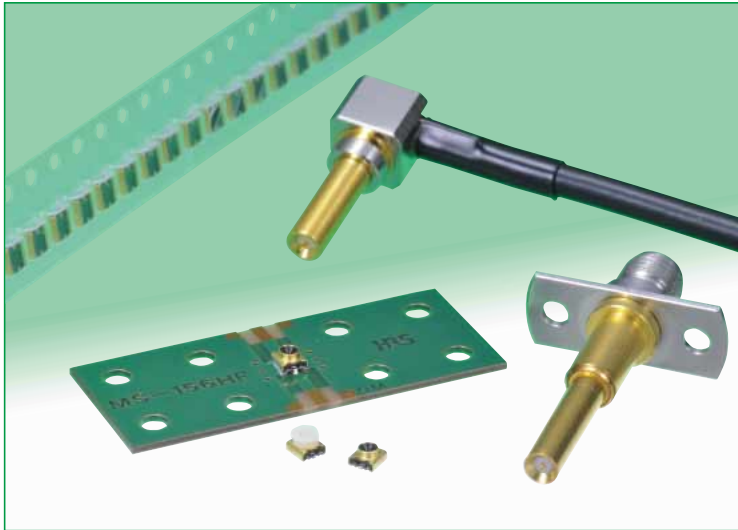


# Subminiature Coaxial Switch 1.6 mm High, DC to 6 GHz

MS-156HF Series

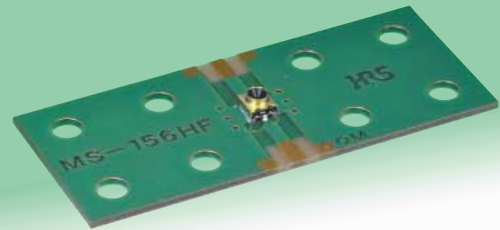
Halogen Free



## Overview

Developed for inspection of high frequency circuits used in portable terminals. Verification of the circuit performance is accomplished by simply inserting the external plug in the board mounted receptacle. This action re-directs the circuit from normal condition to the plug side. Removing the plug restores circuit to its normal condition.

Space-saving design  
Low profile -1.6 mm protrusion above the board.  
Lightweight -0.025 g. total weight.



MS-156HF

## Features

### 1. Low insertion loss

0.1 dB typical at 6 GHz (not mated with the plug).

### 2. Space-saving design

2.7 mm x 2.7 mm occupied board space.

### 3. Low profile

1.6 mm protrusion above the board.

### 4. Lightweight

0.025 g. total weight (without vacuum cap).

### 5. Durability

100 mating/unmating cycles, with corresponding plug.

### 6. Performs over a wide frequency range

Applicable frequencies range over a wide band, from DC to 6 GHz.

### 7. Solder wicking prevention

Nickel plating barrier on the contacts prevents solder compound intrusion (wicking) into the contact engagement areas.

### 8. Board placement with automatic equipment

Packaged on tape-and-reel. Also available with a vacuum pick-up cap over each switch.

### 9. RoHS compliant

All components and materials comply with the requirements of the EU Directive 2002/95/EC.

### 10. Halogen Free

Chlorine, and bromine are not used in the receptacles.

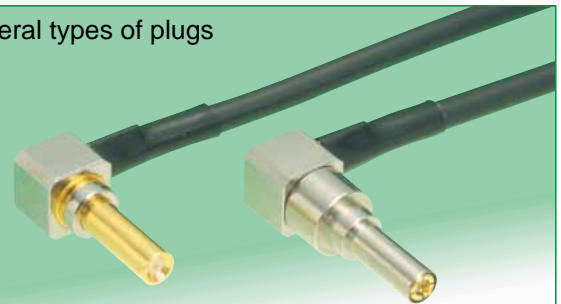
\*Definition according to IEC 61249-2-21.

Br 900 ppm max., Cl 900 ppm max., and Br + Cl 1500 ppm max.

## Applications

Portable terminals, ETC, notebook computers (Bluetooth), wireless LAN, POS terminals, GPS terminals, PDA, and any small devices requiring verification of antenna/circuit performance.

