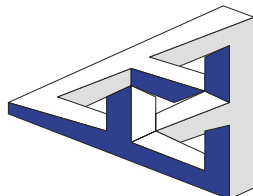




## **Armored Fiber Optic Patch Cord for Emergency & Mobile Emergency Repair Equipment**



**ENSE** - European Network Systems Engineering

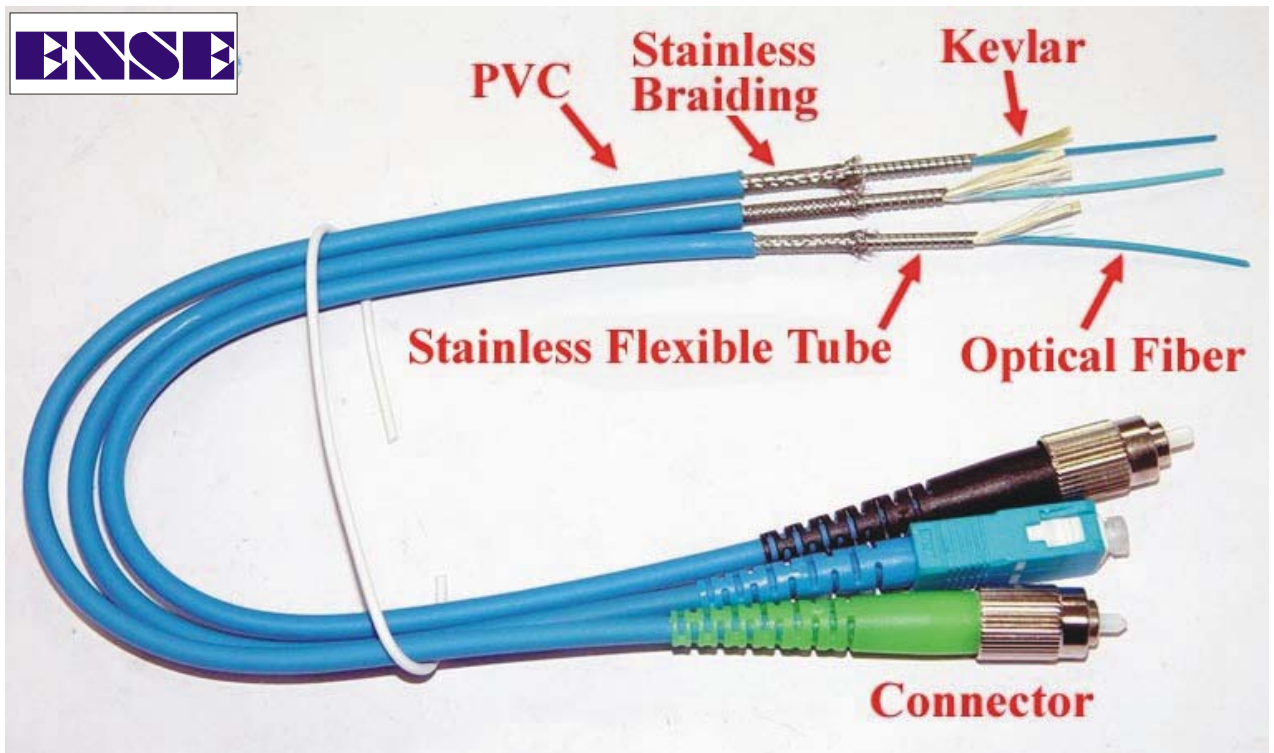
# Introduction

Armored Fiber Optic Patch Cord is to make the fiber optic patch cord being electric-cable-like handling and easy to install. Its engineering design is different from the traditionalistic product for the characteristics that it has developed with a micro diameter armored flexible tube in stainless steel in order to prevent optical fiber from easy-destroyed and broken and it is covered with flame-resistance PVC. In order to ensure the firmly conjunction, we also offer relative strong type connector. This unique design can make the construction process more convenient, reduce the loss and extend the fiber's life.

The difference between armored fiber optic patch cord and traditionalistic fiber optic patch cord is that we use Kevlar + flexible stainless steel tubing + stainless braiding with flame-resistance PVC to substitute Kevlar and PVC jacket of traditionalistic fiber optic patch cord.

