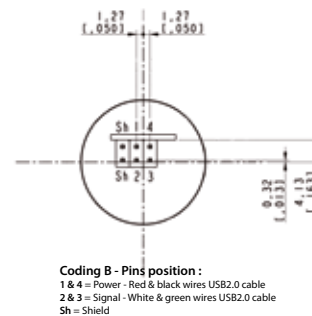
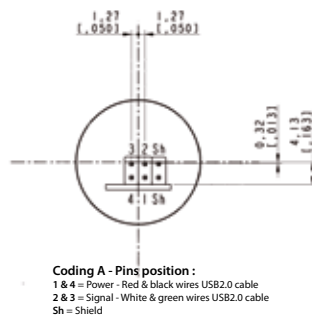
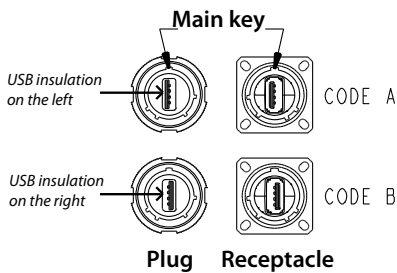


**Datas for coding A**  
Coding B is also available, please consult us.



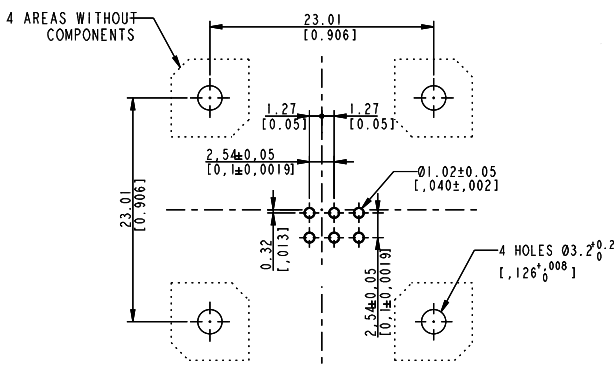
Part number	Plating	P/N for coding A	P/N for coding B
	Nickel - ROHS compliant	USBF TV 25 N F459	USBF TV 2S B 5 N F459
Olive drab cadmium	USBF TV 25 G F459	USBF TV 2S B 5 G F459	
Black zinc nickel - ROHS compliant	USBF TV 25 ZN F459	USBF TV 2S B 5 ZN F459	

### Connection side view

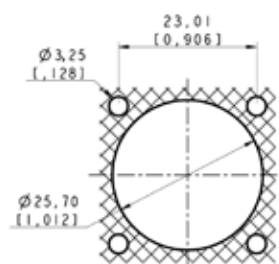


### Recommended PCB hole LAYOUT (Coding A) - Solder side view

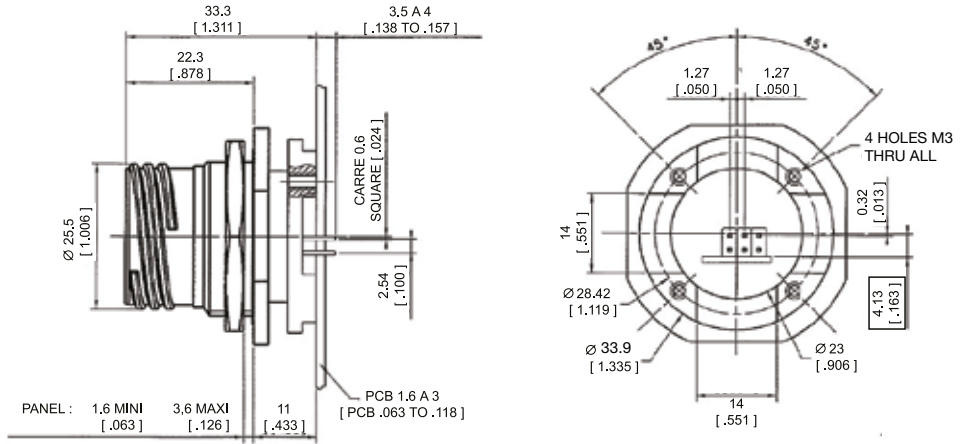
Nota : for coding B, please consult us.



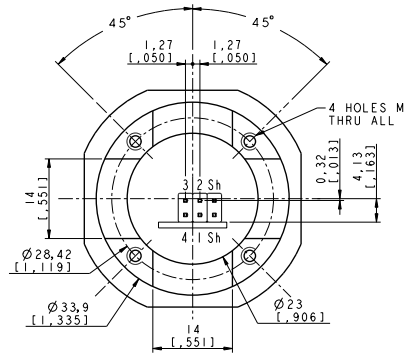
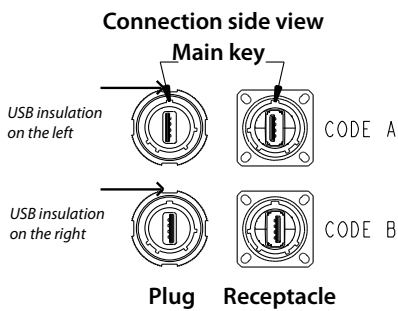
### Panel drilling



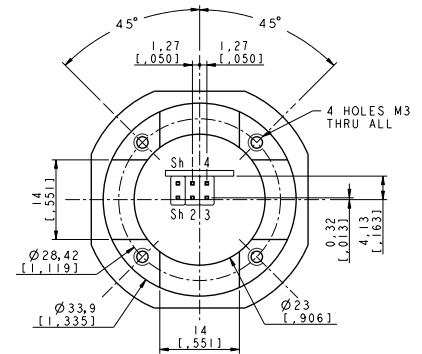
## Jam nut receptacle



Part number	Plating available	P/N for coding A	P/N for coding B
	Nickel - ROHS compliant	USBF TV 75 N F459	USBF TV 7S B 5 N F459
Olive drab cadmium	USBF TV 75 G F459	USBF TV 7S B 5 G F459	
Black zinc nickel - ROHS compliant	USBF TV 75 ZN F459	USBF TV 7S B 5 ZN F459	



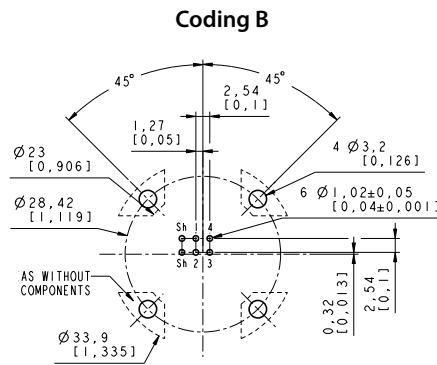
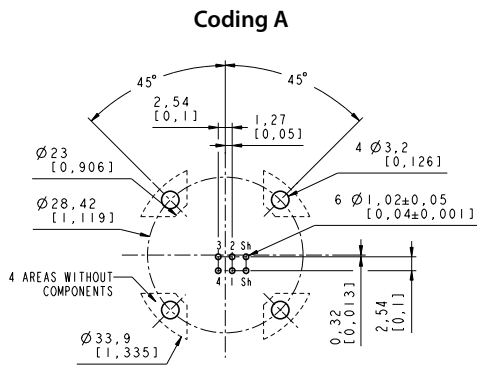
**Coding A - Pins position :**  
 1 & 4 = Power - Red & black wires USB2.0 cable  
 2 & 3 = Signal - White & green wires USB2.0 cable  
 Sh = Shield



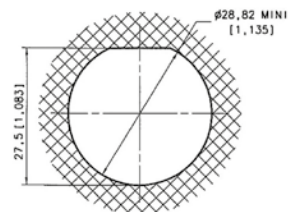
**Coding B - Pins position :**  
 1 & 4 = Power - Red & black wires USB2.0 cable  
 2 & 3 = Signal - White & green wires USB2.0 cable  
 Sh = Shield

## Recommended PCB hole LAYOUT

Solder side view



## Panel drilling



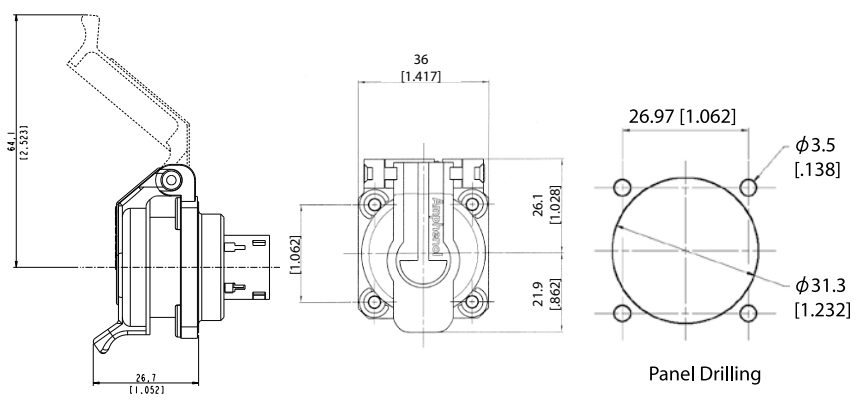
# USB 2.0 Receptacle with Self Closing Cap

**Sealing level IP54**  
(Splash and dust Proof)



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

## USBF 21 X SCC



Version: USB-A (front and back termination)

Part number *	Plating		Metallized inserts (EMI)	
	Part number *	Plating	Metallized inserts (EMI)	
USBF 21B SCC	Black coated	No (blank insert)		
USBF 21N SCC	Nickel plated	Yes		
USBF 21G SCC	Olive drab cadmium plated	Yes		
USBF 21ZN SCC	Black zinc nickel - ROHS compliant	No		

\* The part number includes the receptacle + the self closing cap

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

## RJF 21 X SCC, USBF 21 X SCC, & IEEE1394

**RJ45 version**  
(see page 25)

**USB3.0-A version**  
(see page 94)

**USB-B version**  
(see page 118)

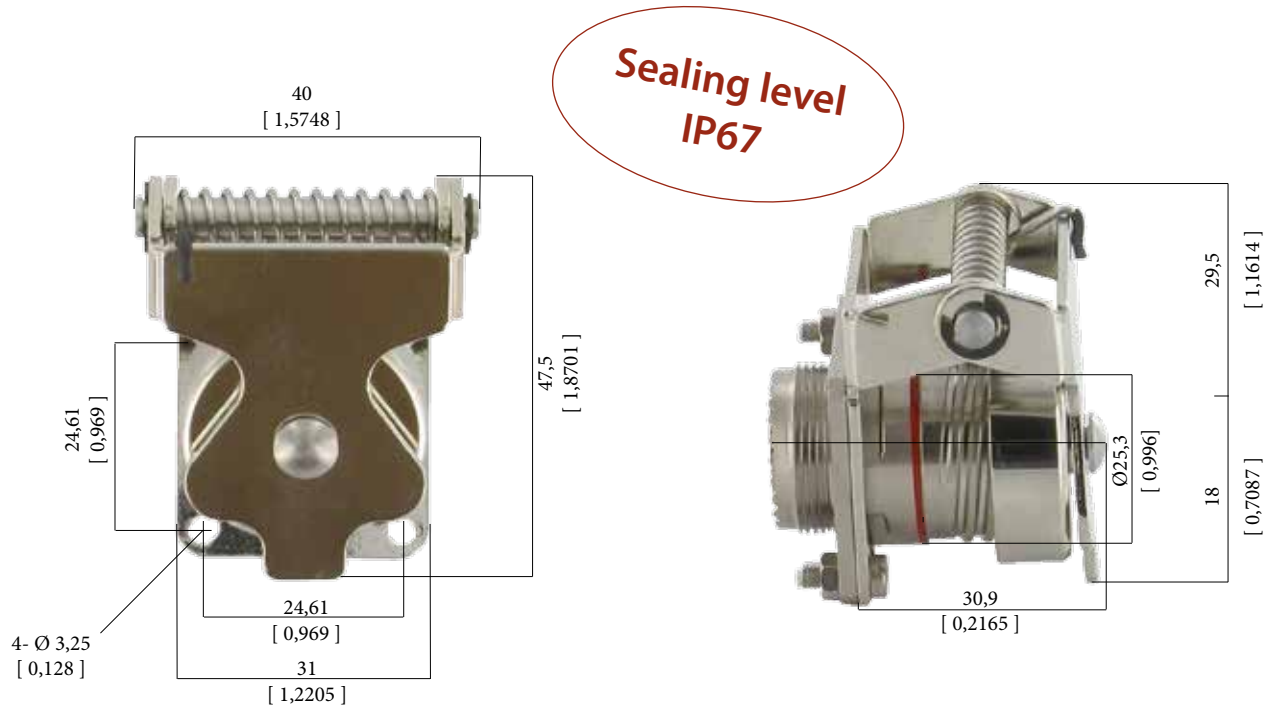
**IEEE1394 version**  
(see page 143)

# Metallic Self Closing Cap (SCC)

For USBF TV 2.0 square flange receptacles.

This Self Closing cap automatically protects the USBF TV (2.0 - type A) square flange receptacles (MIL-DTL-38999 type), protecting your system from dust and water projection.

A spring automatically closes the upper part of the cap when the USB plug is removed from the receptacle.



## IMPORTANT NOTE

Metal Self Closing cap are sold separately (without receptacle).