## Several types of plugs



## Several types of SMA conversion adapters



## Adapter for plug inspection



## ■ Specifications

|                             | Not mated with the plug   | Mated (MS-156-HRMJ-3)  |
|-----------------------------|---|--|
| Operating temperature range | -40°C to +85°C  | -40°C to +85°C   |
| Rated power                 | 2W  | 2W   |
| Frequency range             | DC to 6GHz  | DC to 6GHz   |
| Insertion loss              | 0.1 dB max. (DC to 2.5GHz)<br>0.15 dB max. (2.5GHz to 6.0GHz)                               | 0.5 dB max. (DC to 3.0GHz)<br>1.2 dB max. (3.0GHz to 6.0GHz) |
| Isolation                   | 20 dB max. (DC to 2.0GHz)<br>15 dB max. (2.0GHz to 4.0GHz)<br>13 dB max. (4.0GHz to 6.0GHz) |  |
| V.S.W.R                     | 1.2 max. (DC to 2.5GHz)<br>1.3 max. (2.5GHz to 6.0GHz)                                      | 1.4 max. (DC to 3.0GHz)<br>1.8 max. (3.0GHz to 6.0GHz)       |

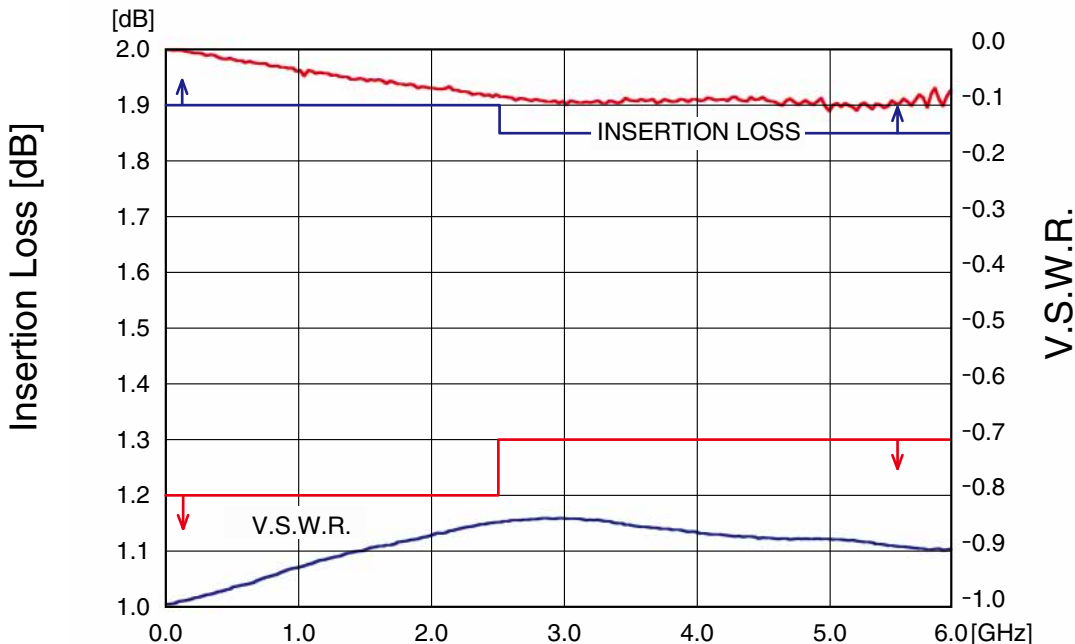
| Item   | Specification  | Conditions  |
|--|--|---|
| 1. Contact resistance                                      | 100 mΩ max.  | 100 mA max.   |
| 2. Insulation resistance                                   | 1000 MΩ min.   | 100 V DC  |
| 3. Withstanding voltage                                    | No flashover or insulation breakdown                                 | 100 V AC / 1 minute   |
| 4. Vibration   | No electrical discontinuity of 1 μs or more                          | Frequency: 10 to 55 Hz, single amplitude of 0.75 mm, 2 hours in each of the 3 axis.                                   |
| 5. Shock   |  | Acceleration of 490 m/s <sup>2</sup> , 6 ms duration, sine half-wave waveform, 3 cycles in each of the 3 axis         |
| 6. Temperature cycle                                       | Contact resistance: 100 mΩ max.<br>Insulation resistance: 10 MΩ min. | Temperature: -55°C → +5°C to +35°C → +85°C → +5°C to +35°C<br>Time: 30 → 2 to 3 → 30 → 2 to 3 (Minutes)<br>100 cycles |
| 7. High temperature exposure                               | Contact resistance: 100 mΩ max.<br>Insulation resistance: 10 MΩ min. | 96 hours at 85°C  |
| 8. Low temperature exposure                                | Contact resistance: 100 mΩ max.<br>Insulation resistance: 10 MΩ min. | 96 hours at -55°C   |
| 9. Humidity  | Contact resistance: 100 mΩ max.<br>Insulation resistance: 10 MΩ min. | 96 hours at 40±2°C, and humidity of 90 to 95%   |
| 10. Durability (mating/un-mating, with corresponding plug) | Contact resistance: 100 mΩ max.                                      | 100 cycles  |

