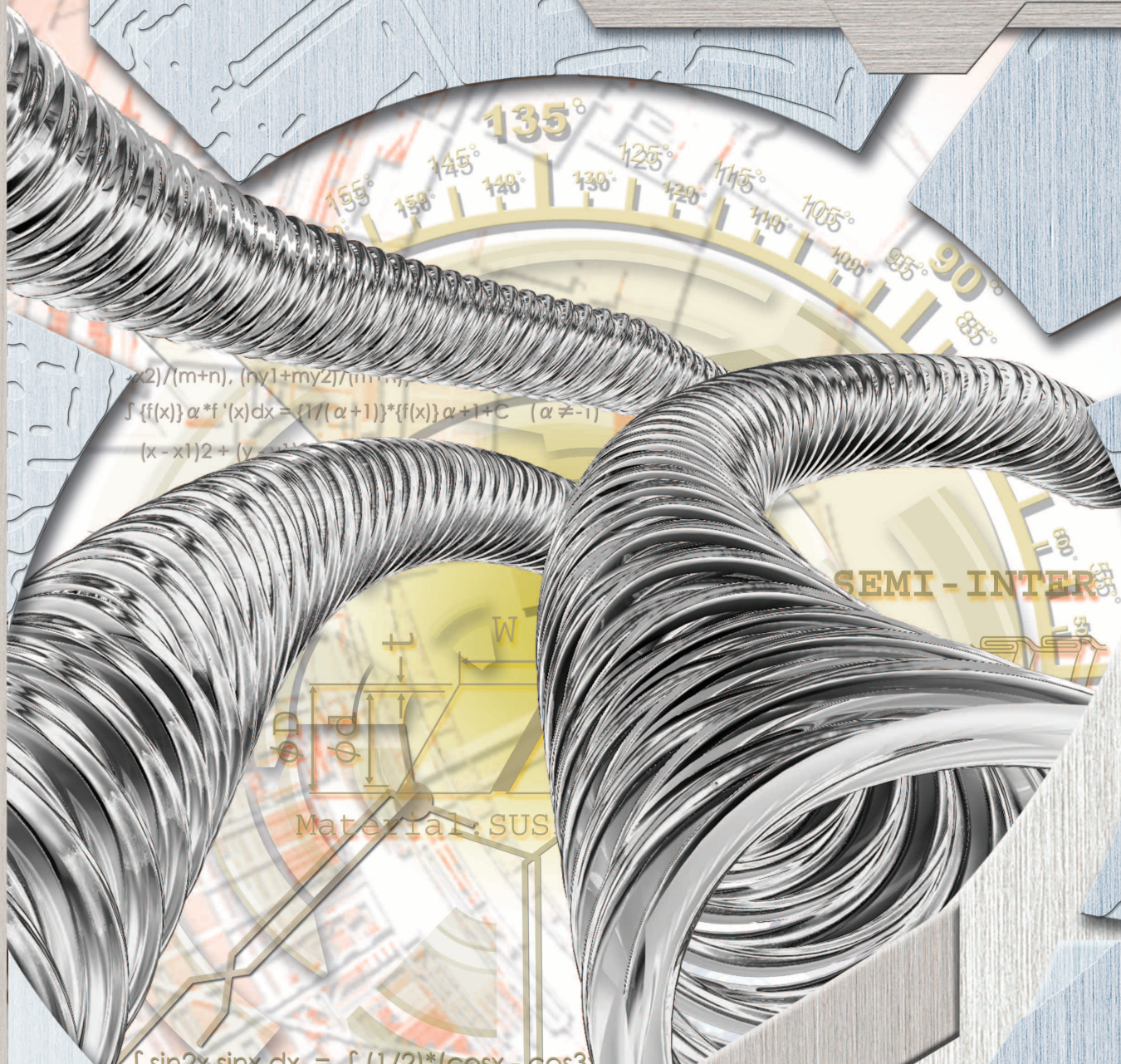


# **FLEXIBLE TUBES & CONNECTORS**



**HAGI**

HAGITEC Co.,LTD.

Ver.002



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## ■ Features

- Impact
- Heat
- Welding sparks
- Repeated bending
- Lateral pressure
- Loss of the optical signals

Combined with the Fiber Protect Connector, a variety of sensors can be completely protected to the sensor head even with applications that require movement. The Fiber Protector has a variety of models due to the different types of interlocking and materials that can be used.

Custom made products can be produced to our clientele's specifications for various applications:

- Fluids
- Micro-thin
- Torque transmission
- Medical

## ■ New Product

As PVC substitute for the fiber protector sheathing material, Olefin Elastomer, was developed which is a highly pliable and low cost halogen free compound. This makes for an environmental friendly product.

## ■ Applications

For protection of Optical Fibers and Sensor Cables, Communication Equipment, Medical Equipment, Arcade Game Machines, Robots, Lighting, Fiber Scopes, Light Guides, Measurement device, Microphone Stands, Underground Protective Pipes, Shower Hose Coverings, Gas Water Heaters, and Flexible Outlet Pipes in Water Purifiers.

## ■ Insertion

Using special techniques, approximately 1000m of the flexible tube would have cables or optic fibers inserted and placed on a reel.