The optical performance of these two patch cords are the same, yet, the mechanical properties of armored fiber optic patch cord are much better than traditionalistic fiber optic patch cord.

# Construction



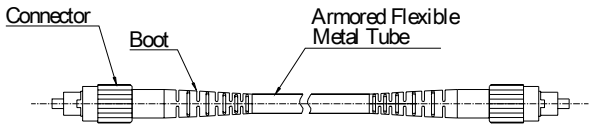
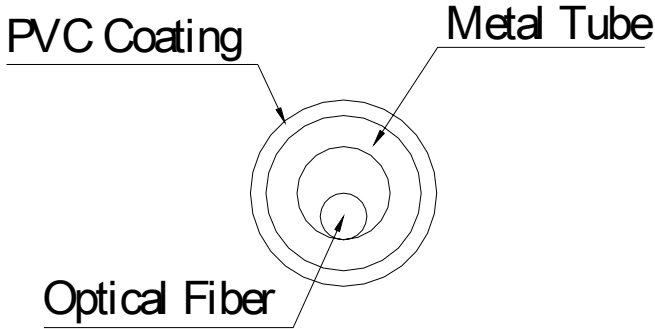
# Armored Fiber Optic Patch Cord for Emergency



## Foldable Trolley Design

- Easy to Pull
- Easy to Move
- Easy to Rest

# Specification – Table No. 1

Type		Structure		
				
<b>Cable</b>	<b>Armored Flexible Tube</b>	<b>Fiber Type</b>	SM 9/125 0.9mm PVC Fiber	
		<b>Number of Optical Fibers</b>	1	
		<b>Tube Material</b>	Stainless	
		<b>Inner Diameter</b>	1.5mm±0.2mm	
		<b>Outer Diameter</b>	2.8mm±0.2mm	
		<b>Weight</b>	22 g/m approx.	
		<b>Tensile Strength</b>	147N ( 15kgf ) below	
		<b>Minimum Bending Radius *1</b>	40mm±5mm above	
	<b>Coating</b>	<b>Material</b>	2450 ( 250kgf ) / 50mm below Flame-resistance PVC	
		<b>Outer Diameter</b>	3.3mm±0.2mm	
<b>Connector</b>	<b>X, Y, Z Dimension</b>		46 mm X 10mm X 10mm	
	<b>Material</b>		Connector : Boot: Plastic Ferrule: Ceramic	
	<b>Weight</b>		9g/pcs	
	<b>Tensile Strength</b>	X direction	147N ( 15kgf ) below	
		Y direction	98N ( 10kgf ) below	
		Z direction	98N ( 10kgf ) below	
	<b>Insertion loss</b>		0.20 dB below	
	<b>Return loss</b>		55 dB below	
	<b>Repeatability</b>		0.2db below	
	<b>Interchangeability</b>		0.2db below	
<b>Temperature Range</b>		-40 ~85		
Note: *1. It means the bending radius of armored flexible metal tube.				

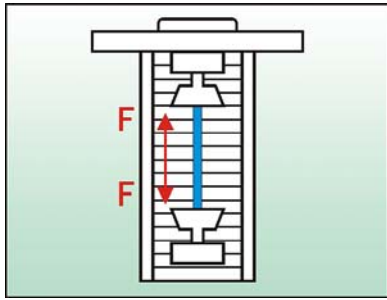
## Specification – Table No. 2

Type	Single Mode	Multi Mode
Number of Optic Fibers	2,4,6 or 12	2,4,6 or 12
Connector Type	FC / SC / ST / LC / MTRJ	FC / SC / ST / LC / MTRJ
Dimensions for Single Piece (mm)	300(L) x 285(W) x 530(H)	300(L) x 285(W) x 530(H)
Aluminum Case Dimensions (mm)	350(L) x 320(W) x 560(H)	350(L) x 320(W) x 560(H)
Insertion Loss	≤0.2dB	≤0.3dB
Return Loss	* as table No. 3	—
Repeatability	≤0.1dB	≤0.1dB
Ambient Temperature	- 40° ~ + 85°	- 40° ~ + 85°
Outer Diameter	3.3mm ± 0.2mm	
Length	30 meters / 60 meters / 120 meters	

