

# Ultra Small Surface Mount Coaxial Connectors - 1.9mm or 2.3mm, 2.4mm Mated Height

## U.FL Series



Up to 6GHz

Mated height comparison (with E.FL series)

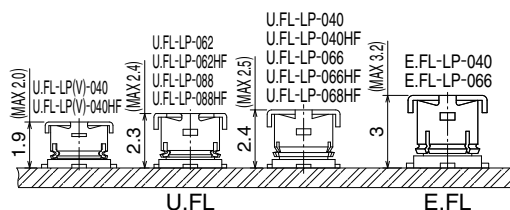


Fig.1

## ■Features

**1. Nominal mated height of 1.9 or 2.3mm, 2.4mm (Max. 2.0 or 2.4mm, 2.5mm)(Fig.1)**

**2. Small mounting area**

The receptacle occupies an area of 7.7mm<sup>2</sup>.

**3. Light weight**

Receptacle: 15.7mg

**4. Supports high frequency up to 6GHz**

To meet the frequency requirements of a wide variety of miniature devices, the connectors offer high frequency performance from DC to 6GHz, with a V.S.W.R. of 1.3 to 1.5 max.

**5. Automatic board placement**

Packaged on tape-and-reel the receptacles can be placed with vacuum nozzles of the automatic placement equipment.

**6. Plugs are terminated with ultra-fine coaxial (fluorinated resin insulated) cable**

Standard ultra-fine coaxial cable of 0.81mm diameter (single braid shielding) is used for the plug termination, assuring secure and stable connections.

**7. Simple connector mating / unmating**

Use of available extraction tool assures correct disconnection of the plug and receptacle.

**8. Verification of the fully mated condition**

Tactile click sensation confirms fully mated condition, assuring complete electrical and mechanical connection.

**9. Halogen-free\*(Receptacle,plug(HF type))**

\*As defined by IEC61249-2-21

Br-900 ppm maximum, Cl-900 ppm maximum, Cl+Br combined-1,500 ppm maximum

## ■Applications

Mobile phones, wireless communication devices, electronic measuring instruments, GPS, wireless LAN, Bluetooth and any application requiring high frequency transmission using small coaxial connectors.