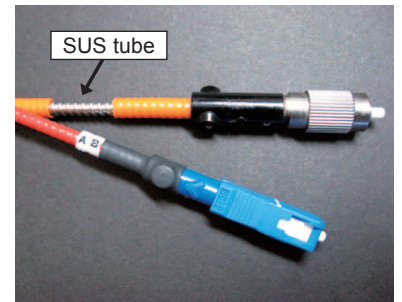
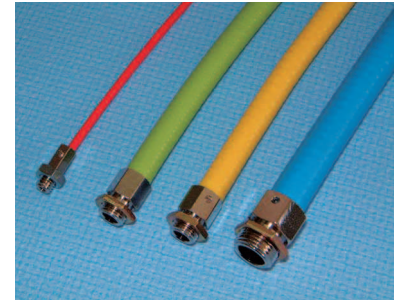
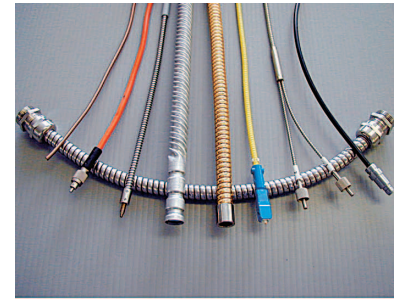
## ■ PVC Color

Standard: ●Glossy Black also available matte Black, ●Green, ●Yellow, ●Blue, ●Orange, ○White, ●Gray, ●Pink, ●Red, ○Clear

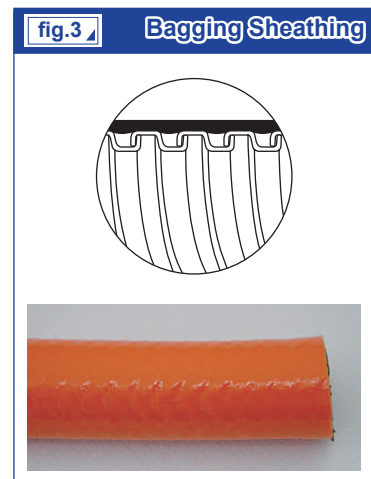
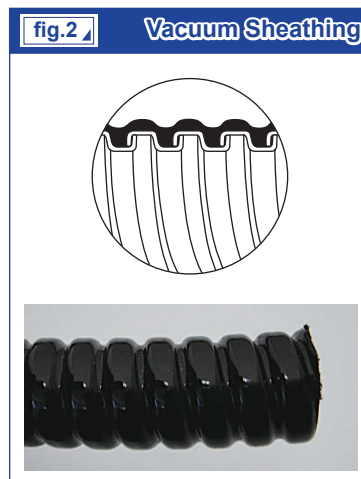
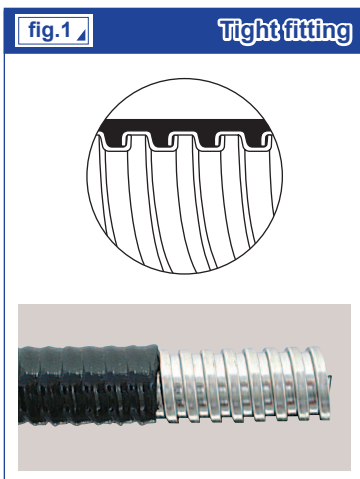
Please specify the requested color after the model number, if other than Glossy Black.  
Example: KSP-4N (Pink)

## ■ PVC Sheathing variation

There are four types of PVC sheathing on Casing Tubes



|                            |           |  |       |
|----------------------------|-----------|--|-------|
| ○ Tight fitting            | KSP- _N   | Standard Item. PVC will fill the spiral valley to make the finished surface even and smooth.                         | fig.1 |
| ○ Vacuum Sheathing         | KSP- _N-B | During processing, the sheathing will be applied in a vacuum. The finished surface will have the spiral pattern.     | fig.2 |
| ○ Bagging Sheathing        | KSP- _N-F | Sheathing only on the surface of tube and no PVC in the spiral valley, however the surface will be even and smooth . | fig.3 |
| ○ Heat Shrinking Sheathing | KSP- _N   | Please contact us for details.   |       |



## Features

- General purpose and standard stock items
- Lightweight
- Pliable
- Non-stretch
- High pulling load strength
- Resists lateral pressure
- Excellent bending characteristics
- KSP & KSO types are mistproof and oil resistance (black standard color)

## Materials

- Flexible Tube: Stainless Steel
- Sheathing: Soft Vinyl-Chloride (PVC), Olefin Elastomer (new product)

## Optional Materials for

- Flexible Tube: Titanium, Brass, Copper, Aluminum, Electroplating Copper strip
- Sheathing: Polyethylene (PE), Silicon Rubber (Si), Fluorocarbon Resin (ETFE.FEP), Stainless Steel Braiding (B) \*Please refer page 13 in this catalog for more details.
- Sheathing Combinations: Stainless Steel Braiding+PVC, Kevlar+PVC, etc.

## Applications

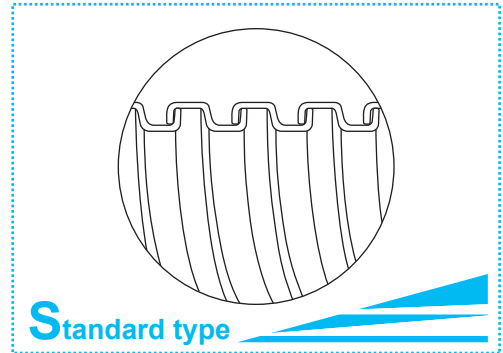
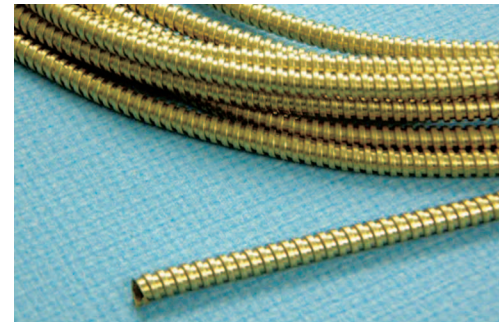
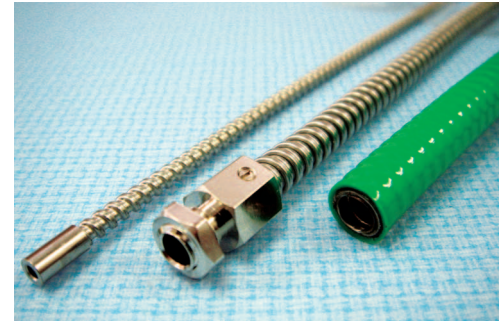
- Optical Fiber and Sensor Cable protection
- Communication Equipment
- Medical Equipment
- Arcade game machines
- Robots
- Lighting
- Fiber scopes
- Light guides
- Measurement devices