Part number	Plating	P/N
	Black - ROHS compliant	<b>USBFTVSCCB</b>
	Nickel - ROHS compliant	<b>USBFTVSCCN</b>
	Olive drab cadmium	<b>USBFTVSCCG</b>
	Black zinc nickel - ROHS compliant	<b>USBFTVSCCZN</b>

Sealing level IP67

**Remark:** also compatible with USB3FTV (type A) & USBBFTV (type B) square flange receptacles:  
 USB3FTVXX (see page 95)  
 USBBFTV2XX (see page 119)

■ Panel gasket for square flange receptacle  
 (thickness: 0,8 mm [.031]):

Part number: **JE15**



# High Reliability USB 2.0 Cordsets



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

**Jacket compound specification:**

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

**Applications**

- Robotics
- Motion control
- Railways
- CNC machines
- Battelfield communication
- Industrial process

**Datas  
for cable alone only  
(without USB plug)**

**PHYSICAL CHARACTERISTICS**

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

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

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

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

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

**ELECTRICAL CHARACTERISTICS**

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

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

Length (m/ft)	Part number
0.5 m / 1,64 ft	USB2 AA 050 PU HFFR
1 m / 3.28 ft	USB2 AA 100 PU HFFR
1.50 m / 4.92 ft	USB2 AA 150 PU HFFR
2 m / 6.56 ft	USB2 AA 200 PU HFFR
2.50 m / 8.2 ft	USB2 AA 250 PU HFFR
3 m / 9.84 ft	USB2 AA 300 PU HFFR
3.50 m / 11.48 ft	USB2 AA 350 PU HFFR
4 m / 13.12 ft	USB2 AA 400 PU HFFR
4.5 m / 14.76 ft	USB2 AA 450 PU HFFR
5 m / 16.40 ft	USB2 AA 500 PU HFFR

# USBF SC

Quick release series



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

### Applications

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

### Data transmission

USB specification 2.0  
Data rate: up to 480 Mb/s for high speed USB

### Main characteristics

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

### Environmental protection

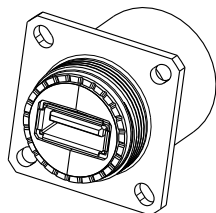
- Sealing (when mated): IP67 (temporary immersion)
- Salt spray: 48 h with nickel plating  
> 500 h with olive drab cadmium
- Fire retardant / Low smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 1 micro s
- Shocks: IK06 ► weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature range: - 40°C / +85°C

### Part number code

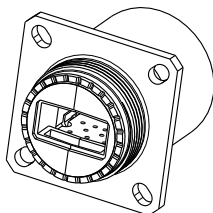
Series	USBF SC	2	1	G
USBF spring loaded				
Shell Type				
6: plug				
1: inline receptacle				
2: square flange receptacle				
7: jam nut receptacle				
Back terminations (receptacles only)				
1: female USB-A				
2: solder (4 tinned holes) - Not available for shell type "1" (inline receptacle)				
Shells material & finish				
N: aluminium shell - nickel plating - ROHS compliant				
G: aluminium shell - olive drab cadmium plating				
BZ: marine bronze shell - ROHS compliant				
ZN: aluminium shell - black zinc nickel plating - ROHS compliant				

### Back terminations

USBFSC Back terminations receptacles



Type 1: female USB-A

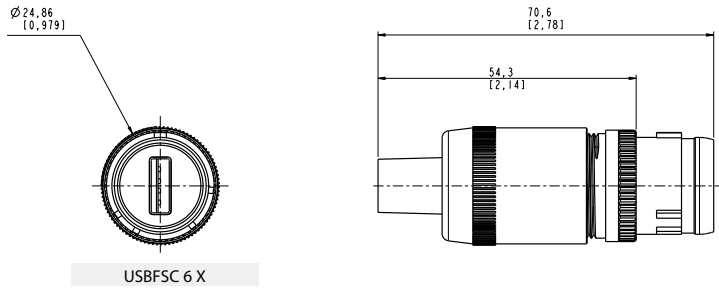


Type 2: solder (4 tinned holes)



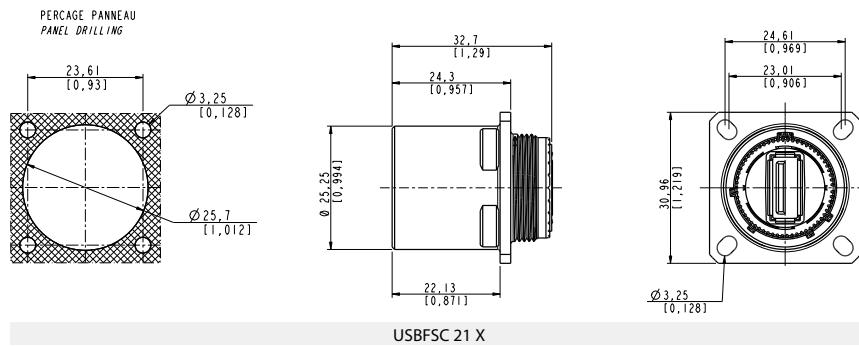
## Plug

### ■ Shell type 6

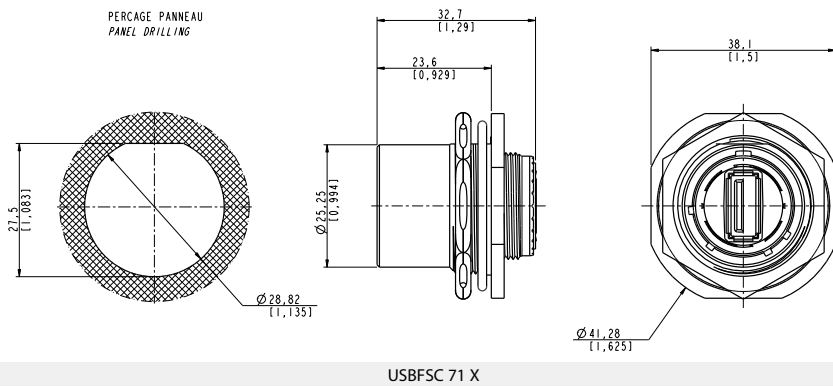


## Receptacles

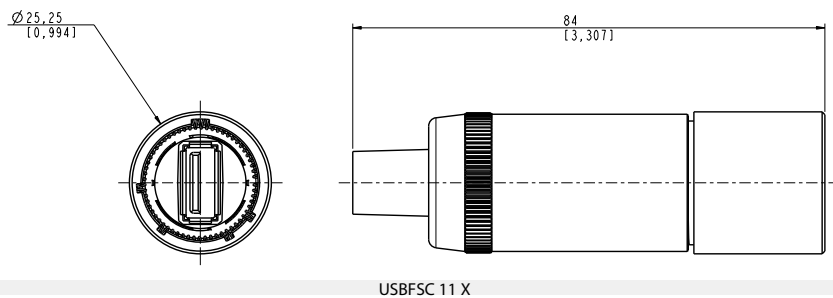
### ■ Square flange receptacle 4 mounting holes: shell type 2



### ■ Jam nut receptacle hexagonal nut mounting: shell type 7



### ■ Inline receptacle: shell type 1



# USBBF TV (USB-B)

USB connection system for harsh environment



## USB Field allows you to use a standard USB 2.0 connection in harsh environment:

- sealed against fluids and dusts (IP68)
- shock, vibration and traction resistant
- no cabling operation in field and no tools required
- improved EMI protection
- Tri Start thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device
- plug retention in the receptacle: 100N in the axis
- mating cycles: 500 minimum
- temperature range: -40°C/+85°C

### Applications

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

### Data transmission

USB specification 2.0  
Data rate: up to 480 Mb/s for high speed USB

### 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

### Environmental protection

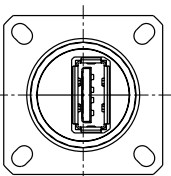
- Sealed against fluids and dusts (IP68)
- Temperature range: - 40°C / +85°C

## Part number code

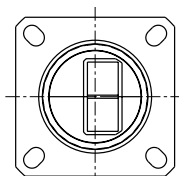
Series	USBBF TV	2	1	G
USBB Field TV				
Shell type				
6: plug				
2: square flange receptacle				
2PE: square flange receptacle with metal backshell (type 1) & with metal backshell + plastic gland (type 2)				
2PEM: square flange receptacle metal gland (only for soldering back termination type 2)				
7: jam nut receptacle				
7PE: jam nut receptacle with metal backshell (type 1) & with metal backshell + plastic gland (type 2)				
7PEM: jam nut receptacle metal gland (only for soldering back termination type 2)				
Back terminations (receptacles only)				
1: female USB-A				
2: solder (4 tinned holes)				
Shells material & finish				
N: aluminium shell - nickel plating - ROHS compliant				
G: aluminium shell - olive drab cadmium plating				
ZN: aluminium shell - black zinc nickel plating - ROHS compliant				

Examples: - Plug-cadmium plating: USBBF TV 6G  
 - Square flange receptacle-USB-A back termination - cadmium plating: USBBF TV 21G  
 - Jam nut receptacle, solder termination -nickel plating: USBBF TV 72N

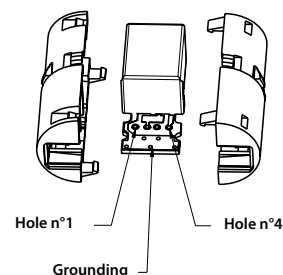
## Back terminations



Type 1: female USB-A

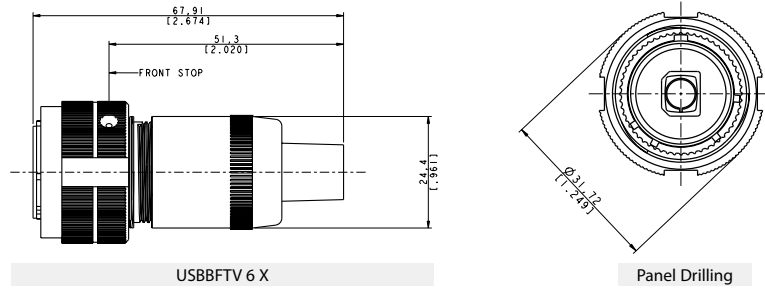


Type 2: solder (4 tinned holes)



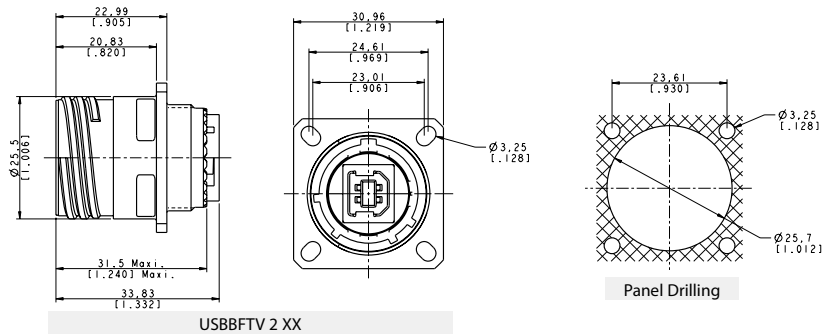
## Plug

### ■ Shell type 6

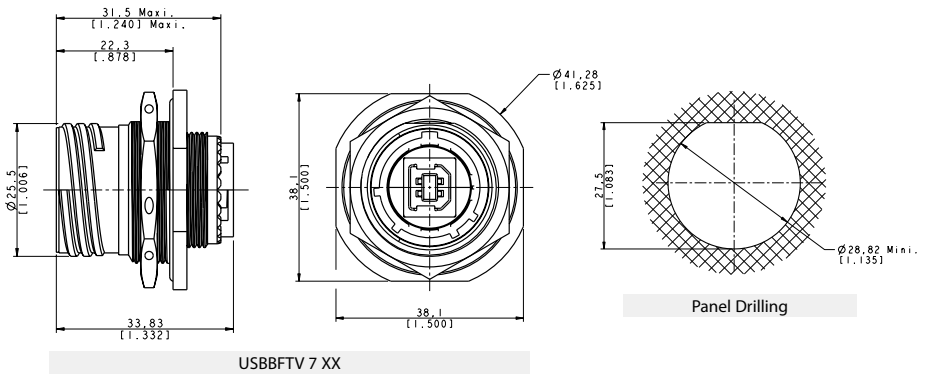


## Receptacles

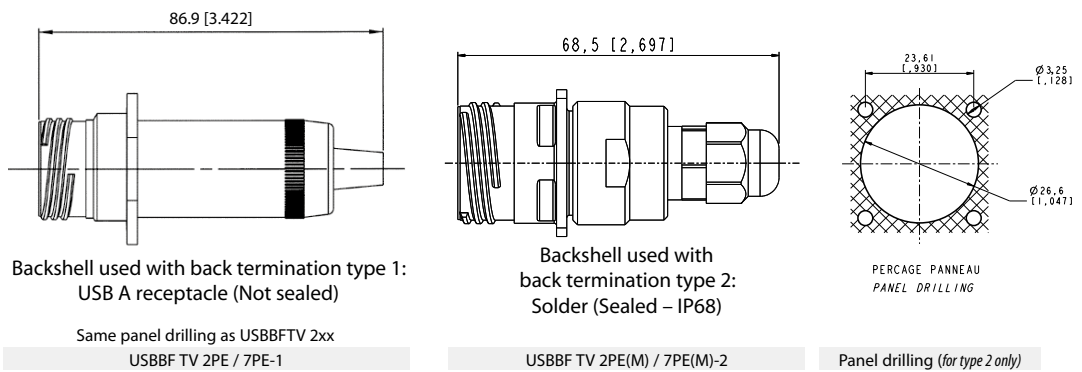
### ■ Shell type 2 - Square flange receptacle



### ■ Shell type 7 - Jam nut receptacle



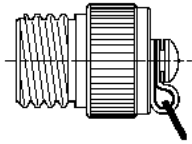
### ■ «2PEM» and «7PEM» shells with backshell to protect back termination from dust, shocks and vibration.