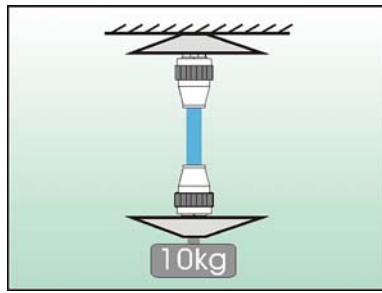
## Specification – Table No. 3

same data for Single Mode SC/FC/ST connector

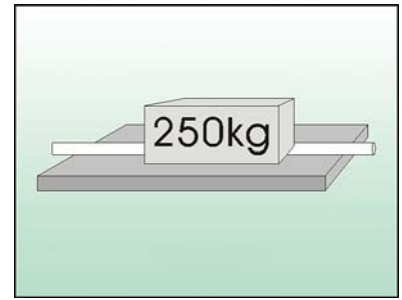
Connector Type	FC/PC	FC/SPC	FC/UPC	FC/APC
Insertion Loss	≤0.2dB	≤0.2dB	≤0.2dB	≤0.2dB
Return Loss	>45dB	>50dB	>55dB	>65dB
Repeatability	≤0.1dB	≤0.1dB	≤0.1dB	≤0.1dB
Ambient Temp.	- 40°~ + 85°	- 40° ~ + 85°	- 40° ~ + 85°	- 40° ~ + 85°



**Tensile Resistance**



**Straight Pull**



**Pressure Resistance**

### Data for Mechanical Test

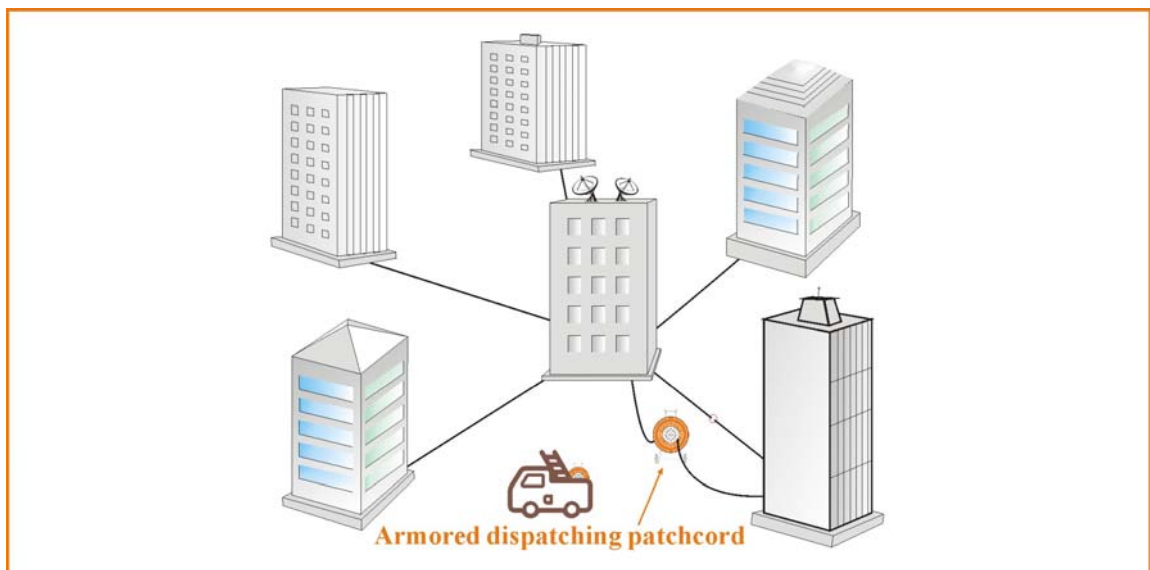
Category	Test Item	Condition	Pass / Fail Criteria
Mechanical Test	Vibration Test	10~55Hz/2hrs Amplitude 1.5mm Rate: 45Hz/min	$\Delta I.L. < 0.2db$ , R.L. > 40db
	Flex Test	Load: 2Kg Rotate $0^{\circ}, 90^{\circ}, 0^{\circ}, -90^{\circ}, 0^{\circ}$ 100 cycles	$\Delta I.L. < 0.2db$ .
	Twist Test	Load: 2kg 2.5 turns	$\Delta I.L. < 0.2db$
	Tensile Test	Straight Pull : 15kg (60sec)	$\Delta I.L. < 0.2db$
	Pressure Resistance Test	Adding weight until $\Delta I.L. > 0.2db$	$\Delta I.L. < 0.2db$