## ■ Materials

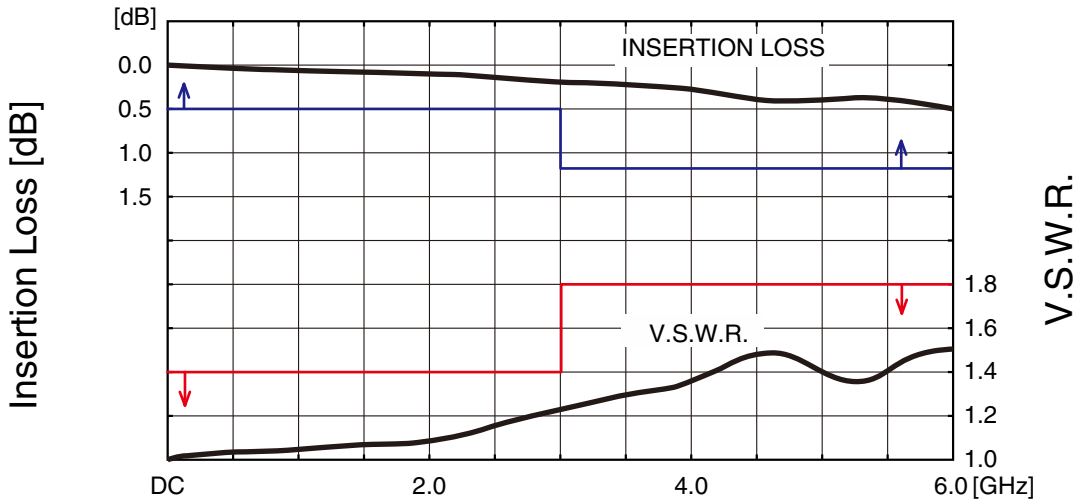
| Part             | Material         | Finish                | Remarks |
|------------------|------------------|-----------------------|---------|
| Shell            | Phosphor bronze  | Gold plated           | ————    |
| Insulator        | 6T Nylon         | ————                  | UL94HB  |
| Common terminal  | Beryllium copper | Selective gold plated | ————    |
| Antenna terminal | Phosphor bronze  | Selective gold plated | ————    |

◆ Typical Data

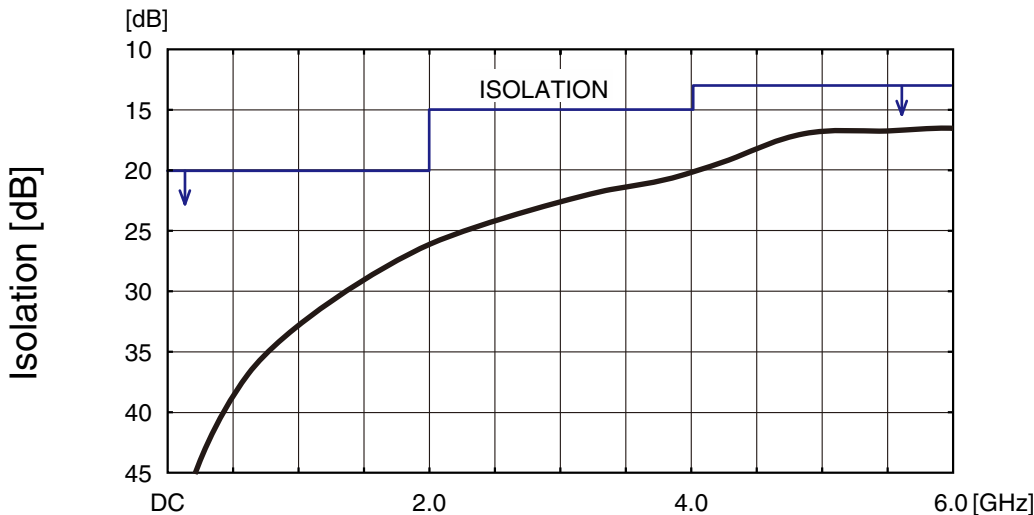
● NORMALLY CLOSED(N.C)~(Not mated with the plug)



● OPEN(N.O)~(Mated with the plug)