## About Standard Length

Standard length of the tube is approx. 100m and it is consist of two or three shorter length of tubes such as 75m+25m, 45m+55m. Please contact us when you need a tube without connections.

## Notes

1. Delivery time will be 14 to 21 days after receiving the order.
2. processing (assembling metal fittings and de-burring). Upon request, we will accept orders for the insertion of Optical Fibers and Cable Harness



| Standard type |                     |                     |                       |               |                       |                              |                   |          |                     | PVC coating type    |               |                       |                              |                   |  |
|---------------|---------------------|---------------------|-----------------------|---------------|-----------------------|------------------------------|-------------------|----------|---------------------|---------------------|---------------|-----------------------|------------------------------|-------------------|--|
| Model         | ID<br>± 0.2mm(inch) | OD<br>± 0.2mm(inch) | Bending<br>Radius(mm) | Length<br>(m) | Approx<br>Weight(g/m) | Max Length<br>one stretch(m) | Standard<br>stock | Model    | ID<br>± 0.3mm(inch) | OD<br>± 0.3mm(inch) | Length<br>(m) | Approx<br>Weight(g/m) | Max Length<br>one stretch(m) | Standard<br>stock |  |
| KS-1.2N       | 1.2±0.1(0.047)      | 2.3±0.1(0.091)      | 23                    | 100           | 12                    | 250                          | ○                 | KSP-1.2N | 3.0(0.118)          | 100                 | 18            | 250                   | ○                            |                   |  |
| KS-1.5N       | 1.5±0.1(0.059)      | 2.6±0.1(0.102)      | 23                    | 100           | 14                    | 250                          | ○                 | KSP-1.5N | 3.4(0.134)          | 100                 | 20            | 250                   | ○                            |                   |  |
| KS-1.8N       | 1.8(0.071)          | 2.9(0.114)          | 23                    | 100           | 15                    | 300                          | ○                 | KSP-1.8N | 3.7(0.145)          | 100                 | 25            | 300                   | ○                            |                   |  |
| KS-2.2N       | 2.2(0.087)          | 3.4(0.134)          | 20                    | 100           | 16                    | 300                          | ○                 | KSP-2.2N | 4.4(0.173)          | 100                 | 38            | 300                   | ○                            |                   |  |
| KS-2.6N       | 2.6(0.102)          | 3.8(0.150)          | 20                    | 100           | 19                    | 300                          | ○                 | KSP-2.6N | 4.8(0.189)          | 100                 | 40            | 300                   | ○                            |                   |  |
| KS-3N         | 3.0(0.118)          | 4.6(0.181)          | 18                    | 100           | 30                    | 300                          | ○                 | KSP-3N   | 6.1(0.240)          | 100                 | 60            | 300                   | ○                            |                   |  |
| KS-3.2N       | 3.2(0.126)          | 4.8(0.189)          | 18                    | 100           | 32                    | 300                          | ○                 | KSP-3.2N | 6.3(0.248)          | 100                 | 62            | 300                   | ○                            |                   |  |
| KS-3.5N       | 3.5(0.138)          | 5.0(0.197)          | 19                    | 100           | 34                    | 300                          | ○                 | KSP-3.5N | 6.1(0.240)          | 100                 | 65            | 300                   | ○                            |                   |  |
| KS-4N         | 4.0(0.157)          | 5.6(0.220)          | 19                    | 100           | 36                    | 150                          | ○                 | KSP-4N   | 7.0(0.276)          | 100                 | 66            | 150                   | ○                            |                   |  |
| KS-5N         | 5.0(0.197)          | 7.0(0.276)          | 24                    | 100           | 45                    | 100                          | ○                 | KSP-5N   | 8.5(0.335)          | 100                 | 70            | 100                   | ○                            |                   |  |
| KS-6N         | 6.0(0.236)          | 8.0(0.315)          | 25                    | 100           | 60                    | 100                          | ○                 | KSP-6N   | 9.2(0.362)          | 100                 | 100           | 100                   | ○                            |                   |  |
| KS-7N         | 7.0(0.276)          | 9.0(0.354)          | 27                    | 100           | 62                    | 100                          | ○                 | KSP-7N   | 10.0(0.394)         | 100                 | 116           | 100                   | ○                            |                   |  |
| KS-8N         | 8.0(0.315)          | 10.0(0.394)         | 30                    | 100           | 75                    | 100                          | ○                 | KSP-8N   | 11.4(0.449)         | 100                 | 120           | 100                   | ○                            |                   |  |