# Applications

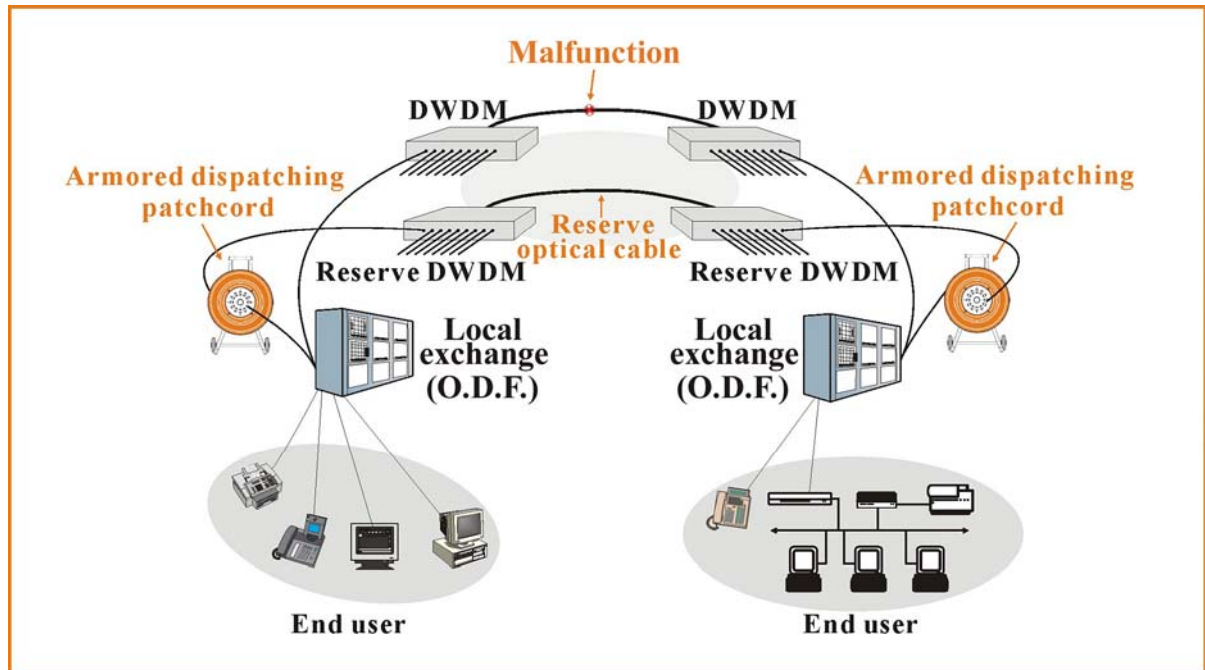
- Circuit Test
- Live Broadcasting
- Local Exchange (O.D.F.) Dispatch Engineering Overhaul