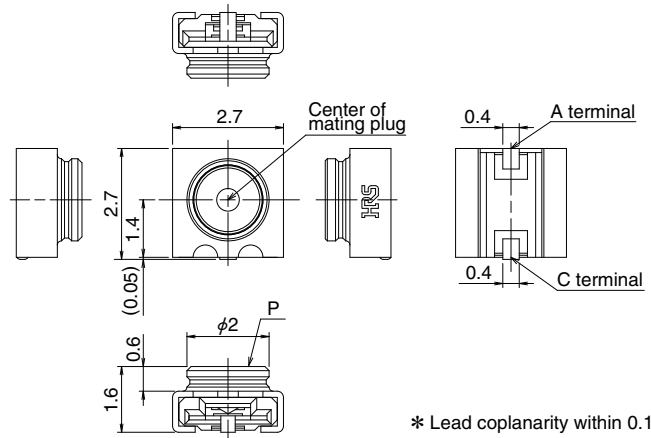
● ISOLATION



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## ■ Receptacle

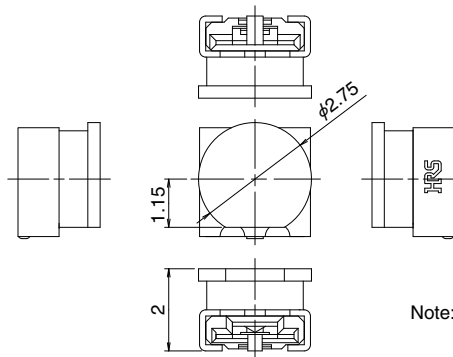
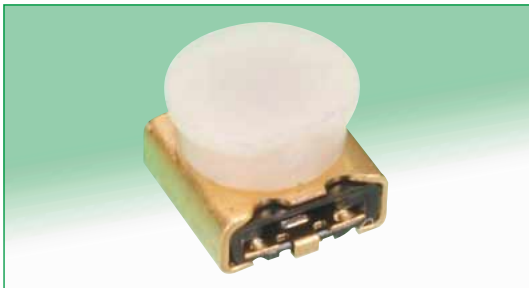
### ● Without vacuum pick-up cap



\* Lead coplanarity within 0.1mm

| Part Number  | CL No.        | Packaging          |
|--------------|---------------|--------------------|
| MS-156HF     | 358-0238-4    | 10,000 pieces/reel |
| MS-156HF(01) | 358-0238-4-01 | 100 pieces/bag     |
| MS-156HF(20) | 358-0238-4-20 | 2,000 pieces/reel  |

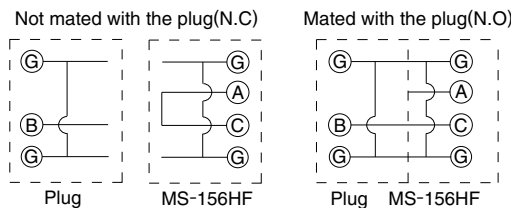
### ● With vacuum pick-up cap



Note: Vacuum pick-up cap flat can be oriented in any direction. Orientation will not affect placement of the switch on the board.

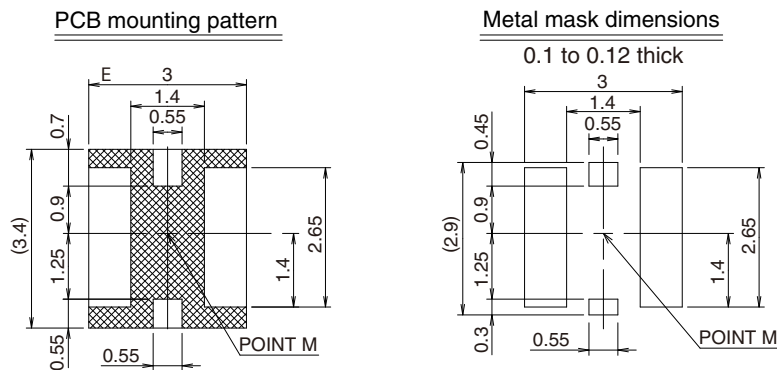
| Part Number  | CL No.        | Packaging         |
|--------------|---------------|-------------------|
| MS-156HF(02) | 358-0238-4-02 | 8,500 pieces/reel |
| MS-156HF(22) | 358-0238-4-22 | 1,500 pieces/reel |

## ◆ Circuit diagram




## ◆ PCB mounting pattern and metal mask dimensions

- \* Request drawing of the specific part for exact dimensions and tolerances.
- \* Specified dimensions must be followed to assure correct board placement and performance.

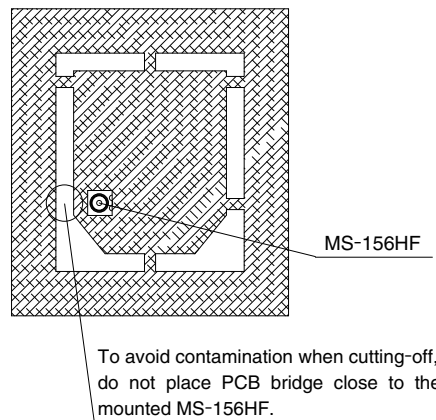


▨ This area must be free of conductive traces and resist field.

## ◆ Precautions

1. This product is intended to be used for circuit inspection only. Consult us if any other application is considered.
2. Cross-hatched area shown on the PCB mounting pattern must be free of any conductive traces. Placing conductive traces in this area may affect performance and will void product warranties. When the bottom surface of the product (i.e., the  shaded area of the specified land dimensions diagram on the previous page) has been processed with a substrate copper trace and resist processing, Hirose Electric will not be able to warrant the product.
3. Do not use hand soldering for mounting of MS-156HF.  
Doing so could result in solder and flux wicking to the contact areas.
4. Exercise caution as not to allow any debris to enter the board mounted MS-156HF when cutting PCB.

