Amphenol

RJ Field

RJF TV

Self Closing Cap
(RJ 45/USB/IEEE 1394)

NEW
CAT6

RJF RB (RJ Fast)

RJF 544

RJF EZ

USB-A Field

NEW

Rugged USB memory key

FW Field (IEEE 1394)

RJ11 Field **NEW**

MTRJ Field - LC Field

NEW

RJ Switch

FIELD Series - *catalog*

Reinforced Infocom Connectors for Harsh Environment
RJ45 Field - RJ11 Field - RJ Switch - USB Field - FireWire Field - LC Field - MTRJ field

TABLE OF CONTENTS

APPLICATIONS

Commercial
Avionics and Rail
Mass Transit

Factory
Automation

Video
and CCTV

Wireless
Systems

C4ISR
Military
Communications

RJFIELD CONCEPT

The Amphenol Field Series allows you to transform a standard infocom cordset into a rugged waterproof connector for harsh environments.

RJ field allows you to use Ethernet Class D / Cat. 5e connections for 10 Base T, 100 Base TX or 1000 Base T networks in extreme environments.

EXAMPLE FOR RJ 45 CORDSET

RJ stop ® patent

No Cabling

No Tool

www.rjfield.com
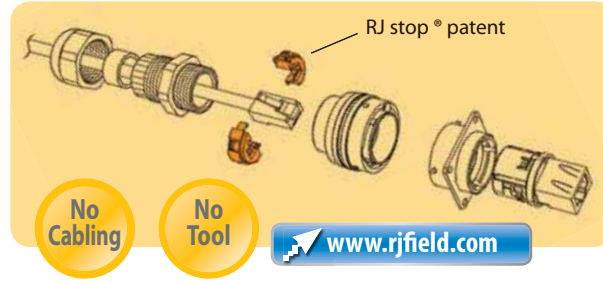
- A full range of versions depending upon the application
- No cabling operation nor measurement required after installation
- Sealing: IP67 (1 meter immersion for up to 30 minutes)
- Shock, vibration and traction resistant
- Inline extension
- Mechanical coding/polarization
- EMI protection

RJFIELD SELECTION GUIDE

CONNECTORS	Series	Industrial Ethernet Specification	Coupling Mechanism	Shape	Material	Specification	Prime Market	Page
	RJF RB		Reverse Bayonet	Circular	Plastic	N/A	Industrial & Telecom	3
	RJF544	IEC 60603-7 variant 12	Push Pull	Circular	Plastic	N/A	Industrial & Telecom	6
	RJF EZ	IEC 60603-7 variant 13	Lever	Rectangular	Plastic	N/A	Industrial & Telecom	8
	RJF	IEC 60603-7 variant 11	Bayonet	Circular	Metal	MIL-C-26482	MIL/Aero & Industrial	10
	RJF TV		Thread	Circular	Metal	MIL-DTL-38999 (Series III)	MIL/Aero & Rail Mass Transit	15
	USBFTV		Thread	Circular	Metal	MIL-DTL-38999 (Series III)	Mil/Aero & Rail Mass Transit	26
	Rugged USB Key			Circular	Metal	N/A	MIL/Aero & Industrial	31
	USBBF		Thread	Circular	Plastic	N/A	Industrial & Telecom	33
	FWFTV		Thread	Circular	Metal	MIL-DTL-38999 (Series III)	Mil/Aero & Video	34
	Self Closing Cap		Bayonet (for RJ45) N/A (for USB-A and IEEE1394)	Circular	Metal	N/A	Industrial & Telecom	37
	RJ11F		Bayonet	Circular	Metal	MIL-C-26482	MIL/Aero & Industrial	38
	MTRJFTV		Thread	Circular	Metal	MIL-DTL-38999 (Series III)	Mil/Aero & Rail Mass Transit	40
	LC/LX5F		Thread	Circular	Metal	MIL-DTL-38999 (Series III)	Mil/Aero & Rail Mass Transit	42

RJFIELD SELECTION GUIDE

ETHERNET SWITCHES	Series	Sealing	Material	Number of ports	Unmanaged	Ring	Managed	Prime Market	Page
	RJS	IP30	Metal & Plastic	5 or 9	x	x	x	Factory Automation / Video	44
	RJSPC	IP67	Plastic	5	x	x		Factory Automation	47
	RJSML	IP67	Metal	9	x	x	x	MIL/Aero	51

RJFIELD SELECTION GUIDE

CABLE & CORDSET	Reels	Cordsets	Prime Market	Page
	(without RJ45) 100 m (around 238 ft) 300 m (around 984 ft)	*(with RJ45 overmolded at each end)* Available lengths see page 25	Mil/Aero & Rail Mass Transit	25
	Available in Cordset	Available Lenght see page 32	Mil/Aero / Rail Mass Transit & Industrial	32

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!

NEW CAT6

NEW PCB

IDC Receptacle

PCB Receptacle

MAIN CHARACTERISTICS

- Sealed against fluids and dust (IP67)
- 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]

ROHS COMPLIANT

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

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

Environmental Protection
- Sealing: IP67
- Salt Spray > 1000 h
- Fire Retardant / Low Smoke: UL94 V0 and NFF 16102, DIN 5510-2
- Thermal Shock: 5 cycles at - 40°C / +100°C
- Operating Temperature: - 40°C / +85°C

Part Number Code

		RJF RB	7	1RA		
Series RJF RB						
Shell Type						
6:	Composite reverse bayonet Plug, Plastic Gland					
7:	Composite jam nut Receptacle					
Back Terminations *(For Receptacles only)*						
1:	Female RJ45					
1RA:	Right angle female RJ45					
2:	RJ45 Cordset					
3U:	IDC cat6 - unshielded					
3F:	IDC cat6 - partial shielding					
3S:	IDC cat6 - 100% shielded					
5:	Straight PCB					
Cordset Length *(For Receptacles with "2" back termination only)*						
03:	0.3m [11.81 inches]					
05:	0.5m [19.68 inches]					
10:	1m [39.37 inches]					
15:	1.5m [59.05 inches]					
Cabling Configuration *(For "7" Receptacles and with type "2" back termination only)*						
100BTX:	(=568B)					

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

61.94
[2.438]

35.3
[1.391]

φ32
[1.260]
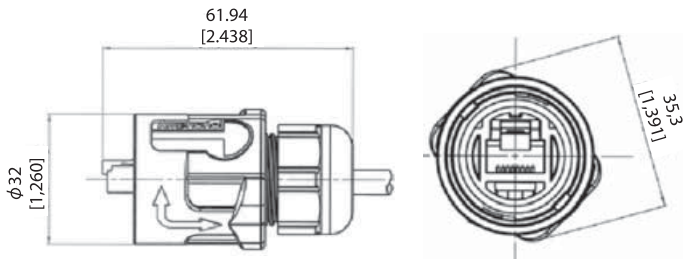
RJF RB 6

Receptacle

■ Type 1: Female RJ45
(front mounting)

43.9
[1.729]

13.5
[.530]

φ27.4
[1.079]

φ34
[1.339]

φ25.65
[1.010]

4.78
[.188]

φ27.18
[1.070]

1.6 MINI / 3.2 MAXI
[0.063 MINI / 0.126 MAXI]
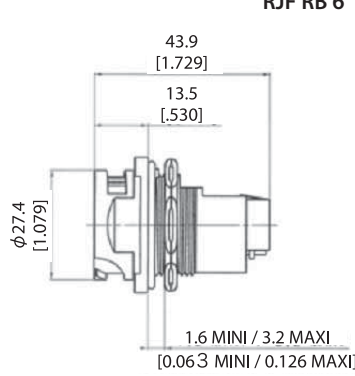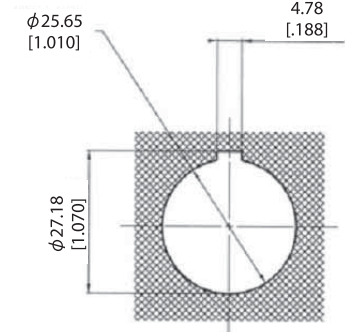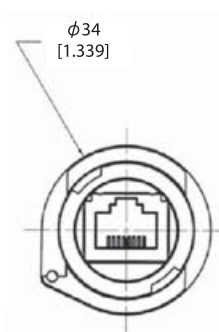
Panel Drilling

RJF RB 71

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

43
[1.691]

13.5
[.530]

φ27.4
[1.079]

φ34
[1.339]

φ25.65
[1.010]

4.78
[.188]

φ27.18
[1.070]

1.6 MINI / 3.2 MAXI
[0.063 MINI / 0.126 MAXI]
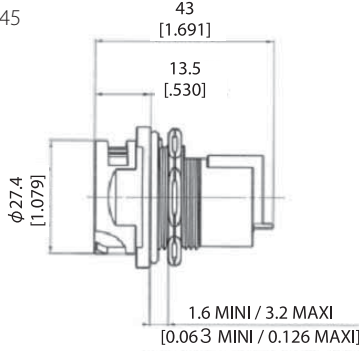
Panel Drilling

RJFRB71RA
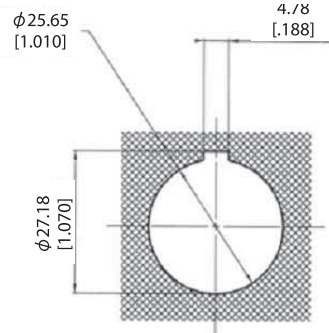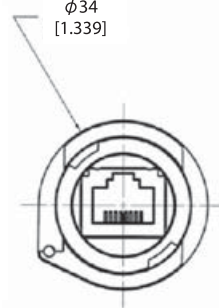
■ Type 2: RJ45 Cordset
(front mounting)

43
[1.691]

13.5
[.530]

φ27.4
[1.079]

φ34
[1.339]

φ25.65
[1.010]

4.78
[.188]

φ27.18
[1.070]

1.6 MINI / 3.2 MAXI
[0.063 MINI / 0.126 MAXI]
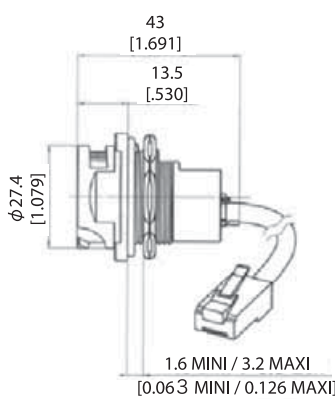
Panel Drilling

RJFRB72XX 100BTX (XX=03, 05, 10 or 15 - see part number code page 3)
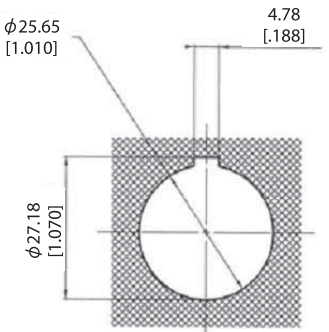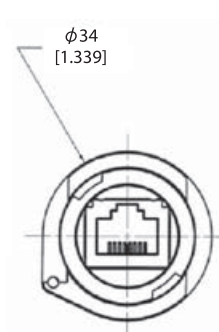
■ Type 3: IDC Cat6 termination
(rear mounting)

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

Panel Drilling

φ31.7
[1.248]

30.4 MIN.
[1.1969]
ON FLAT
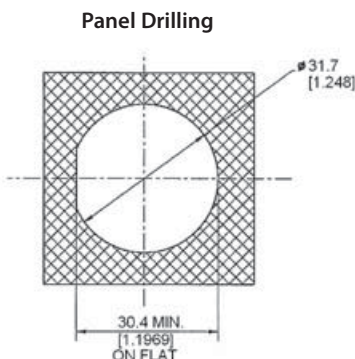
Shielded: **RJFRB73S**

4

■ Straight PCB termination receptacle:
(rear mounting)
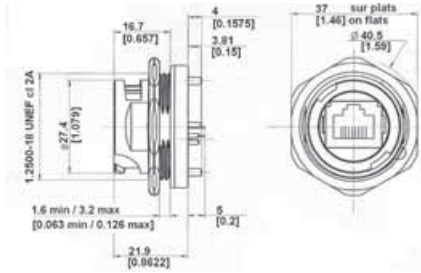
Panel Drilling
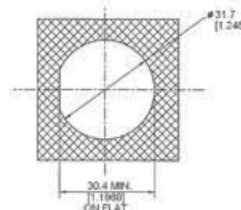
IMPORTANT NOTE
The customer's PCB design will determine the receptacle category.

PCB Drilling RJFRB

Assembly Instructions

1	
2	
3	
4	
5	
6	
7	
8	
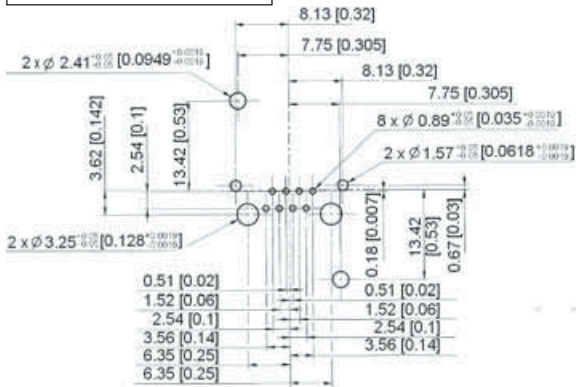
Accessories

■ **IP67 Dust Caps**
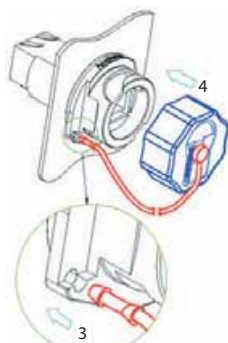
RJF RB C7
Cap for receptacles RJFRB71 / 71RA / 72xxx
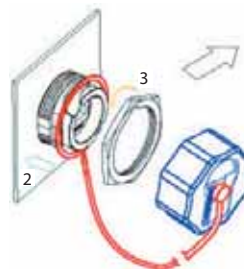
RJF RB C75
Cap for receptacles RJFRB75 and RJFRB73x

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!

ROHS COMPLIANT

MAIN CHARACTERISTICS
- **Compliant with IEC 60603-7 variant 12**
- Shock, Vibration and Traction resistant
- No cabling operation in field and no tools required
- Sealed against fluids and dust (IP67)
- **Quick Push Pull coupling**
- RJ45 cordset retention in the plug: 100 N in the axis
- Mating cycles: 500 min
- Improved EMI Protection
- Compatible with cable diameter
  from 5,5 mm [0.216 in] to 13 mm [0.512 in]

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

Environmental Protection
- Sealing: IP67
- Salt Spray > 1000 h
- Fire Retardant / Low Smoke: UL94 V0 and NFF 16102, DIN 5510-2
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 10 nano s.
- Thermal Shock: 5 cycles at - 40°C / +100°C
- Operating Temperature: - 40°C / +85°C

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

Part Number Code

		RJF 544	2	2	03	100 BTX
Series **RJField 544 - Push Pull**						
Shell Type						
6:	Composite Push Pull Plug, Plastic Gland					
2:	Composite Square Flange Receptacle					
2M:	Metallized (Ni) Composite Square Flange Receptacle					
Back Terminations *(For Receptacles only)*						
1:	Female RJ45					
2:	RJ45 Cordset					
Cordset Length *(For Receptacles with "2" Back Termination only)*						
03:	0.3 meters [11.81 inches]					
05:	0.5 meters [19.68 inches]					
10:	1 meter [39.37 inches]					
15:	1.5 meters [59.05 inches]					
00:	8 tinned holes at the rear of the PCB to solder the cable					
Cabling Configuration *(For "2" Receptacles only)*						
100BTX:	(=568B)					

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

Plug

■ Type 6 Shell with Plastic Gland

64 [2.519]

φ32.5 [1.279]

φ14.6 [.575]
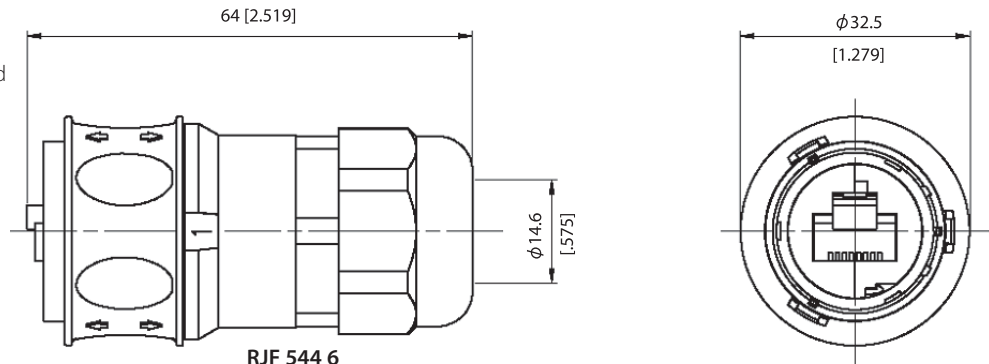
RJF 544 6

Receptacle

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

14 [.551]   3 [.118]

φ22.3 [.878]

φ25.5 [1.004]

42 [1.653]

31 [1.220]

24.61 [.969]

φ3.5 [.138]

24.61 [.969]

φ3.5 [.138]

φ26 [1.024]

24.61 [.969]

Panel Drilling
(same as#16 MIL-C-5015)
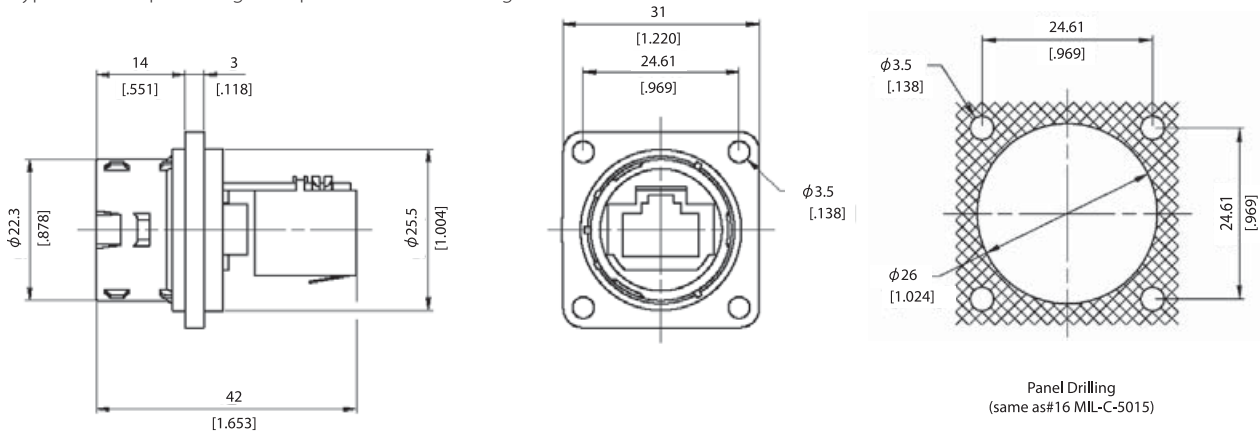
RJF 544 2

Back Terminations
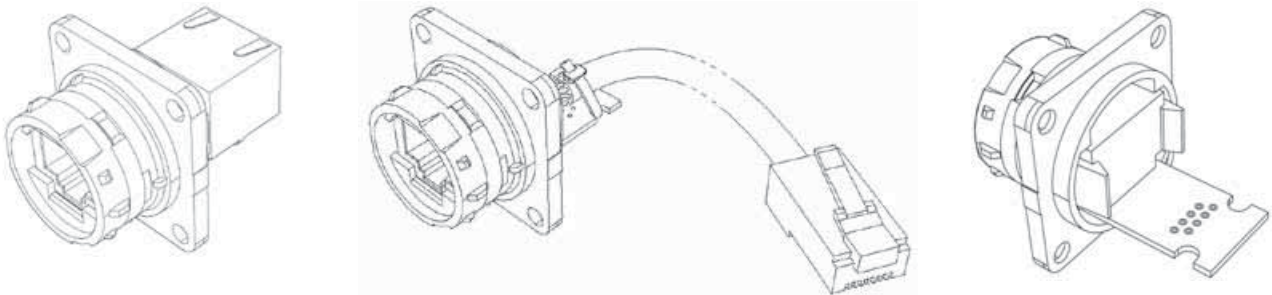
Type 1: Female RJ45   Type 2: RJ45 Cordset   Type 2 - 00: Solder – 8 tinned holes

Notes: - Type 2 without RJ45 plug at the end of the cable are also available: consult factory   - Type 1 also available with 90° female RJ45

Accessories

■ **IP67 Caps**

45 [1.772]

32.5 [1.279]

150 [5.905]