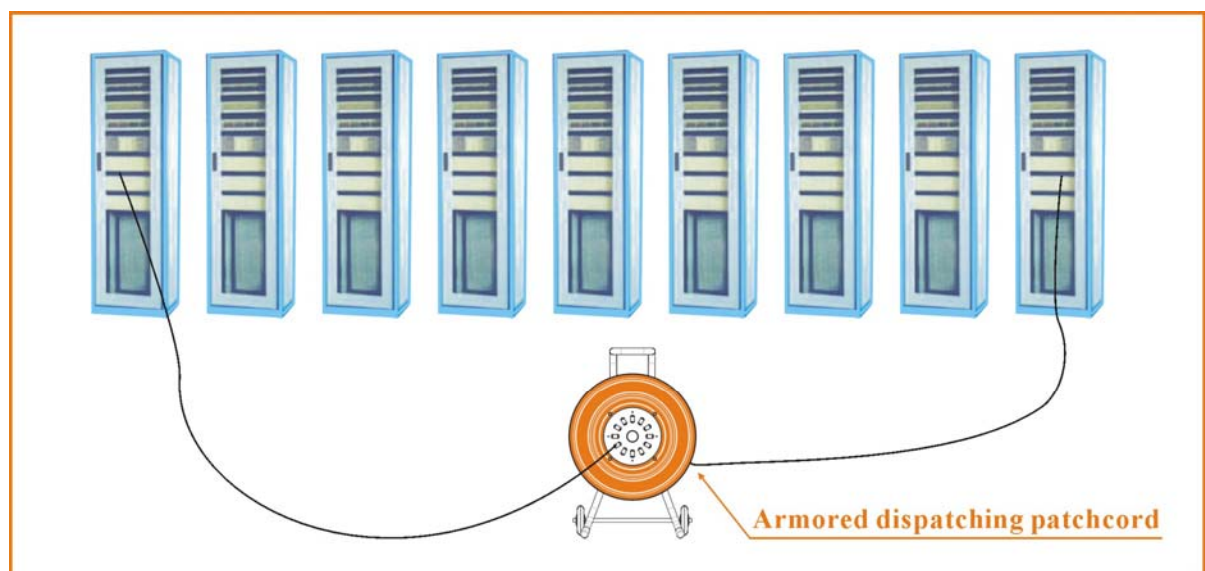
- As temporary connection when LAN interrupted or broken



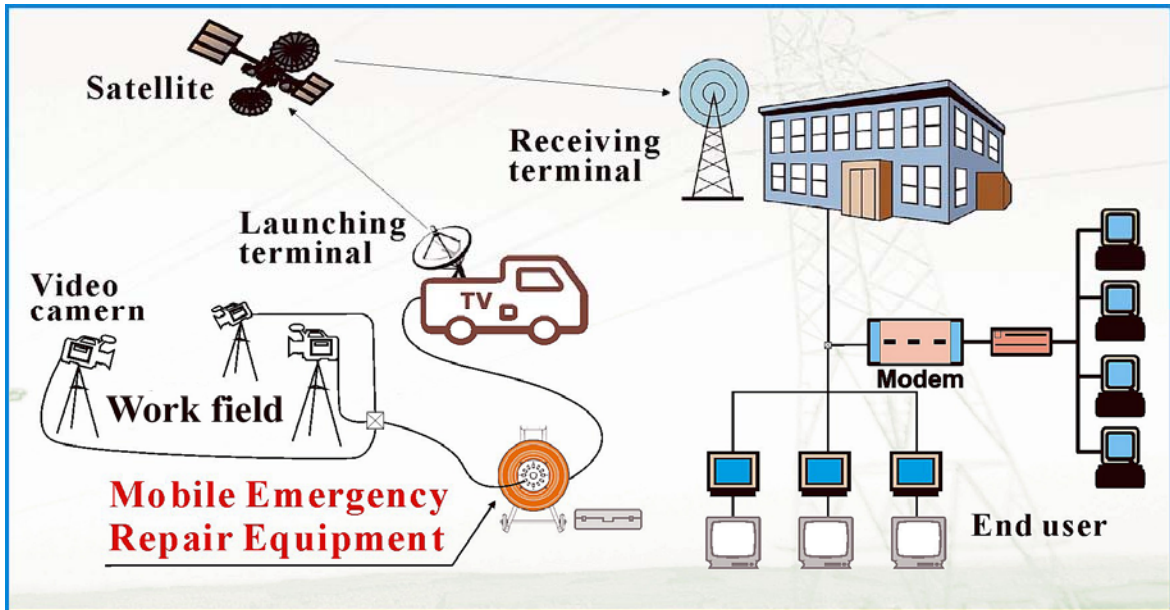
- As temporary connection when fiber optic cable is interrupted or broken