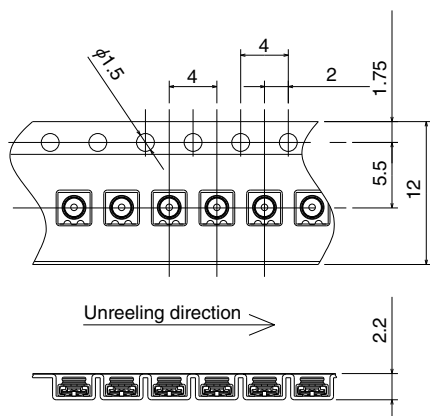
Recommended Mounting of MS-156HF coaxial switch  
on the PCB during the manufacturing process



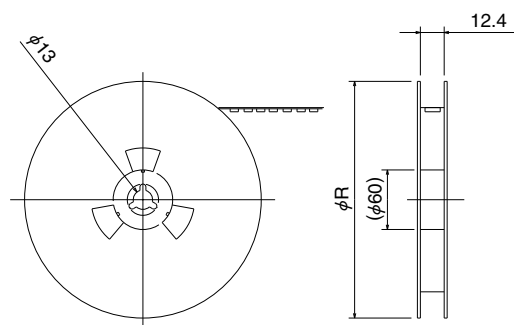
5. Do not use the washing process.
6. Please refrain from using the product in environments specifically affected by excessive vibration, shock, dust, high humidity, gases, very high temperatures and very low temperatures such as outdoor equipment. It might cause degradation or destruction of the product. Even if it endures during a short time, long time qualification is not guaranteed.
7. For use of this product, be sure to put contact area of plug on position P(P4 full view) perpendicularly.
8. Plugs can be roughly classified to two types.
  - For mass production line automatic check (Press down type)
  - For manual check (With retentive lock) : Unable to be used at production line.
9. When automatic inspections are to be performed during the manufacturing operations, request the MS-156 plug connector manual for examples of implementation.

## ◆ Packaging Specifications

### ● Without vacuum cap

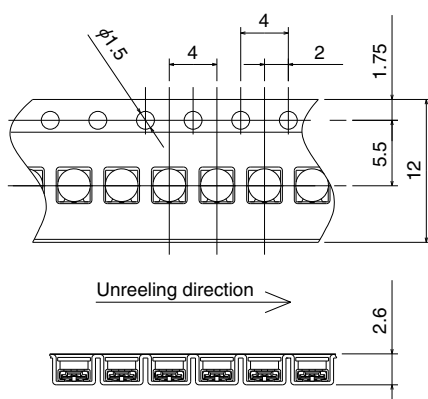


### ● Reel dimensions

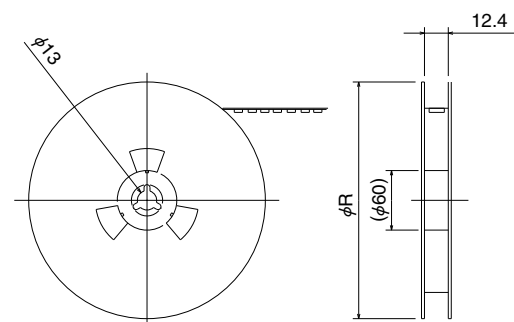


| Part Number  | Reel Size  | Packaging          |
|--------------|------------|--------------------|
| MS-156HF     | R = φ380mm | 10,000 pieces/reel |
| MS-156HF(20) | R = φ180mm | 2,000 pieces/reel  |

### ● With vacuum cap

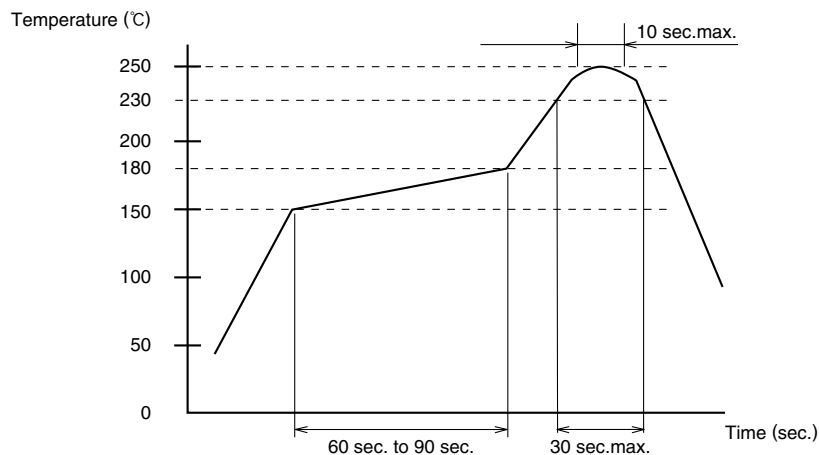


### ● Reel dimensions



| Part Number  | Reel Size  | Packaging         |
|--------------|------------|-------------------|
| MS-156HF(02) | R = φ380mm | 8,500 pieces/reel |
| MS-156HF(22) | R = φ180mm | 1,500 pieces/reel |