| KS-9N         | 9.5(0.374)          | 12.3(0.484)         | 31                    | 50            | 110                   | 50                           | ○                 | KSP-9N   | 14.2(0.559)         | 50                  | 170           | 50                    | ○                            |                   |  |
| KS-10N        | 10.0(0.394)         | 12.7(0.500)         | 32±8                  | 50            | 115                   | 50                           | ○                 | KSP-10N  | 14.7(0.579)         | 50                  | 175           | 50                    | ○                            |                   |  |
| KS-11N        | 11.0(0.433)         | 13.7(0.539)         | 33±8                  | 50            | 120                   | 50                           | ○                 | KSP-11N  | 15.9(0.626)         | 50                  | 180           | 50                    | ○                            |                   |  |
| KS-12N        | 12.0(0.472)         | 14.8(0.582)         | 33±8                  | 50            | 125                   | 50                           | ○                 | KSP-12N  | 16.6(0.653)         | 50                  | 190           | 50                    | ○                            |                   |  |
| KS-13N        | 13.0(0.512)         | 15.8(0.622)         | 31±8                  | 50            | 130                   | 50                           | ○                 | KSP-13N  | 17.7(0.697)         | 50                  | 200           | 50                    | ○                            |                   |  |
| KS-14N        | 14.0±0.3(0.551)     | 17.0±0.3(0.669)     | 36±8                  | 50            | 135                   | 50                           | ○                 | KSP-14N  | 19.0(0.748)         | 50                  | 260           | 50                    | ○                            |                   |  |
| KS-15N        | 15.8±0.3(0.622)     | 18.9±0.3(0.744)     | 36±10                 | 50            | 170                   | 50                           | ○                 | KSP-15N  | 21.0(0.827)         | 50                  | 310           | 50                    | ○                            |                   |  |
| KS-19N        | 19.1±0.3(0.752)     | 22.5±0.3(0.886)     | 50±10                 | 50            | 210                   | 15                           | ○                 | KSP-19N  | 24.5(0.965)         | 50                  | 325           | 15                    | ○                            |                   |  |
| KS-22N        | 20.8±0.3(0.819)     | 24.8±0.5(0.976)     | 70±15                 | 50            | 215                   | 15                           | ○                 | KSP-22N  | 26.3±0.5(1.035)     | 50                  | 565           | 15                    | ○                            |                   |  |
| KS-25N        | 25.4±0.3(1.000)     | 29.2±0.5(1.150)     | 80±15                 | 50            | 225                   | 15                           | ○                 | KSP-25N  | 32.0±0.5(1.260)     | 50                  | 580           | 15                    | ○                            |                   |  |
| KS-28N        | 26.4±0.5(1.039)     | 30.9±0.5(1.217)     | 80±15                 | 50            | 340                   | 15                           | ○                 | KSP-28N  | 33.0±0.5(1.299)     | 50                  |               |                       | ○                            |                   |  |
| KS-31N        | 31.8±0.5(1.252)     | 36.0±0.5(1.417)     | 90±15                 | 30            | 490                   |                              | ○                 | KSP-31N  | 39.5±0.5(1.555)     | 30                  |               |                       | ▲                            |                   |  |
| KS-36N        | 35.0±0.5(1.378)     | 39.5±0.5(1.555)     | 100±15                | 30            | 540                   |                              | ▲                 | KSP-36N  | 41.8±0.5(1.646)     | 30                  |               |                       | ▲                            |                   |  |
| KS-39N        | 38.1±0.8(1.500)     | 42.1±0.8(1.657)     | 110±20                | 30            |                       |                              | ▲                 | KSP-39N  | 46.0±0.8(1.811)     | 30                  |               |                       | ▲                            |                   |  |
| KS-42N        | 40.0±0.8(1.575)     | 44.0±0.8(1.732)     | 110±20                | 30            |                       |                              | ▲                 | KSP-42N  | 48.0±0.8(1.890)     | 30                  |               |                       | ▲                            |                   |  |
| KS-51N        | 50.8±0.8(2.000)     | 54.8±0.8(2.157)     | 125±30                | 20            |                       |                              | ▲                 | KSP-51N  | 58.8±1.0(2.315)     | 20                  |               |                       | ▲                            |                   |  |
| KS-54N        | 51.3±0.8(2.020)     | 55.3±0.8(2.177)     | 125±30                | 20            |                       |                              | ▲                 | KSP-54N  | 59.3±1.0(2.335)     | 20                  |               |                       | ▲                            |                   |  |