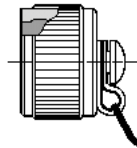
## Accessories

- **Metallic caps** (same as USB-A version - see page 99)

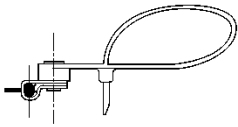
	USBF TVC	2	G
<b>Connector type</b>			
<b>6:</b> plug			
<b>2:</b> square flange receptacle			
<b>7:</b> jam nut receptacle			
<b>Shells material &amp; finish</b>			
<b>N:</b> nickel plating - <i>ROHS compliant</i>			
<b>G:</b> olive drab cadmium plating			
<b>ZN:</b> aluminium shell - black zinc nickel plating - <i>ROHS compliant</i>			



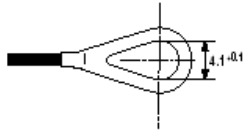
Plug Cap



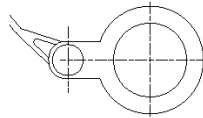
Receptacle Cap



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**



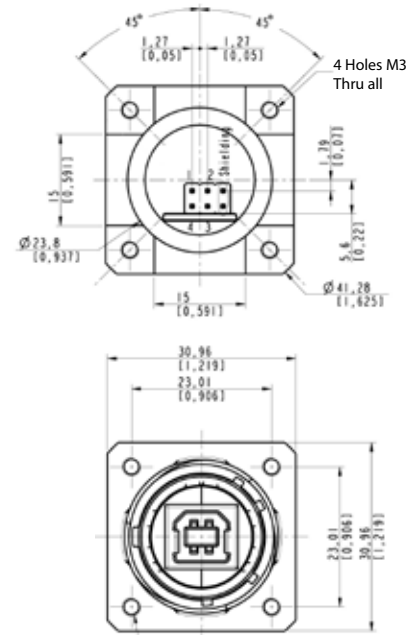
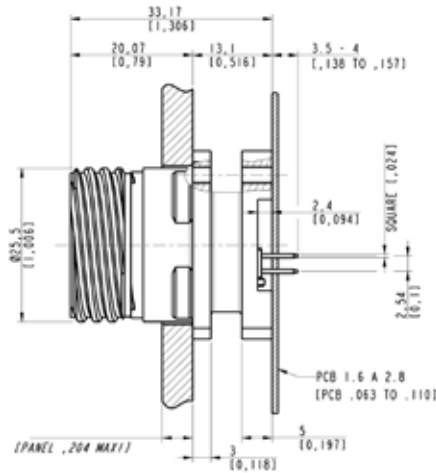


# USBBF TV

## Stand off receptacles

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

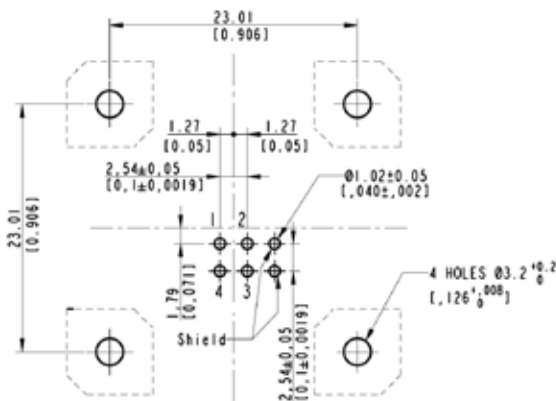
### Square flange receptacle



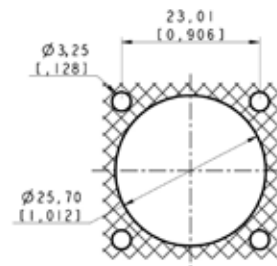
Part number	Plating	Part number
	Nickel - ROHS compliant	USBBF TV 2 5 N F459
	Olive drab cadmium	USBBF TV 2 5 G F459
	Black Zinc Nickel - ROHS compliant	USBBF TV 2 5 ZN F459

### Recommended PCB hole LAYOUT

Solder side view



### Panel drilling





# USBBF TV

Transversally sealed receptacles



## Applications

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

## Data transmission

USB specification 2.0  
Data rate: up to 480 Mb/s for high speed USB

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

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

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

## 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)
- USBF 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  
1000 h with marine bronze shell
- Fire retardant / Low smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 1 micro s
- Shocks: IK06 ► weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature range: - 40°C / +85°C

## Part number code

Series	USBBF TV	7S	2	G	10	OPEN
USBB Field TV						
Shell type						
2S: sealed square flange receptacle						
2PES: sealed square flange receptacle + backshell + plastic gland						
2PEMS: sealed square flange receptacle + backshell + metal gland						
7S: sealed jam nut receptacle						
7PES: sealed jam nut receptacle with backshell						
7PEMS: sealed jam nut receptacle + backshell + metal gland						
Back terminations						
2: rugged USB cable						
Shells plating						
N: nickel						
G: olive drab cadmium						
ZN: aluminium shell - black zinc nickel plating - ROHS compliant						
USB cable length						
03: 30 cm [11.81 inches]						
05: 50 cm [19.68 inches]						
10: 1 meter [39.37 inches]						
USB cable end						
A: standard USB-A plug						
OPEN: open USB cable (no connector)						

- Examples:
- Olive drab cadmium jam nut receptacle: USBBF TV 7 XX
  - Nickel square flange receptacle: USBBF TV 2 XX



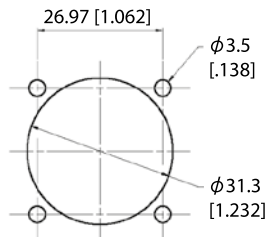
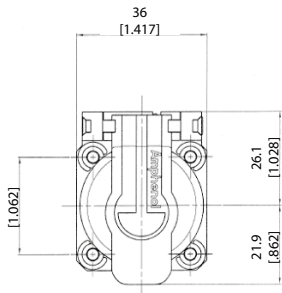
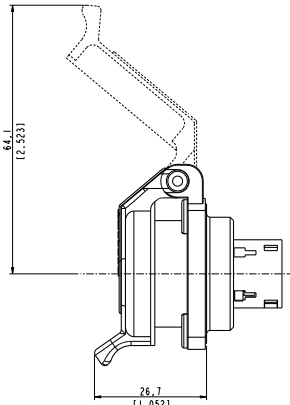
# USB B receptacle with Self Closing Cap

Sealing level IP54  
(Splash and dust Proof)



This Self Closing Cap automatically protects the RJ Field square flange receptacles (MIL-C-26482 type), protecting your system from dust and water projections.  
A spring automatically closes the upper part of the cap when the USB B plug is removed from the receptacle.

## USBBF 21 X SCC



Panel Drilling

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

Part number*	Plating	Metallized inserts (EMI)	Part number
	Black coated	No (blank insert)	<b>USBBF 21B SCC</b>
	Nickel plated	Yes	<b>USBBF 21N SCC</b>
	Olive drab cadmium plated	Yes	<b>USBBF 21G SCC</b>
	Black Zinc Nickel - ROHS plating	No	<b>USBBF 21ZN SCC</b>

\* The part number includes the receptacle + the self closing cap

■ Note: panel gasket with any of these receptacles, p/n JE18



## RJF 21 X SCC, USBF 21 X SCC, & IEEE1394



RJ45 version  
(see page 25)



USB2.0 & 3.0 - A version  
(see pages 94 & 107)



IEEE1394 version  
(see page 143)

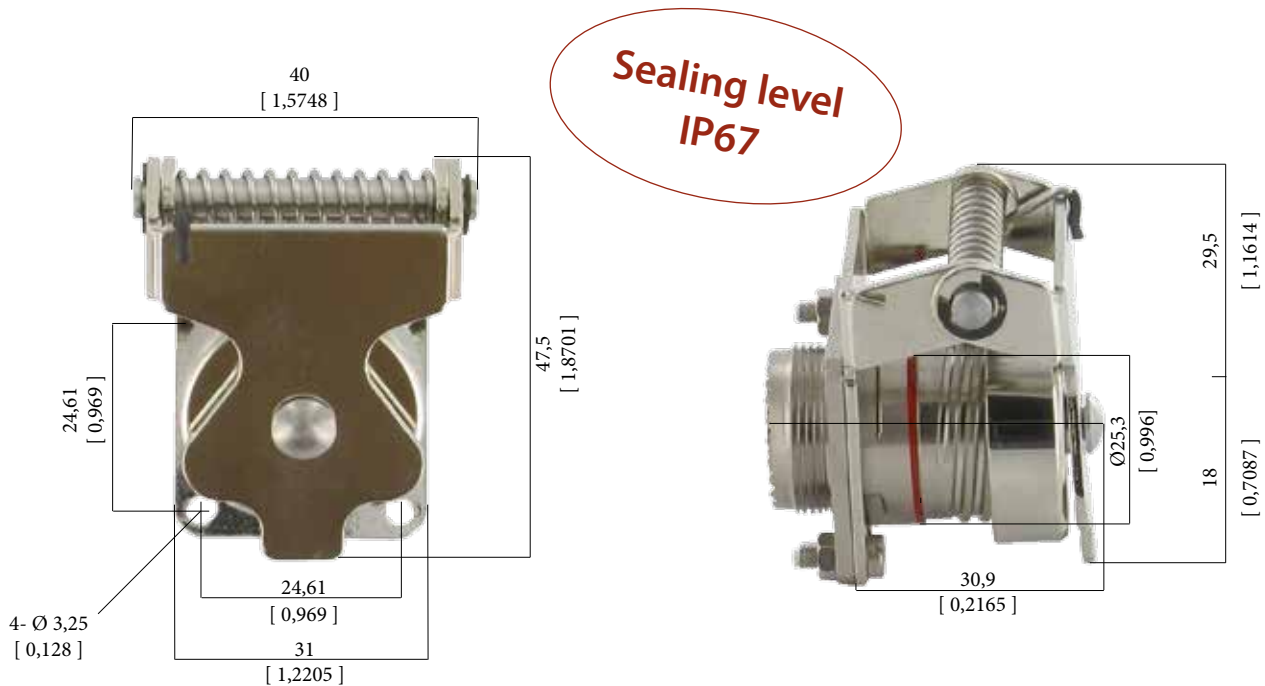


# Metallic Self Closing Cap (SCC)

For USBB square flange receptacles.

This Self Closing cap automatically protects the USBB (2.0 - type A) square flange receptacles (MIL-DTL-38999 type), protecting your system from dust and water projection.

A spring automatically closes the upper part of the cap when the USB plug is removed from the receptacle.



## IMPORTANT NOTE

Metal Self Closing cap are sold separately (without receptacle).



Part number	Plating	P/N
	Black - ROHS compliant	<b>USBFTVSCCB</b>
	Nickel - ROHS compliant	<b>USBFTVSCCN</b>
	Olive drab cadmium	<b>USBFTVSCCG</b>
	Black Zinc Nickel - ROHS plating	<b>USBFTVSCCZN</b>

**Remark:** also compatible with USB3FTV (type A) & USBBFTV (type B) square flange receptacles:

USB3FTV2XX (see page 95)

USBFTV2XX (see page 108)

■ Panel gasket for square flange receptacle (thickness: 0,8 mm [.031]):

Part number: **JE15**



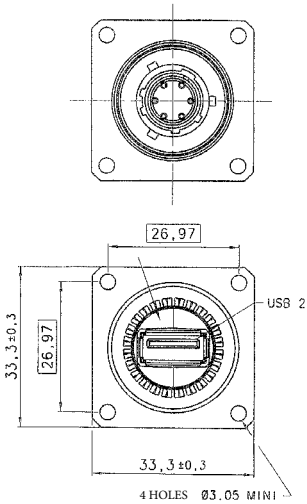
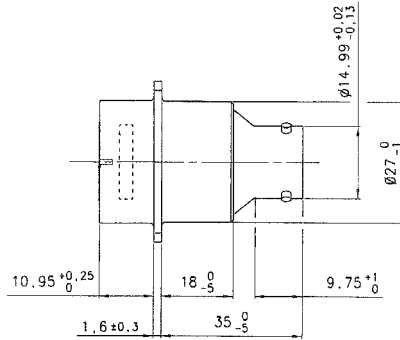


# Special USB adaptor

For Military & Commercial Aeronautics

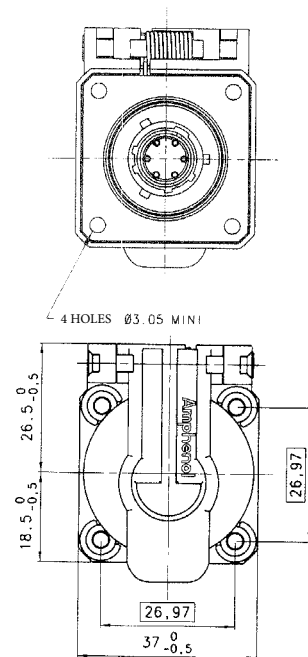
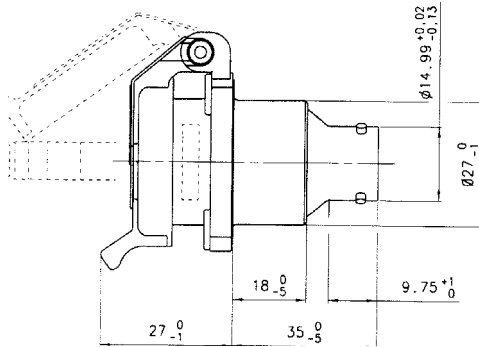
At the rear of the adaptor, the connection is for connectors type EN3646.

## Adaptor USB only



Part number	Plating	Coding	P/n
	Black anodized	N	<b>35608</b>
Black anodized	W	<b>35615</b>	

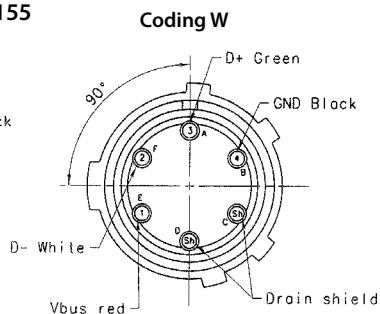
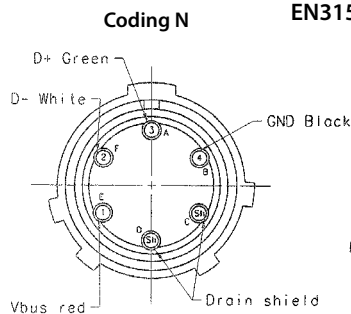
## Adaptor USB + Self Closing Cap (SCC)



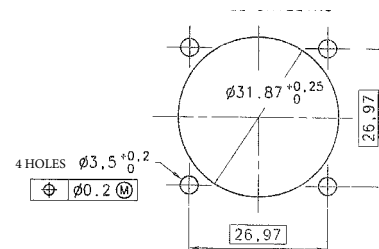
Part number	Plating	Coding	P/n
	Black anodized	N	<b>35616</b>
Black anodized	W	<b>35617</b>	

For all options:

10-6 Male contact  
EN3155



Panel drilling





# Rugged USB Solutions



## Cable assemblies

### Table of contents

 USB-A Field : plastic & neoprene solutions with self closing cap .....	118
 USB-B Field : Plastic shell - Overmolded cordset plug .....	121



# USB-A Field

Rugged USB-A plastic & neoprene solutions with Self Closing Cap



Amphenol USB-A Field - Plastic & Neoprene versions are rugged USB interconnect solutions fitted to be used in any industrial harsh environment. The Self Closing Cap enclosure enables to protect the USB-A Field receptacle from dust and fluids when the plug or the USB Memory key are unmated.