## ◆ Recommended Temperature Profile



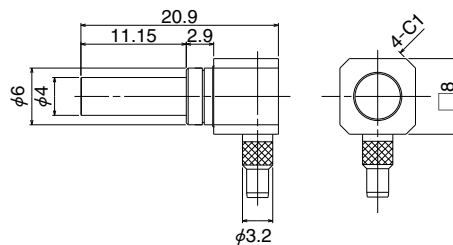
#### Using Lead-free Solder paste

|   |                       |                      |
|---|-----------------------|----------------------|
| 1 | Maximum temperature   | : 250°C              |
| 2 | Peak temperature      | : 240°C to 250°C     |
| 3 | Peak temperature time | : 10 sec. max.       |
| 4 | 230°C min.            | : 30 sec. max.       |
| 5 | 150°C to 180°C        | : 60 sec. to 90 sec. |

Metal mask thickness : 0.1 to 0.12 mm  
 Reflow cycles : 2 cycles

## ■ Plugs

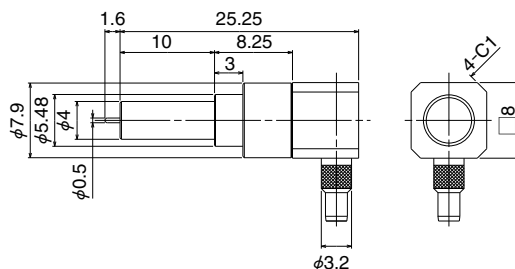
### ● Press down, right angle



| Part Number    | CL No.     | Durability   |
|----------------|------------|--------------|
| MS-156-C(LP)-1 | 358-0173-0 | 10,000 Times |

Applicable cable: 1.5D-HQEW, 1.5D-QEW (Fujikura Ltd.)

### ● Simplified lock, right angle

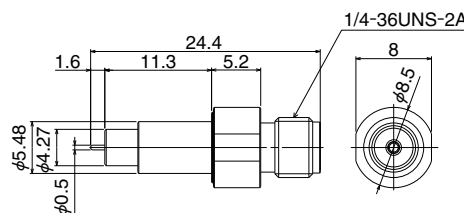


| Part Number    | CL No.     | Durability |
|----------------|------------|------------|
| MS-156-C(LP)-2 | 358-0174-3 | 500 Times  |

Applicable cable: 1.5D-HQEW, 1.5D-QEW (Fujikura Ltd.)

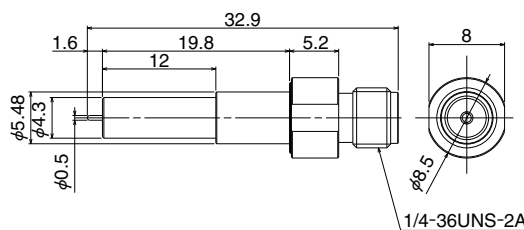
## ■ SMA Conversion Adapters

### ● Simplified lock, straight, short



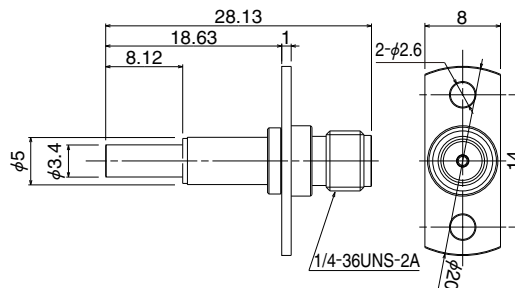
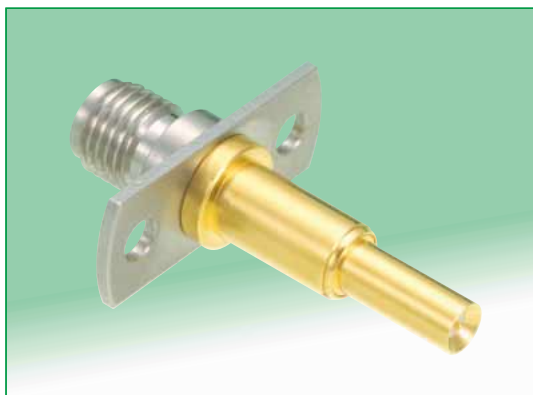
| Part Number   | CL No.     | Durability |
|---------------|------------|------------|
| MS-156-HRMJ-2 | 358-0170-2 | 500 Times  |