## ●Space Factor of Mated Connector

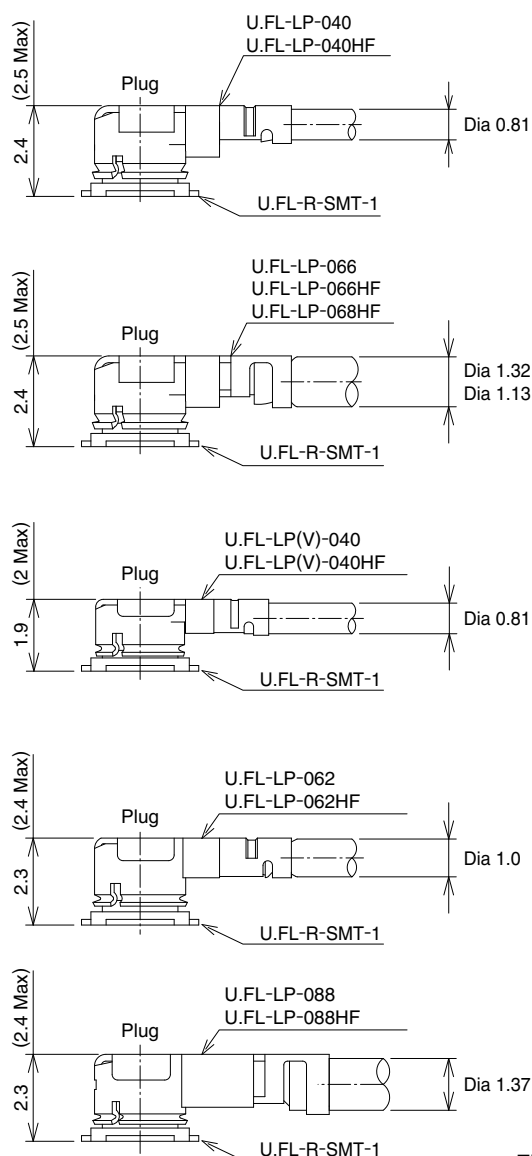


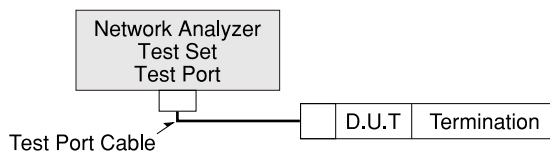
Fig.2

## Product Specifications

Ratings	Nominal characteristic impedance Frequency range	50 ohms DC to 6GHz	Operating temperature range Operating humidity	-40°C to +90°C 90%RH max.	Storage temperature range Storage humidity	-30°C to +70°C 90%RH max.
Item		Specification		Conditions		
1. Contact resistance		Center : 20 m ohms max. Outer : 10 m ohms max.		10 mA max.		
2. Insulation resistance		500 M ohms min.		100 V DC		
3. Withstanding voltage		No flashover or insulation breakdown.		200 V AC / 1 minute		
4. V.S.W.R.*	Part No.		Up to 3GHz		3 to 6GHz	
	U.FL-LP-040* dia.0.81mm Coaxial Cable Assembly		1.3 Max		1.35 Max	
	U.FL-LP(V)-040* dia.0.81mm Coaxial Cable Assembly		1.3 Max		1.3 Max	
	U.FL-LP-068* dia.1.13mm Coaxial Cable Assembly		1.3 Max		1.4 Max	
	U.FL-LP-066* dia.1.32mm Coaxial Cable Assembly		1.3 Max		1.5 Max	
	U.FL-LP-062* dia.1mm Coaxial Cable Assembly		1.3 Max		1.3 Max	
	U.FL-LP-088* dia.1.37mm Coaxial Cable Assembly		1.3 Max		1.4 Max	
5. Durability (mating / un-mating, with corresponding plug)		Contact resistance Center : 25 m ohms max. Outer : 15 m ohms max.		30 cycles		
6. Vibration		No electrical discontinuity of 1μs min. No damage, cracks or parts dislocation.		Frequency: 10 to 100 Hz, single amplitude of 1.5mm, acceleration of 59m/s², for 5 cycles in the direction of each of the 3 axis.		
7. Shock				Acceleration of 735 m/s², 11ms duration, sine half- wave waveform, 3 cycles in each of 3 axes.		
8. Humidity (Steady state)		No damage, cracks or parts dislocation. Insulation resistance 10 M ohms min.(humidity high) Insulation resistance 500 M ohms min.(dry)		96 hours at temperature of 40°C and humidity of 95%.		
9. Temperature cycle		No damage, cracks or parts dislocation. Contact resistance: 25 m ohms max. (Center) 15 m ohms max. (Outer)		Temperature: -40°C→+5 to +35°C→+90°C→+5 to +35°C Time: 30min. → 3min. → 30min. → 3min. 5 cycles		
10. Salt spray		No excessive corrosion		5% salt water solution, 48 hours		

\*V.S.W.R. Measurement System

The above V.S.W.R. standard values were measured using the measurement connection shown below.



Note 1: Cable type connectors were measured with SMA conversion adapters attached to both ends of the harness product of a suitable 100cm cable.

Note 2: Board type connectors were mounted to a 50Ω glass epoxy board and measurements were conducted with SMA conversion adapters attached.

## Material

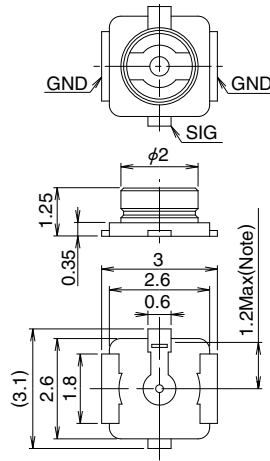
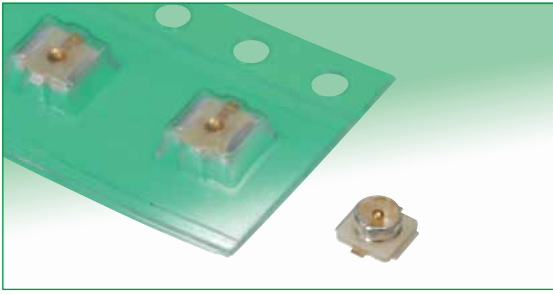
### ●Plug-right angle

Part	Material	Finish/Remarks
Shell	Phosphor bronze	Silver plated
Insulator	PBT, Color: Black	UL94V-0(040,066, LP(V)-040, 062, 088)
	PBT, Color: Gray	UL94HB(LP(V)-040HF)
	LCP, Color: Milky-white	UL94V-0(040HF,066HF, 068HF, 062HF, 088HF)
Female center contact	Phosphor bronze	Gold plated

### ●Receptacle

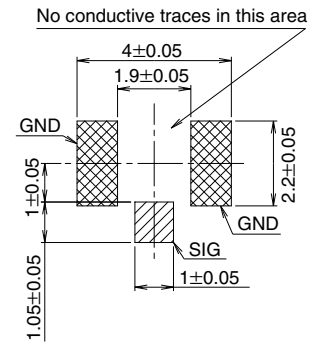
Part	Material	Finish/Remarks
Shell	Phosphor bronze	Silver plated
Insulator	LCP, Color: Milky-white	UL94V-0
Male center contact	Brass	Gold plated

## Receptacles



U.FL-R-SMT-1

## Recommended PCB Mounting Pattern

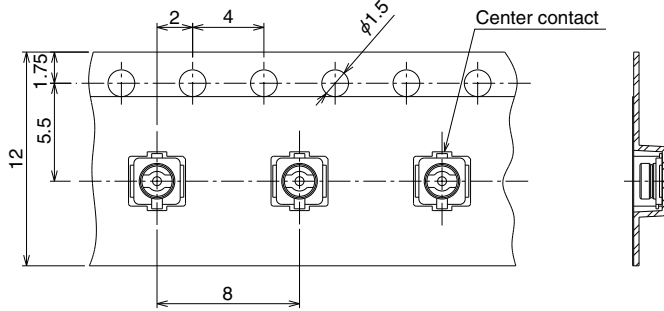


Part No.	HRS No.	Packaging	Weight / EA	RoHS
U.FL-R-SMT-1(01)	331-0472-2 01	100 pcs/pack	15.7/mg	○
U.FL-R-SMT-1(60)	331-0472-2 60	4,000 pcs/reel		
U.FL-R-SMT-1(80)	331-0472-2 80	10,000 pcs/reel		

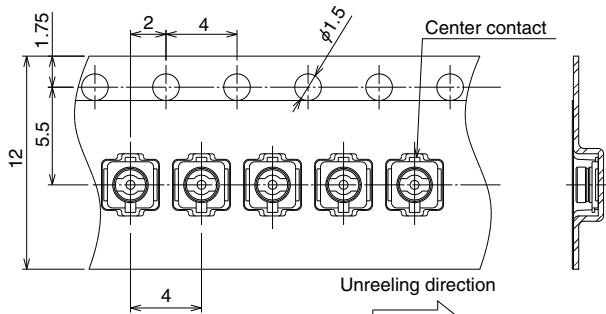
Note: This area may be covered by insulating material.