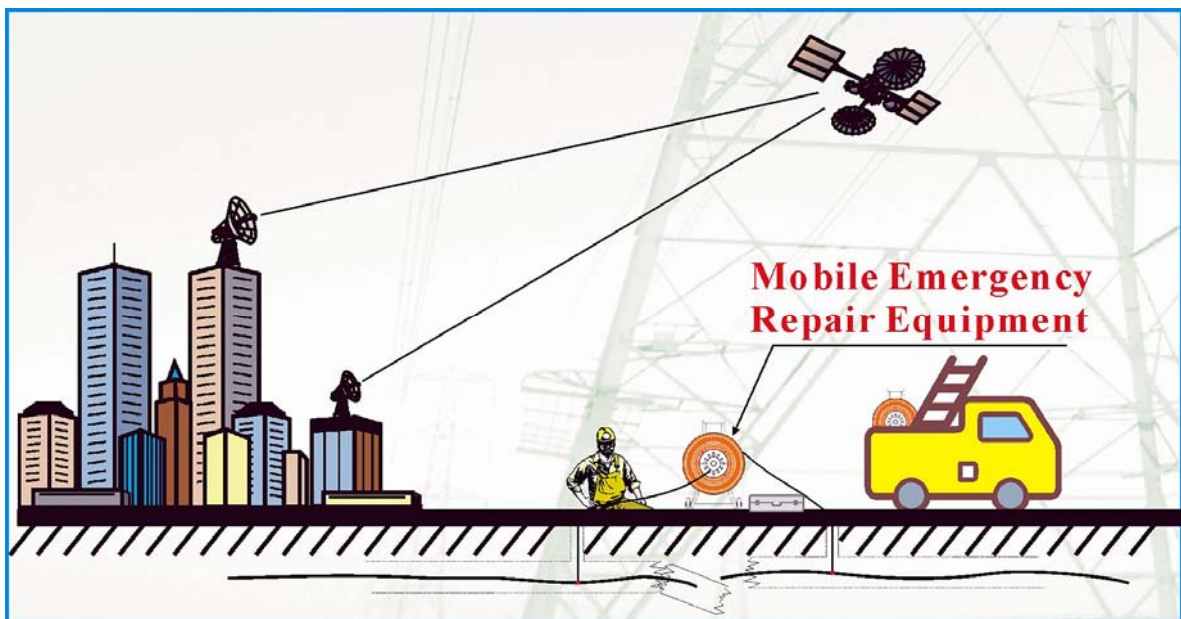
- As temporary connection of switches from two remote ends in the building



- As temporary connection for outdoor live broadcasting



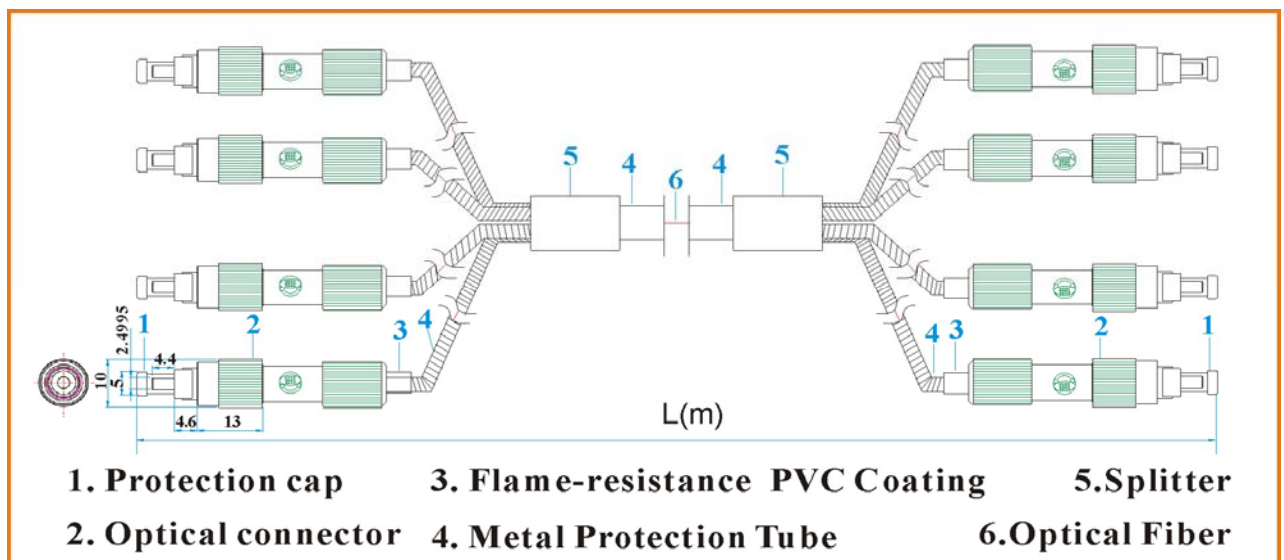
- Mobile Emergency Repair Equipment Option with Repair Kit