### Applications

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

### Main characteristics

- Sealing level:
  - Matted condition with plug or rugged USB Memory Key: IP67
  - Receptacle with Self Closing Cap alone : IP54
- Mating cycles: 500
- Push-pull mating
- Neoprene shells for plug & USB Keys
- Data transmission: USB specification 2.0
- Data rate: up to 480 Mb/s for high speed USB
- Temperature range: -40°C / +85°C
- RoHS compliant

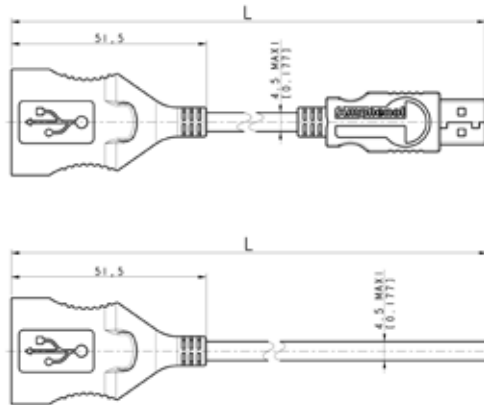
### Plug with soft neoprene shell



**Part number:**  
USBAP 6 xxxA  
with USB-A plug

IP67 when matted  
on receptacle

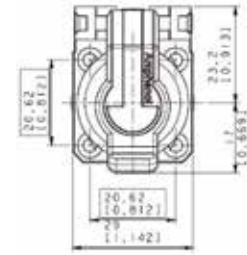
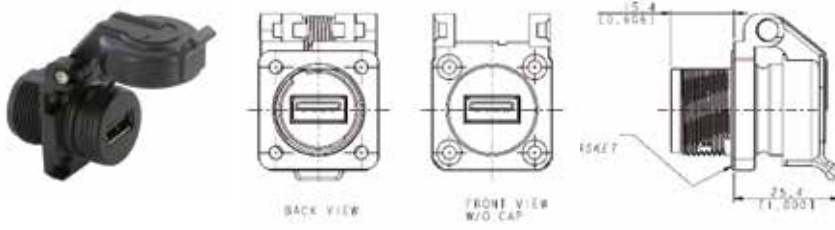
**Part number:**  
USBAP 6 xxx  
Open



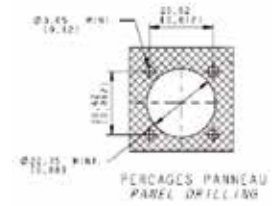
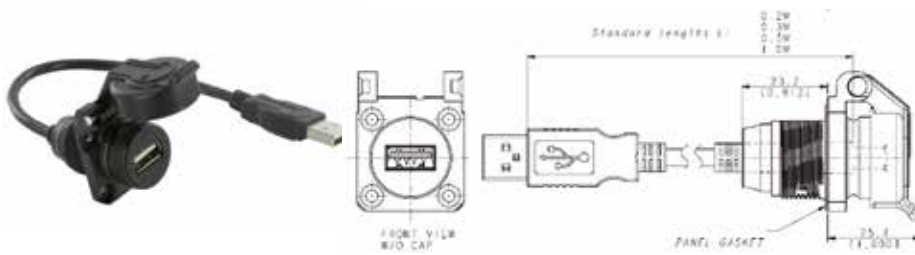
Part number	Extremity type Open or USB-A	$L^{+5cm}_0$	$L^{+0.164ft}_0$
		Meters	Feet
USBAP6 05 OPEN	Open	0.5	1.64
USBAP6 05A	USB-A	0.5	1.64
USBAP6 10 OPEN	Open	1.0	3.28
USBAP6 10A	USB-A	1.0	3.28
USBAP6 15 OPEN	OPEN	1.5	4.92
USBAP6 15A	USB-A	1.5	4.92
USBAP6 20 OPEN	OPEN	2.0	6.56
USBAP6 20A	USB-A	2.0	6.56

## Square flange receptacle

IP54  
when alone



Part number:  
USBAPSCC 21

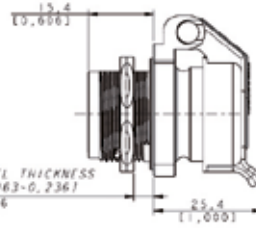
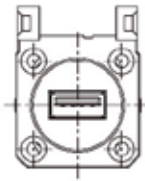
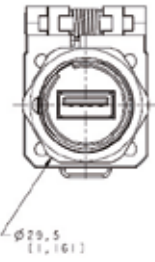


Part number	Cordset length	
	Meters	Feet
USBAPSCC 22 02A	0.2	0.66
USBAPSCC 22 03A	0.3	0.98
USBAPSCC 22 05A	0.5	1.65
USBAPSCC 22 10A	1.0	3.28

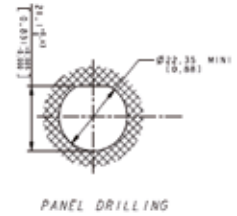
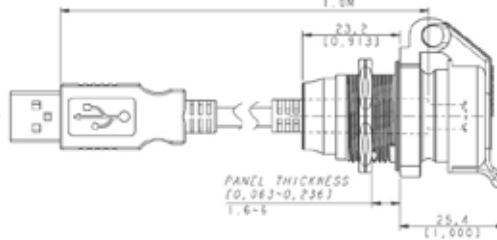
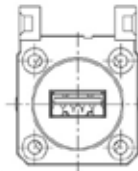
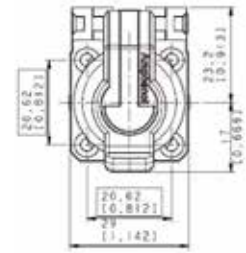
### Jam nut receptacle



Part number:  
USBAPSCC 71

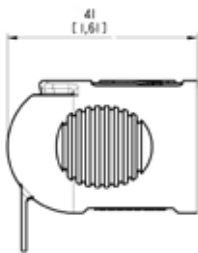


IP54  
when alone



Part number	Cordset length	Cordset length
	Meters	Feet
USBAPSCC 72 02A	0.2	0.66
USBAPSCC 72 03A	0.3	0.98
USBAPSCC 72 05A	0.5	1.65
USBAPSCC 72 10A	1.0	3.28

### USB plastic - IP67 cap (for square flange receptacle only)

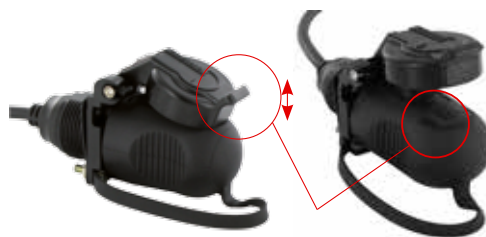


Part number:  
USBAP IP67 CAP



Cap lanyard fixed by a screw  
(for square flange receptacle only)

#### How to unplug:



#### Locking Shape:

Push-up the self-closing cap before removing the USBKey, Plug or IP67 protective cap from the receptacle



# USB-B Field

Plastic shell - Overmolded cordset plug



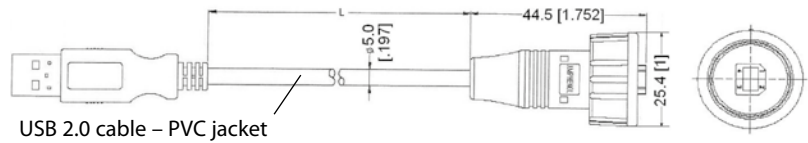
## IP68 SEALED USB-B CONNECTION SYSTEM

- Plastic shells
- Thread coupling
- Overmolded plug cordset: male sealed USB-B plug to standard USB-A plug
- Available cordset lengths: 1m and 2m - For other lengths please contact us
- Rear mount jam nut receptacle with 50mm flying lead + 5-way connector back termination. Panel gasket included.
- Temperature range: -20°C +80°C

### Applications

- Embedded computers
- Data transfer
- Numerical control machine

## Overmolded plug cordset : male sealed USB-B plug, standard USB-A plug.

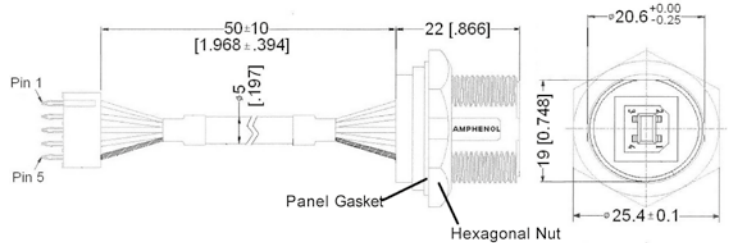


Part number	Length	
	USBBF6100	1000±50mm
USBBF6200	2000±50mm	[78.74±1.97]

## Receptacle - Female USB-B

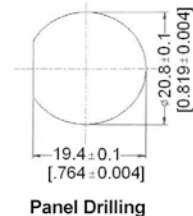


Part number :  
USBBF7



### JWT CONNECTOR - PITCH 2.5MM

- JWT 1 = USB1 = RED (AWG 24)
- JWT 2 = USB2 = WHITE (AWG 28)
- JWT 3 = USB3 = GREEN (AWG 28)
- JWT 4 = USB4 = BLACK (AWG 24)
- JWT 5 = USB Shield



## Receptacle cap



Part number:  
USBBFC7





# Rugged USB Solutions



## Rugged electronics

### Table of contents

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Reinforced USB amplifier .....	131

# Reinforced USB3FTV Memory Keys

Derived from MIL-DTL-38999 series III specification • Capacities 16, 32 & 64 GB



We provide reinforced USB memory keys available in different capacities. They can be used ONLY with our Amphenol Socapex USBFTV or USB3FTV series receptacles. When mated on the receptacle, the system is IP68 and allows data transmission in harsh environments.

### Environmental protection

- Sealing: IP68 (when mated)
- Salt spray: 48 h with nickel plating (ROHS)  
> 500 h with olive drab cadmium
- Vibrations: MIL-STD-810G method 514.5 fig 514.5.C cat 14
- Temperature range: - 40°C / +85°C (MIL-STD-810F)
- Data transmission during vibration & temperature tests

### Other features

- Type: USB3.0 (capacities 16, 32,64 & 128 GB)
- Voltage: 5V DC - 500 mA max

### IMPORTANT NOTE

USBFTV memory key to be used with USBFTV receptacles (3.0 and 2.0)  
▶ see page 86 for 3.0 & page 97 for 2.0

NEW

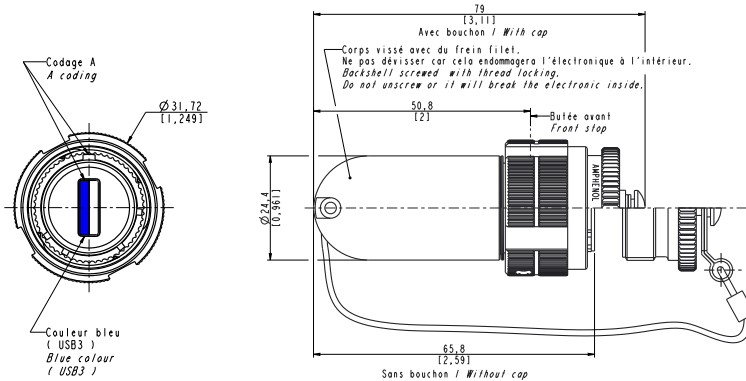
### Specific features

- Engineering control (Product Change Notice & End of life Policy)
- Memory type: MLC (3000 read/write cycles)
- Wear Leveling function\*
- MTBF: 1,000,000 hours

Interface	Super-speed USB3.0 compliant; backward compatible with USB2.0 and USB1.1			
Speed performance**	16GB	32GB	64GB	
	Read (MB/s)	200	205	200
	Write (MB/s)	47	85	80

Power consumption\*\*: Active: 265 mA / Idle: 70mA

\*\* Results may vary from flash configurations or host system settings.



### Custom design

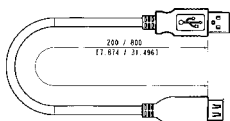
Amphenol can also study the integration of electronic selected by a customer. In order to do so, we need to receive a sample of the USB memory stick so we can study its integration into our existing design or adapt it.

Please send your requests to [contact@usbfield.com](mailto:contact@usbfield.com)

**Note:** our rugged memory keys are sold under standard electronic manufacturer configuration for data storage. If, for your own usage, you need to re-configure the electronic (under Linux for example), it will be under customer responsibility. Amphenol is not responsible for any wrong doing or misguided use of the product by its customers.

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).

### Memory size for 16, 32 & 64 GB capacities



A male/Femelle USB cordset is included with each memory key

**\*Wear-Leveling:** Flash memory can be erased a limited number of times. In a typical application, and especially if a file system is used, specific pages are constantly updated (e.g., the page that contains the FAT, registry, etc.). Without any special handling, these pages would wear out more rapidly than other pages, reducing the lifetime of the entire flash. To overcome this inherent deficiency, USB-Disk Module (UDM) uses wear-leveling algorithm. This wear-leveling algorithm ensures that consecutive writes of a specific sector are not written physically to the same page in the flash. This distributes flash media usage evenly across all pages, thereby maximizing flash lifetime. The wear-leveling mechanism provides write/erase cycles for reliable data storage over an extended period.

### Definition of part number

USB3FTV KEY 6	A	64	N	CAP	APA
For USB3.0 version	Coding position: A: coding A B: coding B	Capacity for <u>USB3FTV KEY</u> : 16 / 32 / 64 / 128	Plating N: nickel G: olive drab cadmium ZN: Black Zinc Nickel	CAP: with cap Blank: without cap	
<b>Nota:</b> USB3.0 is compatible with USB2.0	<b>⚠</b> Coding position must be the same than the receptacle	<b>Nota:</b> other capacity, please consult us at <a href="mailto:contact@usbfield.com">contact@usbfield.com</a>	<b>Nota:</b> please check the plating of your USBFTV receptacle.		

