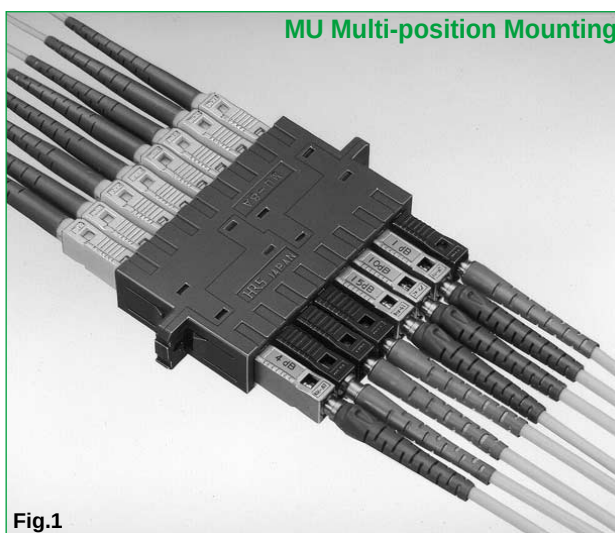
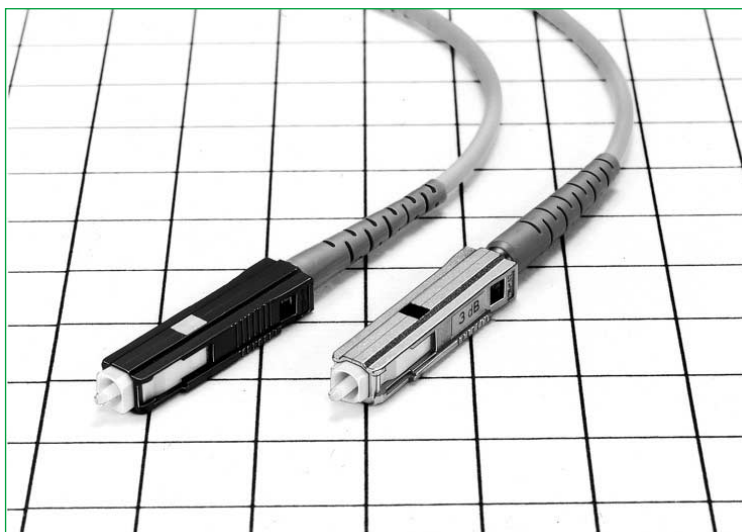


# MU Type Optical In-Line Attenuators



## Features

### 1. Smaller package

Hirose's original design combines a plug and attenuator into the same connector size of a standard MU plug, and the superior design enable to save a space using 4.5 mm pitch MU multiple adapters as shown in Fig. 1 and 2.

### 2. Easy to Change attenuation level

Easy to change the attenuation level by exchanging the attenuatin part with a simple push-twist lock as shown in Fig.3(See page 80).15 levels of attenuation are currently available : 0,1,2,3,4,5,6,7,8,9,10,12.5,15,17.5,and 20 dB

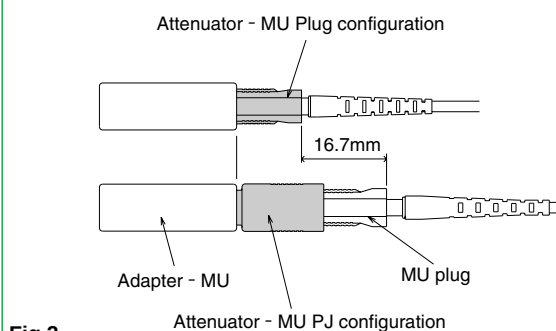
### 3. Insertion and extraction tool

The MU standard tool is available as shown in Fig. 4.