φ3.5 [.138]
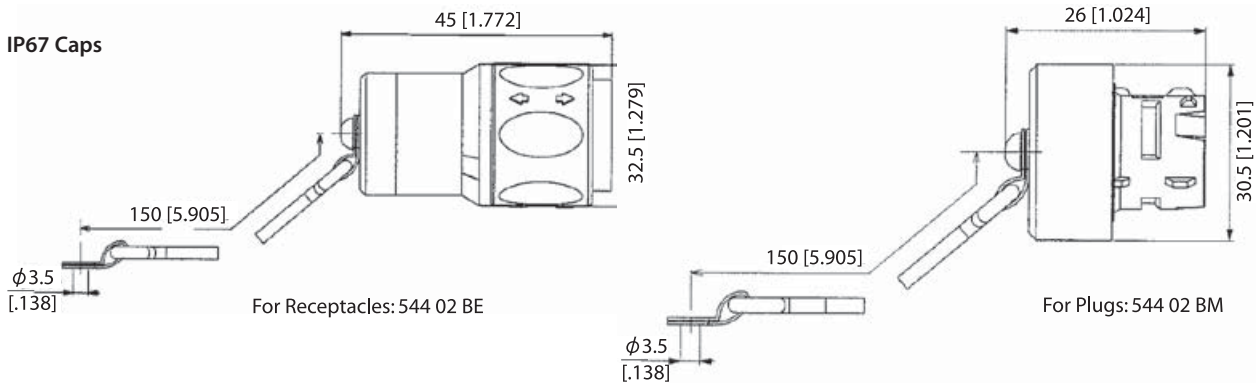
For Receptacles: 544 02 BE

26 [1.024]

30.5 [1.201]

150 [5.905]

φ3.5 [.138]

For Plugs: 544 02 BM

■ Panel Gasket (Thickness: 1 mm [.039]): Part No. 544 02 JE
■ Plug Insert removal tool: Part No. 5440 OT 02

RJF EZ

Ethernet Connection System for Harsh Environment – Industrial Ethernet

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

MAIN CHARACTERISTICS

- **Compliant with IEC 60603-7 variant 13**
- Sealed against fluids and dust (IP67)
- 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]

Applications

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

Environmental Protection

- Sealing: IP67
- Salt Spray > 1000 h
- Fire Retardant / Low Smoke: UL94 V0 and NFF 16102, DIN 5510-2
- Thermal Shock: 5 cycles at - 40°C / +100°C
- Operating Temperature: - 40°C / +85°C

Data Transmission

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

ROHS COMPLIANT

Part Number Code

Series RJField EZ - Lever	RJF EZ	2	2	03	100 BTX
Shell Type					
6: Composite Lever Plug, Plastic Gland					
2: Composite Square Flange Receptacle					
Back Terminations (For Receptacles only)					
1: Female RJ45					
2: RJ45 Cordset					
Cordset Length (For Receptacles with "2" Back Termination only)					
03: 0.3m [11.81 inches]					
05: 0.5m [19.68 inches]					
10: 1m [39.37 inches]					
15: 1.5m [59.05 inches]					
Cabling Configuration (For "2" Receptacles only)					
100BTX: (=568B)					

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

67.5 [2.659]

26.7 [1.051]

ϕ14.6 [.575]

34 [1.339]

RJF EZ 6

Receptacle

24.4 [.961]

R2.50 [.098]

30 [1.181]

40 [1.575]

30 [1.181]

24.4 [.961]

25.55 [1.006]   18 [.709]

34 [1.339]

ϕ3.50 [.138]
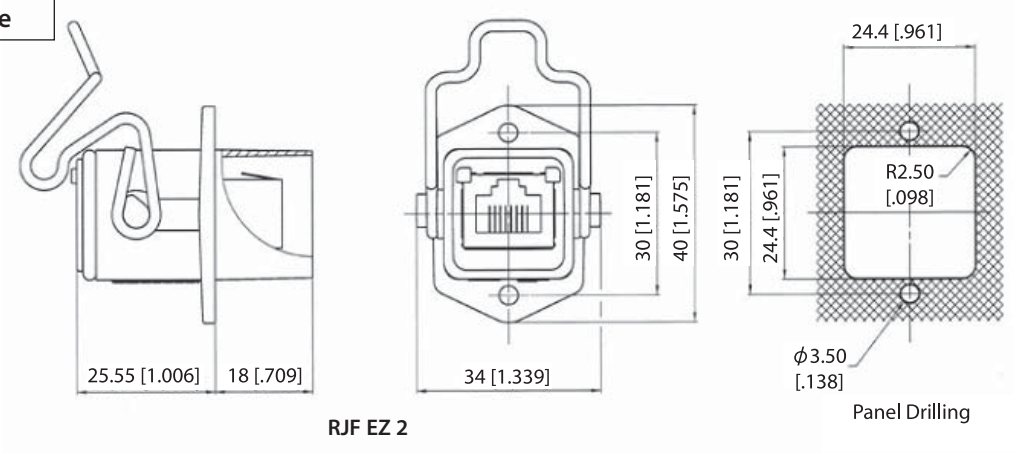
Panel Drilling

RJF EZ 2

Back Terminations

Type 1: Female RJ45

Type 2: RJ45 Cordset

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

Assembly Instructions

4

3

2

1

RJStop® Patent
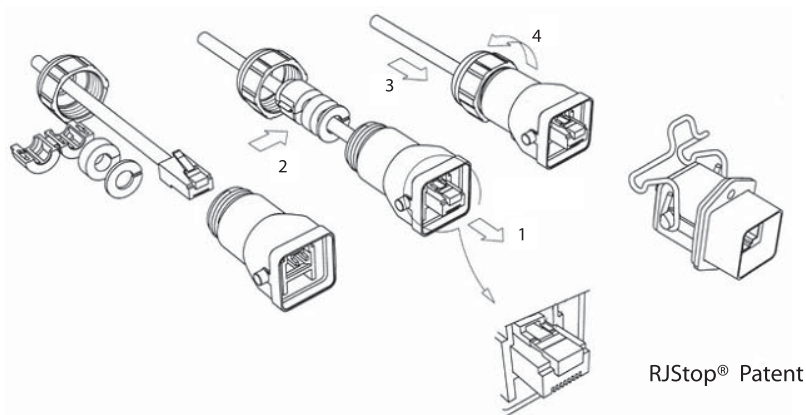
Accessories

■ **IP67 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!

ROHS COMPLIANT
"N": nickel plating
"B": black coating

MAIN CHARACTERISTICS

- **Compliant with IEC 60603-7 variant 11**
- **Bayonet coupling** ("Audible & Visual" coupling signal)
- **Robust metallic shells based on MIL-C-26482**
- RJ45 cordset retention in the plug: 100 N in the axis
- Mating cycles: 500 min
- Sealed against fluids and dust (IP67)
- Shock, Vibration and Traction resistant
- No cabling operation in field and no tools required
- Mechanical Coding / Polarization (4 positions)
- Compatible with cable diameter
  from 5,5 mm [0.216 in] to 13 mm [0.512 in]

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

Environmental Protection
- Sealing: IP67
- Salt Spray: 48 h with Nickel plating
  > 96 h with black coating
  > 500 h with Oliv Drab Cadmium
- Fire Retardant / Low Smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 10 nano s.
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Thermal Shock: 5 cycles at - 40°C / +100°C
- Temperature Range: - 40°C / +85°C

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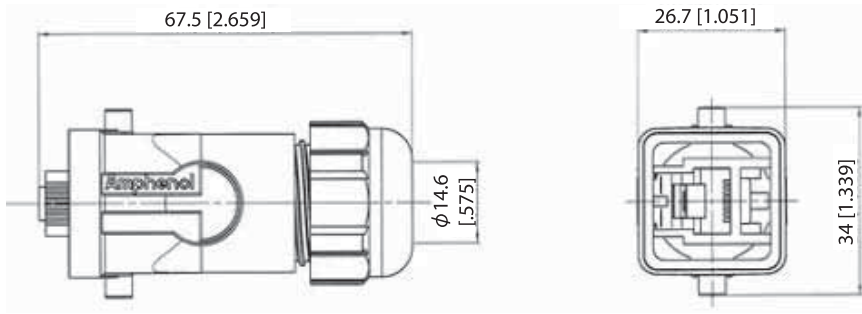Cat 5e per TIA/EIA 568B and ClassD per ISO/IEC 11801

Part Number Code

Series RJField	RJF	2	2	B	03	100 BTX

Shell Type
6: Plug, Plastic Gland
6M: Plug, Metal Gland
2: Square Flange Receptacle
2PE: Square Flange Receptacle, IP67 backshell, Plastic gland
2PEM: Square Flange Receptacle, IP67 backshell, Metal gland
7: Jam Nut Receptacle
7PE: Jam Nut Receptacle, IP67 backshell, Plastic gland
7PEM: Jam Nut Receptacle, IP67 backshell, Metal gland

Back Terminations *(For Receptacles only)*
1: Female RJ45
2: RJ45 Cordset

Shell Finishes
B: Black Coating - ROHS compliant
N: Nickel *(Note: with this version, the inserts are metallized)* - ROHS compliant
G: Olive Drab Cadmium *(Note: with this version, the inserts are metallized)*

Cordset Length *(For Receptacles with "2" Back Termination only)*
03: 0.3m [11.81 inches]
05: 0.5m [19.68 inches]
10: 1m [39.37 inches]
15: 1.5m [59.05 inches]
00: 8 tinned holes at the rear of the PCB to solder the cable

Cabling Configuration *(For "2" Receptacles only)*
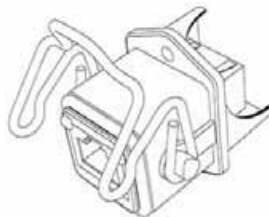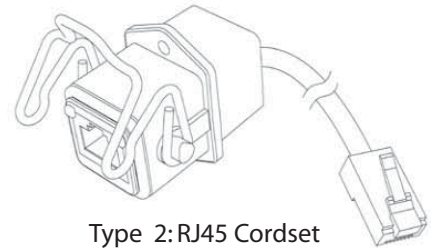100BTX: (=568B)

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

10

Plug:

■ Shell type 6 with Plastic or Metal Gland

57.8 [2.275] Fully Assembled

φ34.9 [1.374]

φ14.8 [.583]

RJF 6

Receptacles:

■ Square flange receptacle
4 mounting holes: Shell type 2

13.4 [.527]

11.8 [.464]

φ28.58 [1.125]

φ27.3 [1.075] MAX

39.1 [1.539]

33.3 [1.311]
26.97 [1.062]

φ3.2 [.125]

26.97 [1.062]

φ3.5 [.138]

φ31.3 [1.232]

Panel Drilling

RJF 2

■ Jam nut receptacle
Hexagonal Nut mounting:
Shell type 7

21.7 [.854]

3.2 [.126]

φ28.58 [1.125]

1.6 [.062] MIN/
3.2 [.126] MAX

39.1 [1.539]

41.3 [1.626]

φ30.7 $^{0}_{-0.3}$ [1.197-1.209]

φ32 $^{+0.3}_{0}$ [1.260-1.272]

Panel Drilling

RJF 7

■ Receptacles with IP67 backshell:
Shell type 2PE and 7PE with Plastic or Metal Gland

82 [3.23] Fully Assembled

82 [3.23] Fully Assembled

RJF 2PE/2PEM

RJF 7PE/7PEM
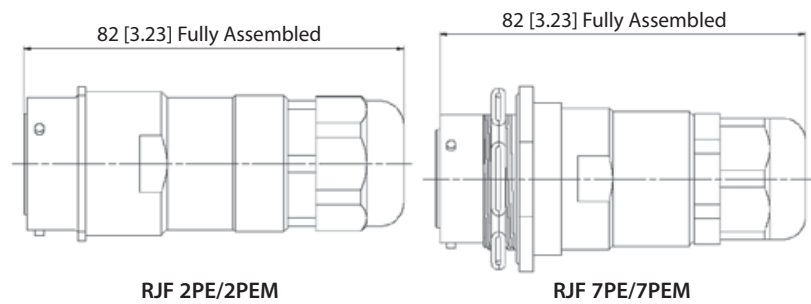
Back Terminations:

Type 1: Female RJ45

Type 2: RJ45 Cordset

Type 2 - 00: Solder - 8 tinned holes

Notes: • Type 2 without RJ45 plug at the end of the cable are also available: consult factory   • Type 1 also available with 90° female RJ45

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

Assembly instructions

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

AUDIBLE LOCKING

1

2

RJ45 PLUG

1

2

HALF INSULATOR

RJ STOP® Patent

STOPPER

1

STOPPER

HALF INSULATOR

Easy and Safe: No field cabling tools required

1   2   3

INSERT CODES

KEYING

CODE   A

CODE   B

CODE   C
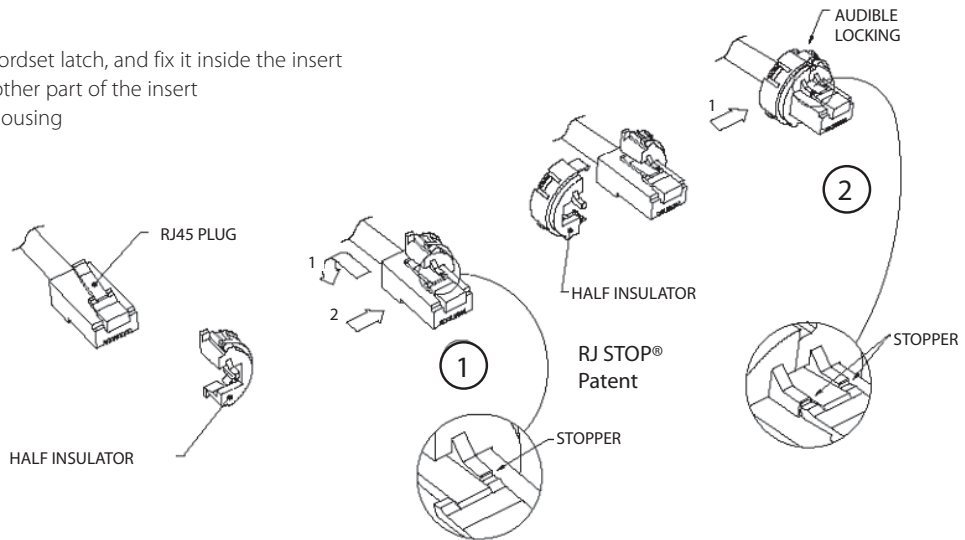
CODE   D
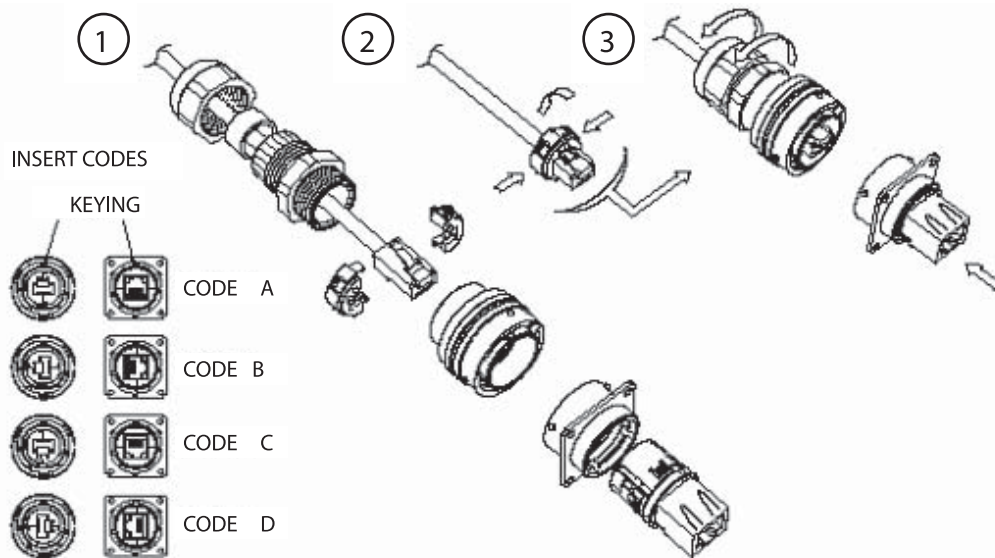
Accessories:

■ **Metallic cap**

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

Plug Cap

Receptacle Cap

Ø3.6

Square Flange
type "2"

Plug Cap end
type "6"

Jam nut receptacle
type "7"

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

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

12

RJF

Special receptacles: Right angle, cable mount inline & PC tails

Right Angle Receptacles

ROHS COMPLIANT
"N": nickel plating
"B": black coating

Some applications have minimal space inside the system. The right angle receptacles meet this need while keeping the advantage of connecting a standard RJ45 cordset at the back.

Square Flange Receptacle - 4 mounting holes - Right Angle – 4 clocking positions:
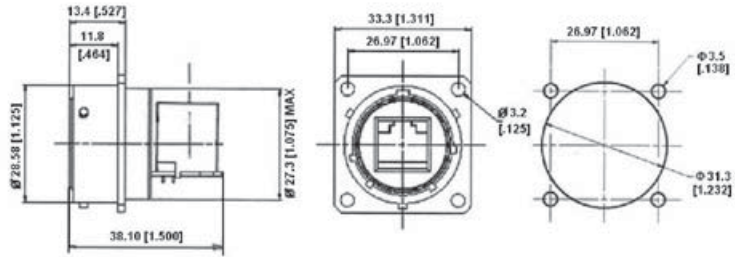
PART NUMBERS:
Black coating: **RJF21RAB**
Nickel plating: **RJF21RAN**
Olive Drab Cadmium plating: **RJF21RAG**

Jam Nut Receptacle – Hexagonal nut mounting - Right Angle – 4 clocking positions:

Panel Drilling
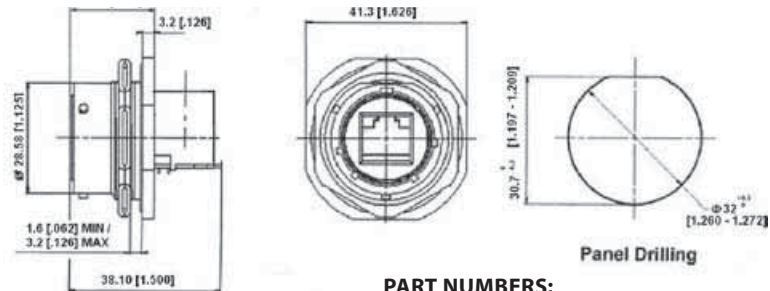
PART NUMBERS:
Black coating: **RJF71RAB**
Nickel plating: **RJF71RAN**
Olive Drab Cadmium plating: **RJF71RAG**

Inline Cable Mount Receptacles

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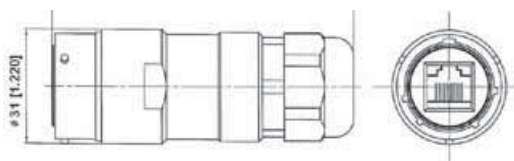
PART NUMBERS:

Plastic Gland	**Metallic Gland**
Black coating: **RJF2PEWF1B**	Black coating: **RJF2PEMWF1B**
Nickel plating: **RJF2PEWF1N**	Nickel plating: **RJF2PEMWF1N**
Olive Drab Cadmium plating: **RJF2PEWF1G**	Olive Drab Cadmium plating: **RJF2PEMWF1G**

PCB 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.
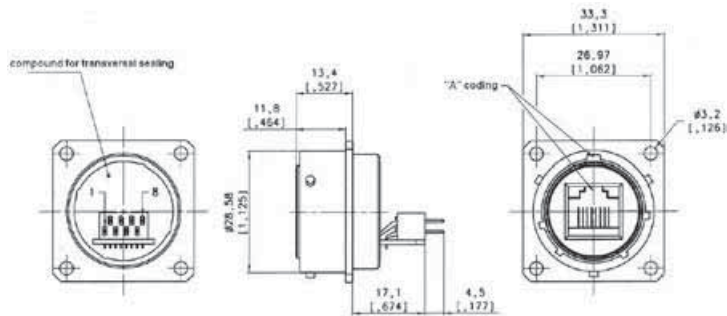
PCB LAYOUT – SOLDER FACE VIEW
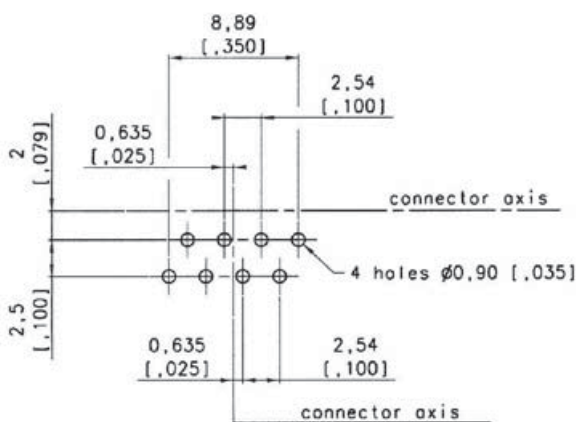
PANEL DRILLING
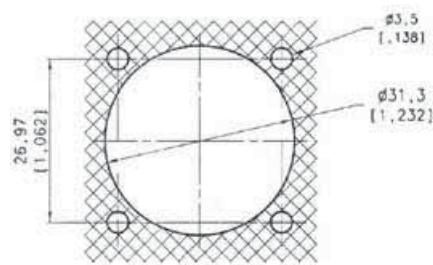
PART NUMBERS:
Note:
1. Platings available:
"B": black coating
"N": nickel plating
"G": olive drab cadmium plating

2. As these receptacles are compounded, coding position has to be chosen before ordering

Examples:
Square flange receptacle – black coating – coding A: **RJF2SA5B**
Square flange receptacle – nickel plating – coding C: **RJF2SC5N**
Square flange receptacle – olive drab cadmium plating – coding D: **RJF2SD5G**

Insert Codes
Keying

CODE A
CODE B
CODE C
CODE D
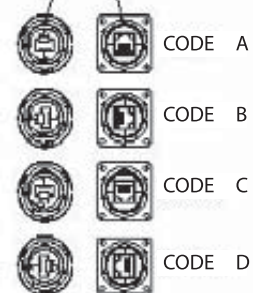
Environmentally Sealed Receptacles

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. For more information, please consult datasheet RJF-RJFTV Environmentally Sealed Receptacles, page 24.