### ● Simplified lock, straight, long



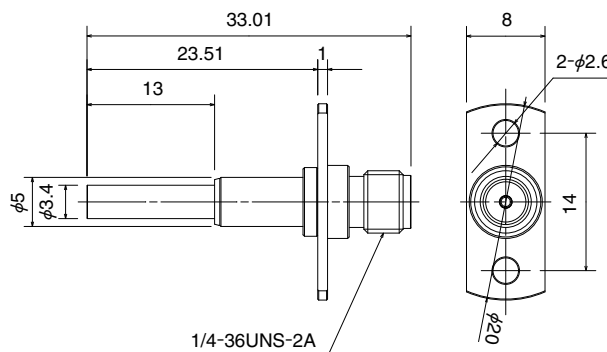
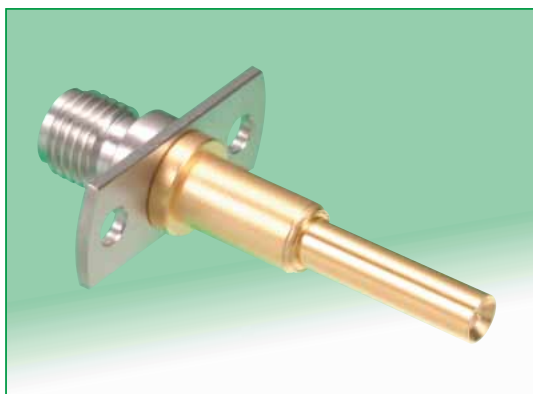
| Part Number   | CL No.     | Durability |
|---------------|------------|------------|
| MS-156-HRMJ-5 | 358-0177-1 | 500 Times  |

● Press down, with flange, short



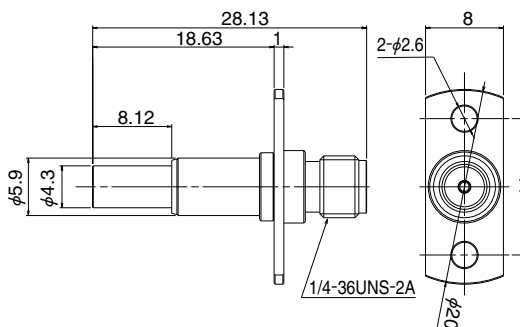
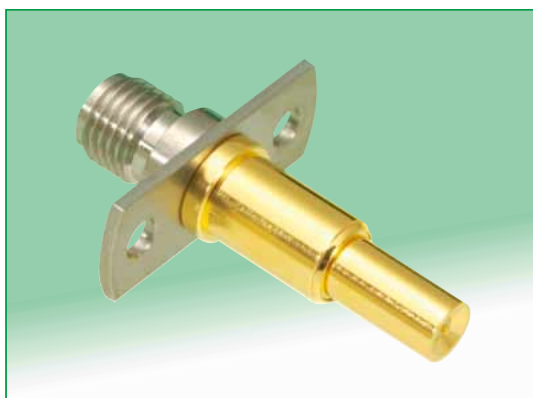
| Part Number   | CL No.     | Durability   |
|---------------|------------|--------------|
| MS-156-HRMJ-3 | 358-0171-5 | 10,000 Times |

● Press down, with flange, long



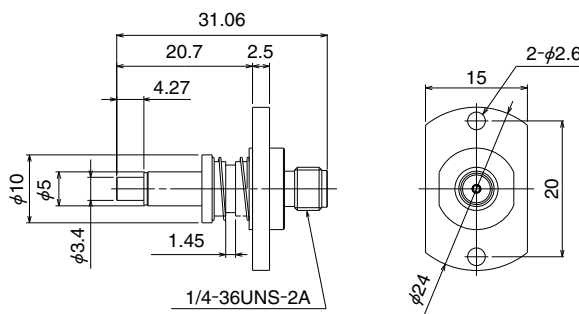
| Part Number    | CL No.     | Durability   |
|----------------|------------|--------------|
| MS-156-HRMJ-14 | 358-0198-1 | 10,000 Times |

● Press down, with flange  
(Increased self alignment)



| Part Number   | CL No.     | Durability   |
|---------------|------------|--------------|
| MS-156-HRMJ-6 | 358-0181-9 | 10,000 Times |

● Floating

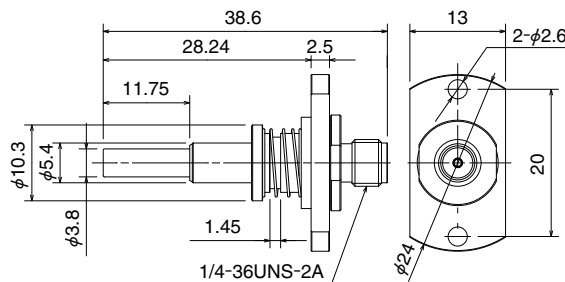


| Part Number   | CL No.     | Durability   |
|---------------|------------|--------------|
| MS-156-HRMJ-9 | 358-0180-6 | 10,000 Times |