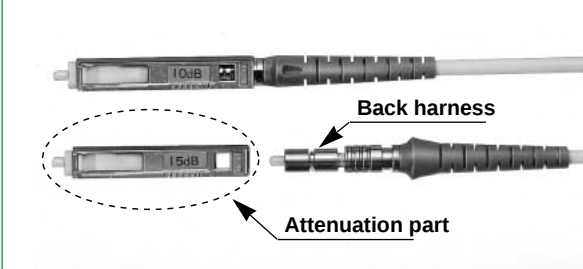
### 4. Maximum input power :100mW

### 5. Please contact us if you have any requests. Hirose will offer excellent solutions to meet your requirements.

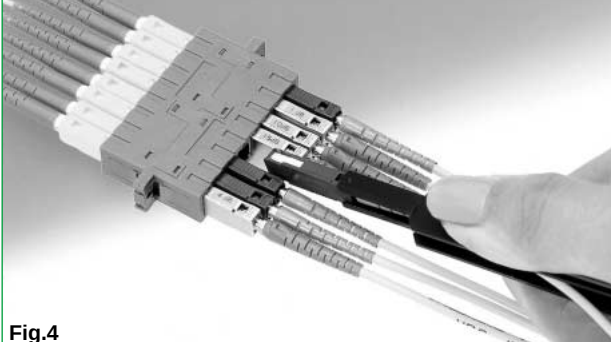
## Save 16.7mm space



## Easy to change an attenuation part



## MU standard tool is available



## Applications

Power level adjustment of optical fiber communication networks.

## Product Specifications

| Ratings | Operation temperature range | -25°C to +70°C | Storage temperature range | -25°C to +70°C |
|---------|-----------------------------|----------------|---------------------------|----------------|
|         | Max. Input Power            | 100mW          | Fiber type                | SM             |

| Item                          |                                               | Test Method                                                                                                                 | Specifications                                                                                         |                                 |
|-------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------|
| Optical Characteristics       | Attenuation                                   | Measurement at a point within the wavelength of $1310 \pm 30$ nm, and a point within the wavelength of $1550 \pm 30$ nm.    | Attenuation Tolerance                                                                                  |                                 |
|                               |                                               |                                                                                                                             | 0dB                                                                                                    | $\leq 0.5$ dB                   |
|                               |                                               |                                                                                                                             | 1,2dB                                                                                                  | $\pm 0.5$ dB                    |
|                               |                                               |                                                                                                                             | 3,4,5,6dB                                                                                              | $\pm 0.8$ dB                    |
|                               |                                               |                                                                                                                             | 7,8,9dB                                                                                                | $\pm 1.0$ dB                    |
|                               |                                               |                                                                                                                             | 10dB                                                                                                   | $\pm 1.2$ dB                    |
|                               |                                               |                                                                                                                             | 12.5,15,17.5,20dB                                                                                      | $\pm \text{ATT} \times 10\%$ dB |
|                               | Return Loss(R.L.)                             |                                                                                                                             | $\geq 40$ dB                                                                                           |                                 |
| Mechanical Characteristics    | Engagement and separation forces              | Engagement and separation forces at 50mm/s.                                                                                 | Engagement force: $\leq 12.5$ N<br>Separation force: $\leq 12.5$ N                                     |                                 |
|                               | Gauge retention force                         | Zirconia gauge at $\phi 1.249 \pm 0.0005$ mm.                                                                               | 1.0N to 2.5N                                                                                           |                                 |
|                               | Mating durability                             | Insertion and extraction number for connectors:500<br>Insertion and extraction number for an attenuation element:50         | 1) Attenuation shall be satisfied after the test.<br>2) No breakage, crack or looseness on components. |                                 |
|                               | Vibration                                     | For 3 hours at an amplitude of 1.5mm.with the frequency range 10 to 55Hz.<br>In each of three mutually perpendicular plane. |                                                                                                        |                                 |
|                               | Shock                                         | 3 times in each of three mutually perpendicular axis with the acceleration $981\text{m/s}^2$ .                              |                                                                                                        |                                 |
| Environmental Characteristics | Compasite Temperature-humidity<br>Cyclic test | Humidity : 90% to 96%<br>Temperature : -10°C to 65°C,<br>Cyclic : 10 cycles(240 hours)                                      | No significant corrosion.                                                                              |                                 |
|                               | Temperature cycling                           | Temp : 25→-25→-25→70→70→25°C<br>Time : 15 30 30 30 15 min<br>Cyclic : 10 cycles                                             |                                                                                                        |                                 |
|                               | Dry heat                                      | Temperature : 85°C Time : 500 hours                                                                                         |                                                                                                        |                                 |
|                               | Cold                                          | Temperature : -25°C Time : 500 hours                                                                                        |                                                                                                        |                                 |
|                               | Salt Mist                                     | Salt Mist : 5% Time : 48 hours                                                                                              |                                                                                                        |                                 |