ROHS COMPLIANT
"N": nickel plating
"B": black coating

RJF TV

Ethernet Connection System for Harsh Environment

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

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 (IP67)
- Shock, Vibration and Traction resistant
- No cabling operation in field and no tools required
- Mechanical Coding / Polarization (4 positions)
- Improved EMI protection
- **Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device**
- **Robust metallic shells**
- RJ45 cordset retention in the plug: 100 N in the axis
- Mating cycles: 500 min
- Compatible with cable diameter from 5,5 mm [0.216 in] to 13 mm [0.512 in]

Environmental Protection
- Sealing: IP67
- Salt Spray: 48 h with Aluminium shell - Nickel plating
  > 500 h with Aluminium shell - Olive Dran Cadmium plating
  1000h with Marine bronze shell
- Fire Retardant / Low Smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 10 nano s.
- Compounded versions tested per NAS 1599 (5-3000 Hz, 20g, 12h)
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Thermal Shock: 5 cycles at - 40°C / +100°C
- Temperature Range: - 40°C / +85°C

Part Number Code

Series RJ Field TV	RJF TV	2	2	G	03	100 BTX

Shell Type
6:	Plug with Plastic gland
6M:	Plug with Metal gland
2:	Square Flange Receptacle
2PE:	Square Flange Receptacle, IP67 backshell, Plastic gland
2PEM:	Square Flange Receptacle, IP67 backshell, Metal gland
7:	Jam Nut Receptacle
7PE:	Jam Nut Receptacle, IP67 backshell, Plastic gland
7PEM:	Jam Nut Receptacle, IP67 backshell, Metal gland
2SA, 7SA:	Compounded versions: *see page 24*

Back Terminations *(Receptacles only)*
1:	Female RJ45
2:	RJ45 Cordset

Shells material & Finish
N:	Aluminium shell - nickel plating (receptacle inserts are metallized) - ROHS compliant
G:	Aluminium shell - olive drab cadmium plating (receptacle inserts are metallized)
BZ:	Marine bronze shell (receptacle inserts are metallized) - ROHS compliant

Cordset Length *(type 2 back termination only)*
03:	0.3m [11.81 inches]
05:	0.5m 19.68 inches]
10:	1m [39.37 inches]
15:	1.5m [59.05 inches]
00:	8 tinned holes at the rear of the PCB to solder the cable

Cabling Configuration *(for Type ""2"" receptacles only)*
100BTX:	(=568B)

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
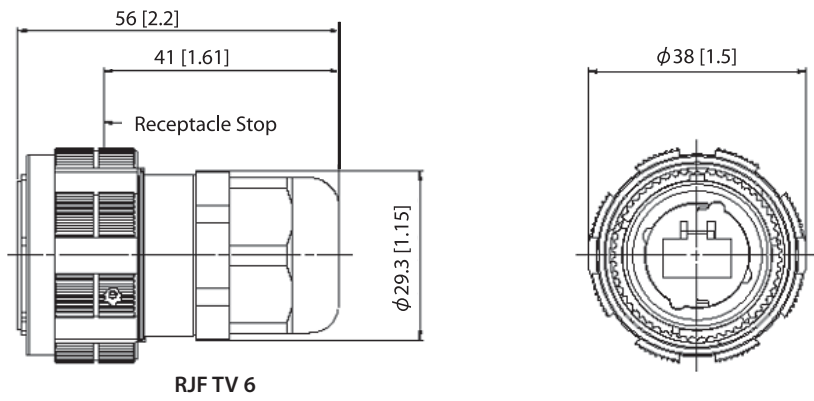
56 [2.2]

41 [1.61]

Receptacle Stop

φ29.3 [1.15]

φ38 [1.5]

RJF TV 6

Receptacles:

■ Square flange receptacle
4 mounting holes: Shell type 2

43.1 [1.696]

22.99 [.905]

20.83 [.820]

31.55 [1.242]

10.9 [.429]

36.53 [1.438]

29.36 [1.156]

26.97 [1.062]

3.25 [.128]

4.93 [.194]

RJF TV 2

29.36 [1.156]

φ3.25 ⁰₋₀.₂₅ [.118 - .128]

φ32.94 [1.297]

40.5 [1.594]

Panel Drilling

■ Jam nut receptacle
Hexagonal Nut mounting:
Shell type 7

43.09 [1.696]

22.3 [.878]

φ31.55 [1.24]

39.6 [1.559]

Carré 46.02 [Square 1.812]

φ49.23 [1.938]

RJF TV 7

47 MINI [1.850 mini]

33.8₋₀.₂₅⁰ [1.323 - 1.333]

φ35.16 MINI [1.384 mini]

47 [1.850] MINI

Panel Drilling

■ Receptacles with IP67 backshell:
Shell type 2PE and 7PE with Plastic or Metal Gland

92 [3.622]

RJF TV 2PE/2PEM/7PE/7PEM

Back Terminations

Type 1: Female RJ45

Type 2: RJ45 Cordset

Type 2 - 00: Solder – 8 tinned holes

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

16
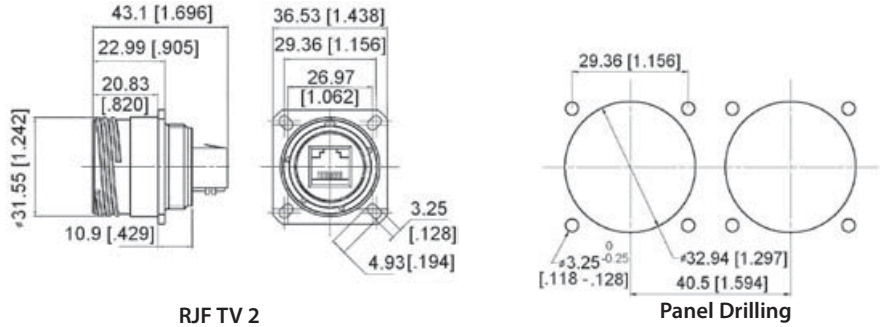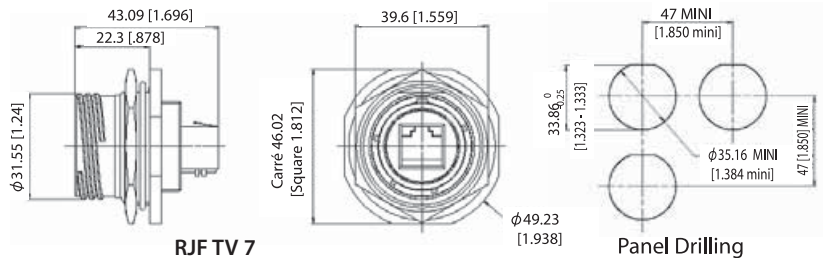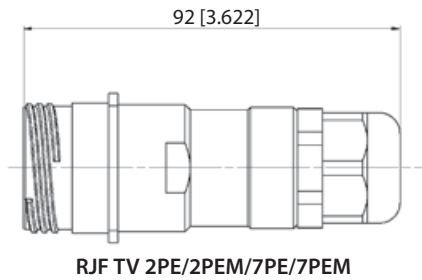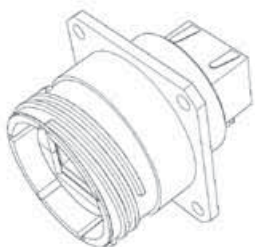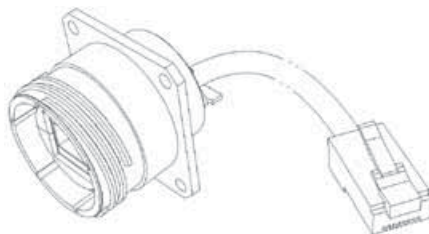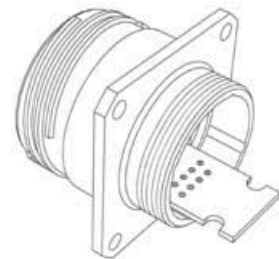
Insert Codings

CONNECTION SIDE VIEW

Plug   Receptacle

Main Key

CODE A

CODE B

CODE C

CODE D

CLIC!

CLIC!
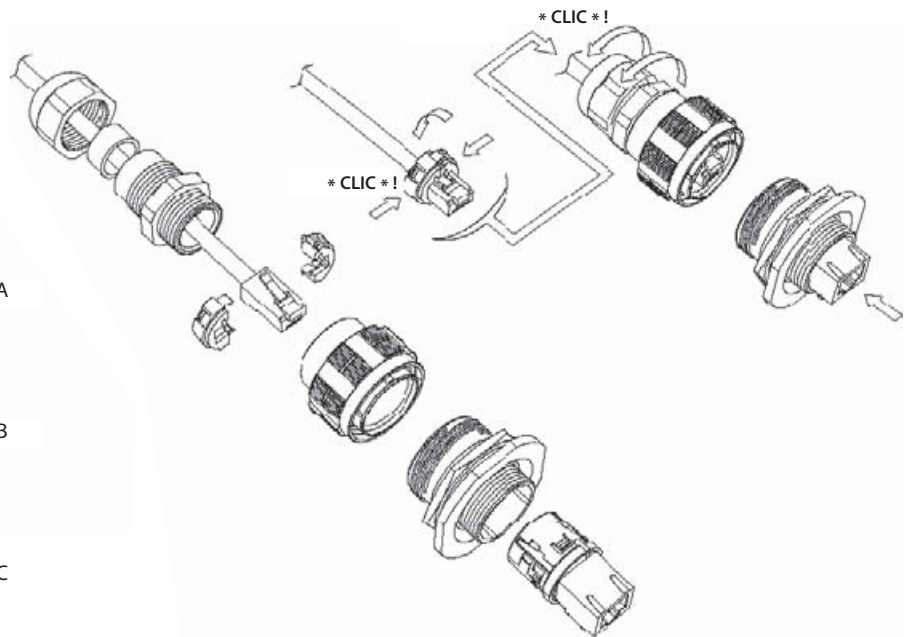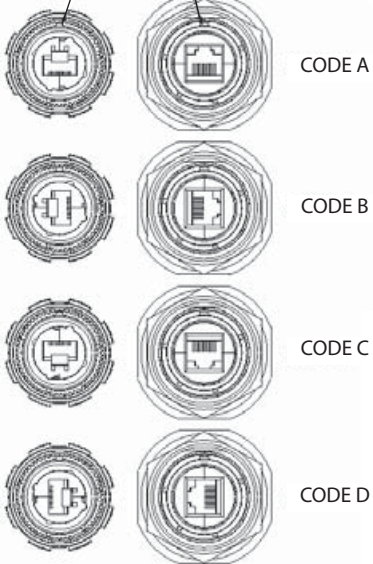
Accessories

■ **Metallic Caps**

	RJFTVC	2	G
Connector Type			
6: Plug			
2: Square Flange Receptacle			
7: Jam Nut Receptacle			
Shell Material & finish			
N: Aluminium shell - nickel plating - ROHS compliant			
G: Aluminium shell - olive drab cadmium plating			
BZ: Marine bronze shell - ROHS compliant			
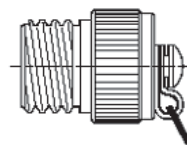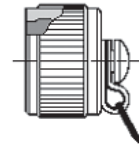
Plug Cap   Receptacle Cap
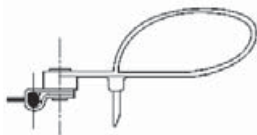
Plug Cap end
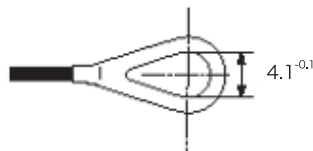
Square flange receptacle cap end $4.1^{-0.1}$
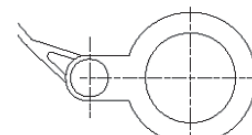
Jam Nut receptacle cap end

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

■ **Insert removal tool: RJF ODE**

17

RJF TV

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.

Approx.48,7

Approx.49,5

29,4

4-Ø3,2

29,4

39

Ø31,5

Approx.28,1
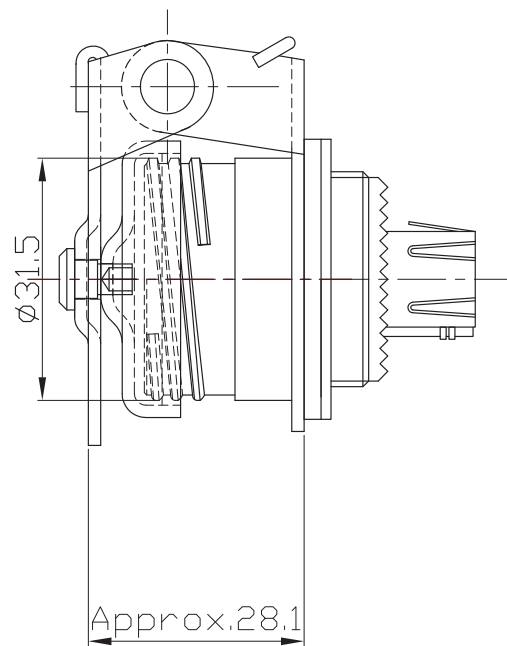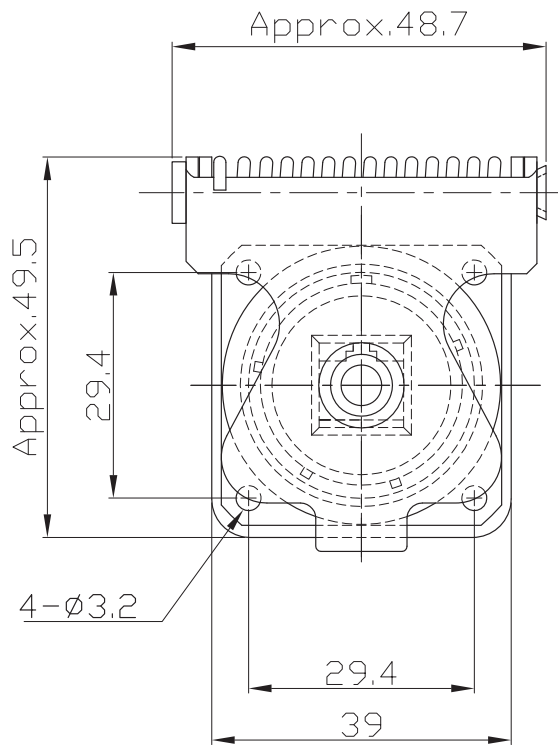
■ **Panel Gasket for square flange receptacle (Thickness: 0,8 mm [.031]):**

PART NUMBER: **JE19**

PART NUMBER:

Self closing cap only: **RJFTVSCC**

Remark: Compatible only with RJFTV square flange receptacle type: RJFTV**2**XXX (see page 15)

18

RJFTV

RJFTV series receptacles and plugs with EMI backshells provide a solution with 360° shielding: same protection than the one proposed by standard MIL-DTL-38999 series III connectors. With those solutions we recommend using our reinforced and double shielded cat5E cable, see page 25.
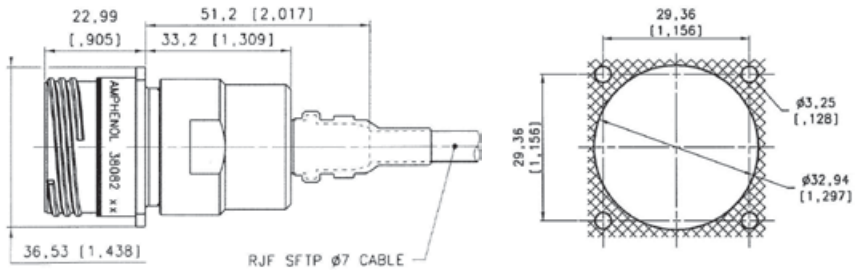
PART NUMBERS:
Olive Drab Cadmium Plating: **Kit38082**
Nickel Plating: **Kit38082NI**

SQUARE FLANGE RECEPTACLE

22.99 [.905]
51.2 [2.017]
33.2 [1.309]
36.53 [1.438]
RJF SFTP Ø7 CABLE

29.36 [1.156]
29.36 [1.156]
Ø3.25 [.128]
Ø32.94 [1.297]

Kit38082 and Kit38082NI include:

RECEPTACLE BODY — 2 METALLIZED INSERTS — BACKSHELL BODY — HEAT-SHRINK SLEEVE — RJ45 RECEPTACLE — BAND — GASKET

JAM NUT RECEPTACLE

22.3 [.878]
51.9 [2.044]
33.9 [1.336]
46.02 [1.812]
RJF SFTP Ø7 CABLE

Ø35.16 MINI [1.384]
33.86 -0.25 [1.333 -0.010]
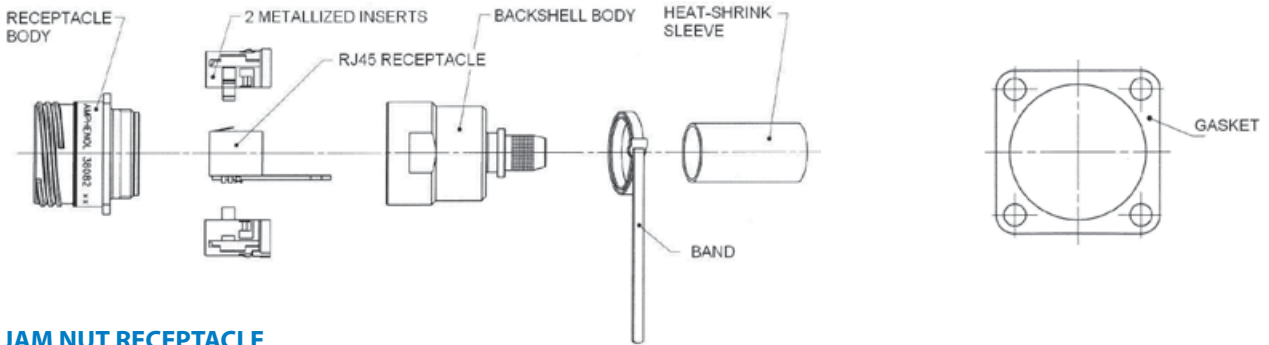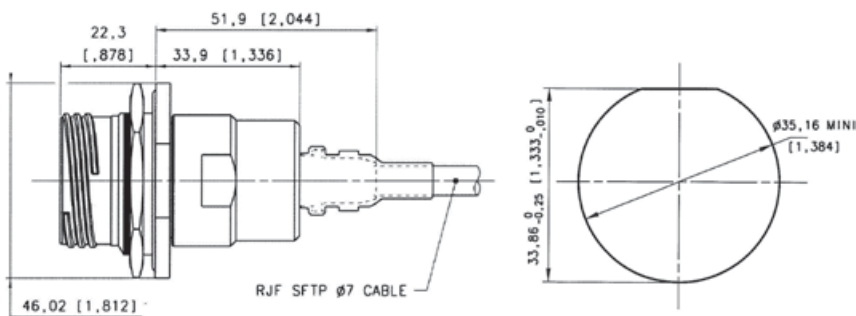
PART NUMBERS:
Olive Drab Cadmium Plating: **Kit38204**
Nickel Plating: **Kit38204NI**

Kit38204 and Kit38204NI include:
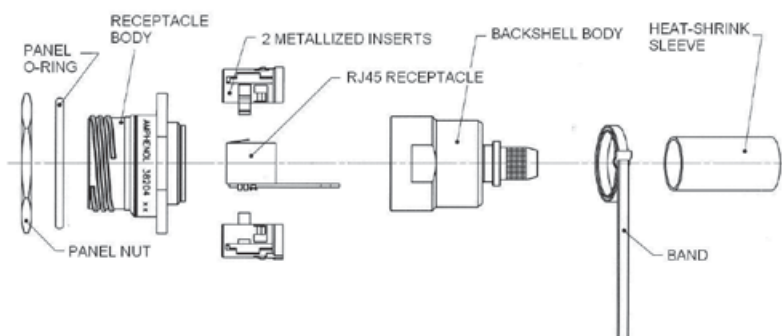
PANEL O-RING — RECEPTACLE BODY — 2 METALLIZED INSERTS — BACKSHELL BODY — HEAT-SHRINK SLEEVE — RJ45 RECEPTACLE — PANEL NUT — BAND