## Embossed Carrier Tape Dimensions(IEC 60286-3 compliant)

### Embossed Carrier Tape Dimensions



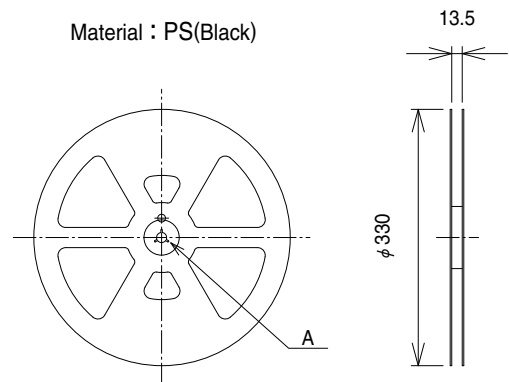
U.FL-R-SMT-1(60): 8mm pitch



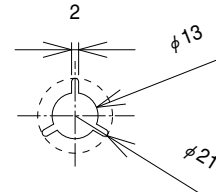
U.FL-R-SMT-1(80): 4mm pitch

### Reel Dimensions

Material : PS(Black)



A(SCALE FREE)



## ■Cable Assembly (Plug)



Part No. Size	U.FL-LP-040 U.FL-LP-040HF	U.FL-LP-066 U.FL-LP-066HF U.FL-LP-068HF	U.FL-LP(V)-040 U.FL-LP(V)-040HF(06)	U.FL-LP-062(06) U.FL-LP-062HF(06)	U.FL-LP-088(06) U.FL-LP-088HF(06)
Mated Height	2.5mm Max. (2.4mm Nom.)	2.5mm Max. (2.4mm Nom.)	2.0mm Max. (1.9mm Nom.)	2.4mm Max. (2.3mm Nom.)	2.4mm Max. (2.3mm Nom.)
Applicable cable	Dia. 0.81mm	Dia. 1.13mm and Dia. 1.32mm	Dia. 0.81mm	Dia. 1mm	Dia. 1.37mm
Weight (mg)	54	59	35	45.5	72
Environmental compliant	The article excellent end HF other than halogen-free, it only as for RoHS compliant				

## ●Cable Guide

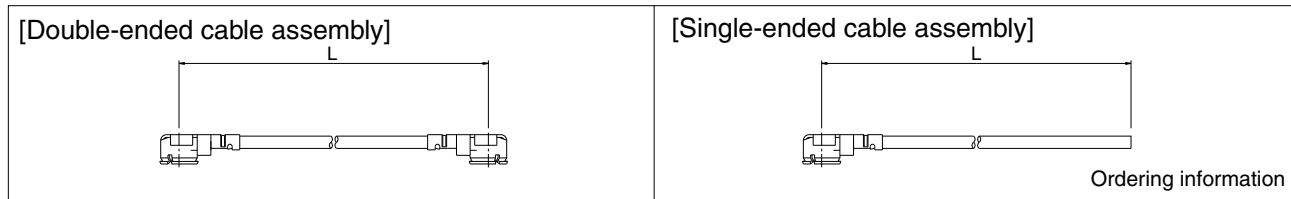
Description	Cable Type	Cable Specification						
		Inner Conductor*	Dielectric Diameter	Outer Conductor*	Jacket Diameter	Flame Retardant Grade	Nominal attenuation	
							At 3GHz	At 6GHz
Dia.0.81mm Coaxial Cable	04	7/0.05 SA (AWG#36)	Dia.0.4mm FEP	Single Shield TA	Dia.0.81mm FEP	VW-1	6.52dB/m	9.52dB/m
Dia.1.13mm Coaxial Cable	068	7/0.08 SA (AWG#32)	Dia.0.68mm FEP	Single Shield TA	Dia.1.13mm FEP		3.73dB/m	5.44dB/m
Dia.1.32mm Coaxial Cable	066	7/0.08 SA (AWG#32)	Dia.0.66mm FEP	Double Shield TA	Dia.1.32mm FEP		3.8dB/m	5.6dB/m
Dia.1mm Coaxial Cable	062	7/0.071 SA (AWG#33)	Dia.0.62mm FEP	Tape, single Shield TA	Dia.1mm FEP		3.1dB/m	4.4dB/m
Dia.1.37mm Coaxial Cable	088	7/0.102 SA (AWG#30)	Dia.0.88mm FEP	Single Shield TA	Dia.1.37mm FEP		2.8dB/m	4.3dB/m
Dia.1.37mm Coaxial Cable	088	7/0.102 SA (AWG#30)	Dia.0.88mm FEP/PTEE	Tape, Single Shield TA	Dia.1.37mm FEP		2.5dB/m	3.4dB/m

(data as provided by cable suppliers, for reference only)

\* SA : Silver plated annealed copper wire, TA : Tin plated annealed copper wire

[Plugs can be ordered only as terminated cable assemblies.]

## ◆How To Specify Cable Assembly



### ●Ordering information

Used plug: U.FL-LP(V)-040, U.FL-LP(V)-040HF(06)  
U.FL-LP-040, U.FL-LP-040HF(Dia.0.81mm)

Double-Ended **U.FL - 2LP HF6 - 04N [ ] TV - A - L**  
① ② ③ ④ ⑤ ⑥ ⑦

Single-Ended **U.FL - LP HF6 - 04N [ ] TV - A - L**  
① ② ③ ④ ⑤ ⑥ ⑦

① Series name	U.FL
② Assembly type	LP: Single ended LPV: Plug(V) Single ended 2LP: Double ended 2LPV plug(V) Double ended
③ Environmental compliant	HF6: Halogen-free 6: RoHS compliant
④ Cable type	04N: Dia.0.81mm Ultra-fine coaxial cable
⑤ Cable color	1: White, 2: Black
⑥ Cable outer conductor	TV: Tin plated braided wire
⑦ Total length(mm)	Length(L)