**Example:** - USB3.0 version, coding B, capacity of 64GB, olive drab cadmium plating, with cap: p/n is **USB3FTVKEY6 B 64 G CAP APA**







# Rugged ATEX Zone 2 solutions



## Table of contents

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---------------------------------	-----

# RJFTVX, USBFTVX, RJ11FTVX

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



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

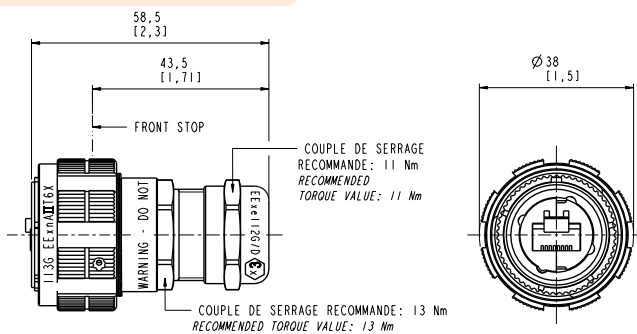


## RJFTVX • Rugged and sealed RJ45 connector



RJFTVX allows you to use an Ethernet Class D / Cat. 5e connection for 10 BaseT, 100 BaseTx or 1000 BaseT networks in ATEX zone 2 environments. With the patented RJStop system you can use a standard RJ45 cordset in a metallic plug which will protect it from shocks, dust and fluids. RJFTVX features the same main characteristics than RJFTV series (see page 26).

### Plug

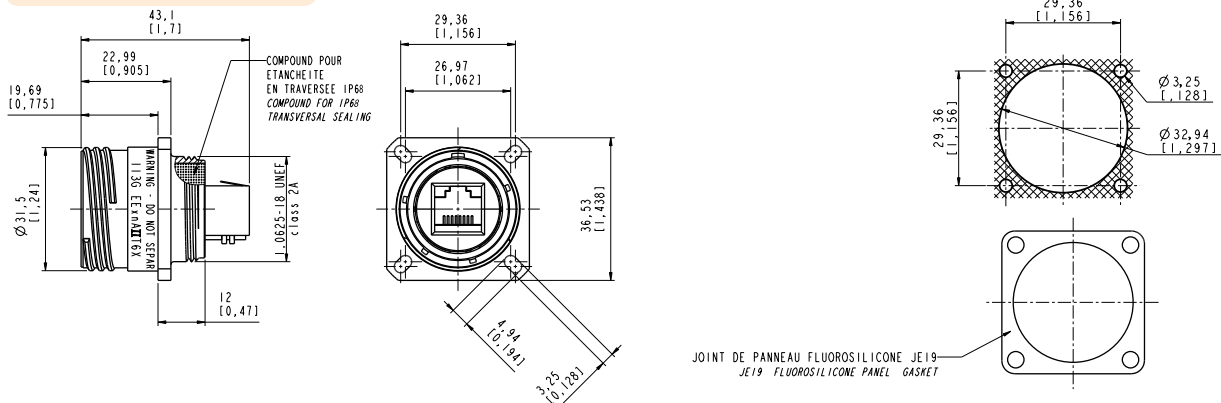


### Characteristics

- Ex marking IIG ExnAII T6 X
- Operating temperature range -40°C / +60°C
- Voltage 60 Veff max
- Power 20 W max
- Outside cable diameter 6mm to 12mm
- Sealing IP68
- Data transmission 10 BaseT, 100 BaseTX & 1000 BaseT networks. Cat. 5e per TIA/EIA 568B & Class D per ISO/IEC 11801

Part number	Plating	Plug	IP68 metallic cap
	Nickel	<b>RJFTVX6MN</b>	<b>RJFTVC6N</b>
	Olive drab cadmium	<b>RJFTVX6MG</b>	<b>RJFTVC6G</b>
	Black Zinc Nickel	<b>RJFTVX6MZN</b>	<b>RJFTVC6ZN</b>

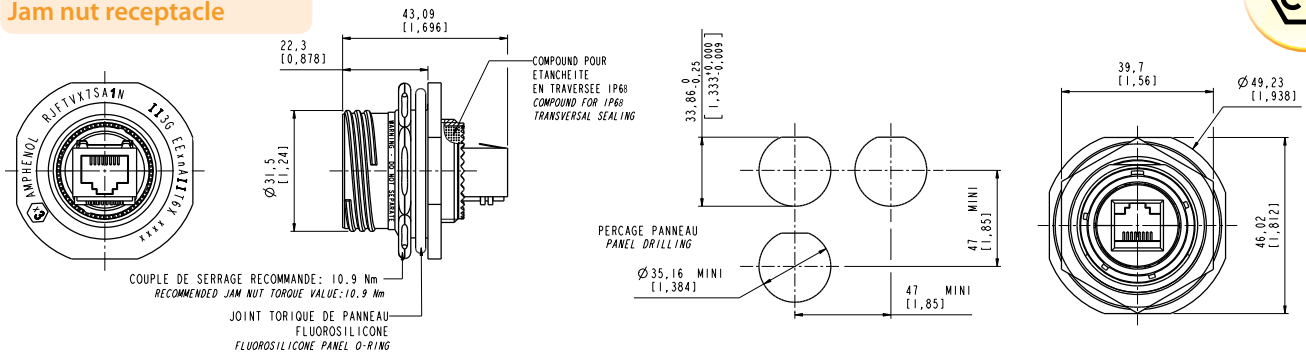
### Square flange receptacle



Part number	Plating	Receptacle, RJ45 back termination, coding A	IP68 metallic cap
	Nickel	<b>RJFTVX2SA1N</b>	<b>RJFTVC2N</b>
	Olive drab cadmium	<b>RJFTVX2SA1G</b>	<b>RJFTVC2G</b>
	Black Zinc Nickel	<b>RJFTVX2SA1ZN</b>	<b>RJFTVC2ZN</b>



## Jam nut receptacle

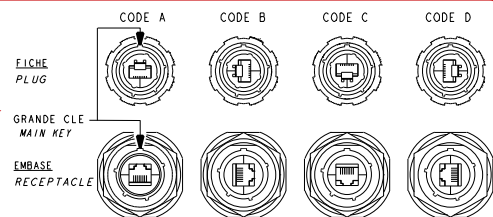


Part number	Plating	Receptacle, RJ45 back termination, coding A	IP68 metallic cap
	Nickel		<b>RJFTVX7SA1N</b>
Olive drab cadmium		<b>RJFTVX7SA1G</b>	<b>RJFTVC7G</b>
Black Zinc Nickel		<b>RJFTVX7SA1ZN</b>	<b>RJFTVC7ZN</b>

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

Receptacles can be provided with RJ45 cordsets.

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

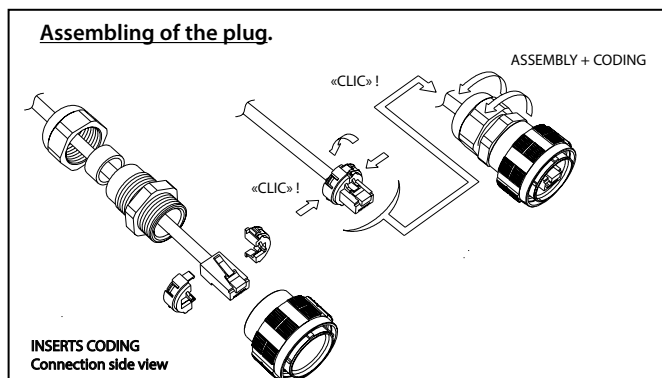


Part number	Nickel plating	Olive drab cadmium plating	Black Zinc Nickel plating	RJ45 cordset length (meters)
	RJFTVX2SA2N03100BTX		RJFTVX2SA2G03100BTX	RJFTVX2SA2ZN03100BTX
RJFTVX2SA2N05100BTX		RJFTVX2SA2G05100BTX	RJFTVX2SA2ZN05100BTX	0.5
RJFTVX2SA2N10100BTX		RJFTVX2SA2G10100BTX	RJFTVX2SA2ZN10100BTX	1.0
RJFTVX2SA2N15100BTX		RJFTVX2SA2G15100BTX	RJFTVX2SA2ZN15100BTX	1.5

## Part number code

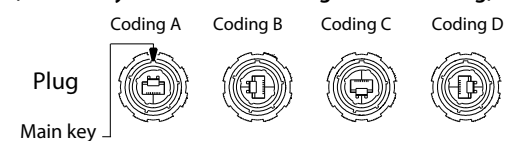
Series RJ Field TV	RJFTVX	7S	A	2	N	05 100BTX
Shell Type						
2S: Square flange receptacle						
7S: Jam nut receptacle						
6M: Plug						
Coding (for receptacles only)						
"A" (Standard) or "B", "C", "D"						
Back Terminations (for receptacles only)						
1: Female RJ45						
2: RJ45 cordset						
Shell Material and Finish:						
N: Nickel						
G: Olive drab cadmium						
ZN: Black Zinc Nickel						
Cordset length (for receptacles with "2" back termination only)						
03 100BTX: 30 cm [11.81 inches]						
10 100 BTX: 1 meter [39.37 inches]						
05 100 BTX: 50 cm [19.68 inches]						
15 100BTX: 1,5 meters [59.04 inches]						

## Assembly instructions for the plug



### 4 codings possibilities

(defined by the customer during the assembling).



**IMPORTANT NOTE:** to remove the insert use the

■ Insert removal tool for plug

P/N: RJF ODE





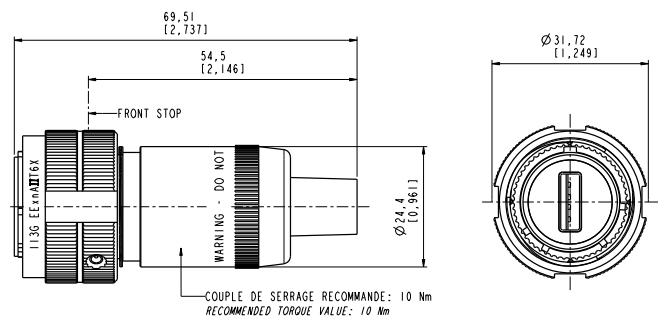
## USBFTVX • Rugged and sealed USB connector



With USBFTVX, you can insert a standard USB 2.0 cordset into a metallic plug which will protect it from shocks, dust and fluids. This range is fitted to be used in Atex zone 2 environments. This metallic plug is connected into a receptacle, using a Tri Start thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device for high vibrations. USBFTVX features the same main characteristics than USBFTV series (see page 76).

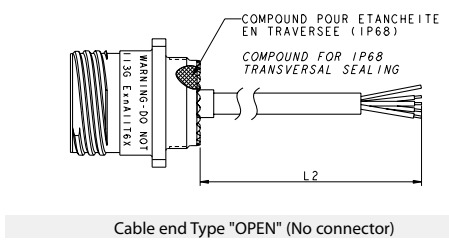
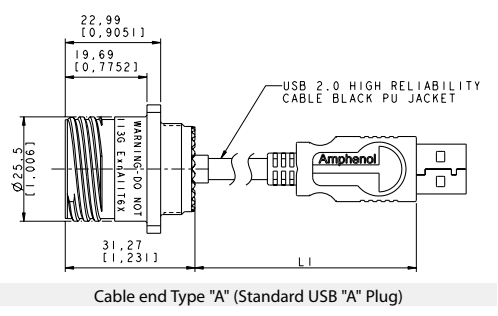
Characteristics			
Ex marking	IIG ExnAII6 X	Outside cable diameter	4mm to 6mm
Operating temperature range	-40°C / +70°C	Sealing	IP68
Voltage	60 Veff max	Data transmission	USB 2.0 up to 480 Mb/s
Power	20 W max		

### Plug

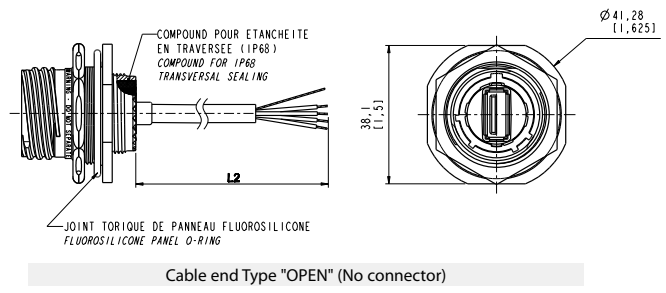
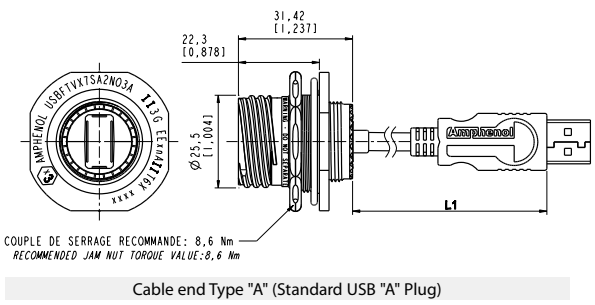


Part number	Plating	Plug	IP68 metallic cap
	Nickel	<b>USBFTVX6N</b>	<b>USBFTVC6N</b>
	Olive drab cadmium	<b>USBFTVX6G</b>	<b>USBFTVC6G</b>
	Black Zinc Nickel	<b>USBFTVX6ZN</b>	<b>USBFTVC6ZN</b>

### Square flange receptacle



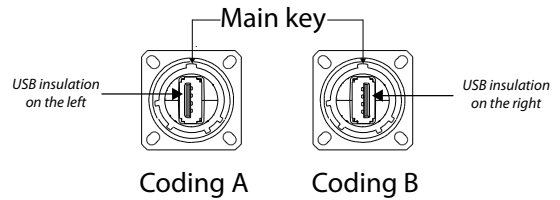
### Jam nut receptacle





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

Connection side view of the receptacle



### Part number code

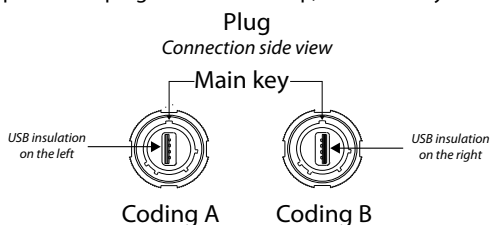
Series USB Field TV	USBFTVX	25	A	2	N	03	A
<b>Shell Type</b>							
25: square flange receptacle							
75: jam nut receptacle							
<b>Coding: "A" (Standard) or "B"</b>							
<b>Back Terminations</b>							
2: rugged USB cable							
<b>Shells Plating</b>							
N: Nickel							
G: Olive drab cadmium plating							
<b>USB cable length</b>							
03: 30 cm [11.81 inches]							
05: 50 cm [19.68 inches]							
10: 1 meter [39.37 inches]							
<b>USB cable end</b>							
A: Standard USB-A plug							
OPEN: Open cable (no connector)							

### CAPS for receptacles :

Part number	Plating	Cap for square flange receptacle	Cap for jam nut receptacle
		Nickel	USBFTVC2N
	Olive drab cadmium	USBFTVC2G	USBFTVC7G
	Black Zinc Nickel	USBFTVC2ZN	USBFTVC7ZN

### Assembly instructions of the plug

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



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

#### IMPORTANT NOTE

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



#### IMPORTANT NOTE

To remove the insert use the insert removal tool for plug.