19

WIRE POSITION
TO BE DEFINED
BY CUSTOMER
ACCORDING TO NETWORK

PLUGS

Grounding Ring
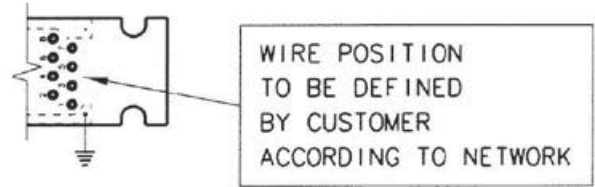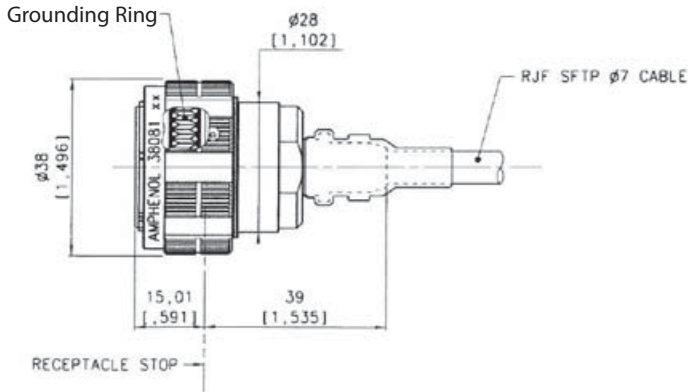
PART NUMBERS:
Olive Drab Cadmium Plating: **Kit38081**
Nickel Plating: **Kit38081NI**

Kit38081 and Kit38081NI include:
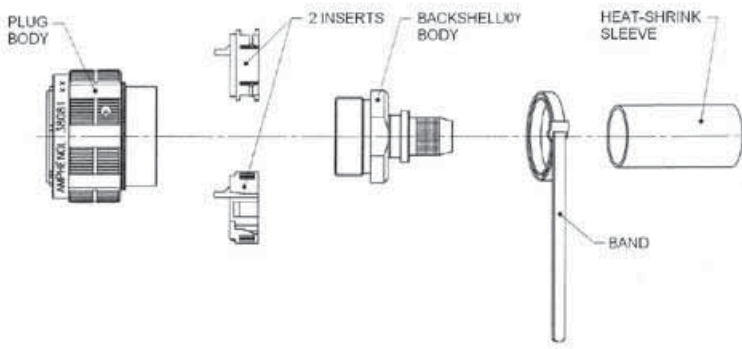
We advise using our double Shielded, reinforced Cat5E cable (see page 25) with these RJFTV series EMI connectors.If customer wants to use his own cable, please check with us regarding compatibility with our backshells: **contact@rjfield.com**.
We also provide assembled cordsets, (see examples below). For this type of solution please provide the configuration needed: length, description of second end…
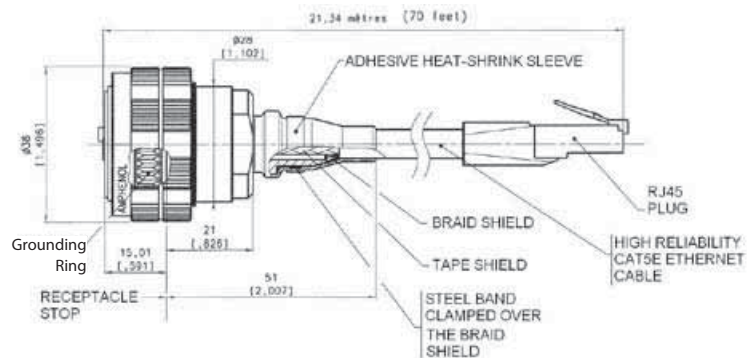
RJFTV

Right angle – Through Bulkhead – PC Tails Receptacles

Right Angle Receptacles

RoHS COMPLIANT

"N": nickel plating

Some applications have minimal space inside the system. The right angle receptacles meet this need while keeping the advantage of connecting a standard RJ45 cordset at the back.

SQUARE FLANGE RECEPTACLE
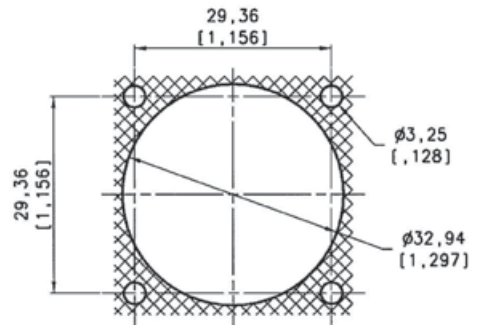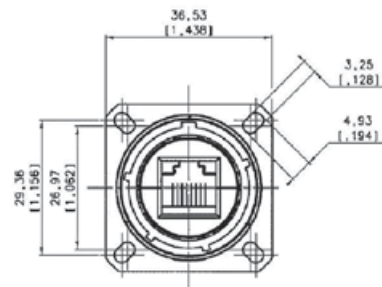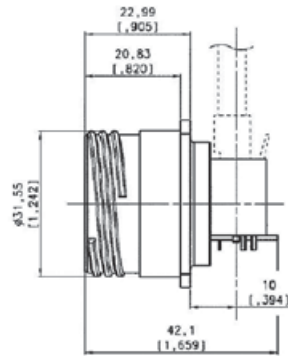
PART NUMBERS:
Nickel plating: **RJFTV21RAN**
Olive Drab Cadmium plating: **RJFTV21RAG**

PANEL DRILLING

JAM NUT RECEPTACLE
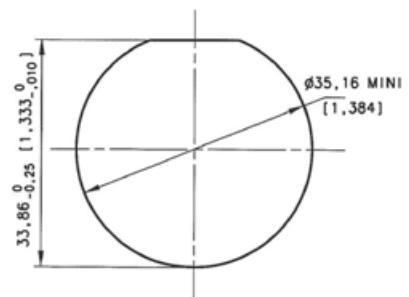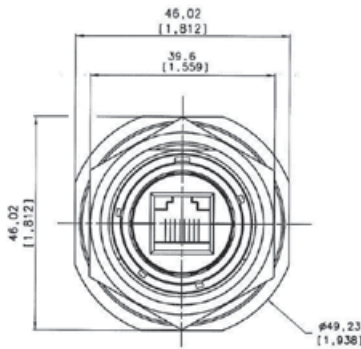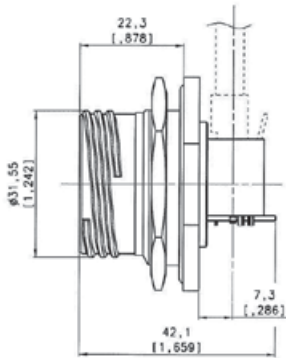
PANEL DRILLING

PART NUMBERS:
Nickel plating: **RJFTV71RAN**
Olive Drab Cadmium plating: **RJFTV71RAG**

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 (IP67) inside and outside the equipement, and keeps the flexibility offered by panel mount and plug connectors.

ROHS COMPLIANT
"N": nickel plating
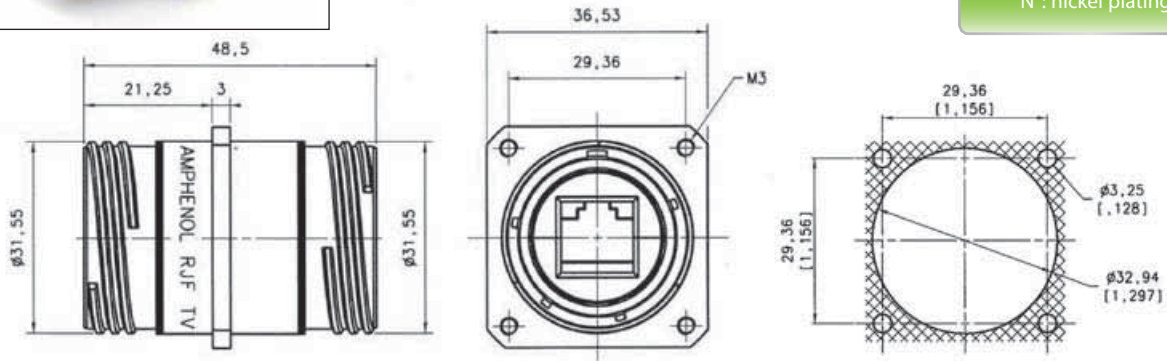
PART NUMBERS:
Nickel plating – Non metallized inserts: **RJFTVB2N ISO BRUT**   Olive Drab Cadmium plating – Non metallized inserts: **RJFTVB2G ISO BRUT**
Nickel plating – Metallized inserts: **RJFTVB2N ISO NI**   Olive Drab Cadmium plating – Metallized inserts: **RJFTVB2G ISO NI**

Environmentally Sealed Receptacles

RJF TV 7SA2 G 05 100BTX

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 example. In addition, the Sealed RJF TV have been successfully tested in very high vibration corresponding to airplanes applications. For more information, please consult datasheet RJF-RJFTV Environmentally Sealed Receptacles .

PCB Tails receptacles

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

SQUARE FLANGE RECEPTACLE
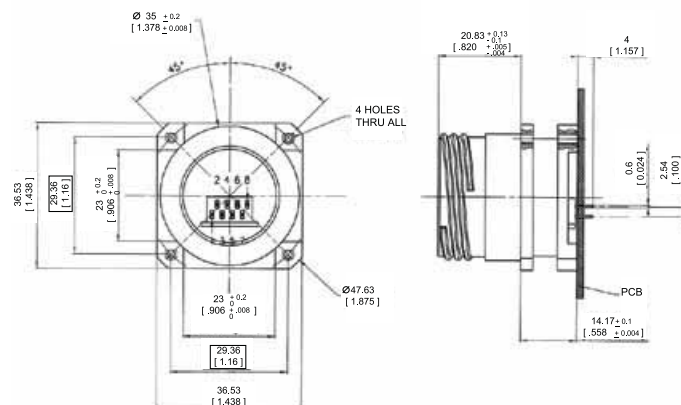
PART NUMBERS:
Olive Drab Cadmium Plating: **RJFTV25GF459**
Nickel Plating: **RJFTV25NF459**

PCB LAYOUT
Solder view face

PANEL DRILLING

JAM NUT RECEPTACLE

PANEL : 1,6 MINI   3,6 MAXI
        [.063]   [.126]

PART NUMBERS:
Olive Drab Cadmium Plating: **RJFTV75GF459**
Nickel Plating: **RJFTV75NF459**

PCB LAYOUT
Solder view face

PANEL DRILLING

23

RJF/RJF TV

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

ROHS COMPLIANT
"N": nickel plating
"B": black coating
"BZ": marine bronze (only for RJFTV)

MAIN CHARACTERISTICS
- Same as the RJF and RJF TV series … a complete IP67 sealing of the receptacle (even with no plug or no protective cap mated) is added. IP 67 means immersion during 30 minutes under 1 meter of water (watertight).
- Outside dimensions are the same as the standard RJF and RJF TV series.
- Vibrations: The compounded versions of the RJF TV have been tested in vibration following the NAS 1599 Aeronautic specification (Ambient temperature): 5 - 3000 Hz, 20g, 2,5 mm [.1 inch] double amplitude, 3 axes, 12 hours Note: This specification exceeds MIL-C-26500 requirements.

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.

Plug   Receptacle
Main Key

CODE A
CODE B
CODE C
CODE D

RJFTV 7S A 2G 15 100BTX

Part Number Code

			RJF TV	**7S**	**A**	**2**	**G**	**03**	**100 BTX**
Series									
RJF:	MIL-C-26482 bayonet								
RJFTV:	MIL-C-38999 series III								
Shell Type									
2S:	Sealed Square Flange Receptacle								
7S:	Sealed Jam Nut Receptacle								
Coding									
A,B,C,D									
Back Terminations *(For Receptacles only)*									
1:	Female RJ45								
2:	RJ45 Cordset								
Shell material & Finish									
B:	Aluminium shell - black coating - ROHS compliant (available for RJF Series Only)								
N:	Aluminium shell - nickel plating - ROHS compliant (note: receptacle inserts are metallized)								
G:	Aluminium shell - olive drab cadmium plating (note: receptacle inserts are metallized)								
BZ:	Marine bronze shell (receptacle inserts are metallized) - ROHS compliant (only available for RJFTV)								
Cordset Length *(For Receptacles with "2" Back Termination only)*									
03:	0.3m [11.81 inches]								
05:	0.5m [19.68 inches]								
10:	1m [39.37 inches]								
15:	1.5m [59.05 inches]								
Cabling Configuration *(For "2" Receptacles only)*									
100BTX:	(=568B)								

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

CABLE CAT 5E

High Reliability Cat 5e Ethernet Cable & Cordsets

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

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

HFFR: Halogen Free Flame Retardant

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

ROHS COMPLIANT

PHYSICAL CHARACTERISTICS

CONDUCTORS	24 AWG (0,25 mm²) tinned copper, 7x0.20 mm
INSULATION	Color coded 568-B, Linear Low Density Polyethylene, Nom. Dia. 0,039" (1mm)
ASSEMBLY	Pairs cabled with Kevlar strength members and separation tape wrapped
SHIELDS	Inner: Aluminium mylar 100% coverage Outer: Tinned copper braid 80% coverage
JACKET	Black, special PUR compound
WEIGHT	40 lbs / mft (59 kg/km)
OUTSIDE DIAM.	0.28" (7.1 mm) nom.
MIN BEND RADIUS *(During installation)*	67.5mm (9x O. D.)
MIN BEND RADIUS *(During operation)*	37.5mm (5 x O.D.)
MIN FLEXES TO FAILURE	Passes IEC 61156-6 requirtements
TEMPERATURE	Plus 70°C, minus 25°C

Cordsets with a RJ45 plug overmolded on each end

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

ELECTRICAL CHARACTERISTICS

DC Resistance	96 Ohms/Km @ 20°C
Impedance	100 +/- 15 Ohms 1-100 MHz

Attenuation

772 KHz	2.70 db/100m nom.
1 MHz	3.15 db/100m nom.
4 MHz	6.45 db/100m nom.
10 MHz	9.90 db/100m nom.
16 MHz	12.3 db/100m nom.
20 MHz	13.8 db/100m nom.
31.25 MHz	17.7 db/100m nom.
62.5 MHz	25.6 db/100m nom.
100 MHz	33 db/100m nom.

N.E.X.T. *(Near-End Crosstalk Loss)*

772 KHz	64 db min.
1 MHz	62 db min.
4 MHz	53 db min.
10 MHz	47 db min.
16 MHz	44 db min.
20 MHz	42 db min.
31.25 MHz	40 db min.
62.5 MHz	35 db min.
100 MHz	32 db min.

Capacitance	46pF/m nom. @ 1KHz
LCL	43 dB min. @ 64 KHz
Capacitance Unbalance	3.4 pF/m max. @ 1KHz (wire to ground)
Insulation Resistance	150 M Ohm min.
Voltage Rating	230 VMS
Dielectric Strength	VAC/1 min - 700 V/Min
Propagation Delay (100 MHz)	5.2 ns/m max. @ 100 MHz
Delay Skew	20 ns/100m max. @ 1-100 MHz
Resistance Unbalance	3% max. @ 20°C
Structural Return Loss (100 MHz)	23db/100m min. @ 1-20 MHz
Spark test (tested during production)	3 KV
Velocity of propagation	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

25

USBF TV

USB Connection System for Harsh Environment

With USB Field, you can insert a standard USB 2.0 cordset into a metallic plug which will protect it from shocks, dust and fluids.
No hazardous on-field cabling and grounding!
This metallic plug is connected into a receptacle, using a Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device for high vibrations.

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

ROHS COMPLIANT
"N": nickel plating
"BZ": marine bronze

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
- Mechanical Coding / Polarization (2 positions)
- Improved EMI protection
- Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device
- 2 mechanical Coding / Polarization possibilities by the user (receptacle insert rotation)
- USBF TV plug retention in the receptacle: 100 N in the axis
- Mating cycles: 500 to 1500

Environmental Protection
- Sealing (when mated): IP67 (Temporary immersion)
- Salt Spray: 48 h with Nickel plating
                        > 500 h with Olive Drab Cadmium
                        1000 h with marine bronze shell
- Fire Retardant / Low Smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 1micro s
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature Range: - 55°C / +85°C

Part Number Code

Series USB Field TV	USBF TV	2	1	G
Shell Type **6:** Plug **2:** Square Flange Receptacle **2PE:** Square Flange Receptacle with backshell **7:** Jam Nut Receptacle **7PE:** Jam Nut Receptacle with backshell				
Back Terminations (Receptacles only) **1:** USB-A receptacle **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				

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

Plug

■ Shell type 6
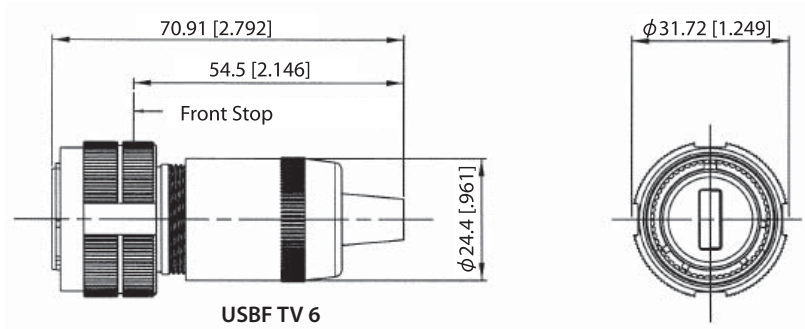
70.91 [2.792]

54.5 [2.146]

Front Stop

φ31.72 [1.249]

φ24.4 [.961]

USBF TV 6

Receptacles

■ Square flange receptacle
4 mounting holes: Shell type 2

22.99 [.905]

20.83 [.820]

φ25.5 [1.006]

31.41 [1.237]

30.96 [1.219]

23.01 [.906]

24.61 [.969]

10.58 [.417]

φ3.25 [.128]

$\phi 3.25 \, ^{0}_{-0.25}$

$[.128 \, ^{0}_{-.010}]$

23.61 [.930]

φ25.70 [1.012]

35 [1.378]

USBF TV 2

Panel Drilling

■ Jam nut receptacle
Hexagonal Nut mounting:
Shell type 7

31.42 [1.237]

22.3 [.878]

φ25.5 [1.006]

CARRE 38.1 SQUARE [1.500]

φ41.28 [1.625]

$27.5 \, ^{0}_{-0.25}$
$[1.083 \, ^{0}_{-.010}]$

38.1 [1.500]

40 MINI [1.575]

40 MINI [1.575]

φ28.82 MINI [1.135]

USBF TV 7

Panel Drilling

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

86.9 [3.422]

72.7 [2.862]
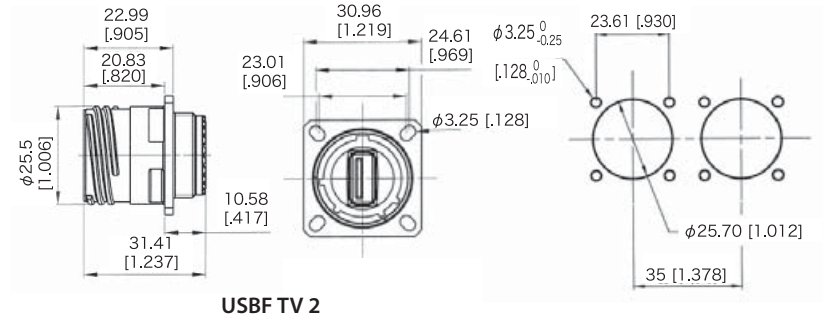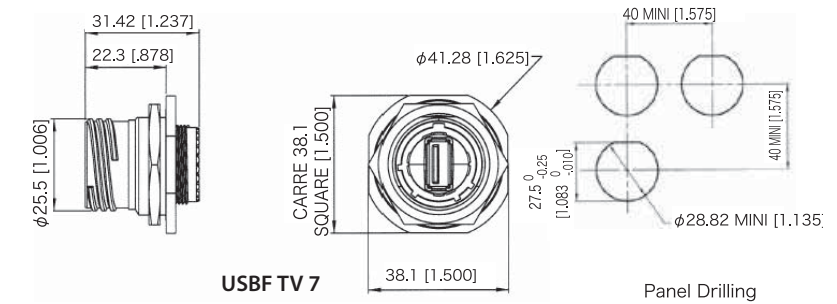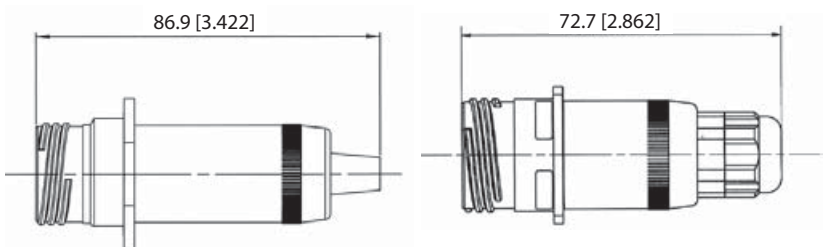
Backshell used with back termination type 1:
USB A receptacle (Not sealed)