Used plug: U.FL-LP-062(06), U.FL-LP-062HF(06)(Dia.1mm)

Double-Ended **U.FL - 2LP HF6 - 062N [ ] D - A - L**  
① ② ③ ④ ⑤ ⑥ ⑦

Single-Ended **U.FL - LP HF6 - 062N [ ] D - A - L**  
① ② ③ ④ ⑤ ⑥ ⑦

① Series name	U.FL
② Assembly type	LP: Single ended 2LP: Double ended
③ Environmental compliant	HF6: Halogen-free 6: RoHS compliant
④ Cable type	062N: Dia.1mm Ultra-fine coaxial cable
⑤ Cable color	1: Gray, 2: Black, 3: White
⑥ Cable outer conductor	D: Copper tape+ Tin plated braided wire
⑦ Total length(mm)	Length(L)

Used plug: U.FL-LP-066, U.FL-LP-068HF(Dia.1.13mm)

Double-Ended **U.FL - 2LP HF6 - 068N [ ] T - A - L**  
① ② ③ ④ ⑤ ⑥ ⑦

Single-Ended **U.FL - LP HF6 - 068N [ ] T - A - L**  
① ② ③ ④ ⑤ ⑥ ⑦

① Series name	U.FL
② Assembly type	LP: Single ended 2LP: Double ended
③ Environmental compliant	HF6: Halogen-free 6: RoHS compliant
④ Cable type	068N: Dia.1.13mm Ultra-fine coaxial cable
⑤ Cable color	1: Gray, 2: Black, 3: White
⑥ Cable outer conductor	T: Tin plated braided wire
⑦ Total length(mm)	Length(L)

Used plug: U.FL-LP-088(06), U.FL-LP-088HF(06)(Dia.1.37mm)

Double-Ended **U.FL - 2LP HF6 - 088K [ ] T - A - L**  
① ② ③ ④ ⑤ ⑥ ⑦

Single-Ended **U.FL - LP HF6 - 088K [ ] T - A - L**  
① ② ③ ④ ⑤ ⑥ ⑦

① Series name	U.FL
② Assembly type	LP: Single ended 2LP: Double ended
③ Environmental compliant	HF6: Halogen-free 6: RoHS compliant
④ Cable type	088K: Dia.1.37mm Ultra-fine coaxial cable
⑤ Cable color	1: Gray, 2: Black, 3: White
⑥ Cable outer conductor	T: Tin plated braided wire PD: Copper tape + Tin plated braided wire
⑦ Total length(mm)	Length(L)

Used plug: U.FL-LP-066, U.FL-LP-066HF(Dia.1.32mm)

Double-Ended **U.FL - 2LP HF6 - 066N [ ] - A - L**  
① ② ③ ④ ⑤ ⑥

Single-Ended **U.FL - LP HF6 - 066N [ ] - A - L**  
① ② ③ ④ ⑤ ⑥

① Series name	U.FL
② Assembly type	LP: Single ended 2LP: Double ended
③ Environmental compliant	HF6: Halogen-free 6: RoHS compliant
④ Cable type	066N: Dia.1.32mm Ultra-fine coaxial cable
⑤ Cable color	1: Gray, 2: Black
⑥ Total length(mm)	Length(L)

### ●Standard tolerances for (L)

(L)(mm)	Standard Tolera(mm)
*L=35 to 200	±4
L=200 to 500	±8
L=500 to 1000	±12
L=Longer than 1000	±1.5% of (L)

Note: Minimum available length(L) is 35mm

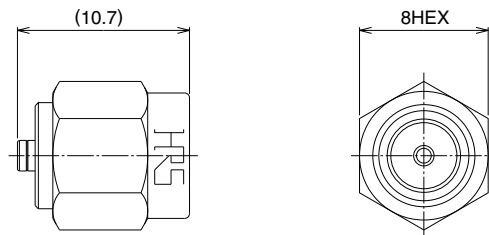
## ■Conversion Adapters

### ●SMA Conversion Adapter

(Mating portion: U.FL side jack - SMA side plug)



Note: The U.FL side mating portions has a lower lock retention force than the regular product, therefore, cannot be used for purposes other than performance measurements.



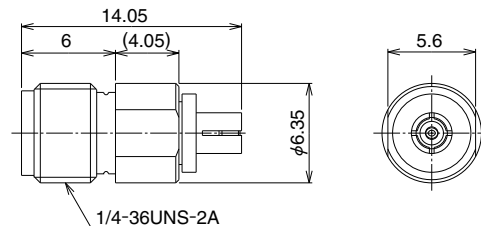
Part No.	HRS No.	RoHS
HRMP-U.FLJ(40)	311-0300-2 40	○

### ●SMA Conversion Adapter

(Mating portion: U.FL side plug - SMA side jack)



Note: The U.FL side mating portions has a lower lock retention force than the regular product, therefore, cannot be used for purposes other than performance measurements.



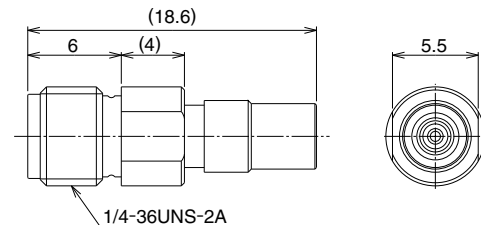
Part No.	HRS No.	RoHS
HRMJ-U.FLP(40)	311-0301-5 40	○

### ●SMA Conversion Adapter

(Mating portion: U.FL side plug - SMA side jack)



Note: This connector is used by compressing the mated portion of U.FL side onto the U.FL-R-SMT-1 portion.