KS-63N to 104N/ Special order

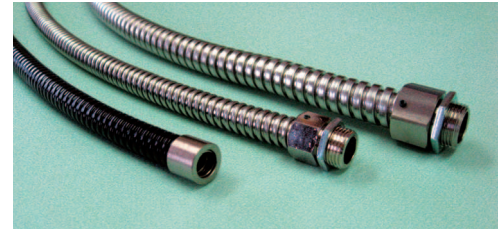
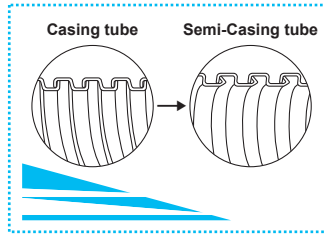
KSP/OD will be product by customers order.

※Standard stock ○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us



### Features

- General application
- Light weight
- Pliable
- better twist resistance than KS-\*\*N



| Standard type |                     |                     |                       |               |                       |                              |                   | PVC coating type |                     |               |                       |                              |                   |
|---------------|---------------------|---------------------|-----------------------|---------------|-----------------------|------------------------------|-------------------|------------------|---------------------|---------------|-----------------------|------------------------------|-------------------|
| Model         | ID<br>± 0.2mm(inch) | OD<br>± 0.2mm(inch) | Bending<br>Radius(mm) | Length<br>(m) | Approx<br>Weight(g/m) | Max Length<br>one stretch(m) | Standard<br>stock | Model            | OD<br>± 0.2mm(inch) | Length<br>(m) | Approx<br>Weight(g/m) | Max Length<br>one stretch(m) | Standard<br>stock |
| SKS-8N        | 7.9(0.311)          | 10.0(0.394)         | 38                    | 100           | 88                    | 100                          | ▲                 | SKSP-8N          | 11.4(0.449)         | 100           | 100                   | 100                          | ▲                 |
| SKS-9N        | 9.4(0.370)          | 12.3(0.484)         | 45                    | 50            | 140                   | 50                           | ○                 | SKSP-9N          | 14.2±0.3(0.559)     | 50            | Please ask            | 50                           | ○                 |
| SKS-10N       | 9.8(0.386)          | 12.7(0.500)         | 45                    | 50            | 148                   | 50                           | ▲                 | SKSP-10N         | 14.7±0.3(0.579)     | 50            | Please ask            | 50                           | ▲                 |
| SKS-11N       | 10.8(0.425)         | 13.7(0.539)         | 47                    | 50            | 158                   | 50                           | ▲                 | SKSP-11N         | 15.9±0.3(0.626)     | 50            | Please ask            | 50                           | ▲                 |
| SKS-12N       | 11.9(0.469)         | 14.8(0.583)         | 50                    | 50            | 165                   | 50                           | ▲                 | SKSP-12N         | 16.1±0.3(0.634)     | 50            | Please ask            | 50                           | ▲                 |
| SKS-13N       | 12.8(0.504)         | 15.8(0.622)         | 52                    | 50            | 178                   | 50                           | ▲                 | SKSP-13N         | 17.7±0.3(0.697)     | 50            | Please ask            | 50                           | ▲                 |
| SKS-15N       | 15.8±0.3(0.622)     | 18.9±0.3(0.744)     | 55                    | 50            | 260                   | 50                           | ▲                 | SKSP-15N         | 21.0±0.3(0.827)     | 50            | Please ask            | 50                           | ▲                 |

※Standard stock ○=HAGITEC's standard stock item. Stock quantity is 10 to 500m. ▲=Semi standard stock

### Features

Standard stock item. Olefin Elastomer is the new ECO material for HAGITUBE sheathing which can be used for instead of PVC. This makes for a highly pliable product that is chemical and weather resistant. Best of all, this product does not contain any lead or halogen compound making it suitable for ROHS.

### Olefin System Elastomer

PVC substitute, highly pliable with superior weather resistance  
Heat proof: maximum 60 °C  
Standard Color: ●Matte Black  
By order basis color: ●Blue, ●Yellow, ●Green, ●Red, ●Purple, ○White, (Please contact us for the minimum order.)

### Materials

- Flexible Tube: Stainless Steel
- Sheathing: Olefin Elastomer(new product)
- Sheathing Color: ●Matte black
- Sheathing Type: Tight Fitting

### Note

Colors and heat resistance. Grade are available as a custom order.



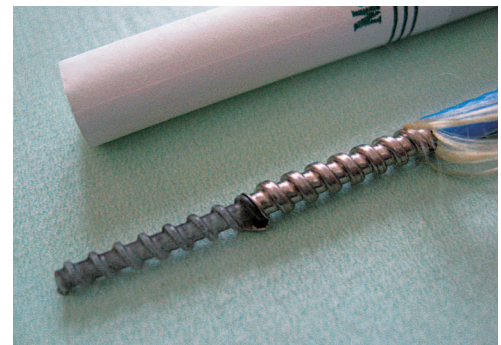
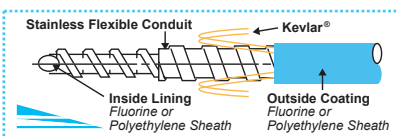
| Model    | ID<br>± 0.2mm(inch) | OD<br>± 0.2mm(inch) | Bending<br>Radius<br>±5(mm) | Length<br>(m) | Approx<br>Weight(m/g) | Max Length<br>one stretch(m) | Standard<br>stock |
|----------|---------------------|---------------------|-----------------------------|---------------|-----------------------|------------------------------|-------------------|
| KSO-1.2N | 1.2±0.1(0.047)      | 3.0±0.1(0.118)      | 23                          | 100           | 18                    | 250                          | ▲                 |
| KSO-1.5N | 1.5±0.1(0.059)      | 3.4±0.1(0.134)      | 23                          | 100           | 20                    | 250                          | ▲                 |
| KSO-1.8N | 1.8(0.071)          | 3.7(0.146)          | 23                          | 100           | 25                    | 300                          | ○                 |
| KSO-2.2N | 2.2(0.087)          | 4.4(0.173)          | 20                          | 100           | 38                    | 300                          | ▲                 |
| KSO-2.6N | 2.6(0.102)          | 4.8(0.189)          | 20                          | 100           | 40                    | 300                          | ○                 |
| KSO-3N   | 3.0(0.118)          | 6.1(0.240)          | 18                          | 100           | 60                    | 300                          | ○                 |
| KSO-3.2N | 3.2(0.126)          | 6.3(0.248)          | 18                          | 100           | 62                    | 300                          | ▲                 |
| KSO-3.5N | 3.5(0.138)          | 6.1(0.240)          | 19                          | 100           | 65                    | 300                          | ▲                 |
| KSO-4N   | 4.0(0.157)          | 7.0(0.276)          | 19                          | 100           | 66                    | 150                          | ○                 |
| KSO-5N   | 5.0(0.197)          | 8.5(0.335)          | 24                          | 100           | 70                    | 100                          | ○                 |
| KSO-6N   | 6.0(0.236)          | 9.2(0.362)          | 25                          | 100           | 100                   | 100                          | ○                 |
| KSO-7N   | 7.0(0.276)          | 10.0(0.394)         | 27                          | 100           | 116                   | 100                          | ○                 |
| KSO-8N   | 8.0(0.315)          | 11.4(0.449)         | 30                          | 100           | 120                   | 100                          | ○                 |
| KSO-9N   | 9.5(0.374)          | 14.2±0.3(0.559)     | 31                          | 100           | 170                   | 50                           | ○                 |
| KSO-10N  | 10.0(0.394)         | 14.7±0.3(0.579)     | 32±8                        | 100           | 175                   | 50                           | ▲                 |
| KSO-11N  | 11.0(0.433)         | 15.9±0.3(0.626)     | 33±8                        | 100           | 180                   | 50                           | ▲                 |
| KSO-13N  | 13.0(0.512)         | 17.7±0.3(0.697)     | 31±8                        | 100           | 200                   | 50                           | ○                 |
| KSO-14N  | 14.0(0.551)         | 19.0±0.3(0.748)     | 36±8                        | 100           | 260                   | 50                           | ▲                 |
| KSO-15N  | 15.8±0.3(0.622)     | 21.0±0.3(0.827)     | 36±10                       | 100           | 310                   | 50                           | ▲                 |