USBF TV 2PE/7PE-1

Backshell used with
back termination type 2:
Solder (Sealed – IP67)

USBF TV 2PE/7PE-2

Back Terminations
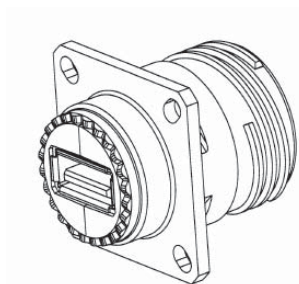
Type 1: USB-A Receptacle
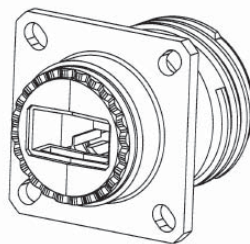
Type 2: Solder
4 Tinned holes to solder your cable
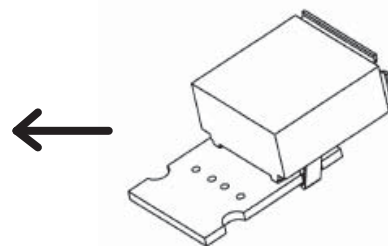
View of the PCB of the
Type 2 version with 4 tinned
holes for solder termination

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Assembly Instructions

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

Plug Assembly

1. Only if you need a full sealing (IP67): 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
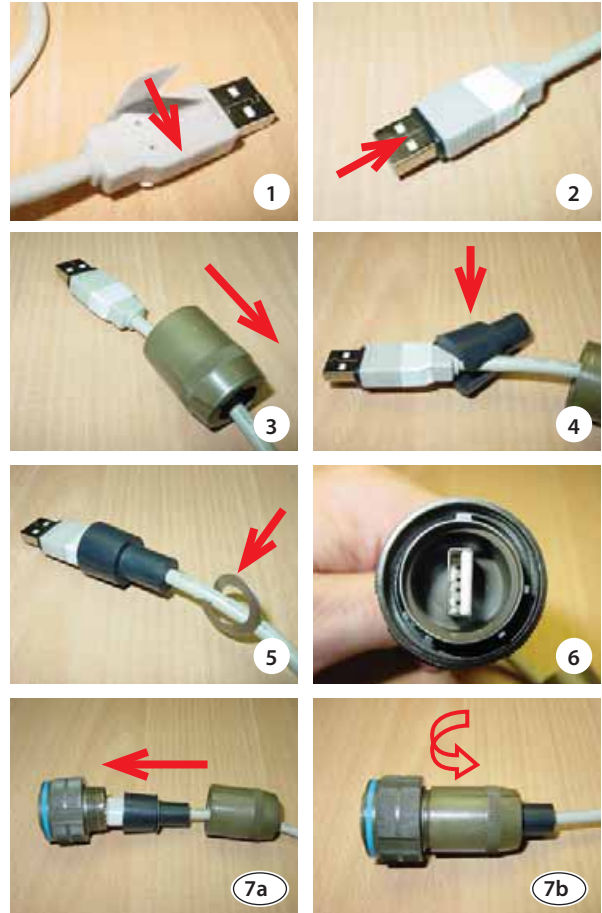
IMPORTANT NOTE
The connection sealing is not done by the black retention spacer (which is sloted), but by the front face ORing (see 2)

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
Connector Type				
6:	Plug			
2:	Square Flange Receptacle			
7:	Jam Nut Receptacle			
Shells Material & Finish				
N:	Aluminium shell - Nickel - ROHS compliant			
G:	Aluminium shell - Olive Drab Cadmium			
BZ:	Marine bronze shell - ROHS compliant			

Plug Cap

Receptacle Cap

Plug Cap end

Square flange receptacle cap end

Jam Nut receptacle cap end

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

■ Receptacle Insert removal tool: USBF ODE
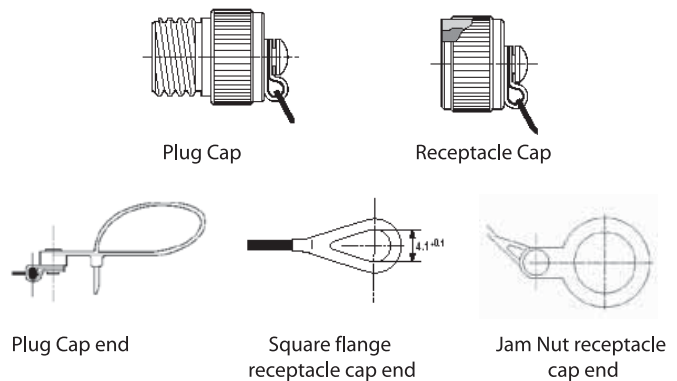
USBFTV

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 32
We can provide those receptacles: • with cordset already soldered
• without cordset
For 360° shielded USBFTV series receptacles, please consult us:
www.usbfield.com

EXAMPLE WITH A SQUARE FLANGE RECEPTACLE *(PROVIDED WITHOUT CABLE)*
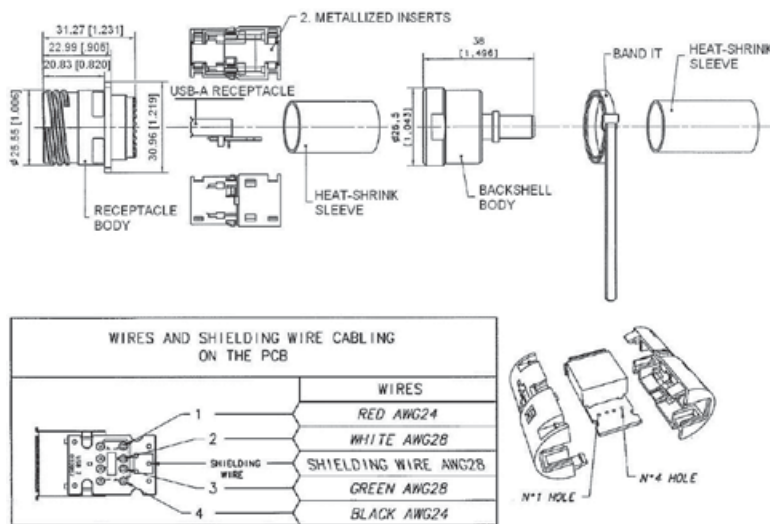
IMPORTANT NOTE
With receptacles provided without cable, customer will have to solder his cable on the PCB, please find below the cabling specification.
If customer prefers to use his cable, please check with us compatibility with our EMI backshells:
www.usbfield.com

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

RoHS COMPLIANT
"N": nickel plating

PC TAILS RECEPTACLE WITH « STAND OFF » SHELL

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

Panel Drilling

RECOMMENDED PCB HOLE LAYOUT
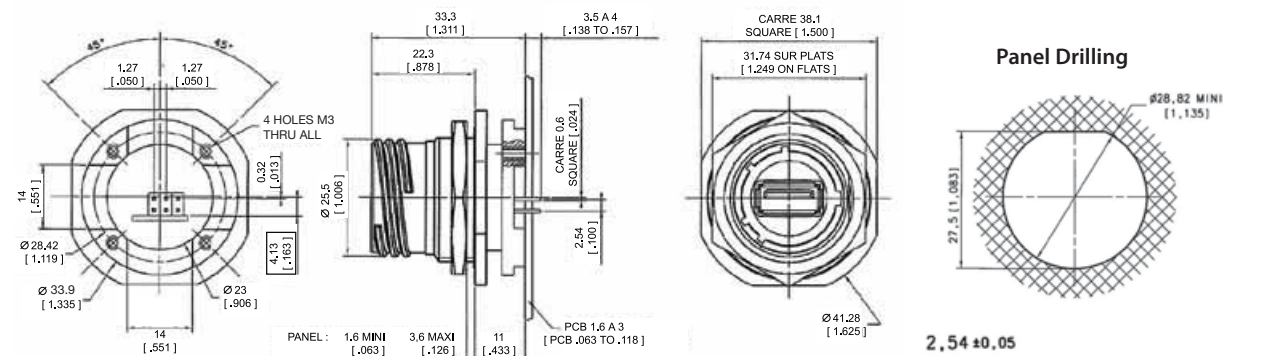
PART NUMBERS:
Jam nut receptacle – Nickel: **USBFTV75NF459**
Jam nut receptacle – Olive Drab Cadmium: **USBFTV75GF459**
Square flange receptacle – Nickel: **USBFTV25NF459**
Square flange receptacle – Olive Drab Cadmium: **USBFTV25GF459**
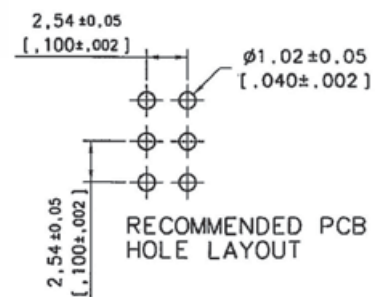
REINFORCED USBFTV MEMORY KEYS

(Derived from MIL-DTL-38999 series III specification)
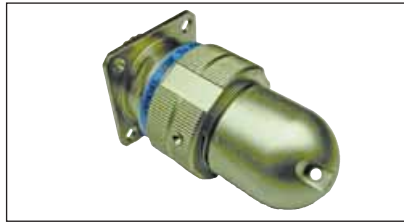
We provide reinforced USB memory keys available in different capacities. They can be used ONLY with our USBFTV series receptacles. When mated on the receptacle, the system is IP67.

Dimensions of rugged USBFTV Key shown with receptacle USBFTV21x

ROHS COMPLIANT
"N": nickel plating

Environmental Protection
- Sealing: IP67 (when mated)
- Salt Spray: 48 h with Nickel plating (ROHS)
  > 500 h with Olive Drab Cadmium
- Vibrations: MIL-STD-810F method 514.5 fig 514.5.C cat 14
- Temperature Range: - 40°C / +85°C (MIL-STD-810F)

Data transmission during vibration and temperature tests

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

PANEL DRILLING

23,61
[0,93]

Ø 3,25
[0,128]

Ø 25,7
[1,012]

31,43
[1,237]

22,99
[0,905]

20,83
[0,82]

Ø 25,53
[1,005]

24,61
[0,969]

23,01
[0,906]

30,96
[1,219]

Ø 3,25
[0,128]

Ø 31,72
[1,249]

FRONT STOP

33,12
[1,304]

Ø 24,4
[0,961]

Ø 2,7
[0,106]

48,13
[1,895]

200 / 800
[7,874 / 31,496]
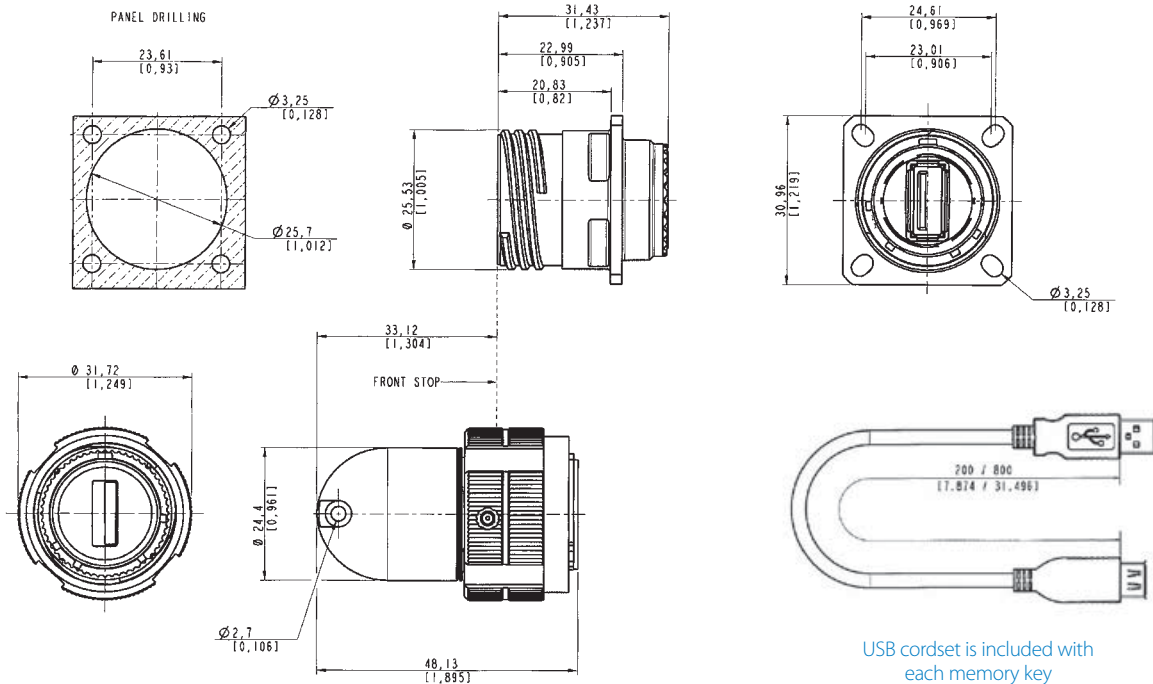
USB cordset is included with each memory key

DEFINITION OF PART NUMBER

USBFTV KEY 6   A   0256   N   CAP

| Beginning of every USBFTV Key part number. Remains unchanged. | **Coding position:** **A:** coding A **B:** coding B **NB:** please check the coding of your USBFTV receptacle* | **Capacity of your USBFTV Key:** 0256 \| 0512 \| 1024 \| 2048 \| 4096 Other capacity, please consult us at **contact@rjfield.com** | **Plating:** **"N":** nickel plating **"G":** olive drab cadmium **NB:** please check the plating of your USBFTV receptacle | **Cap:** With cap **Blank:** Without cap |

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

EXAMPLE: **USBFTVKEY6A0256N:** USBFTV KEY – CODING A – CAPACITY OF 256MO – NICKEL PLATING

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

REINFORCED USB MEMORY KEYS

We provide reinforced USB memory keys available in different capacities. When mated, the system is IP67. Shells are metallic with 1/4 turn bayonet coupling.

ROHS COMPLIANT

Dimensions of rugged USBF Key:

Environmental Protection
- Sealing: IP67 (when closed)
- Salt Spray: 48 h with Nickel plating (ROHS)
                     > 96 h with Black coating (ROHS)
                     > 500 h with Olive Drab Cadmium
- Vibrations: MIL-STD-810F method 514.5 fig 514.5.C cat 14
- Temperature Range: - 40°C / +85°C (MIL-STD-810F)

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

51,7 [2,034]

Ø24,4 [0,96]

200 / 800
[7.874 / 31.496]
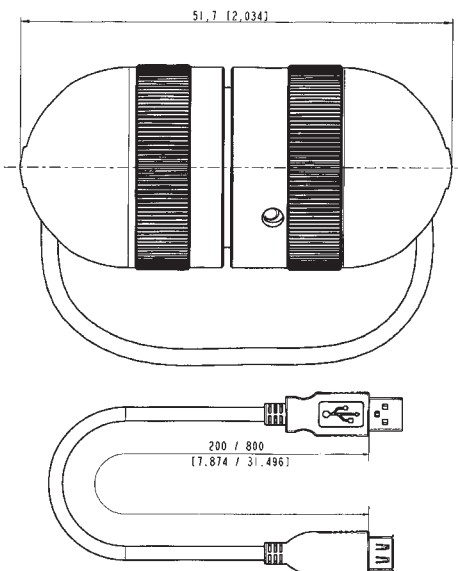
USB cordset is included with
each memory key
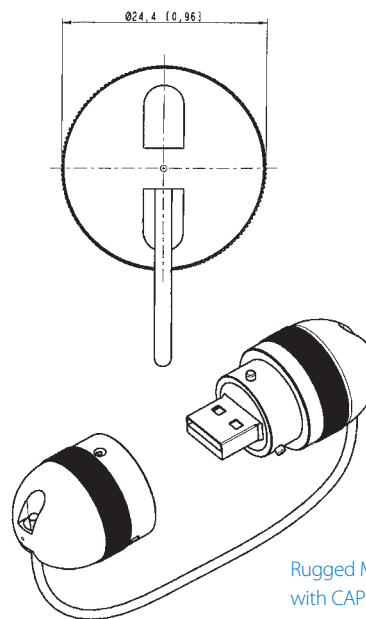
Rugged Metallic USB KEY
with CAP SEALING: IP 67

DEFINITION OF PART NUMBER

USBF KEY   0256   N

Beginning of every USB Key part number. Remains unchanged.

Capacity of your USBF Key:
0256
0512
1024
2048
4096
Other capacity, please consult us
at **contact@rjfield.com**

Shell finish:
N: Natural
G: Green
B: Black

EXAMPLE: **USBFKEY0256N:** USB MEMORY KEY - CAPACITY OF 256MO - SHELL FINISH: NATURAL
EXAMPLE: **USBFKEY1024G:** USB MEMORY KEY - CAPACITY OF 1024MO - SHELL FINISH: GREEN

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 foild), 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

ROHS COMPLIANT

PHYSICAL CHARACTERISTICS

DATA CONDUCTORS	bare copper, 7/0.12 mm nom (28 AWG)
DATA INSULATION	0.9 mm nom
COLOR DATA PAIR	Green & white
POWER CONDUCTORS	Tinned copper, 7/0.2 mm (24 AWG)
POWER INSULATION	1.1 mm nom
COLOR POWER WIRE	Red & Black
SHIELDS	Foil: poviding 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
JACKET	PU compound
COLOR JACKET	Black
WEIGHT	26 lbs/mft (38 kg/km)
OUTSIDE DIAM.	0.20 inch (5.1 mm nom. +/- 0.15)
MIN BEND RADIUS (During installation)	45.9 mm (9x O. D.)
MIN BEND RADIUS (During operation)	25.5mm (5 x O.D.)
TEMPERATURE installation	Plus 60°C, minus 5°C
TEMPERATURE operational	Plus 70°C, minus 30°C

ELECTRICAL CHARACTERISTICS

DC RESISTANCE	94 Ohms/Km @ 20°C
IMPEDANCE	90 +/- 13 Ohms 1-400 MHz

ATTENUATION	
1 KHZ	8 db/100m max.
4 MHZ	15,6 db/100m max.
24 MHZ	38 db/100m max.
96 MHZ	76 db/100m max.
200 MHZ	128 db/100m max.
400 MHZ	232 db/100m max.

CAPACITANCE 2X28 AWG	54pF/m nom. @ 1KHz
CAPACITANCE UNBALANCE	2.0 pF/m max. @ 1KHz (wire to ground)
DIELECTRIC STRENGTH	VAC/1 min - 500 V/Min
RESISTANCE UNBALANCE	2% max. @ 20°C
VELOCITY OF PROPAGATION	65% min. 68% max.

CORDSETS WITH A USB A PLUG OVERMOLDED ON EACH END (OUT OF USB SPECIFICATION > 5 M)	
Length (m/ft)	Part Number
6 m / 19,68 ft	USB2 AA 600 PU HFFR
7 m / 22.96 ft	USB2 AA 700 PU HFFR
8 m / 26.24 ft	USB2 AA 800 PU HFFR
9 m / 29.52 ft	USB2 AA 900 PU HFFR
10 m / 32.80 ft	USB2 AA 1000 PU HFFR

CORDSETS WITH A USB A PLUG OVERMOLDED ON EACH END (UNDER USB SPECIFATION ≤ 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

USB B Field

SEALED (IP67) USB-B CONNECTION SYSTEM
• USB-B male plug overmolded on USB2.0 cable
• USB-A plug can be used with USBFTV
• USB-B female receptacle with 50 mm wires & 5 way connectors
• Plastic shells
• Thread coupling
• Rear mount Jam Nut receptacle with panel gasket included

Applications

■ Embedded Computers   ■ Data Transfer   ■ Numerical Control Machine

MALE SEALED PLUG USB-B / USB-A CORDSET

FEMALE RECEPTACLE AND CAP

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

USB 2.0 cable – PVC jacket
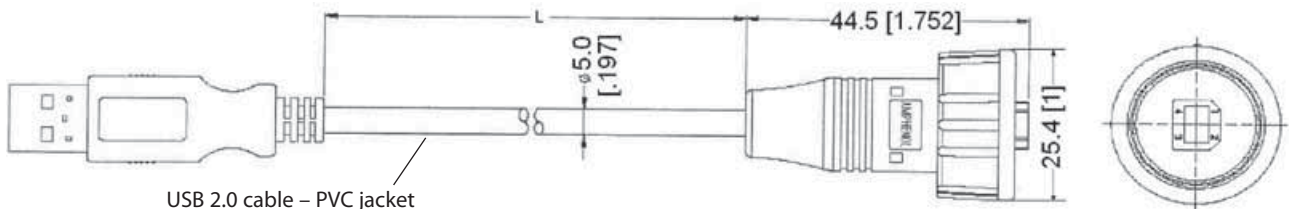
PART NUMBERS:
 L = 1000±50mm [39.37±1.97] - P/N: **USBBF6100**
 L = 2000±50mm [78.74±1.97] - P/N: **USBBF6200**

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

PIN ASSIGNMENTS *(FRONT VIEW)*
1 = RED (AWG 24)
2 = WHITE (AWG 28)
3 = GREEN (AWG 28)
4 = BLACK (AWG 24)
Shield = Drain

RECEPTACLE – FEMALE USB-B
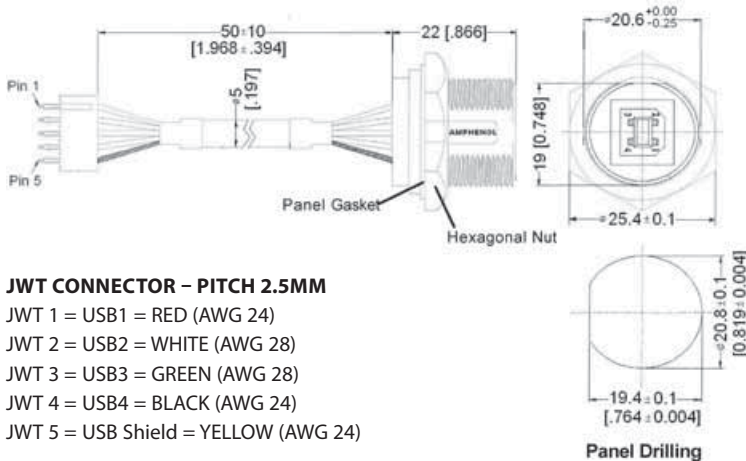
JWT CONNECTOR – PITCH 2.5MM
JWT 1 = USB1 = RED (AWG 24)
JWT 2 = USB2 = WHITE (AWG 28)
JWT 3 = USB3 = GREEN (AWG 28)
JWT 4 = USB4 = BLACK (AWG 24)
JWT 5 = USB Shield = YELLOW (AWG 24)

Panel Drilling

RECEPTACLE CAP

RECEPTACLE PN:
USBBF7

CAP PN: *USBBFC7*

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FWF TV

IEEE 1394 Connection System for Harsh Environments

With FW Field, you can insert a standard IEEE1394 cordset into a metallic plug which will protect it from shocks, dust and fluids.
No hazardous on-field cabling and grounding!
This metallic plug is connected into a receptacle, using a Tri Start Thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device for high vibrations.