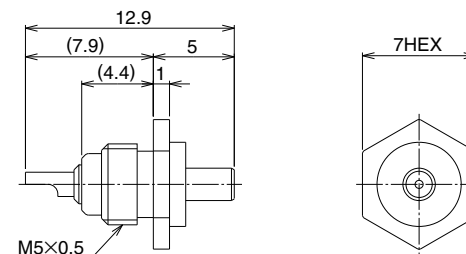


Part No.	HRS No.	RoHS
HRMJ-U.FLP-ST1(40)	311-0385-5 40	○

## ■Receptacle to Inspection



This receptacle is used for inspecting the continuity, withstand voltage, and other aspects of the harness product.



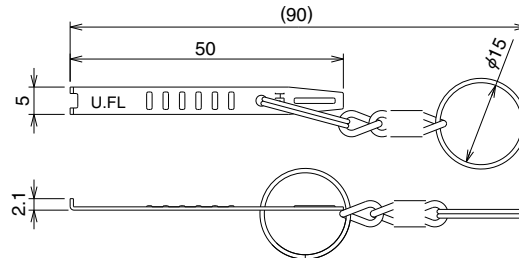
Part No.	HRS No.	RoHS
U.FL-R-1	331-0466-0	○

## ◆Plug Extraction Tool

This tool is used for extraction from a mating condition.



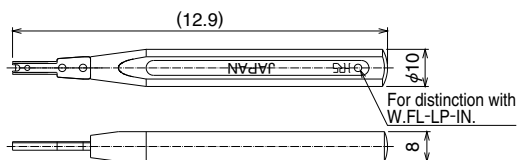
Note: Part No. U.FL-LP-N-2 for U.FL-LP-040/066/088.  
Part No. U.FL-LP(V)-N-2 for U.FL-LP(V)-040/U.FL-LP-062.



Part No.	HRS No.	RoHS
U.FL-LP-N-2	331-0494-5	○
U.FL-LP(V)-N-2	331-0493-2	

## ◆Plug Insertion Tool

This tool is for mating U.FL series plug into receptacle.

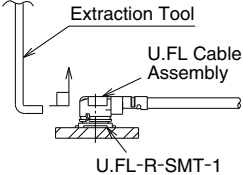
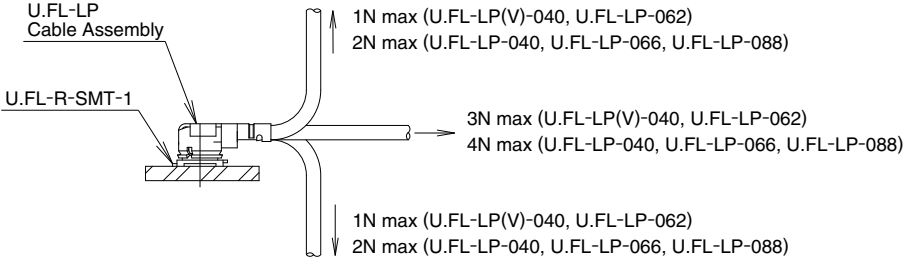


Part No.	HRS No.	RoHS
U.FL-LP-IN	331-0334-9	○

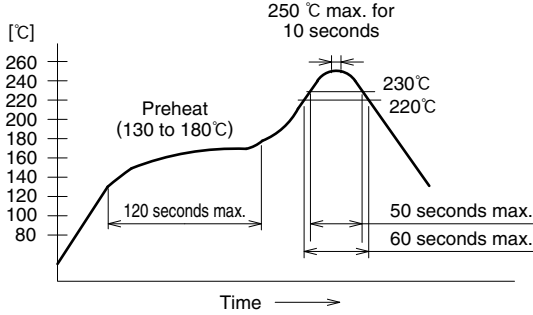


## ◆ Usage Precautions

### 1. Plugs

(1) Mating / unmating	<p>1) To disconnect connectors, insert the end portion of U.FL-LP-N-2 and U.FL-LP(V)-N-2 under the connector flanges and pull off vertically, in the direction of the connector mating axis.</p> <p>2) To mate the connectors, the mating axes of both connectors must be aligned and the connectors can be mated. The "click" will confirm fully mated connection. Do not attempt to insert on an extreme angle.</p> 
(2) Pull forces on the cable after connectors are mated.	<p>After the connectors are mating, do not apply a load to the cable in excess of the values indicated in the diagram below.</p> 
(3) Precautions	Do NOT forcefully twist or deform wires.

### 2. Receptacles

(1) Recommended reflow temperature profile	 <ol style="list-style-type: none"> <li>① The temperature of the printed circuit board surface temperature at the points of contact with the terminals.</li> <li>② Reflow soldering should be performed at a printed circuit surface temperature of 250°C max.</li> <li>③ In individual applications the actual temperature may vary, depending on the solder paste type, volume / thickness and board size / thickness. Consult your solder paste and equipment manufacturer for specific recommendations.</li> </ol>
(2) Recommended manual soldering	Manual soldering: 350°C for 5 seconds
(3) Recommended metal mask thickness	0.1 to 0.12 mm
(4) Reflow cycles	2 times

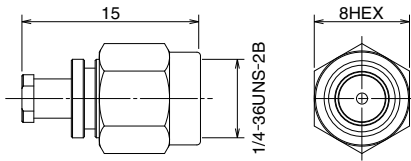
### 3. Operating environment and storage conditions

(1) Operating environment	<p>The connectors are not designed to operate in the following environments:</p> <ul style="list-style-type: none"> <li>• Exposed to a excessive amounts of fine particles and dust</li> <li>• Regions and places having a high density of sulfur dioxide, hydrogen sulfide, nitrogen dioxide or other corrosive gasses.</li> <li>• Environments having large rapid variations in temperature.</li> </ul>
(2) Storage conditions - Receptacle	<p>Store in the Hirose Electric packaging.</p> <p>Temperature: -10 to +40°C, Humidity: 85% max.</p> <p>Use within 6 months of delivery.</p> <p>Receptacles for which the storage period has elapsed must be tested for solderability to the PC board mounting surface.</p>