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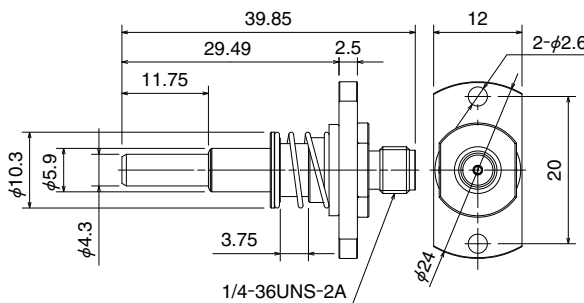
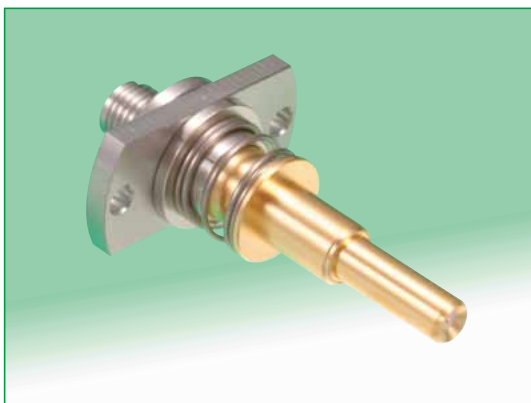


● Floating (Self-Pressing)



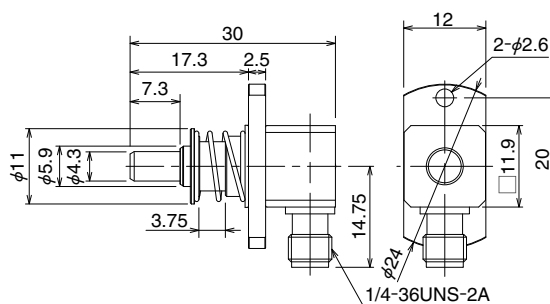
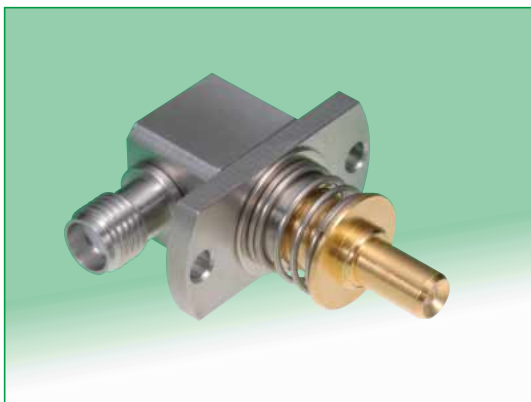
| Part Number    | CL No.     | Durability   |
|----------------|------------|--------------|
| MS-156-HRMJ-10 | 358-0194-0 | 10,000 Times |

● Floating (Self-Pressing)



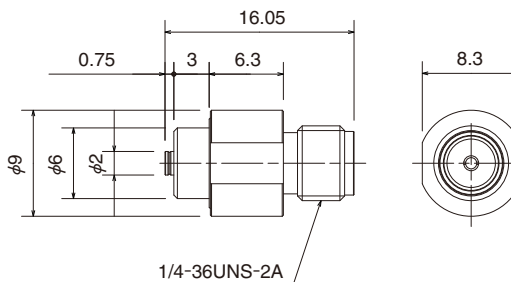
| Part Number    | CL No.     | Durability   |
|----------------|------------|--------------|
| MS-156-HRMJ-12 | 358-0196-6 | 10,000 Times |

● Floating (Self-Pressing)



| Part Number     | CL No.     | Durability   |
|-----------------|------------|--------------|
| MS-156LP-HRMJ-4 | 358-0205-5 | 10,000 Times |

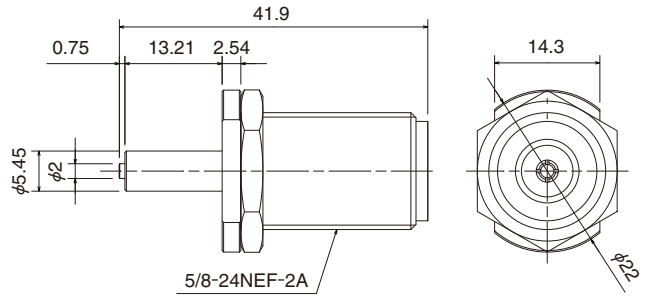
● Adapter for plug inspection



| Part Number    | CL No.     | Durability |
|----------------|------------|------------|
| MS-156R-HRMJ-1 | 358-0188-8 | 500 Times  |

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● Adapter for plug inspection



| Part Number  | CL No.     | Durability |
|--------------|------------|------------|
| MS-156R-NJ-1 | 358-0176-9 | 500 Times  |



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