※Standard stock

○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

### Features

3-Layer Stainless Flexible Conduit is consist of 3 layers of tubes. Stainless casing tube (Flexible Conduit) lined by fluorine or polyethylene sheath inside. And outside of the stainless tube is also coated by fluorine or polyethylene. Inner tube(sheath) is clinging to the surface of the stainless tube so that it prevent the stainless conduit from stretching and/or shrinking, and misting inside. These unique characteristics of the 3-Layer Stainless Flexible Conduit is ideal for wiring optical fibers in automobiles, airplanes, Sewage and in the severe environments.



\*Kevlar® will be applied by request.

\*Contact with us for detail.



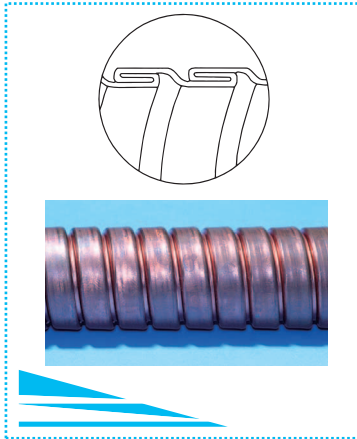
### ■ Features

- Connected firmer than Casing Tube
- Resists lateral pressure, twisting and pulling (in normal use, they do not come apart)
- Excellent pliability
- Withstands repeated bending
- Optimum protection for optical fiber

### ■ Applications

- Optical fiber protection
- Electrical wire protection
- Shower hose covering
- Harness protection in arcade game machines.

Production is scheduled after receiving order.  
(Some sizes are in standard stock.)



| ● Standard type |               |                 |               |                 |                |           |             |                |          | ● PVC coating type |               |                 |           |             |            |   |
|-----------------|---------------|-----------------|---------------|-----------------|----------------|-----------|-------------|----------------|----------|--------------------|---------------|-----------------|-----------|-------------|------------|---|
| Model           | ± 0.2mm(inch) | ID              | ± 0.2mm(inch) | OD              | Bending Radius | Standard  | Approx      | Max length     | Standard | Model              | ± 0.3mm(inch) | OD              | Standard  | Approx      | Standard   |   |
|                 |               |                 |               |                 | ± 10(mm)       | Length(m) | Weight(g/m) | one stretch(m) | stock    |                    |               |                 | Length(m) | Weight(g/m) | stock      |   |
| SA-2.6N         |               | 2.6(0.102)      |               | 3.9(0.153)      | 28             | 100       | -           | 100            | ▲        | SAP-3N             |               | 6.0(0.236)      |           | 100         | Please ask | ▲ |
| SA-3N           |               | 3.0(0.118)      |               | 5.0(0.197)      | 30             | 100       | 52          | 100            | ▲        | SAP-4N             |               | 7.5(0.295)      |           | 100         | Please ask | ▲ |
| SA-4N           |               | 4.0(0.157)      |               | 6.0(0.236)      | 37             | 100       | 56          | 100            | ▲        | SAP-5N             |               | 8.5(0.335)      |           | 100         | Please ask | ▲ |
| SA-5N           |               | 5.0(0.197)      |               | 7.1(0.280)      | 23             | 100       | 60          | 100            | ▲        | SAP-6N             |               | 9.6(0.378)      |           | 100         | Please ask | ▲ |
| SA-6N           |               | 6.0(0.236)      |               | 8.0(0.315)      | 23             | 100       | 64          | 100            | ▲        | SAP-7N             |               | 11.0(0.433)     |           | 100         | Please ask | ▲ |
| SA-7N           |               | 7.0(0.276)      |               | 9.0(0.354)      | 25             | 100       | 68          | 100            | ▲        | SAP-8N             |               | 12.0(0.472)     |           | 100         | Please ask | ▲ |
| SA-8N           |               | 8.0(0.315)      |               | 10.0(0.394)     | 25             | 100       | 72          | 100            | ▲        | SAP-9N             |               | 14.0(0.551)     |           | 50          | Please ask | ▲ |
| SA-9N           |               | 9.5(0.374)      |               | 12.2(0.480)     | 30             | 100       | 76          | 100            | ▲        | SAP-13N            |               | 17.2(0.677)     |           | 50          | Please ask | ▲ |
| SA-13N          |               | 12.5±0.3(0.492) |               | 15.2±0.3(0.598) | 40             | 50        | Please ask  | Please ask     | ▲        | SAP-15N            |               | 21.0±0.4(0.827) |           | 50          | Please ask | ▲ |
| SA-15N          |               | 15.8±0.3(0.622) |               | 18.5±0.3(0.728) | 50             | 50        | 208         | Please ask     | ▲        | SAP-19N            |               | 25.0±0.4(0.984) |           | 50          | Please ask | ▲ |
| SA-19N          |               | 19.1±0.3(0.752) |               | 21.8±0.3(0.858) | 60             | 50        | Please ask  | Please ask     | ▲        | SAP-25N            |               | 32.0±0.5(1.260) |           | 30          | Please ask | ▲ |
| SA-25N          |               | 25.4±0.3(1.000) |               | 28.1±0.4(1.106) | 70             | 50        | 287         | Please ask     | ▲        | -                  |               | -               |           | -           | -          |   |