SMA cable type

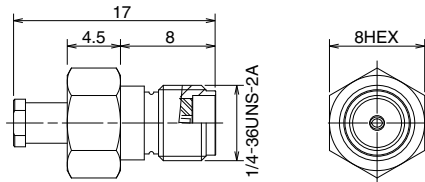
SMA

●Straight Plug



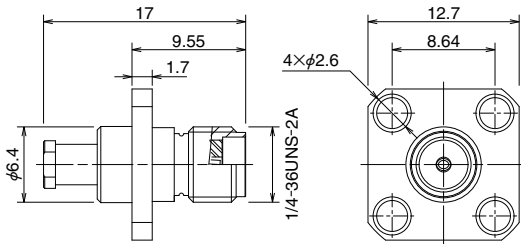
Part No.	HRS No.	Applicable cable	RoHS
HRM-200-040PBN(40)	323-0790-3 40	Dia. 0.81 type	○
HRM-200-066PBN(40)	323-0791-6 40	Dia. 1.13, Dia.1.32 type	
HRM-200-088PBN(40)	323-0800-5 40	Dia. 1.37, Dia.1.48 type	

●Straight Jack



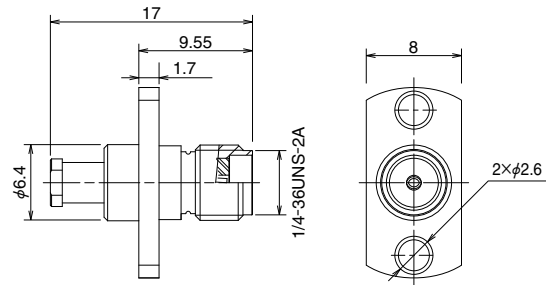
Part No.	HRS No.	Applicable cable	RoHS
HRM-200-040JBN(40)	323-0792-9 40	Dia. 0.81 type	○
HRM-200-066JBN(40)	323-0793-1 40	Dia. 1.13, Dia.1.32 type	
HRM-200-088JBN(40)	323-0801-8 40	Dia. 1.37, Dia.1.48 type	

●Panel mount Jack



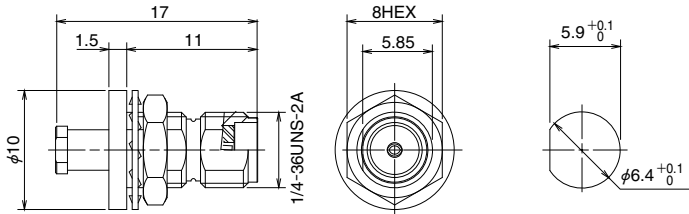
Part No.	HRS No.	Applicable cable	RoHS
HRM-200-040PJ4BN(40)	323-0795-7 40	Dia. 0.81 type	○
HRM-200-066PJ4BN(40)	323-0796-0 40	Dia. 1.13, Dia.1.32 type	
HRM-200-088PJ4BN(40)	323-0803-3 40	Dia. 1.37, Dia.1.48 type	

●Panel mount Jack



Part No.	HRS No.	Applicable cable	RoHS
HRM-200-040PJ2BN(40)	323-0794-4 40	Dia. 0.81 type	○
HRM-200-066PJ2BN(40)	323-0788-1 40	Dia. 1.13, Dia.1.32 type	
HRM-200-088PJ2BN(40)	323-0802-0 40	Dia. 1.37, Dia.1.48 type	

●Panel mount Jack (Bulkhead)

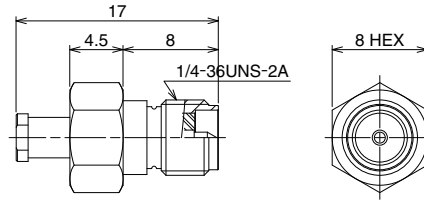


Part No.	HRS No.	Applicable cable	RoHS
HRM-200-040BPJBN(40)	323-0797-2 40	Dia. 0.81 type	○
HRM-200-066BPJBN(40)	323-0798-5 40	Dia. 1.13, Dia.1.32 type	
HRM-200-088BPJBN(40)	323-0804-6 40	Dia. 1.37, Dia.1.48 type	



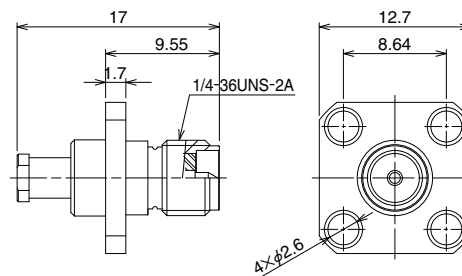
## Reverse polarity SMA

### ● Straight Jack



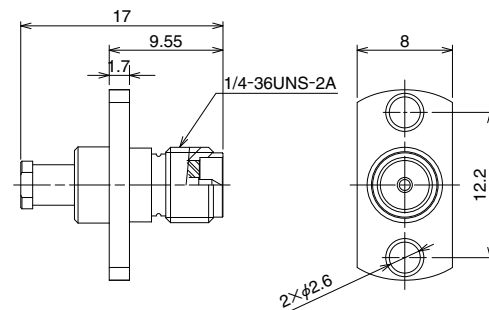
Part No.	HRS No.	Applicable cable	RoHS
SMA(R)-200-040JBN	323-0926-3	Dia. 0.81 type	○
SMA(R)-200-066JBN	323-0931-3	Dia. 1.13, Dia.1.32 type	
SMA(R)-200-088JBN	323-0904-0	Dia. 1.37 type	