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

MAIN CHARACTERISTICS
- No assembly tools required
- Sealed against fluids and dusts (IP67)
- No time-consuming in-field cabling operation necessary
- **Tri-start thread coupling mechanism (MIL-DTL-38999 series III type) with anti-decoupling device**
- FW plug retention in the receptacle: 100 N in the axis
- Mating cycles: 500 to 1500 times
- Improved EMI protection

Environmental Protection
- Sealing (mated): IP67 (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: - 55°C / +85°C

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

Part Number Code

	FW F TV	2	1	G
Series **IEEE1394 Field TV**	FW F TV	2	1	G
Shell Type **6:**　　Plug **2:**　　Square Flange Receptacle **2PE:**　Square Flange Receptacle with backshell **7:**　　Jam Nut Receptacle **7PE:**　Jam Nut Receptacle with backshell				
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
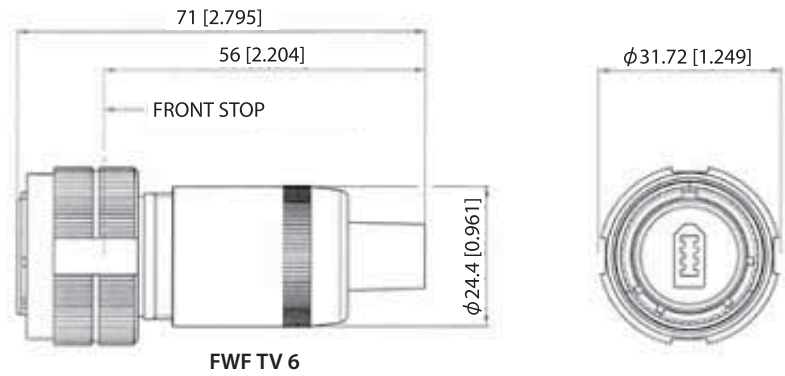
71 [2.795]

56 [2.204]

FRONT STOP

φ31.72 [1.249]

φ24.4 [0.961]

FWF TV 6

Receptacles

■ Square flange receptacle
4 mounting holes: Shell type 2

22.99 [.905]

20.83 [.820]

φ25.5 [1.006]

33.83 [1.332]

24.61 [.969]

23.01 [0.906]

SQUARE 30.96 [1.219]

φ3.25 [.128]

φ3.25 $^{0}_{-0.25}$

[.128 $^{0}_{-.010}$]

23.61 [.930]

φ25.70 [1.012]

35 [1.378]

Panel Drilling

FWF TV 2

■ Jam nut receptacle
Hexagonal Nut mounting:
Shell type 7

33.8 [1.332]

22.3 [.878]

φ25.5 [1.006]

φ41.28 [1.625]

SQUARE 38-1 [1.500]

38.1 [1.500]

40 MINI [1.575]

40 MINI [1.575]

27.5 $^{0}_{-0.25}$ [1.083 $^{0}_{-.010}$]

φ28.82 MINI [1.135]

Panel Drilling

FWF TV 7

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

86.9 [3.422]

77 [3.020]
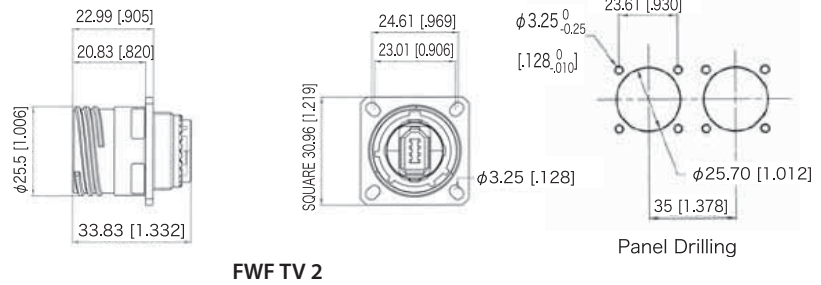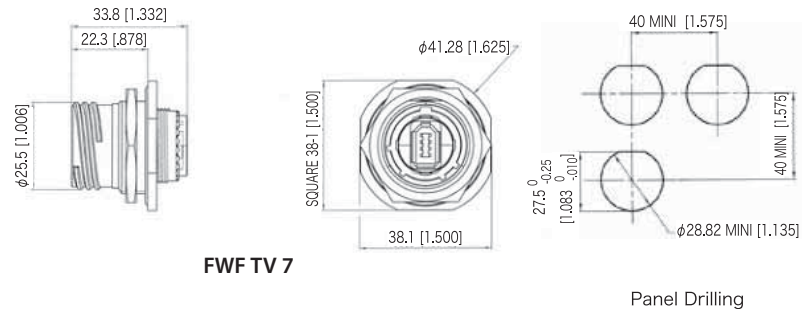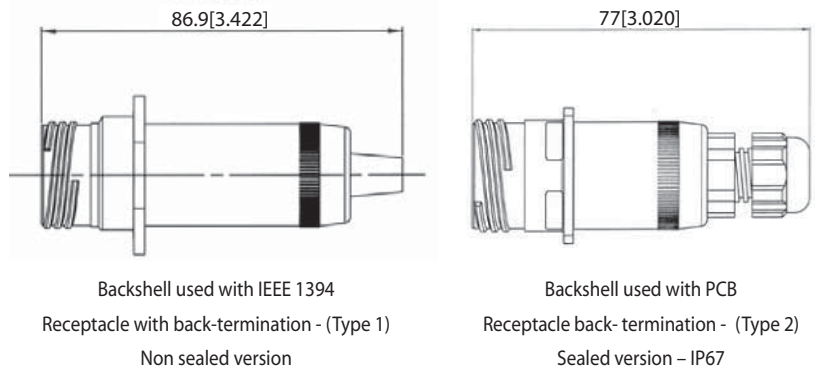
Backshell used with IEEE 1394
Receptacle with back-termination - (Type 1)
Non sealed version

Backshell used with PCB
Receptacle back- termination - (Type 2)
Sealed version – IP67

Back Terminations
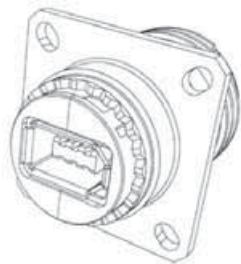
Type 1: IEEE 1394 Receptacle
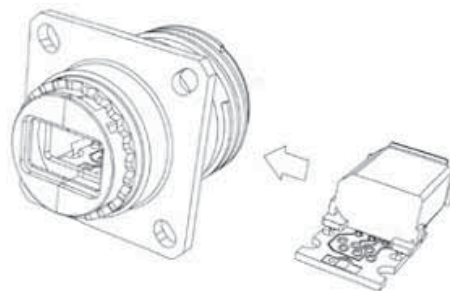
Type 2: Solder
6 Tinned holes for soldering

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

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

Plug Assembly

1. If a fully sealed (IP67) 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
Connector Type			
6: Plug			
2: Square Flange Receptacle			
7: Jam Nut Receptacle			
Shell plating			
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
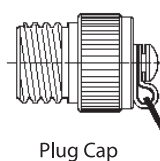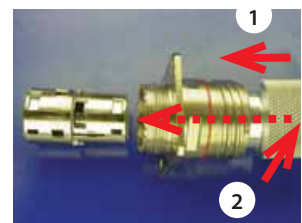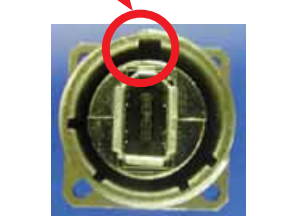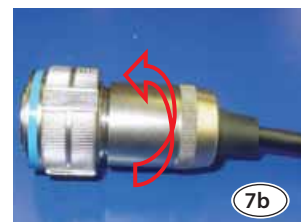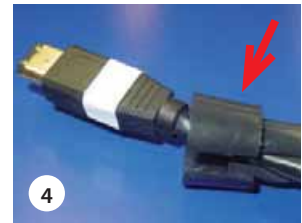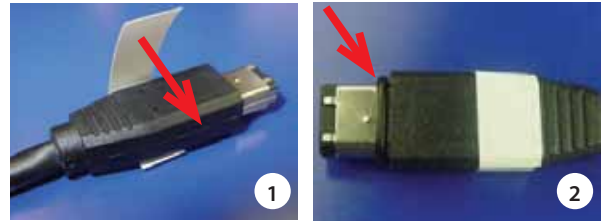
Plug Cap

Receptacle Cap

Plug Cap end

Square flange receptacle cap end

4.1 +0.1
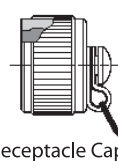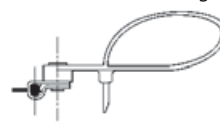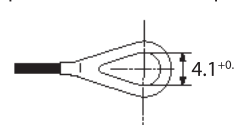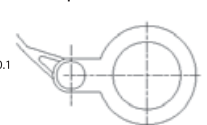
Jam Nut receptacle cap end

SELF CLOSING CAP

For RJ Field, USB and IEEE1394 receptacles

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

ROHS COMPLIANT
"N": nickel plating
"B": black coating

64.1 [2.523]

26.7 [1.052]

36 [1.417]

26.97 [1.062]

26.1 [1.028]

21.9 [.862]

26.97 [1.062]

ϕ3.5 [.138]

ϕ31.3 [1.232]

Panel Drilling
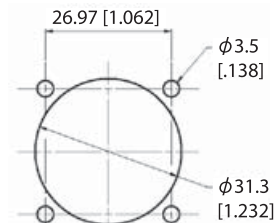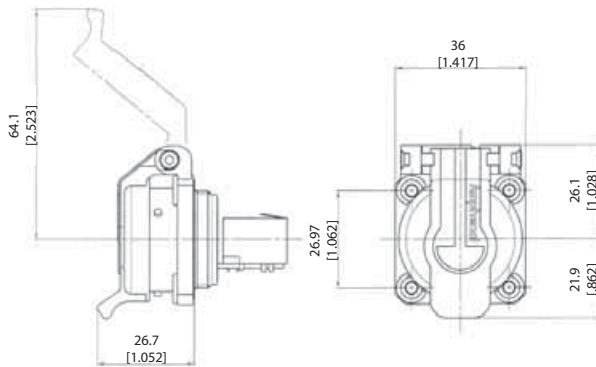
Version: RJ45
RJF 21N SCC
Nickel and metallized inserts (EMI)

RJF 21B SCC
Black and blank insert
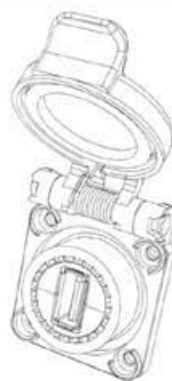
Version: USB
USBF 21N SCC
Nickel and metallized inserts (EMI)

USBF 21B SCC
Black and blank insert

Version: IEEE1394
FWF 21N SCC
Nickel and metallized inserts (EMI)

FWF 21B SCC
Black and blank insert

■ Note: Panel gasket for square flange receptacles: JE18

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RJ11F

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

MAIN CHARACTERISTICS
- **Bayonet coupling** ("Audible & Visual" coupling signal)
- **Robust metallic shells based on MIL-C-26482**
- 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: IP67
- Salt Spray: 48 h with Nickel plating
                     > 96 h with black coating
                     > 500 h with Oliv Drab Cadmium
- Fire Retardant / Low Smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 10 nano s.
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors *(mated pair)*
- Humidity: 21 days, 43°C, 98% humidity
- Thermal Shock: 5 cycles at - 40°C / +100°C
- Temperature Range: - 40°C / +85°C

Applications
- Industrial applications
- Battlefield communication

ROHS COMPLIANT
"N": nickel plating
"B": black coating

Part Number Code

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

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

Accessories

- Metallic cap

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

Plug cap   Recaptacle cap

$\phi 3.6$
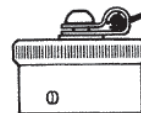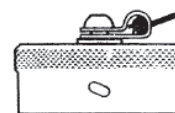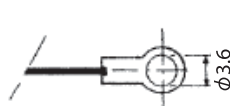
Square Flange type « 2 »   Plug Cap end type « 6 »   Jam nut receptacle type « 7 »

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

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

■ Shell type 6 with Plastic Gland
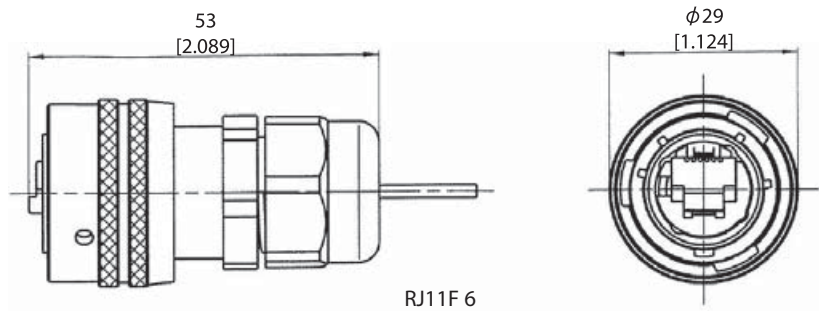
53
[2.089]

ϕ29
[1.124]

RJ11F 6

Receptacles

■ Square flange receptacle
  4 mounting holes: Shell type 2

Panel dilling

13.4[0.528]
11.8
[0.465]

33.01[0.906]

23.01[0.906]

ϕ3.2[0.126]

ϕ3.50
[0.138]

22.2[0.874]

ϕ20.6[0.811]

ϕ28.6[1.126]

39.7[1.563]

RJ11F 2

ϕ25[0.984]

ϕ22.5[0.886]

Rear   Front

■ Jam nut receptacle
Hexagonal Nut mounting: Shell type 7

21.7[0.854]
3.2[0.126]

34.9[1.374]

Panel dilling

ϕ22.2[0.874]

ϕ25.6$_{0}^{0.3}$
[1.008-1.020]

24.3$_{0.3}^{0}$
[0.945-0.957]

1.6 MINI / 3.2 MAXI
[0.063 MINI / 0.126 MAXI]

39.7[1.563]

RJ11F 7
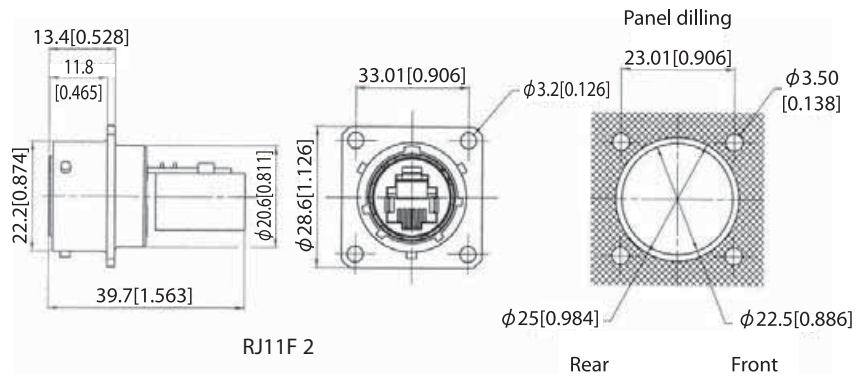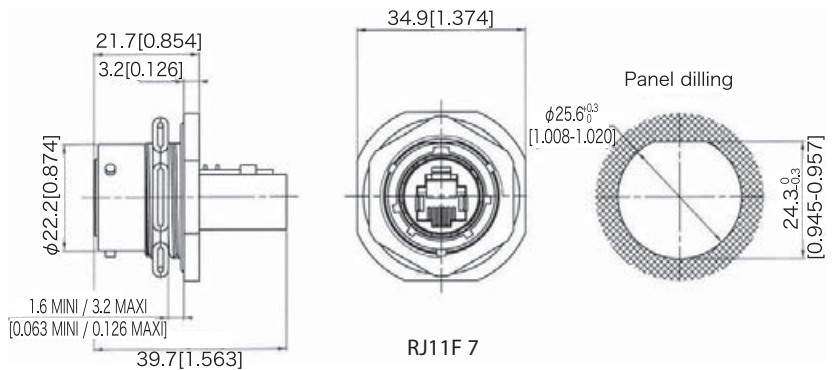
Back Terminations
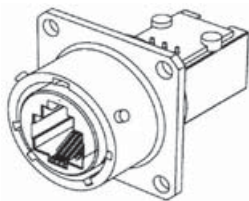
Type 1: Female RJ11 / RJ12
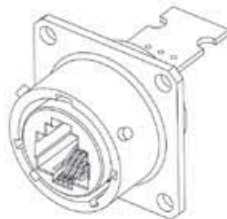
Type 2: Solder
6 tinned through holes to solder your cable

Easy and Safe: No field cabling tools required

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

Insert Codes

Keying

CODE   A

CODE   B

CODE   C

CODE   D
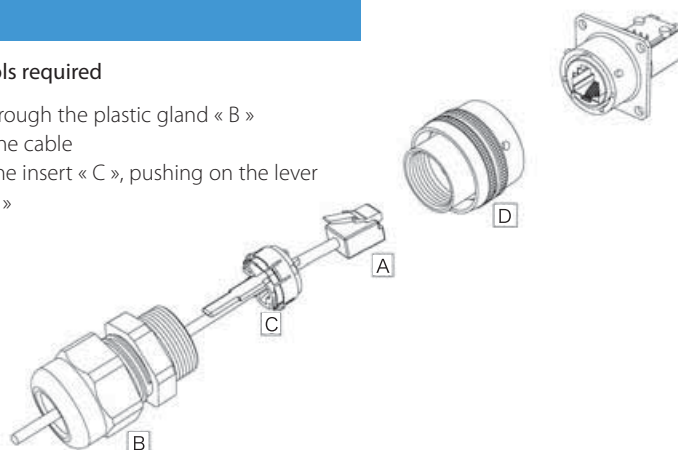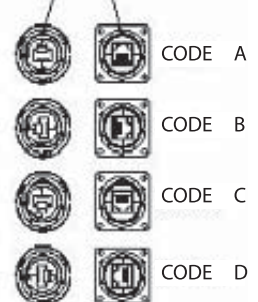
4 coding positions

D

A

C

B

39

MTRJF TV

Transform your MTRJ patchcord into an Environmental Connector

Applications
- Railways
- Base Station
- Military communication
- Navy

With MTRJFTV 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 (IP67)
- Shock, Vibration proof,
- No cabling operation in field and no tools required for installation

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

ROHS COMPLIANT
"N": nickel plating

Part Number Code

Serie MTRJ Field TV	MTRJF TV	6M	C	G	N

Shell Type
6: Plug with metal backshell, plastic PG clamp
6M: Plug with metal backshell and metal PG clamp
2: Square flange receptacle
2PE: Square flange, metal backshell and plastic PG clamp
2PEM: Square flange, metal backshell and metal PG clamp
7: Jam nut receptacle
7PE: Jam nut, metal backshell and plastic PG clamp
7PEM: Jam nut, metal backshell and metal PG clamp