# Advantages

1. Taking Kevlar, Flexible Stainless Steel Tubing, Stainless Steel Braiding and PVC Covering as protection over optic fiber can be acting as a strong safeguard to resist:

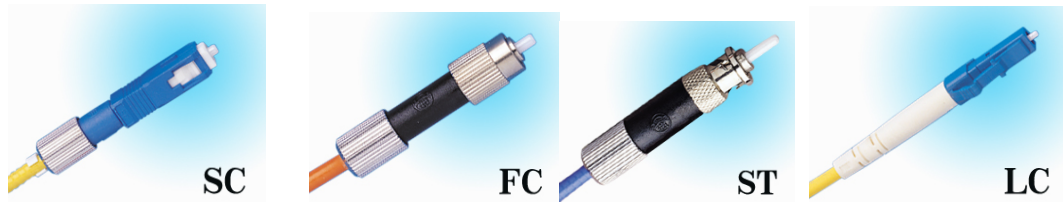
- high tensile strength
- high pressure
- twisting
- biting the cable by mice / rats



Many Styles of Connectors for Your Options

(1 to 1, 2 to 2, 4 to 4, 6 to 6 and 12 to 12)

## 2. SC, FC, ST and LC Connectors Are Available



## 3. Excellent Optical Characteristics: I L $\leq 0.2\text{dB}$ , R L $\geq 55\text{dB}$

## 4. Easy to identify with twelve (12) colors of PVC cover as yellow, black, white, green, blue, gray, red, orange, purple, dark blue, brown and pink.



## 5. QUICK connection to save your golden time. Easy to pull the patch cord outwards and backwards using the pool.

## 6. Foldable Trolley design makes the movement and rest easily.

## 7. Move freely by rolling the wheels.



**Aluminum Case Packing Enhancing the Safety during Transportation and Increasing its Value**



**Mobile Emergency Repair Equipment (Option with Repair Kit)**



## Testing Equipments

The optical characteristics of all pigtails/patch cords under test were measured using JDSU RM-3 Back reflection Meter (Made in Canada).

The other testing instruments including, Norland AC-3000 automated non-contact interferometric microscope (USA), GIANT FORCE programmable temperature and humidity control chamber (Taiwan), SHENKO ELECTRIC vibration shaker (Japan), mechanical tension tester (Made in Taiwan) and XYZ vibration shaker (Made in Taiwan) etc.

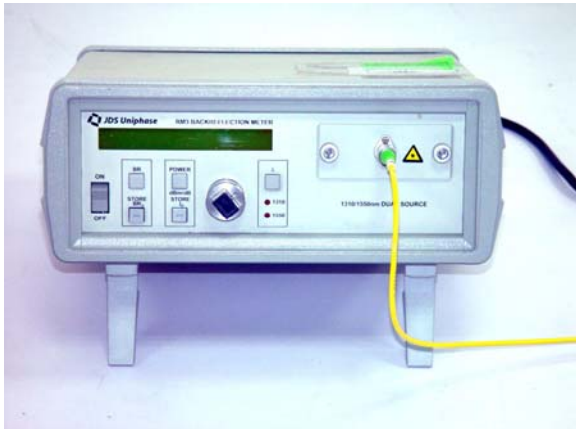
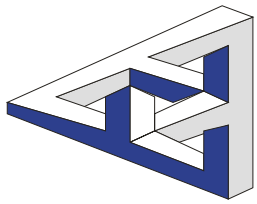


Fig. 1  
JDSU RM-3  
Backreflection Meter  
Made in Canada



Fig. 2  
Automated Interferometric  
Microscope  
Norland AC-3000  
Made in U.S.A.



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