### ● Panel mount Jack



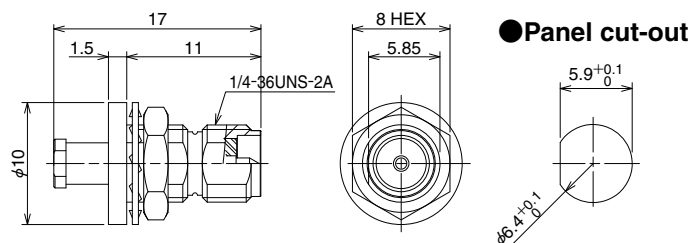
Part No.	HRS No.	Applicable cable	RoHS
SMA(R)-200-040PJ4BN	323-0928-9	Dia. 0.81 type	○
SMA(R)-200-066PJ4BN	323-0932-6	Dia. 1.13, Dia.1.32 type	
SMA(R)-200-088PJ4BN	323-0934-1	Dia. 1.37 type	

### ● Panel mount Jack



Part No.	HRS No.	Applicable cable	RoHS
SMA(R)-200-040PJ2BN	323-0929-1	Dia. 0.81 type	○
SMA(R)-200-066PJ2BN	323-0933-9	Dia. 1.13, Dia.1.32 type	
SMA(R)-200-088PJ2BN	323-0935-4	Dia. 1.37 type	

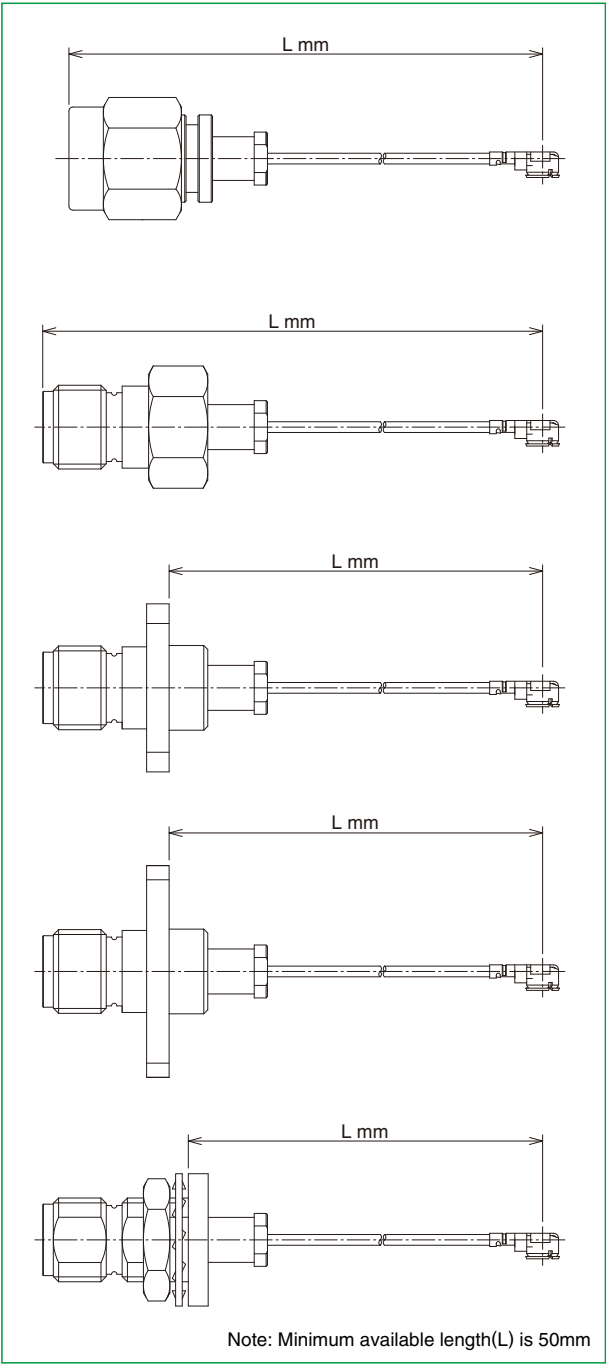
### ● Panel mount Jack (Bulkhead)



### ● Panel cut-out

Part No.	HRS No.	Applicable cable	RoHS
SMA(R)-200-040BPJBN	323-0927-6	Dia. 0.81 type	○
SMA(R)-200-066BPJBN	323-0902-5	Dia. 1.13, Dia.1.32 type	
SMA(R)-200-088BPJBN	323-0901-2	Dia. 1.37 type	

How To Specify Cable Assembly



Ordering information

**HRM P - U.FL - 04 N1 - A - L**

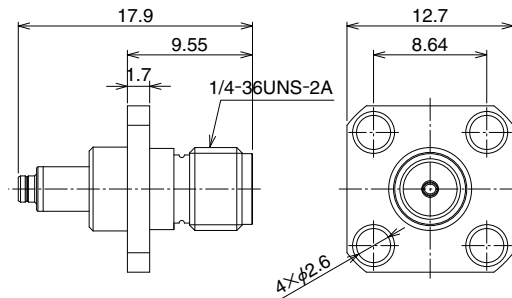
1 2 3 4 5

1 Series name	HRM : SMA type SMAR : Reverse polarity SMA	
2 Connector type	P : Plug J : Jack PJ : Panel mount Jack(Four screws) PJ2 : Panel mount Jack(Two screws) BPJ : Panel mount Jack(Bulkhead)	
3 Cable type	04 : Dia. 0.81mm Coaxial cable 066 : Dia. 1.32mm Coaxial cable 068 : Dia. 1.13mm Coaxial cable 088 : Dia. 1.37mm Coaxial cable	
4 Cable color	04	1: White, 2: Black
	066	
	068	1: Gray, 2: Black
	088	
5 Total length(mm)	Length(L)	