※Standard stock ○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

# Casing Double Spring Tube

### ■ Features

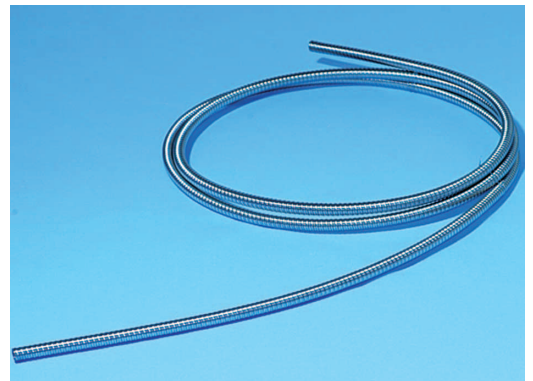
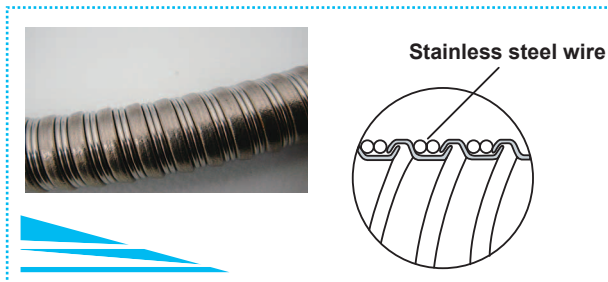
- Stainless steel wire is inserted in to the spiral valley of the casing tube, for a greater bending radius.(It is also possible to make the requested bending radius by modifying the wire diameter and rod.)
- Can be made ultra lightweight and firm by adding a strip of titanium.(The wire rod will be stainless steel).
- Excellent pliability and will withstand repeated bending.

The doubling of the stainless steel wire will produce a stable outer tube diameter.The increased stability results in no elasticity and can be provide optimum protection for Optic Fibers, especially, for the quartz type Optic Fiber and Hollow Optical Fiber.

### ■ Applications

Protection for the large bending radius Optical Fiber

Production is scheduled after receiving orders.



| ● Standard type |               |            |               |             |                |           |             |                |          | ● PVC coating type |               |             |             |          |     |
|-----------------|---------------|------------|---------------|-------------|----------------|-----------|-------------|----------------|----------|--------------------|---------------|-------------|-------------|----------|-----|
| Model           | ± 0.2mm(inch) | ID         | ± 0.2mm(inch) | OD          | Bending Radius | Standard  | Approx      | Max Length     | Standard | Model              | Standard OD   | Standard    | Approx      | Standard |     |
|                 |               |            |               |             | ± 0.2(mm)      | Length(m) | Weight(g/m) | one stretch(m) | stock    |                    | ± 0.2mm(inch) | Length(m)   | Weight(g/m) | stock    |     |
| KSWSP-2.6N      |               | 2.6(0.102) |               | 3.8(0.150)  | 30             | 100       | 27          | 10             | ▲        | KWSPP-2.6N         |               | 4.8(0.189)  |             | 100      | 40  |
| KSWSP-3N        |               | 3.0(0.118) |               | 4.6(0.181)  | 30             | 100       | 33          | 10             | ▲        | KWSPP-3N           |               | 6.1(0.240)  |             | 100      | 49  |
| KSWSP-3.2N      |               | 3.2(0.126) |               | 4.8(0.189)  | 30             | 100       | 35          | 10             | ▲        | KWSPP-3.2N         |               | 6.3(0.248)  |             | 100      | 51  |
| KSWSP-3.5N      |               | 3.5(0.138) |               | 5.0(0.197)  | 75             | 100       | 37          | 10             | ▲        | KWSPP-3.5N         |               | 6.1(0.240)  |             | 100      | 54  |
| KSWSP-4N        |               | 4.0(0.157) |               | 6.0(0.236)  | 40             | 100       | 40          | 10             | ▲        | KWSPP-4N           |               | 7.0(0.276)  |             | 100      | 59  |
| KSWSP-5N        |               | 5.0(0.197) |               | 7.0(0.276)  | 50             | 100       | 52          | 10             | ▲        | KWSPP-5N           |               | 8.5(0.335)  |             | 100      | 76  |
| KSWSP-6N        |               | 6.0(0.236) |               | 8.0(0.315)  | 70             | 100       | 64          | 10             | ▲        | KWSPP-6N           |               | 9.2(0.362)  |             | 100      | 94  |
| KSWSP-8N        |               | 8.0(0.315) |               | 10.0(0.394) | 55             | 100       | Please ask  |                | ▲        | KWSPP-8N           |               | 11.4(0.449) |             | 100      | 106 |