P/N: USBF ODE



## RJ11FTVX • Rugged and sealed RJ11/12 connector

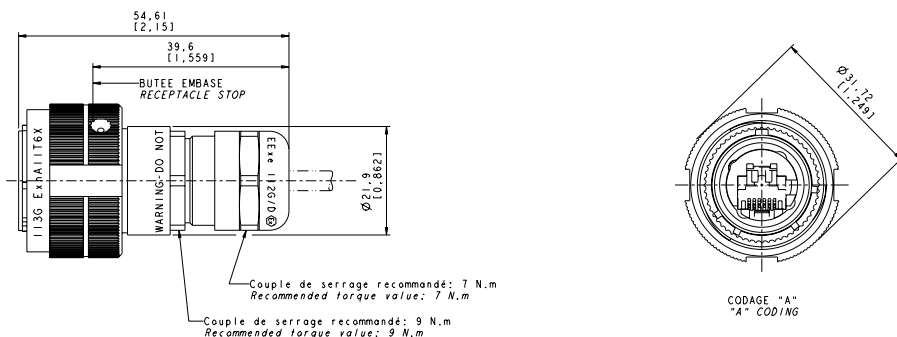


RJ11FTVX allows you to use a standard phone RJ11/RJ12 connection in Atex zone 2 environments. With the patented RJStop® system you can use a standard RJ11 / RJ12 cordset in a metallic plug which will protect it from shocks, dust and fluids.

### Characteristics

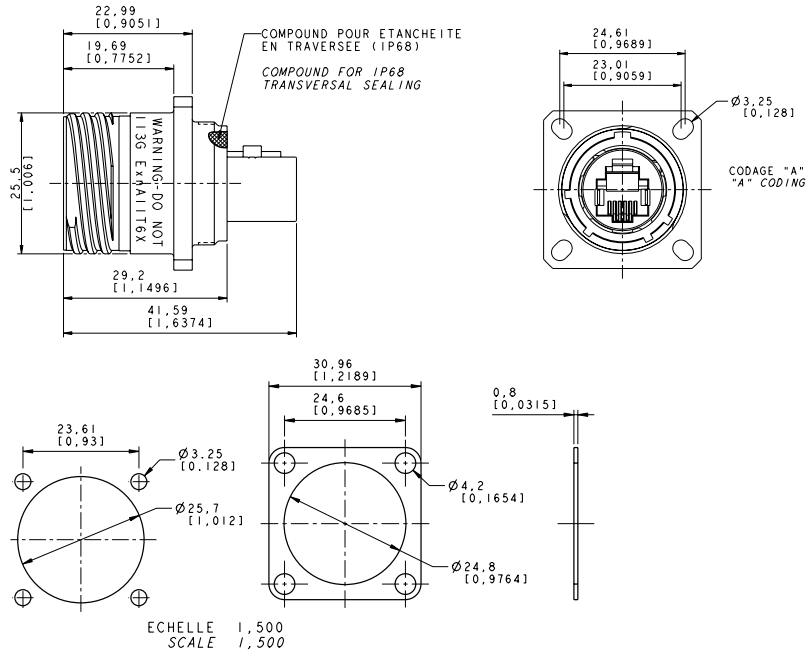
■ Ex marking	IIG ExnAIIIT6 X
■ Operating temperature range	-40°C / +60°C
■ Voltage	60 Veff max
■ Power	20 W max
■ Outside cable diameter	4mm to 5.5mm
■ Sealing	IP68
■ Coupling mechanism	Tri Star thread with anti-decoupling device (MIL-DTL-38999 series III)
■ Mating cycles	500 min
■ Salt spray	48h with nickel plating / 500 h with olive drab cadmium plating
■ Coding	4 mechanical user-defined coding / Polarization settings (insert rotation)
■ Fire retardant / Low smoke	UL94 V0 and NF16 101 & 16 102
■ R11 cordset retention in the plug	100 N in the Axis

### Plug



Part number	Plating	Plug	Cap
	Nickel	<b>RJ11FTVX6MN</b>	<b>RJ11FTVC6N</b>
	Olive drab cadmium	<b>RJ11FTVX6MG</b>	<b>RJ11FTVC6G</b>
	Black Zinc Nickel	<b>RJ11FTVX6MZN</b>	<b>RJ11FTVC6ZN</b>

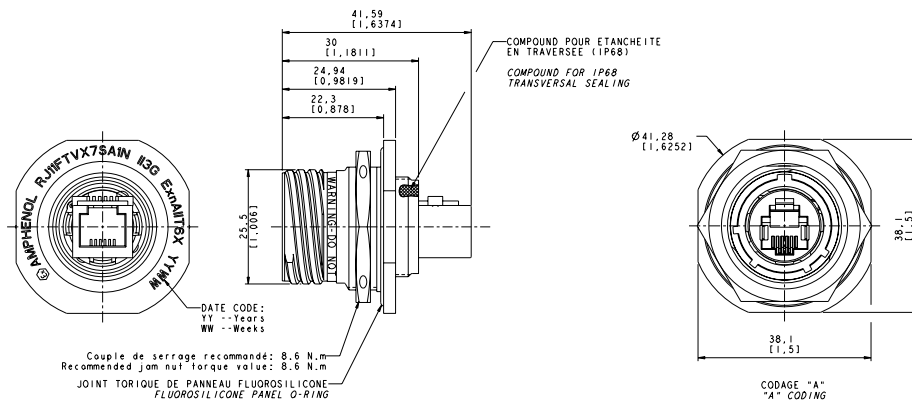
## Square flange receptacle



PERCAGES PANNEAU PANEL DRILLING JOINT DE PANNEAU FLUOR SILICONE JE15 JE15 FLUOROSILICONE PANEL GASKET

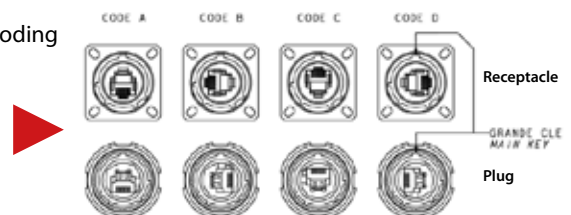
Part number	Plating	Receptacle - Female RJ11 back termination - Coding A	Receptacle cap
	Nickel	<b>RJ11FTVX2SA1N</b>	<b>RJ11FTVC2N</b>
	Olive drab cadmium	<b>RJ11FTVX2SA1G</b>	<b>RJ11FTVC2G</b>
	Black Zinc Nickel	<b>RJ11FTVX2SA1ZN</b>	<b>RJ11FTVC2ZN</b>

## Jam nut receptacle



Part number	Plating	Receptacle - Female RJ11 back termination - Coding A	Receptacle cap
	Nickel	<b>RJ11FTVX7SA1N</b>	<b>RJ11FTVC7N</b>
	Olive drab cadmium	<b>RJ11FTVX7SA1G</b>	<b>RJ11FTVC7G</b>
	Black Zinc Nickel	<b>RJ11FTVX7SA1ZN</b>	<b>RJ11FTVC7ZN</b>

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





# Other rugged solutions



**Field installable**

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# FWF TV

IEEE 1394A Connection System for Harsh Environments



### Applications

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

### Data transmission

IEEE 1394a-2000  
400 Mbits/second over 4.5 meters

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

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

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

### Main characteristics

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

### Environmental protection

- Sealing (mated): IP68 (Temporary immersion - 1 meter up to 30 minutes)
- Salt Spray: 48 h with Nickel plating  
> 500 h with Olive Drab Cadmium
- Fire Retardant / Low Smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 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	FWF TV	2	1	G
IEEE1394 Field TV				
Shell Type				
6:	Plug			
2:	Square Flange Receptacle			
2PE:	Square flange receptacle with metal backshell (type 1) & with metal backshell + plastic gland (type 2)			
7:	Jam Nut Receptacle			
7PE:	Jam nut receptacle with metal backshell (type 1) & with metal backshell + plastic gland (type 2)			
Back Terminations (Receptacles only)				
1:	IEEE 1394 receptacle			
2:	Solder Board (6 tinned holes)			
Shell Plating				
N:	Nickel - ROHS Compliant			
G:	Olive Drab Cadmium			

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

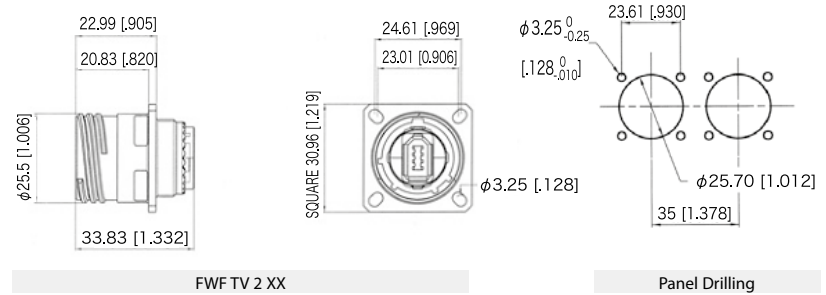
## Plug

- Shell type 6

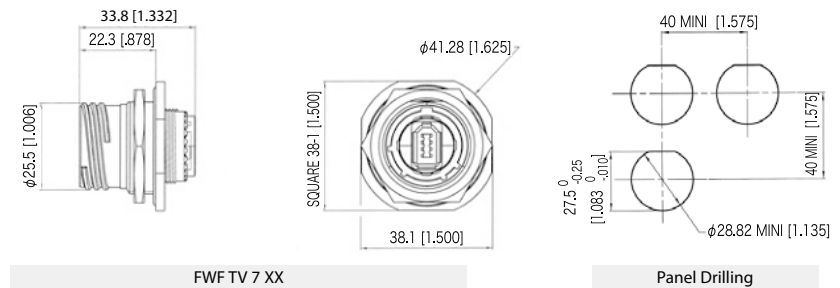


## Receptacles

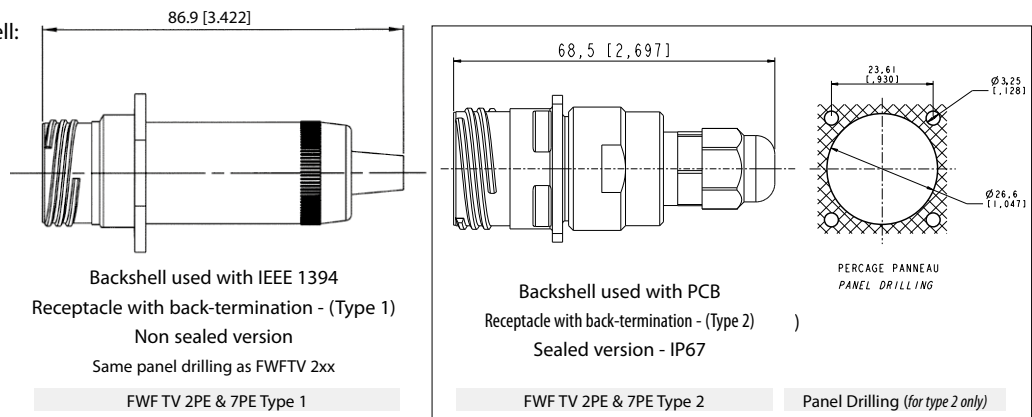
- Square flange receptacle  
4 mounting holes: Shell type 2



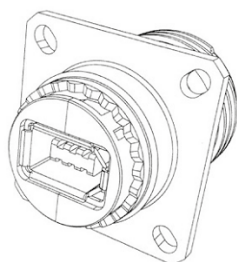
- Jam nut receptacle  
Hexagonal Nut mounting: Shell type 7



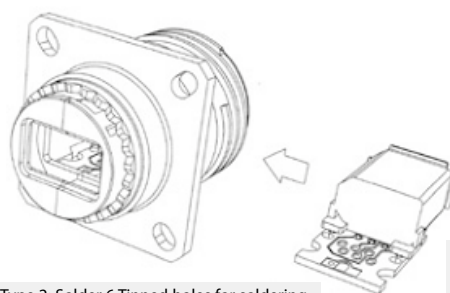
- Receptacles with backshell:  
Shell type 2PE and 7PE



## Back terminations



Type 1: IEEE 1394 Receptacle



Type 2: Solder 6 Tinned holes for soldering

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

## Assembly instructions

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

### Plug Assembly

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

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

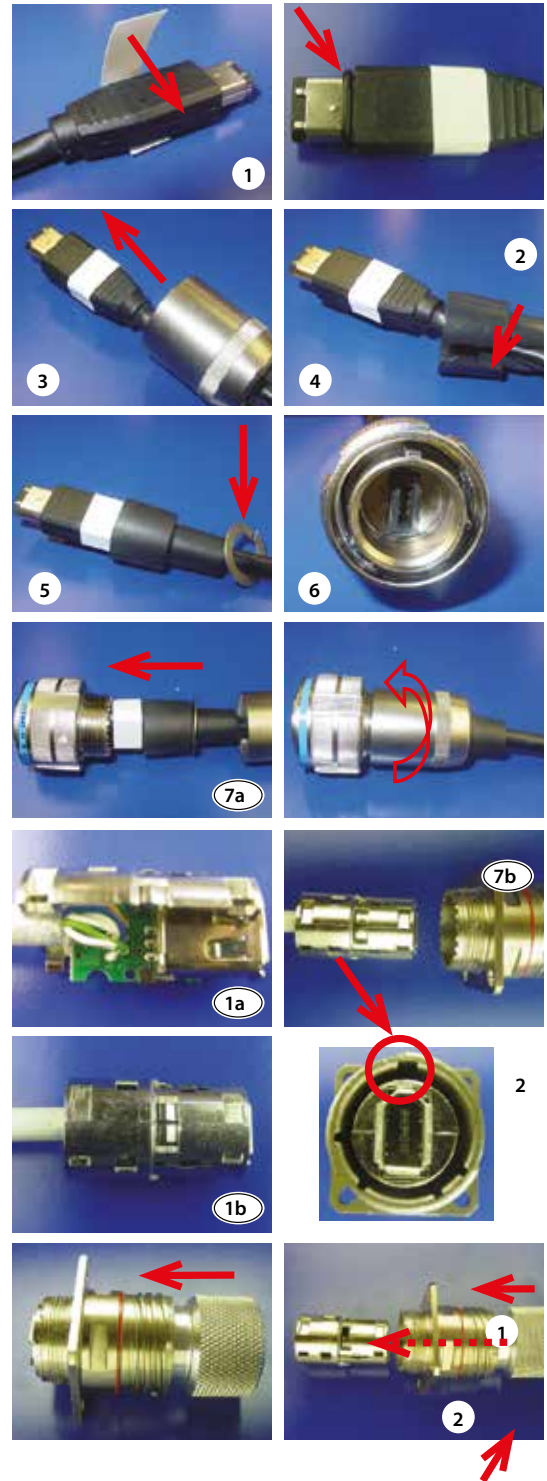
### Receptacle assembly

To Solder your cable onto the PCB:

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

### Removing Modules

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



### Accessories

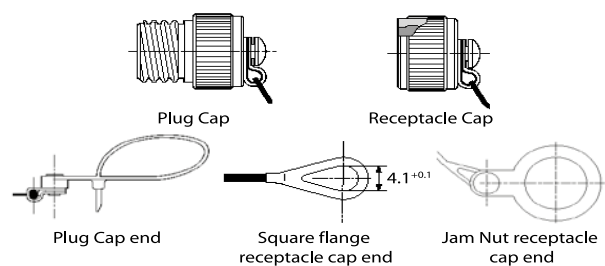
#### Metallic Caps

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

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



■ **Receptacle Insert removal tool:** FWF ODE



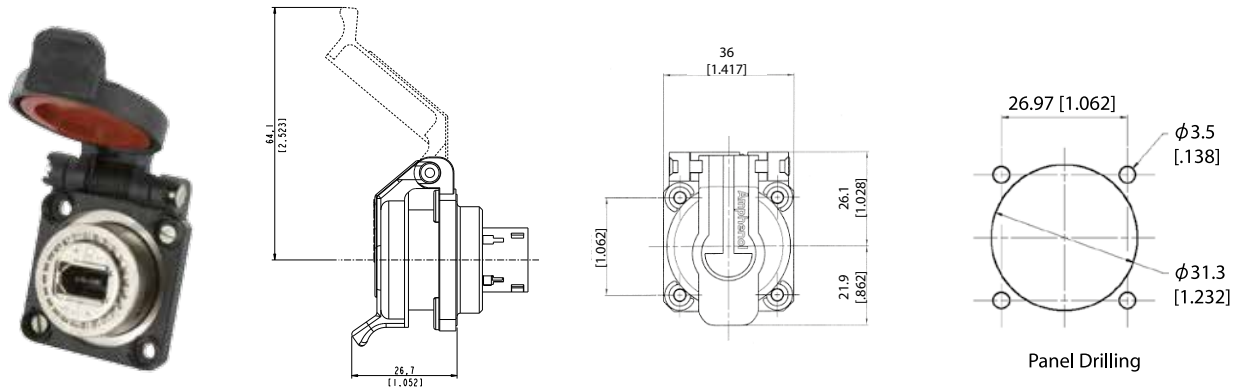


# IEEE1394 Receptacle with Self Closing Cap



This Self Closing Cap automatically protects the IEEE1394 square flange receptacles (MIL-C-26482 type), protecting your system from dust and water projections. A spring automatically closes the upper part of the cap when the IEEE1394 plug, or IEEE1394 cordset, are removed from the receptacle.

## FWF 21 X SCC



### Version IEEE1394

Part number *	Plating		Metallized inserts (EMI)	
	FWF 21B SCC	Black coated	No (blank insert)	Yes
FWF 21N SCC	Nickel plated		Yes	
FWF 21G SCC	Olive drab cadmium plated		Yes	

\* The part number includes the receptacle + the self closing cap

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



## RJF 21 X SCC, USBF 21 X SCC, USBBF 21 X SCC



**RJ45 version**  
(see page 25)

**USB2.0 & 3.0 - A version**  
(see pages 94 & 107)

**USB-B version**  
(see page 118)

# RJ11F

Rugged RJ11/RJ12 Connection System for Harsh Environment



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

### Applications

- Industrial applications
- Battlefield communication

### Main characteristics

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

### Environmental Protection

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

### Part Number Code

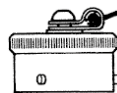
<b>Series</b>	RJ11F	2	2	B
RJ11Field				
<b>Shell Type</b>				
6: Plug, Plastic Gland				
2: Square Flange Receptacle				
7: Jam Nut Receptacle				
<b>Back Terminations (For Receptacles only)</b>				
1: Female RJ11				
2: Solder (6 tinned holes)				
<b>Shell Finishes</b>				
B: Black Coating - ROHS Compliant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

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

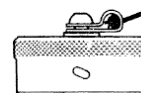
### ■ Metallic cap

	RJ11FC	2	B
<b>Connector Type</b>			
6: Plug			
2: Square Flange Receptacle			
7: Jam Nut Receptacle			
<b>Finishes</b>			
B: Black Coating - ROHS Compliant			
N: Nickel - ROHS Compliant			
G: Olive Drab Cadmium			
ZN: Black Zinc Nickel - ROHS Compliant			

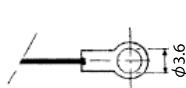
- Panel gasket for square flange « 2 » thickness: 0,6 mm  
P/N: JE 14



Plug cap



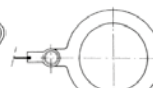
Receptacle cap



Square Flange  
type « 2 »



Plug Cap end  
type « 6 »



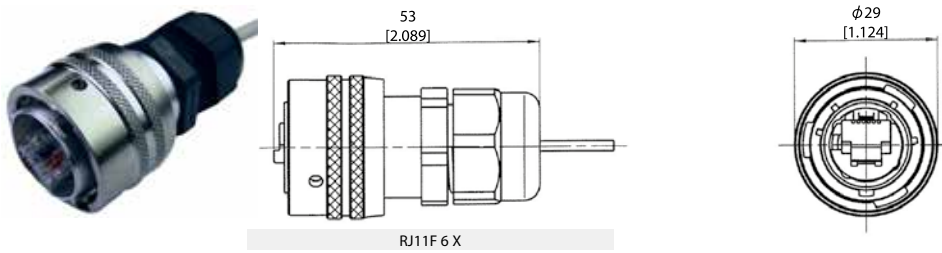
Jam nut receptacle  
type « 7 »

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



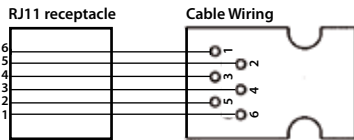
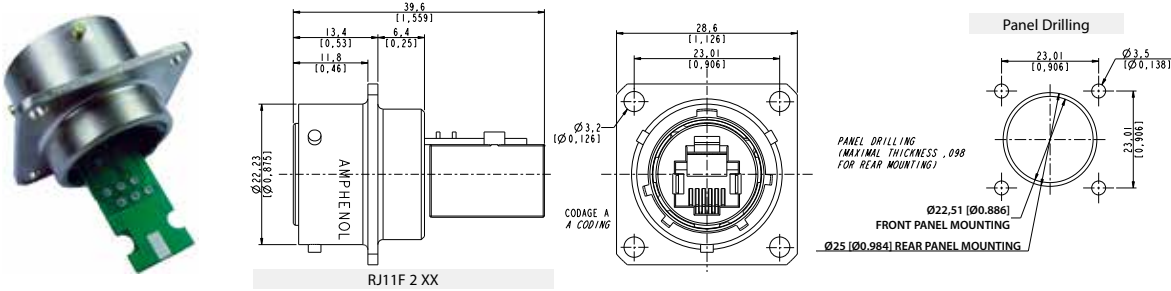
## Plug

- Shell type 6 with Plastic Gland

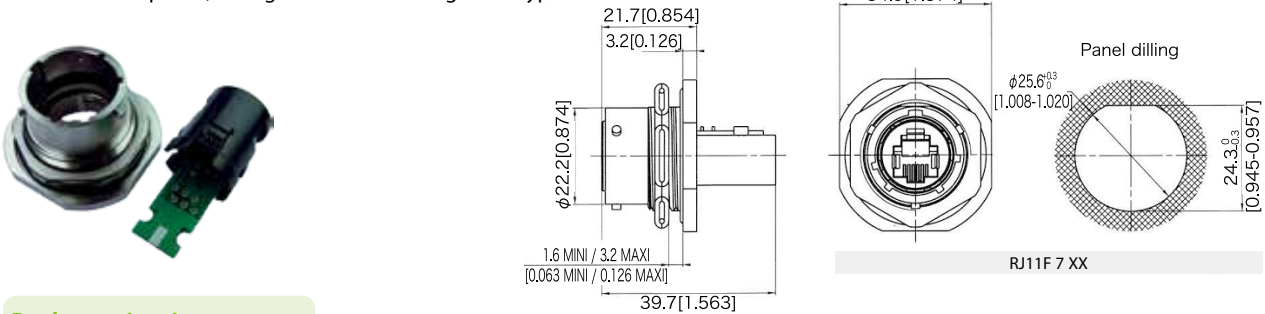


## Receptacles

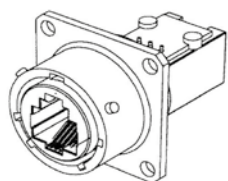
- Square flange receptacle, 4 mounting holes: shell type 2



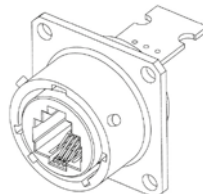
- Jam nut receptacle, Hexagonal Nut mounting: Shell type 7



## Back terminations



Type 1: Female RJ11 / RJ12

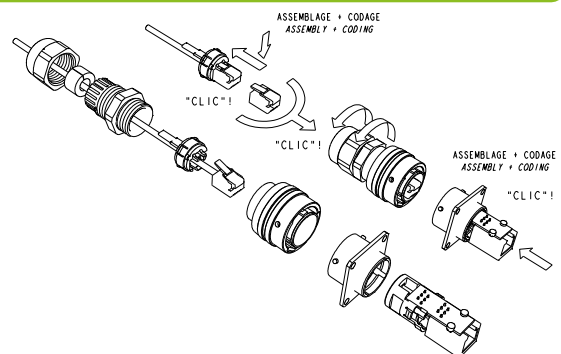
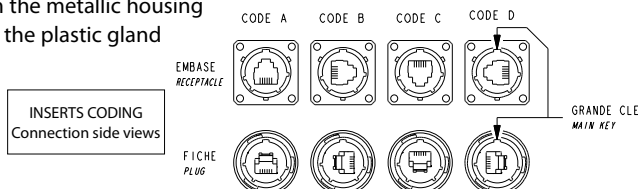


Type 2: Solder 6 Tinned through holes to solder your cable

## Assembly instructions

Easy and Safe: No field cabling tools required

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

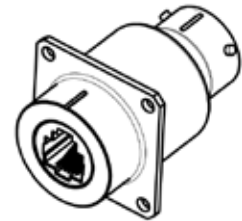
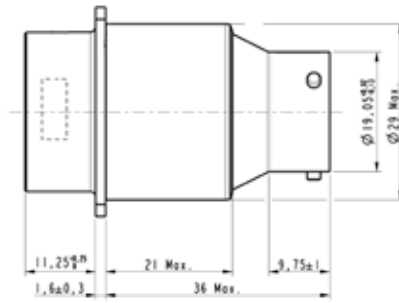




# Special RJ11 adaptor

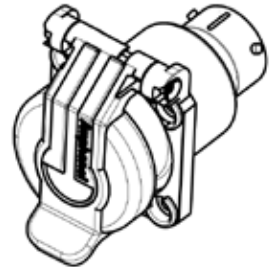
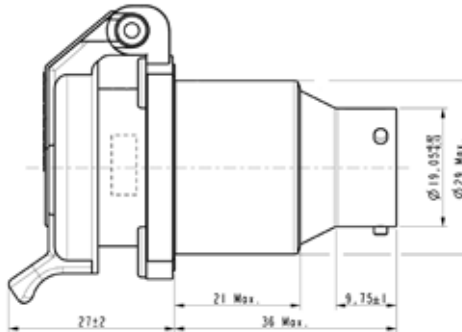
For Military & Commercial Aeronautics

## RJ11 adaptor only

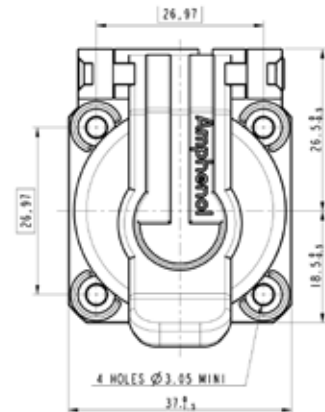
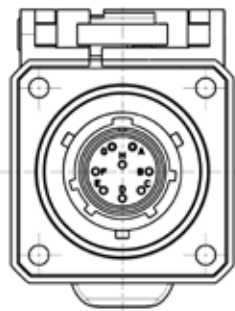


Part number	Coding	
	35639	Y
35641	W	
35643	Z	
35645	N	

## RJ11 adaptor + Self Closing Cap

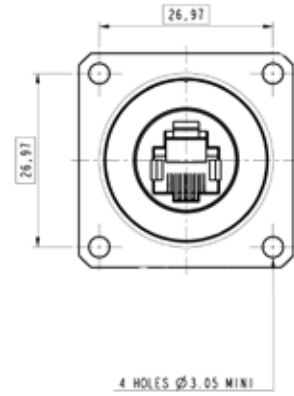
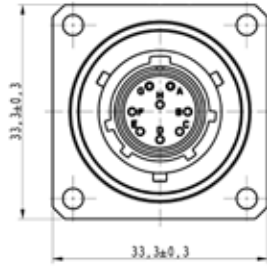
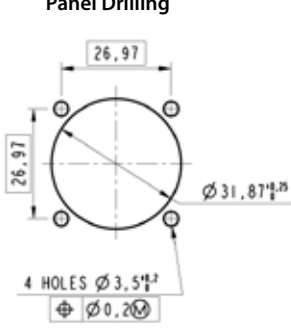