## SMA conversion adapter

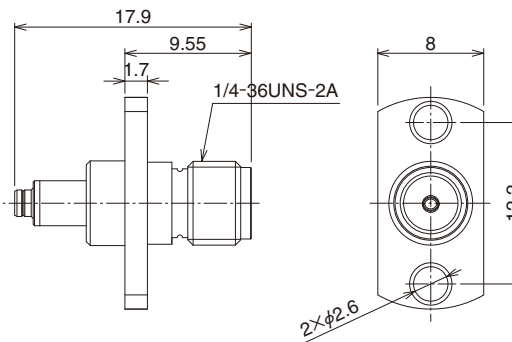
### SMA

#### Panel mount adapter



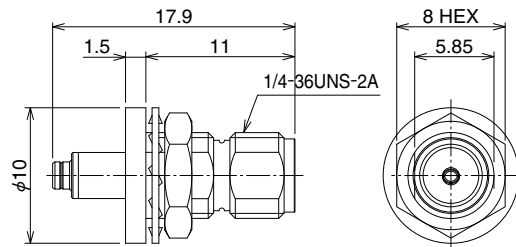
Part No.	HRS No.	RoHS
HRMJ-U.FLJ-PA4	311-0465-2	○

#### Panel mount adapter



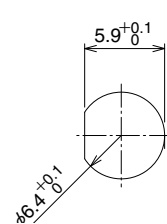
Part No.	HRS No.	RoHS
HRMJ-U.FLJ-PA2	311-0467-8	○

#### Panel mount adapter(Bulkhead)

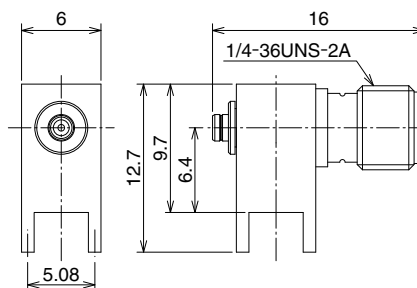
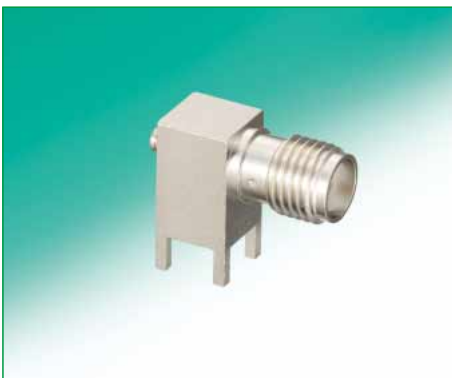


Part No.	HRS No.	RoHS
HRMJ-U.FLJ-BPA-4	311-0463-7	○

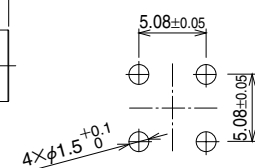
#### Panel cut-out



#### PCB mount adapter



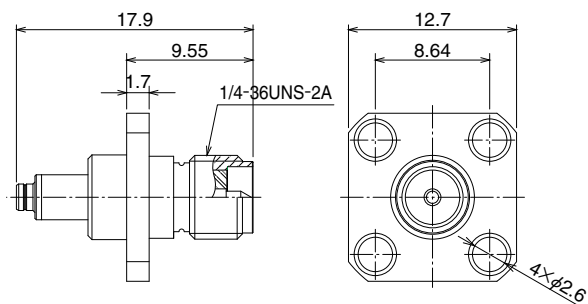
#### Panel cut-out



Part No.	HRS No.	Finish	RoHS
HRMJ-U.FLJ-PC	311-0411-3	Nickel plated	○
HRMJ-U.FLJ-PC(01)	311-0411-3 01	Gold plated	

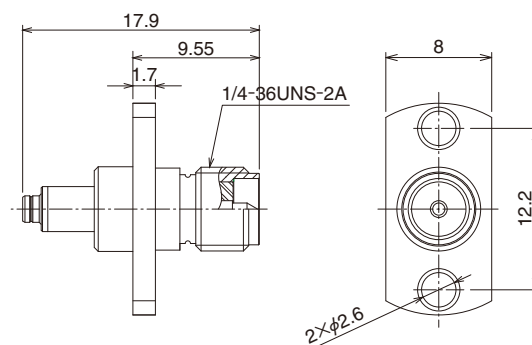
## Reverse polarity SMA

### ●Panel mount adapter



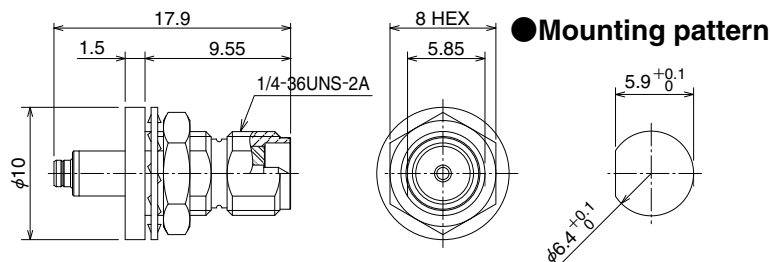
Part No.	HRS No.	RoHS
SMA(R)J-U.FLJ-PA4	311-0466-5	○

### ●Panel mount adapter



Part No.	HRS No.	RoHS
SMA(R)J-U.FLJ-PA2	311-0468-0	○

### ●Panel mount adapter (Bulkhead)



Part No.	HRS No.	RoHS
SMA(R)J-U.FLJ-BPA-4	311-0464-0	○



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