## Materials

| Part         | Material   |
|--------------|------------|
| Body         | Zinc alloy |
| Ferrule      | Zirconia   |
| Split sleeve | Zirconia   |

## Ordering Information

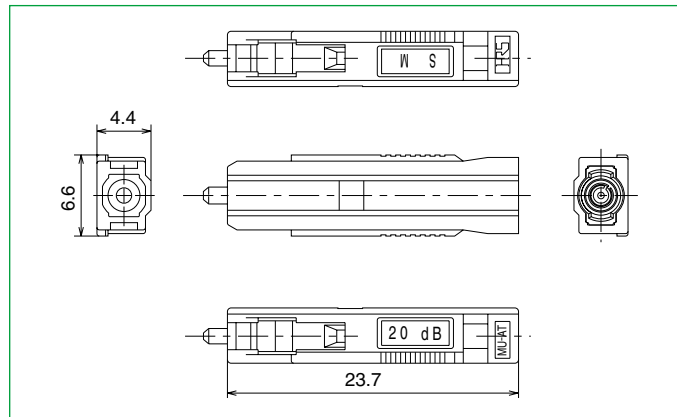
**HMU - PAT - FH - K 1 01**

①      ②      ③      ④ ⑤ ⑥

|                                       |                                                                   |
|---------------------------------------|-------------------------------------------------------------------|
| ① Series name                         | : HMU                                                             |
| ② Indicates a in-line type attenuator |                                                                   |
| ③ Indicates the attenuation part      |                                                                   |
| ④ Polishing type                      | K:AdPC                                                            |
| ⑤ Applicable optical fiber            | 1:SM                                                              |
| ⑥ Attenuation                         | 00:0 dB (Through)12:12.5dB,17:17.5dB<br>01 to N: Attenuation (dB) |

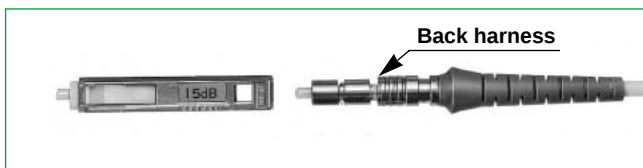
Note: This attenuator is used only with the cable assembly shown on the next page.

## In-line attenuators



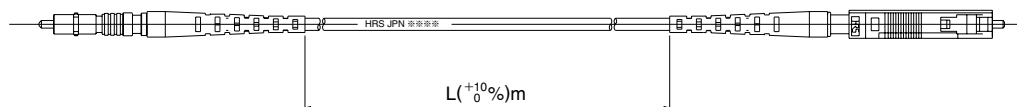
| Part Number     | CL No.     | Attenuation | Specification | Return loss | Wavelength       | Split sleeve | Fiber type |
|-----------------|------------|-------------|---------------|-------------|------------------|--------------|------------|
| HMU-PAT-FH-K100 | 827-0001-8 | 0 dB        | 0.5dB max.    | ≥40dB       | 1310nm<br>1550nm | Zirconia     | SM         |
| HMU-PAT-FH-K101 | 827-0002-0 | 1 dB        | ±0.5dB        |             |                  |              |            |
| HMU-PAT-FH-K102 | 827-0003-3 | 2 dB        |               |             |                  |              |            |
| HMU-PAT-FH-K103 | 827-0004-6 | 3 dB        |               |             |                  |              |            |
| HMU-PAT-FH-K104 | 827-0005-9 | 4 dB        | ±0.8dB        |             |                  |              |            |
| HMU-PAT-FH-K105 | 827-0006-1 | 5 dB        |               |             |                  |              |            |
| HMU-PAT-FH-K106 | 827-0007-4 | 6 dB        |               |             |                  |              |            |
| HMU-PAT-FH-K107 | 827-0011-1 | 7 dB        |               |             |                  |              |            |
| HMU-PAT-FH-K108 | 827-0012-4 | 8 dB        | ±1dB          |             |                  |              |            |
| HMU-PAT-FH-K109 | 827-0013-7 | 9 dB        |               |             |                  |              |            |
| HMU-PAT-FH-K110 | 827-0008-7 | 10 dB       |               |             |                  |              |            |
| HMU-PAT-FH-K112 | 827-0014-0 | 12.5dB      | ±ATT×10%dB    |             |                  |              |            |
| HMU-PAT-FH-K115 | 827-0009-0 | 15 dB       |               |             |                  |              |            |
| HMU-PAT-FH-K117 | 827-0015-2 | 17.5dB      |               |             |                  |              |            |
| HMU-PAT-FH-K120 | 827-0010-9 | 20 dB       |               |             |                  |              |            |