Cable Type
C: Mini round cable 2,8 mm
D: Flat duplex cable 1,6 mm
S: Duplex zipcord 1,6 mm
0: Receptacle without backshell
T: Flat duplex cable + Duplex zipcord for 1,6 mm - 2mm - 2,8mm

Shell Finish
N: Nickel plated
G: Olive drab cadmium plated
B: Bronze
D: Black zinc cobalt
Z: Olive drab zinc cobalt

Polarization
N: Normal
A / B / C / D / E

Cap Series		B	EC	N	TV	W	13

Protective cap type
EC: For square flange receptacle
ER: For jam nut receptacle
F: For plug

Wire type
N: Nylon cord
Blank: Metallic chain

TV: Series

Shell finish
B: Bronze
F: Electroless nickel plated, aluminium version
W: Olive drab cadmium plated, aluminium version
D: Black zinc cobalt
Z: Olive drab zinc cobalt

- **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
MTRJFTV DM TOOL

Line drawings *(Dimensions in mm)*

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

96 Max

29 Max

MTRJ FTV 6
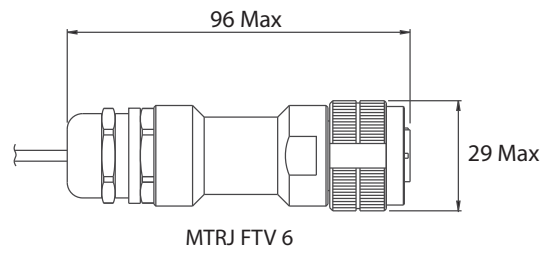
■ Receptacle (MIL DTL 38 999 series III Size 13) with backshell

Square flange receptacle with backshell
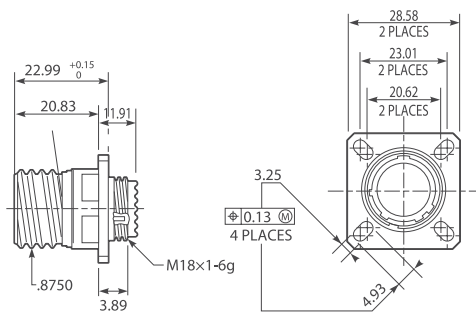
89 Max

$34.93^{+0.23}_{-0.25}$

$22.30^{+0.13}_{-0.10}$

$24.94^{+0.13}_{0}$

38,1

MTRJ FTV 2PE/2PEM

Jam Nut receptacle with backshell

89 Max

23.01

$20.83^{0}_{-0.13}$

$22.99^{+0.13}_{0}$

3.25

4.93

28.81 Max

20.62

MTRJ FTV 7PE/7PEM

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

$22.99^{+0.15}_{0}$

20.83

11.91

M18×1-6g

.8750

3.89

28.58
2 PLACES

23.01
2 PLACES

20.62
2 PLACES

3.25

⊕ |0.13 (M)|
4 PLACES

4.93

MTRJ FTV 2

PANEL DRILLING

Square flange receptacle rear
panel mounting

23.01
20.62

4×3.25

Ø23.42

31.50

Square flange receptacle
front panel mounting

23.01
20.62

4×3.25

Ø19.05

31.50

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

Panel Thickness
1.57 MIN, 3.18 MAX

9.37 MAX

24.26

0.875 (inches)

2.31 MAX

V

Size 13/25
= 22.30

MTRJ FTV 7

38.38

25.58

30.17
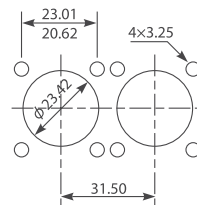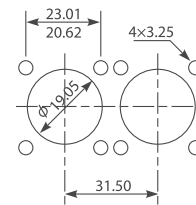
34.93

PANEL DRILLING

Jam nut receptacle
rear panel mounting

25.58

24.26

36.00
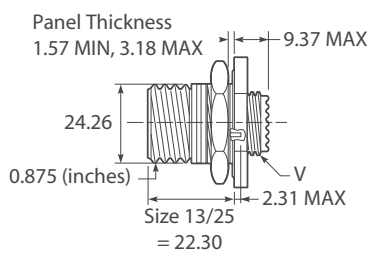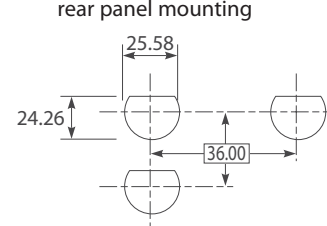
Protective caps

Protective cap for
plug (nylon cord)

0.875 (inches)

20.24 MAX

25.40 mm

Protective cap for
receptacles (nylon cord)

0.875 (inches)

29.62 MAX

29.74 mm

41
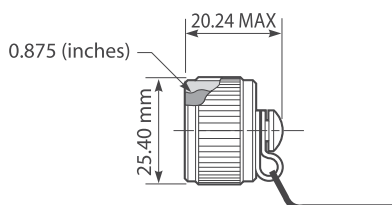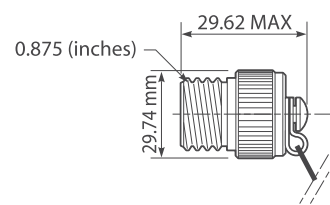
LC/LX5F

Transform your LC/LX5 patchcord into an Environmental Connector

The LC Field and LX5 Field offers an easy system to upgrade from a standard to an environmental LC or LX5.
• Sealed against fluids and dust (IP67)
• 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 or LX5 patchcord in a metallic plug which will protect it from shocks, dust and fluids. **No hazardous on-field cabling!**

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)

Applications
■ Railways
■ Base Station
■ Military communication
■ Navy

ROHS COMPLIANT
"N": nickel plating

Part Number Code

Serie	XXXX TV	XX	X	X	X
Optical connector type					
LCF: LC Field TV					
LX5F: LX5 Field TV					

Shell Type	
6M:	Plug with metal backshell and metal PG clamp
2:	Square flange receptacle without backshell
7:	Jam nut receptacle without backshell

Cable Type	
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
0:	Receptacle without backshell
T:	Flat duplex cable + Duplex zipcord for 1,6 mm - 2 mm - 2,8 mm

Shell Finish	
N:	Nickel plated
G:	Olive drab cadmium plated
B:	Bronze
D:	Black zinc cobalt
Z:	Olive drab zinc cobalt

Polarization	
N:	Normal
A / B / C / D / E	

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

■ **Requested information to order LC/LX5 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
LX5TV MO TOOL: LC FIELD Mounting tools

Dismounting Tools:
LCFTV DM TOOL: LC FIELD Dismounting tools
LX5TV DM TOOL: LC FIELD Dismounting tools
(To dismount the LC or LX5 you need to use both dismounting and mounting tools)

Line drawings *(Dimensions in mm)*
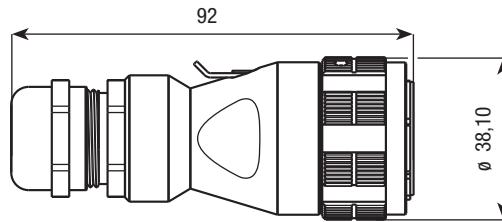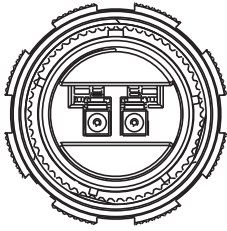
■ Plug (MIL DTL 38 999 series III Size 19)

92

ø 38,10

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

22,99 +0,15 -0
20,83 +0 -0,13
11,91 max
M28x1-6g
3,89 max

36,53 +0,25 -0,25
2 PLACES
29,36 +0,25 -0,25
2 PLACES
26,97
2 PLACES
3,25 +0,20 -0,13
0,13 (M)
4 PLACES
4,93 +0,25 -0,13

PANEL DRILLING

Square flange receptacle rear panel mounting

29,36
26,97
4xø3,25 +0 -0,25
ø 32,94
40,50min

Square flange receptacle front panel mounting

29,36
26,97
4xø 3,25 +0 -0,25
ø 29,98
40,50min

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

PANEL THICKNESS
1,57 MIN 3,18 MAX
9,37 MAX
33,86 +0 -0,025
2,31 MAX
22,30

49,50max
35,15 +0,025 -0
39,67 +0,043 -0,041
46,02 +0,25 -0,25

ø 35,16
33,86 +0 -0,25
47,00min
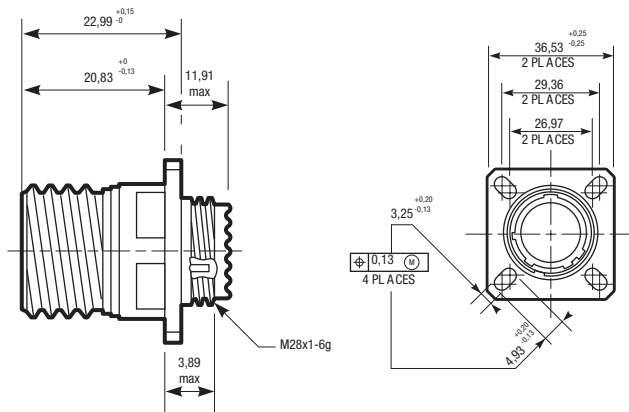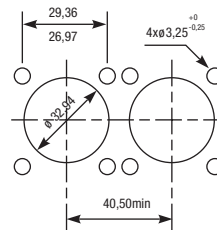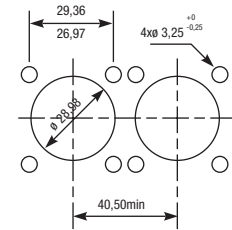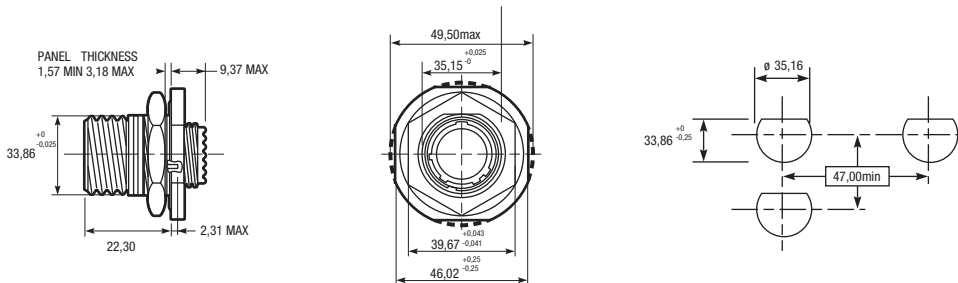
PANEL DRILLING
Jam nut receptacle
rear panel mounting

Protective caps

20,24 MAX
25,40 mm

Protective cap for plug (nylon cord)

29,62 MAX
1,25 (inches)
39,19 mm

Protective cap for receptacles (nylon cord)

RJ Switch

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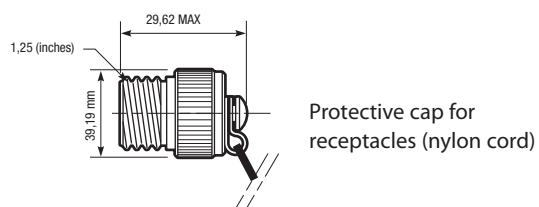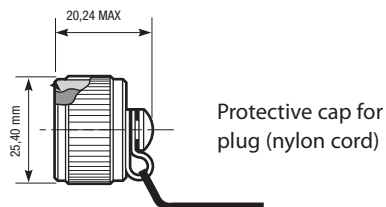
INDUSTRIAL RUGGED ETHERNET SWITCH
Amphenol offers a full range of Rugged Ethernet switches for industrial use. These switches are specifically designed for industrial applications where Real-Time is a key requirement. The wide range, from unmanaged Plug & Play switches to those managed with fiber optics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

This wide range of Ethernet switches is available with following features:
- Unmanaged, Real-Time Ring and Managed models
- RJ45 ports and up to two fiber optics ports (mutlimode or singlemode)
- 5 or 9 port models

KEY FEATURES
- Redundant power inputs with surge/spike protection
- Ultra reliable 1,000,000 hours MTBF
- Hazardous location: operation in Zone 2
- Wide operating temperature range of –40°C to 70/85°C
- Rugged metal packaging with DIN rail or direct panel mounting
- Auto-detecting, auto-crossover and auto-polarity
- Full-Duplex operation with flow control (no collisions!)
- Ring Switch Networking Features
    - Real-Time Ring for ultra-fast fault-tolerant loops
    - Recovery time of 30 ms + 5 ms per hop!
    - Ideal for deterministic systems and PLCs
    - Real-time traffic prioritization
    - Port mirroring for traffic diagnostic

- Managed Switch Networking Features
    - Rapid Spanning Tree (RSTP) for fast redundant rings
    - Priority queuing for real-time performance (QoS and CoS)
    - SNMP v1 and v2 for network management
    - SNMPv3 for authentication and encryption
    - IGMP for multicast filtering
    - VLAN for traffic segregation
    - User friendly configuration (web, Telnet, RS232)
    - Encryption using HTTPS, SSL, SSH, SNMPv3
    - Message filtering to stop broadcast storms
    - RMON and port mirroring for diagnostics
    - The Power of Linux Inside

DESCRIPTION

SC or ST fiber connector (1, 2 or none)

DIN-Rail or Panel Mounting Fixture

5 or 9 connectors (RJ45, SC or ST fiber)

Unmanaged, Ring or Managed Capability

Indicators for Power, Alarm Output Status

Indicators for Link Status and Datarate
- 10 Mbps
- 100 Mbps

Terminal block for Redundant Power Inputs + Alarm Output

IP30 Iridized Aluminum Enclosure
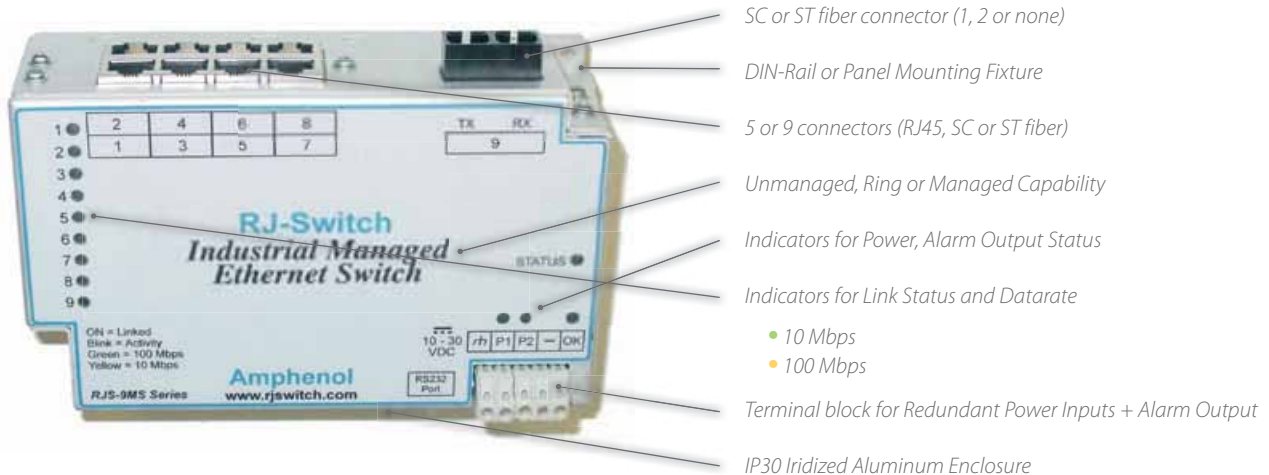
MANAGED, RING & UNMANAGED SWITCH FEATURES

IEEE Ethernet Standards

IEEE 802.3 /u	10 Mbps Ethernet and 100 Mbps Fast Ethernet
IEEE 802.3x	Full-Duplex with Flow Control
IEEE 802.1p	Priority Queuing – QoS, CoS, ToS/DS *(Ring and managed models)*
IEEE 802.1D/w	Rapid Spanning Tree for redundant rings and Spanning Tree for interoperability *(managed models)*
IEEE 802.1Q	VLAN for traffic segregation *(managed models)*

Regulatory Approvals

EMI emissions	EN55022, FCC part 15, ICES-003
EMC immunity	IEC61326-1, IEEE C37.90
Shocks	IEC60068-2-27
Vibrations	IEC60068-2-6
Free Fall	IEC60068-2-32
Hazardous Location	UL1604, CSA C22.2/213 *(Class 1, Div. 2)*, EN50021/Zone 2

Ethernet features

RJ45 ports	5 or 9 Shielded RJ45 ports 10/100BaseTX
Fiber optic ports	SC or ST connectors
	Datarate 100BaseFX *(100Mbps)*
	Wavelength 1300 nm center
	Fiber multimode (mm) optimal: 62.5/125 um
	Fiber singlemode (sm) optimal: 9/125 um
	Fiber max distance *(Full duplex)*: 2km *(mm)*, 15 or 40 km *(sm)*
Ethernet switch type	Intelligent store & forward
Full / Half Duplex	Configurable
RJ45 speed	10 or 100 Mbps auto-negotiation
RJ45 MDI/MDIX	Auto-crossover connection
RJ45 TD and RD polarity	Auto-polarity
Typical latency	16 us + frame time @ 10 Mbps *(varies on load and settings)*
	5 us + frame time @ 100 Mbps
MAC addresses supported	2048
Memory bandwidth	3.2 Gbps

Environmental

Operating Temperature	- 40°C to +85°C
(- 40°C to +70°C for RJS-9MS models)	
Storage Temperature	- 40°C to +85°C
Humidity (non-condensing)	5 to 95 % RH

Status *RS and MS models only*

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

EXCEEDS MIL-STD-1275

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

Power Supply

Input Power *(depends on models)*	4 W - typical,
ALL PORTS ACTIVE AT 100 MBPS	
Redundant Inputs	10 - 50V DC *(models RJS-5RS ; RJS-9RS)*
	10 - 30V DC *(all other models)*

DIMENSIONS *(EXAMPLE FOR 5 PORT RING MODELS)*
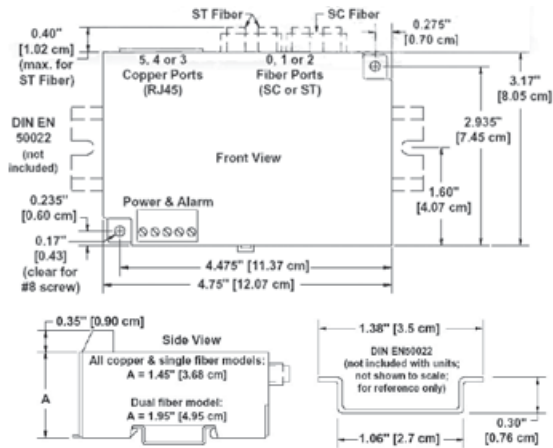
POWER AND ALARM WIRING
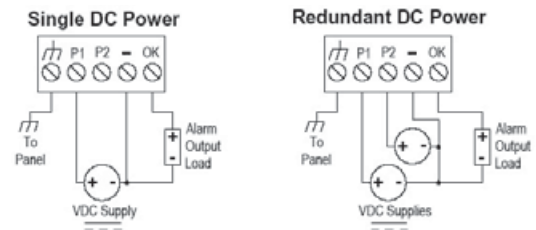
Part Number Code

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

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

A COMPLETE RANGE OF IP67 SEALED INDUSTRIAL ETHERNET SWITCHES

Amphenol offers the widest range of IP67 sealed Industrial Ethernet switches for very harsh environments. The Ethernet interfaces are waterproof & rugged RJ45 connectors from the RJ FIELD series *(www.rjfield.com)*. For any other product such as RJ45/fiber optics converter, please do not hesitate to consult us.

CONSULT OUR DEDICATED
WEBSITE FOR MORE INFORMATION:

RJS-PC5 SERIES
• 5 ports IP67 RJ45 connectors
• Polyester enclosure
• Ring or unmanaged models

RJS-AL SERIES
• 8 ports IP67 RJ45 connectors
• Aluminum enclosure
• Managed or unmanaged models

RJS-PC SERIES
• 8 ports IP67 RJ45 connectors
• Polyester enclosure
• Managed or unmanaged models

RJ Switch

ROHS COMPLIANT

Harsh Environment Industrial Ethernet Switch
Plastic Enclosure - IP67
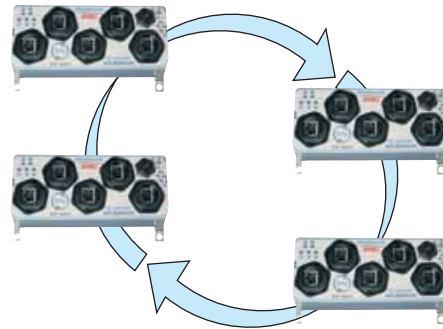
Rugged & Waterproof Switch

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

Amphenol IP67 Industrial Ring Switch

Amphenol IP67 Ring Ethernet switch is a combination of very fast, fault-tolerant network redundancy Sixnet technology and IP67 sealed & rugged packaging, specifically designed for the harshest environments.
Rings self-configure and just run, without any complex configuration.
The switch board is sealed within a waterproof IP67 polyester enclosure suitable for highly corrosive environments. The polyester material is glass fiber reinforced. This makes it very rugged against shocks and vibration.
The I/O interfaces are waterproof & rugged RJ45 connectors from the RJ FIELD plastic circular series.