Part number	Coding	
	35623	N
35640	Y	
35642	W	
35644	Z	



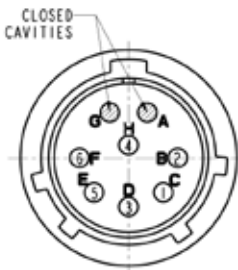
For all options:

Panel Drilling

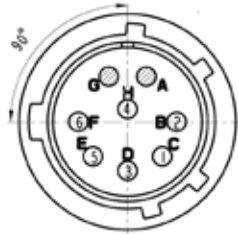


12-8 Male contact / EN3155

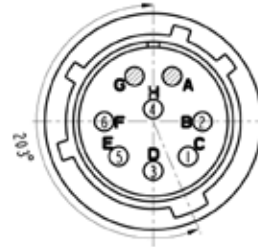
Coding N



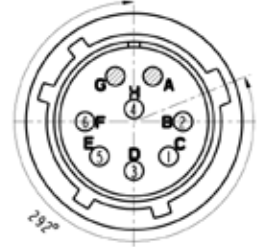
Coding W



Coding Y



Coding Z



# MTRJF TV

Fiber optic solution - Transform your MTRJ patchcord into an Environmental Connector



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

### No hazardous on-field cabling!

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

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

### Applications

- Railways
- Base Station
- Military communication
- Navy

### Mechanical characteristics

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

## Part Number Code

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

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

### Requested information to order MTRJ Field Patchcord

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

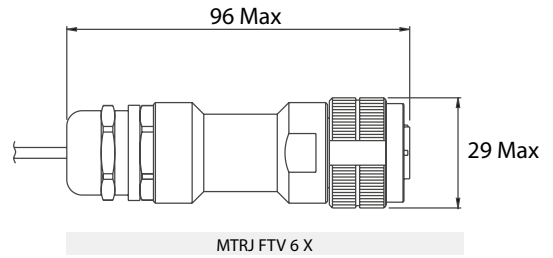
Contact us for other configuration

### Dismounting Tool Ordering Information

MTRJF TV DM TOOL

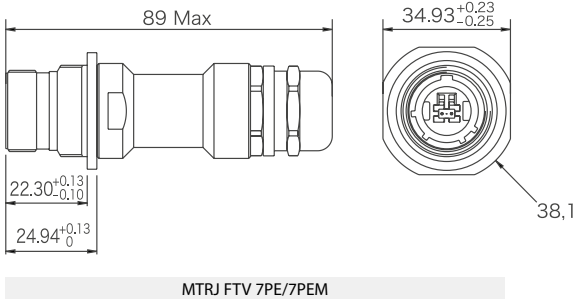
## Line drawings (Dimensions in mm)

### ■ Plug (MIL DTL 38 999 series III Size 13)

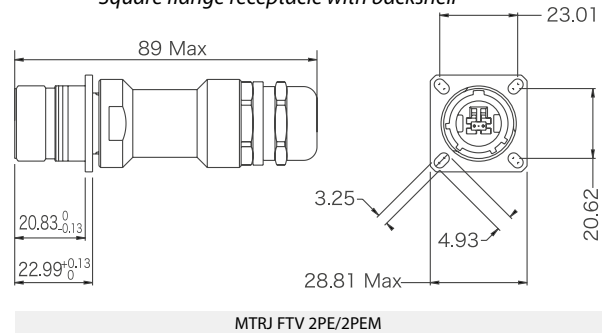


### ■ Receptacle (MIL DTL 38 999 series III Size 13) with backshell

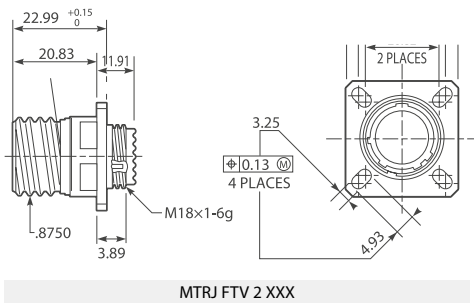
#### Jam Nut receptacle with backshell



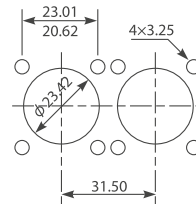
#### Square flange receptacle with backshell



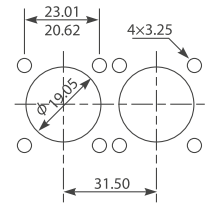
### ■ Square Flange Receptacle (MIL DTL 38 999 series III Size 13)



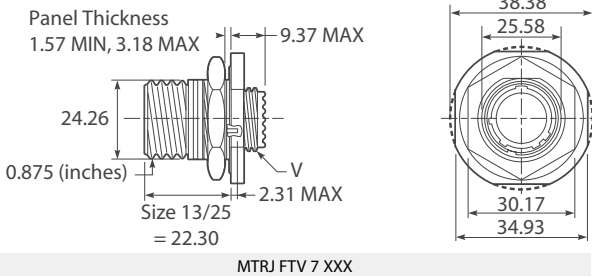
#### Square flange receptacle rear panel mounting



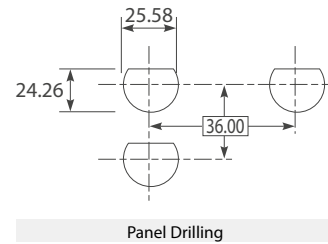
#### Square flange receptacle front panel mounting



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

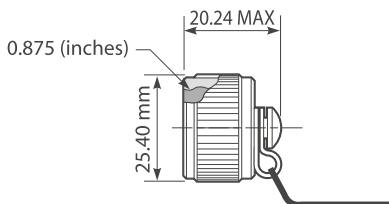


#### Jam nut receptacle rear panel mounting

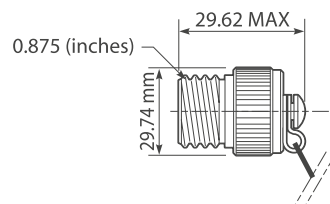


## Protective caps

#### Protective cap for plug (nylon cord)



#### Protective cap for receptacles (nylon cord)



# LC FIELD

Fiber optic solution - Transform your LC patchcord into an Environmental Connector



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

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

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

**No hazardous on-field cabling!**

### Applications

- Railways
- Base Station
- Military communication
- Navy

### Mechanical characteristics

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

### Part number code

<b>Serie</b>	LCFTV	6M	D	G	N
Optical connector type					
<b>Shell Type</b>					
<b>Plug (compatible for all LC PC and APC Duplex)</b>					
6M: Plug with metal backshell and metal PG clamp					
<b>Receptacle without backshell</b>					
<b>Compatible for all LC PC Duplex (adapter blue color)</b>					
2: Square flange receptacle					
7: Jam nut receptacle					
<b>Compatible for all LC APC Duplex (adapter green color)</b>					
2A: Square flange receptacle					
7A: Jam nut receptacle					
<b>Cable Type</b>					
Only for plug					
D: Flat duplex cable 1,6 mm					
E: Duplex zipcord 1,6 mm					
F: Flat duplex cable 2 mm					
G: Duplex zipcord 2 mm					
H: Flat duplex cable 2,8 mm					
I: Duplex zipcord 2,8 mm					
T: Flat duplex cable + Duplex zipcord for 1,6 mm - 2 mm - 2,8 mm					
Only for receptacle (no backshell available for receptacle)					
0: Receptacle without backshell					
<b>Shell Finish</b>					
N: Nickel plated					ZN: Black Zinc Nickel - ROHS Compliant
G: Olive drab cadmium plated					
B: Bronze					
<b>Polarization</b>					
N: Normal					or A / B / C / D / E

<b>Cap Series</b>	B	EC	N	TV	W	19
<b>Protective cap type</b>						
EC: For square flange receptacle						
ER: For jam nut receptacle						
F: For plug						
<b>Wire type</b>						
N: Nylon cord						
Blank: Metallic chain						
<b>TV: Series</b>						
<b>Shell finish</b>						
B: Bronze						
F: Electroless nickel plated, aluminium version						
W: Olive drab cadmium plated, aluminium version						
ZN: Black Zinc Nickel - ROHS Compliant						
Corresponding connector shell size: 19						

### Requested information to order LC Field Patchcord

Type of connector: Male /Female  
 Type of fiber: 50/125, 62,5/125, 9/125  
 Patchcord length: ex 10.5m  
 Drawing: description of the product  
*Contact us for other configuration.*

### Tools informations

**Mounting Tools:**  
 LCFTV MO TOOL: LC FIELD Mounting tools

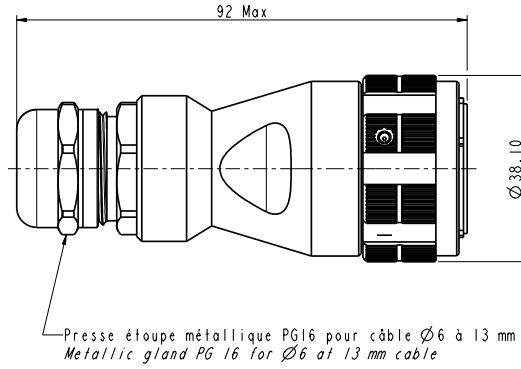
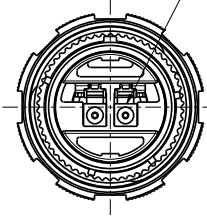
**Dismounting Tools:**  
 LCFTV DM TOOL: LC FIELD Dismounting tools  
*(To dismount the LC you need to use both dismounting and mounting tools)*



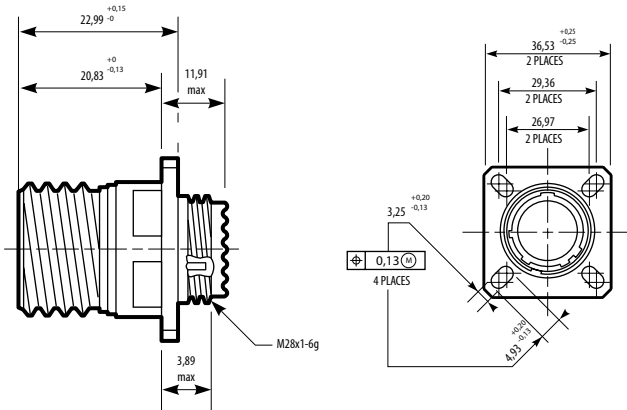
## Line drawings (Dimensions in mm)

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

Connecteur LC Duplex (Non fourni)  
LC Duplex connector (Not supplied)



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

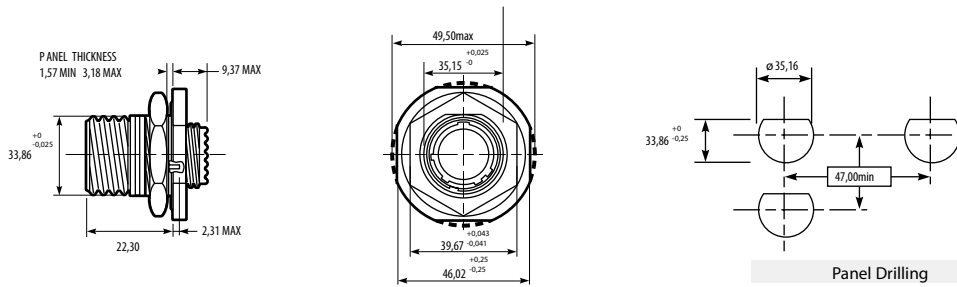


Square flange receptacle rear panel mounting

Square flange receptacle front panel mounting

Panel Drilling

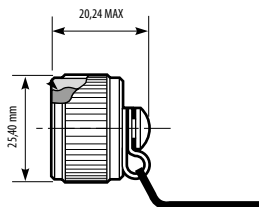
### ■ Jam Nut Receptacle (MIL DTL 38 999 series III Size 19)



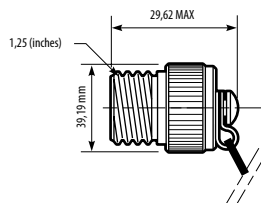
Jam nut receptacle rear panel mounting

Panel Drilling

## Protective caps



Protective cap for plug (nylon cord)



Protective cap for receptacles (nylon cord)

# GLOSSARY

## **10BASE-T**

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

## **100BASE-T**

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

## **1000BASE-T**

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

## **Auto-MDIX**

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

## **Baud**

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

## **Bandwidth**

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

## **bps**

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

## **Broadcast**

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

## **Byte**

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

## **Category 5**

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

## **Category 5 e**

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

## **Category 6**

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

## **CSMA/CD**

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

## **Data rate**

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

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

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

## **Ethernet**

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

## **IEEE 802.3**

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

## **IGMP snooping**

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

## **LAN**

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

### MAC Address

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

### Megabit (Mb)

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

### Megabyte (MB)

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

### Multicast

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

### Port Mirroring

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

### Quality of Service (QoS)

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

### RJ45

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

### RJ-Field

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

### SNMP

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

### Spanning Tree Protocol (STP)

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

### TCP/IP

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

### TELNET

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

### VLAN

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

## CABLE datas

	Category 5 (Cat5)	Category 5E (Cat5E)	Category 6 (Cat6)	Category 6a (Cat6a)	Category 6A (Cat6A)	Category 7 (Cat7)
<b>Data rate</b>	100 MBit/s	1 GBit/s	1 GBit/s	10 GBit/s	10 GBit/s	10 GBit/s
<b>Frequency</b>	100 Mhz	100 Mhz	250 Mhz	500 Mhz	500 Mhz 3db	600 Mhz
<b>Twisted pairs</b>	2 or 4 pairs	4 pairs	4 pairs	4 pairs (each pair individually shielded)	4 pairs (each pair individually shielded)	4 pairs (each pair individually shielded)
<b>Max lenght</b>	100 m	100 m	55 m	100 m	100 m	100 m
<b>Specification</b>	ANSI/TIA-568-A 1-2001	TIA/EIA-568-5-A	ANSI/TIA-568-B. 2-1	ANSI/TIA-568-B. 2-10	ISO/IEC 11801 amendment 2	ISO/IEC 11801 2002 category7/ class F



**NOTES**

Handwriting practice area consisting of 20 horizontal dotted lines.

**NOTES**

Handwriting practice area with 20 horizontal dotted 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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