## Back Cable Assembly (2mm diameter cable type)



The back cable assembly is supplied by Hirose.

Please contact your Hirose sales representative for details concerning your back cable needs, including cable length and mating connector requirements.



## Ordering Information (Back cable assembly)

**HMU - PAT BH 101 K Q - L**  
 ① ② ③ ④ ⑤ ⑥ ⑦

|                                         |                                                  |
|-----------------------------------------|--------------------------------------------------|
| ① Series Name HMU                       | ⑤ Polishing type K: AdPC                         |
| ② Indicates a in-line type attenuator   | ⑥ Fiber cable type(Note)                         |
| ③ Indicate a back cable assembly        | Q: SM-9.5/125, diameter 2mm Jacket color: Yellow |
| ④ Mating connector (Note)               | ⑦ Cable length                                   |
| 011 : FC connector, 2 mm diameter cable | Unit: Meters                                     |
| 04G : SC connector, 2 mm diameter cable |                                                  |
| 101 : MU connector, 2 mm diameter cable |                                                  |

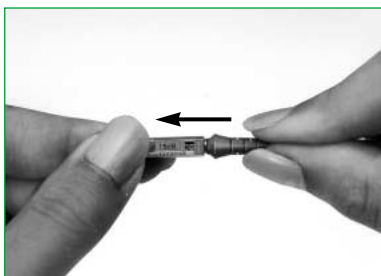
Note: These are examples of offered cable assemblies. They will differ depending on the applicable cable diameter and the type of boot.  
For exact cable assembly specifications, specify the connector type at the mating side and the required total length. Contact your Hirose Electric account representative.

## ◆ Procedure for Changing the Attenuator Element

### Insertion Procedure



- 1 Align the triangle mark of the boot on the back cable assembly with the black indexing mark on the attenuator.

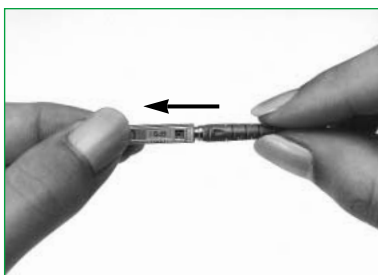


- 2 Insert the back cable assembly into the attenuator.

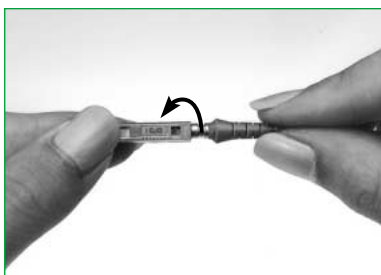


- 3 Turn right the back cable assembly to engage connection lock. After turning, the triangle mark of the boot will be aligned with the attenuation label.

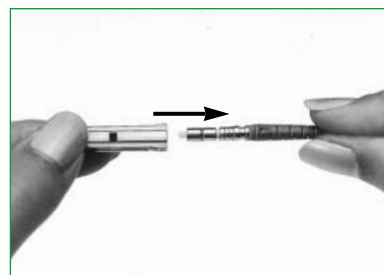
### Withdrawal Procedure



- 1 Press the back cable assembly toward the attenuator.



- 2 Turn right the back cable assembly and release the lock.



- 3 Pull away the back cable assembly.