Key Features
- Waterproof IP67 Rating (NEMA 6)
- Reduced Installation Costs with the patented RJStop® system
- Use any standard RJ45 cordset
- Rugged Enclosure in Polyester reinforced with 30% glass fiber
- Redundant power inputs with surge/spike protection
- Ultra reliable 1,000,000 hours Mean Time Between Failure (MTBF)
- Zone 2 hazardous location
- Ring Switch Networking Features (managed features available!)
  - Real-Time Ring for ultra-fast fault-tolerant loops
    - Recovery time of 30 ms + 5 ms per hop!
  - Modbus monitoring over Ethernet
    - Ideal for deterministic systems and PLCs
  - Real-time traffic prioritization (QoS and CoS)
    - Assure delivery of real-time data
    - Improve network utilization
    - User settable priority assignments
  - Advanced switch features
    - User configurable port settings
    - Port mirroring for traffic diagnostics
    - Pre-configurable for Plug-And-Play simplicity

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

47

IP67 Unmanaged and Ring Switch Features

IEEE Ethernet Standards

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

Regulatory Approvals

EMI emissions	EN55022, FCC part 15, ICES-003
EMC immunity:	IEC61326-1, IEEE C37.90
Shocks:	IEC60068-2-27
Vibrations:	IEC60068-2-6
Free Fall:	IEC60068-2-32
Hazardous Location:	UL1604, CSA C22.2/213 (Class 1, Div. 2), EN50021/Zone 2

Ethernet features

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

Power Supply

Input power (typical)	ES: 2,4 W ; RS: 2,7 W

Status Reporting (for Ring model only)

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

Environmental

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

Weight

	0.54 kg

Real-Time Ring Switches

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

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

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

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

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

Description *(example for Ring model)*

LEDs indicating Activity, Link Status, Datarate (10/100Mbps)

Redundant Power Inputs

OK contact Output

LEDs indicating Power

OK Power & Ring status

LED indicating Ring Status

5 Rugged IP67 RJ Field Ethernet Ports

Real-Time Ring feature

IP67 Polyester Enclosure Reinforced with Glass Fiber

Dimensions *(mm/inch)*

ϕ6,75 [0,266]

95,15 [3,746]

175,6 [6,913]

61,94 [2,438]

ϕ32 [1,260]
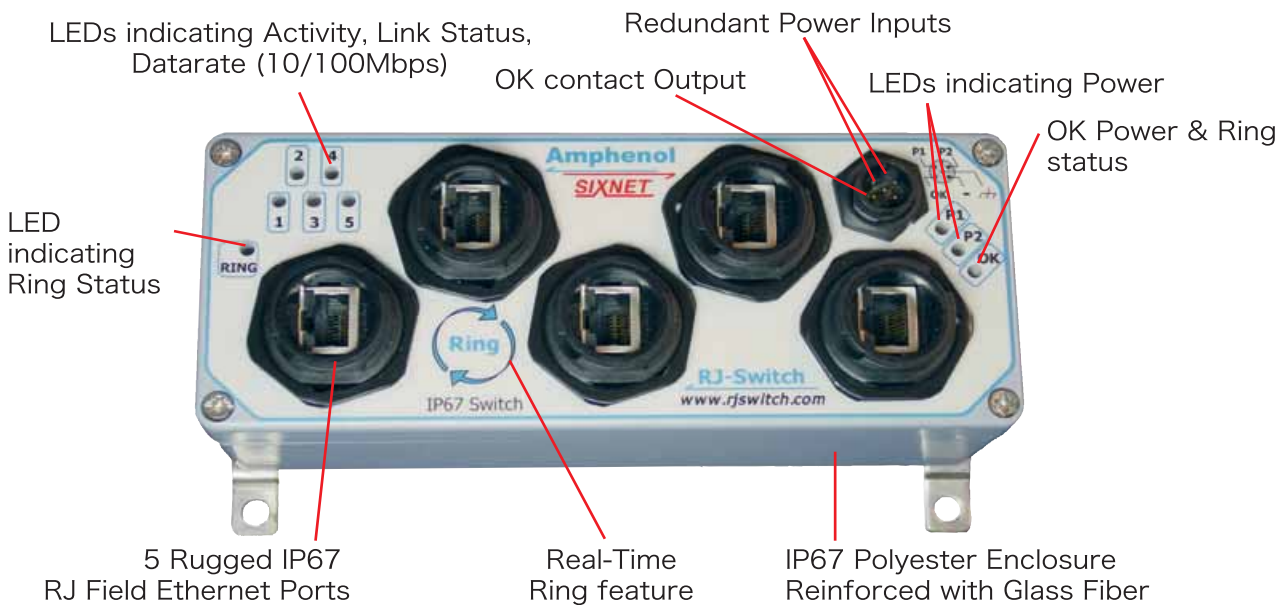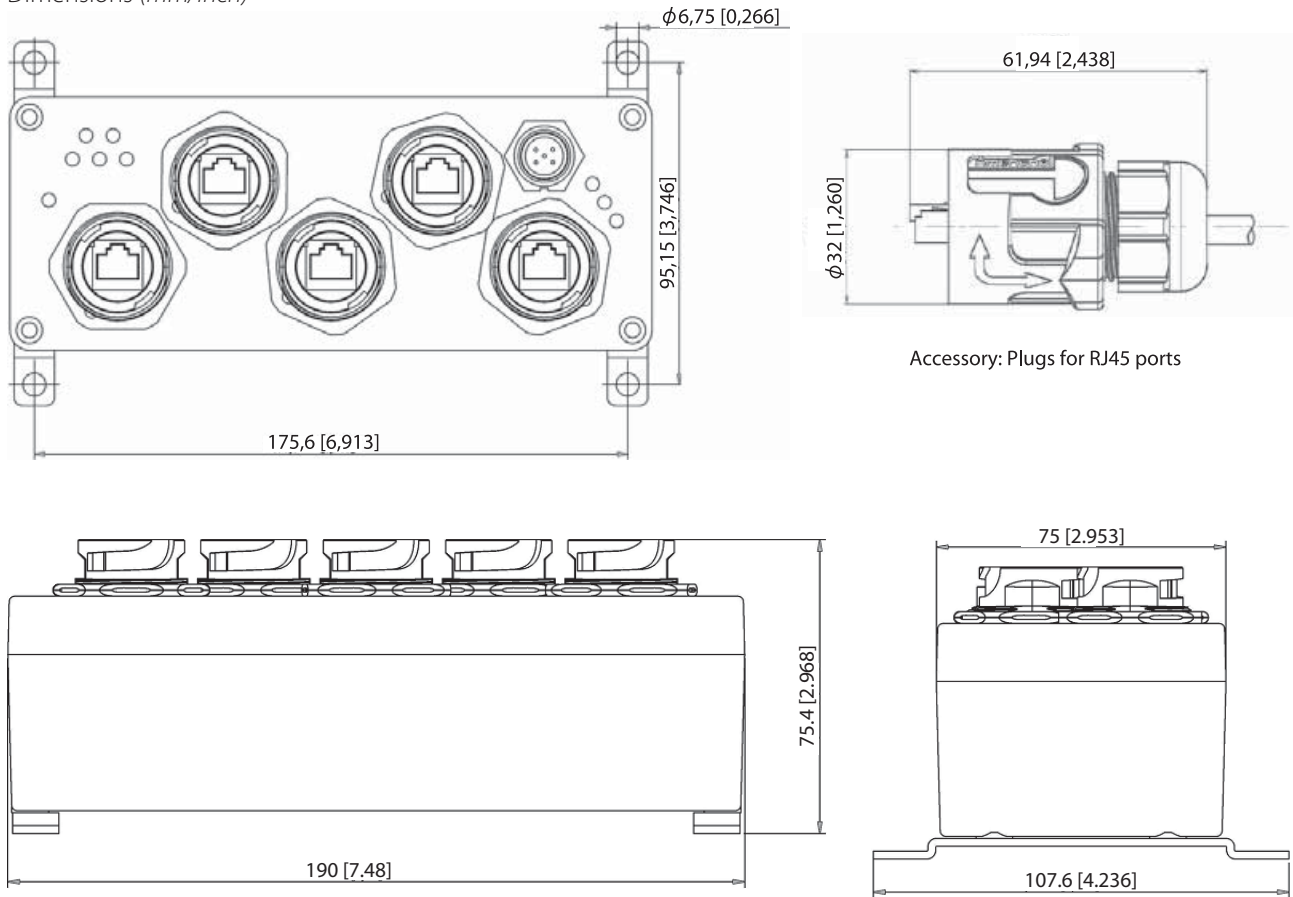
Accessory: Plugs for RJ45 ports

75 [2.953]

75.4 [2.968]

190 [7.48]

107.6 [4.236]

Part Numbers

Series		RJS-PC	5ES	1
IP67 RJ-Switch, with polyester body				
Type of Electronics				
5RS:	5 ports 10/100 Mbps, Ring switch (standard order)			
5ES:	5 ports 10/100 Mbps, Unmanaged switch (special order)			
Connectors				
1:	RJ45 ports, 10/100BaseT(X)			
1CAPS:	Caps are attached on both power and data receptacles			
Military Rated Protection				
Blank:	Industrial protection (standard order)			
EP:	Extended power protection exceeds MIL-STD-1275 (special order)			

Example   IP67 Ethernet Ring switch, 5 ports 10/ 100 Mbps, with caps attached on the receptacles: RJS-PC-5RS-1CAPS

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

Accessories

■ P/N: RJF PC5 PWR
Plug for power port
Sealing protection: IP67

■ P/N: RJF RB 6
Plugs for RJ45 ports
Sealing protection: IP67

FREE WINDOWS
Configuration tool
Download it at
www.rjswitch.com

RJ Switch

Harsh Environment Gigabit Military Ethernet Switches
Sealed and Rugged Military Ethernet Switches

LEDs indicating Power

Leds indicating Activity, Link Status, Datarate (10/100Mbps or Gigabits)

Redundant Power Inputs

Balance pressure vent

Fixture for Vertical Mounting

Non-managed, Ring or Managed Capability

IP67 Aluminum Enclosure with Conductive Plating

9 Rugged IP67 RJF TV Ethernet Ports

Optional Caps Available for Unused Ports

Sealed, Rugged & Waterproof Switch

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

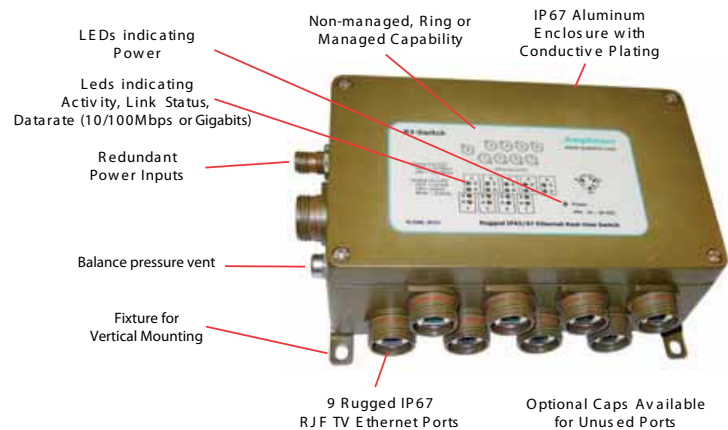This is an easy way to make the Ethernet networks of your systems deterministic. Up to 3 gigabit ports are offered! The switch electronics are sealed within a waterproof IP67 metallic enclosure. The conductive cadmium plating is suitable for most demanding EMI-RFI environments. The I/O interface includes redundant power inputs as well as waterproof rugged RJ45 connectors from the RJF TV FIELD threaded product series based on MIL-DTL-38999 (Series III) metallic shell size 19. This serie enables the transformation without tooling of any standard RJ45 cordset into a robust and waterproof connection system.

Key Features

Rugged environmental features
- Rugged metal packaging with cadmium olive drab protection
- **MIL-DTL-38999 III** connectors for both power and Ethernet ports
- **IP65/IP67** rated
- **MIL-STD-1275** Surge and Spike protection (*)
- **MIL-STD-810F** shocks
- Wide operating temperature range of **–40°C to 70°C**
- Altitude 3000m height ; transportation 10000m height

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

Applications

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

Features for ring and managed models.

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

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

(*): depends on models

Managed & Unmanaged Switch Features

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

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

Regulatory Approvals

EMI emissions   EN55022 class A, FCC part 15, ICES-003
EMC immunity   IEC61326-1, IEEE C37.90
Shocks: MIL-STD-810F: 40g, 11ms, 18 saw tooth shocks

Power Supply

24V DC Input   10 - 30V DC for 9ES model (single power)
    10 - 50V DC redundant for 9RS models
    10 - 30V DC redundant for 9RG, 9MS and 9MG models
Input power   4 to 9 W typical (all ports active), depends on models
Connectors for power   MIL-DTL-38999 III Jam nut receptacle, olive drab cadmium plated
    9ES models: 1 connector TV07RW 0998P: 3 cts # 20 (wire 0.6 mm² maxi)
    Other models: 2 connectors TV07RW0935P: 6 cts # 22D (wire 0.4 mm² maxi)
    The second connector facilitates the cabling for redundant power.

Ethernet features

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

Temperature

Operating Temperature   - 40°C to +70°C
Storage Temperature   - 40°C to +85°C

Status (Ring models)

"OK" contact output   Sourcing power
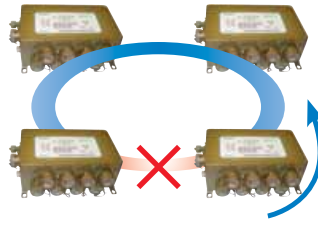Maximum current   0.5 A

Weight

    approx 2.2Kg

EXCEEDS MIL-STD-1275

Power ratings protection	Industrial specifications 9ES1; 9MS1; 9RG1; 9MG1	MIL-STD-1275 Specifications RJS-ML-9RS1
Surge		100 V for 1s
Transient	15 KW peaks	15 KW peaks
Spike	5 KW (10x for 10 µs)	5 KW (10x for 10 µs) 250 V (50x for 100 µs)

Real-Time Ring Switches

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

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

The use of such switches provides a fast network and avoids faults. When a break occurs, the switch instantly transfers data to new path. The link loss recovery is 30 ms plus 5 ms times the number of Ring switches in the ring. For example, 10 ring switches will recover in less than 80 ms. Rings can be pre-configured to "just run". They don't need an assigned IP address. But if you like, you can fine tune the performance of the ring by using a simple Windows wizard (which is free).
Ring networks can be divided into multiple "sub-rings" which enhance reliability and recovery speed through the small ring paths.
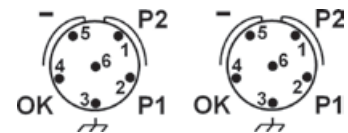
Dimensions (mm/inch) *Military Aluminum ML Enclosure*
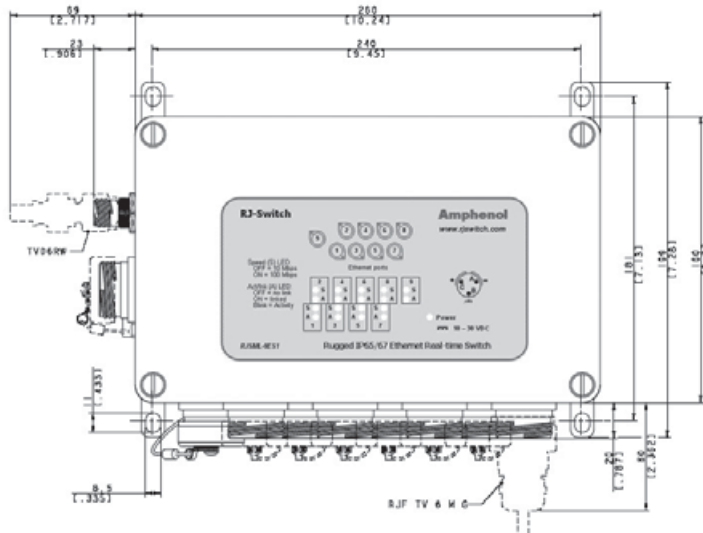
Pin-out for power
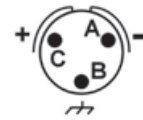
Pin-out for the 9ES1 models

Pin-out for the 2 power connectors of the Ring and managed models
Note: The use of 2 connectors facilitates the cabling of redundant power inputs.

Part Numbers

Series		RJS	ML	9ES1	-
RJ-Switch					
Type of Enclosure					
ML:	Aluminum, OD Green Cadmium Plating & MIL-DTL-38999 (Series III) Receptacles				
Type of Electronics					
9ES1:	Unmanaged 9 ports 10/100 Base T(X)				
9RS1:	Unmanaged RING 9 ports 10/100 Base T(X)				
9RG1:	Unmanaged RING 6 ports 10/100 Base T(X) + 3 ports 10/100/1000 Base T(X)				
9MS1:	Managed 9 ports 10/100 Base T(X)				
9MG1:	Managed 6 ports 10/100 Base T(X) + 3 ports 10/100/1000 Base T(X)				
Accessories:	Caps for receptacles fixed with string directly to the receptacle				
Blank:	No caps included. Note: Without caps, the Ethernet ports are still sealed but the contacts are not protected				
Caps:	Attached caps for both power and data included				

Example: Unmanaged RING switch in an aluminum enclosure with olive drab green conductive cadmium plating, 9 ports 10/100 Base T(X) & RJF TV threaded coupling receptacles & caps added to the switch: **RJS ML 9RS1 CAPS**

Accessories

■ **Plugs for Ethernet ports RJF TV 6 M G**
Based on MIL-DTL-38999
No tool required!

■ **Plugs for I/O ports:**
MIL-DTL-38999, cadmium plated, crimp contacts.

For 9ES1 model
One plug TV 06 RW 0998 S (3 cts #20)
For 9RS1, 9RG1, 9MS1 and 9MG1 models
Two plugs TV 06 RW 0935 S (6 cts # 22D)

Backshells for I/O plugs
We suggest to use MIL-DTL-38999 III backshells.
Consult the dedicated catalog.
Example:
TVNSA 09 014 shielding backshell
+ 804221 straight heat shrink for sealing

■ **Caps for Ethernet ports RJSML C7G**
A simple screwdriver is needed!
Note: Do not order the caps in addition with pre-equipped - CAPS switches.

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USBBF TV *(USB-B type)*

USB Connection System for Harsh Environment

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

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 (IP67)
- 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
- USBF TV plug retention in the receptacle: 100 N in the axis
- Mating cycles: 500 to 1500

Environmental Protection
- Sealing (when mated): IP67 (Temporary immersion)
- Salt Spray: 48 h with Nickel plating
  > 500 h with Olive Drab Cadmium
  1000 h with marine bronze shell
- Fire Retardant / Low Smoke: UL94 V0 and NF F 16 101 & 16 102
- Vibrations: 10 – 500 Hz, 10 g, 3 axes: no discontinuity > 1micro s
- Shocks: IK06: weight of 250 g drop from 40 cm [15.75 in] onto connectors (mated pair)
- Humidity: 21 days, 43°C, 98% humidity
- Temperature Range: - 55°C / +85°C

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

AVAILABLE FEBRUARY 2008

RJF RB (RJ FAST) CONCEPT

NEW CAT6

With RJF RB, RJ STOP is directly molded into the shell

www.rjfield.com

RJFast is the only system on the market capable of converting a standard RJ-45 cable into a category 6 Ethernet connector compatible with industrial environments (including IP67) in a few seconds, without tedious, long and costly crimping.

No Tool

No Cabling

NOTES

RJ FIELD GLOSSARY

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

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

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

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

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

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

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

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

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

Category 5
A performance classification for twisted pair cables, connectors and systems. Specified to 100 MHz. Suitable for voice and data applications up to 155 Mbps.

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

Category 6
A performance classification for twisted pair cables, connectors and systems. Specified up to 250 MHz.

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

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

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

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

IEEE 802.3
IEEE Working Group for CSMA/CD, the protocol used in Ethernet transmissions.

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

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

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

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

Megabyte (MB)
MegaByte. A unit of data storage size which represents one million characters of information.

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

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

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

RJ45
8-position modular jacks used on twisted pair links for Ethernet cabling.

RJ-Field
A wide range of connectors which allow to reinforce and seal standard RJ45 cable. See www.rjfield.com

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

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

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

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

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

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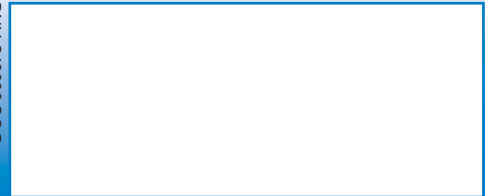
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