※Standard stock ○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us



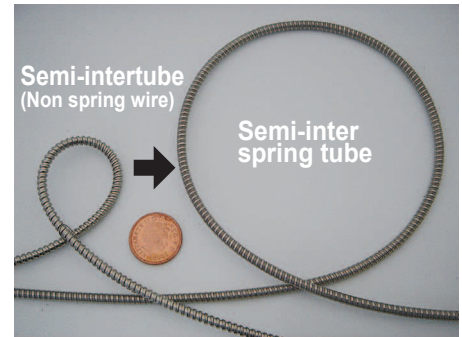
## Features

- Stainless steel wire is inserted in to the spiral valley of the semi-inter tube, for a greater bending radius.(It is also possible to make the requested bending radius by modifying the wire diameter and rod.)
- Excellent pliability and will withstand repeated bending.

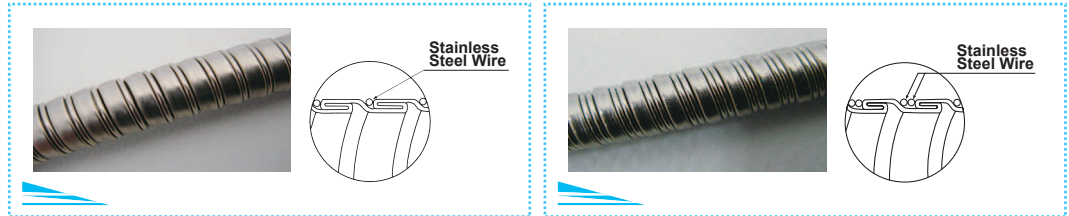
The doubling of the stainless steel wire will produce a stable outer tube diameter. The increased stability results in no elasticity and can be provide optimum protection for Optical Fibers, especially for laser fiber, the quartz type Optical Fiber and Hollow Optical Fiber etc.

## Applications

- Protection of optical fiber for dentistry lasers
- High power laser beam machine and welding machine



Production is scheduled after receiving order.  
(Some sizes are in standard stock.)



| ●Standard type |                     |                     |                            |                    |                    |                           |                | ●PVC coating type |                     |                    |                    |                           |                |
|----------------|---------------------|---------------------|----------------------------|--------------------|--------------------|---------------------------|----------------|-------------------|---------------------|--------------------|--------------------|---------------------------|----------------|
| Model          | ID<br>± 0.2mm(inch) | OD<br>± 0.3mm(inch) | Bending Radius<br>± 30(mm) | Standard Length(m) | Approx Weight(g/m) | Max Length one stretch(m) | Standard stock | Model             | OD<br>± 0.3mm(inch) | Standard Length(m) | Approx Weight(g/m) | Max Length one stretch(m) | Standard stock |
| SA(W)SP-3.2N   | 3.2(0.126)          | 5.2(0.205)          | 60                         | 100                | 67                 | 10                        | ▲              | SA(W)SPP-3.2N     | 6.5(0.256)          | 100                | 99                 | 10                        | ▲              |
| SA(W)SP-4N     | 4.0(0.157)          | 6.0(0.236)          | 70                         | 30                 | 70                 | 10                        | ▲              | SA(W)SPP-4N       | 7.0(0.276)          | 30                 | 103                | 10                        | ▲              |
| SA(W)SP-4.5N   | 4.5(0.177)          | 6.5(0.256)          | 80                         | 30                 | 72                 | 10                        | ▲              | SA(W)SPP-4.5N     | 7.7(0.303)          | 30                 | 106                | 10                        | ▲              |
| SA(W)SP-5N     | 5.0(0.197)          | 7.0(0.276)          | 80                         | 30                 | 74                 | 10                        | ▲              | SA(W)SPP-5N       | 8.6(0.339)          | 30                 | 109                | 10                        | ▲              |
| SA(W)SP-6N     | 6.0(0.236)          | 8.0(0.315)          | 110                        | 30                 | 77                 | 10                        | ▲              | SA(W)SPP-6N       | 9.6(0.378)          | 30                 | 113                | 10                        | ▲              |
| SA(W)SP-7N     | 7.0(0.276)          | 9.3(0.366)          | 115                        | 30                 | 80                 | 10                        | ▲              | SA(W)SPP-7N       | 11.0(0.433)         | 30                 | 118                | 10                        | ▲              |
| SA(W)SP-8N     | 8.0(0.315)          | 10.2(0.402)         | 113                        | 30                 | 83                 | 10                        | ▲              | SA(W)SPP-8N       | 12.0(0.472)         | 30                 | 122                | 10                        | ▲              |
| SA(W)SP-9N     | 9.5(0.374)          | 12.2(0.480)         | 100                        | 30                 | 86                 | 10                        | ▲              | SA(W)SPP-9N       | 14.0(0.551)         | 30                 | 126                | 10                        | ▲              |
| SA(W)SP-10N    | 10.0(0.394)         | 13.0(0.512)         | 150                        | 30                 | 90                 | 10                        | ▲              | SA(W)SPP-10N      | 15.4(0.606)         | 30                 | 132                | 10                        | ▲              |
| SA(W)SP-11N    | 11.0(0.433)         | 14.2(0.559)         | 300                        | 30                 | Please ask         |                           | ▲              | SA(W)SPP-11N      | 16.5(0.650)         | 30                 | Please ask         |                           | ▲              |

※Standard stock ○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

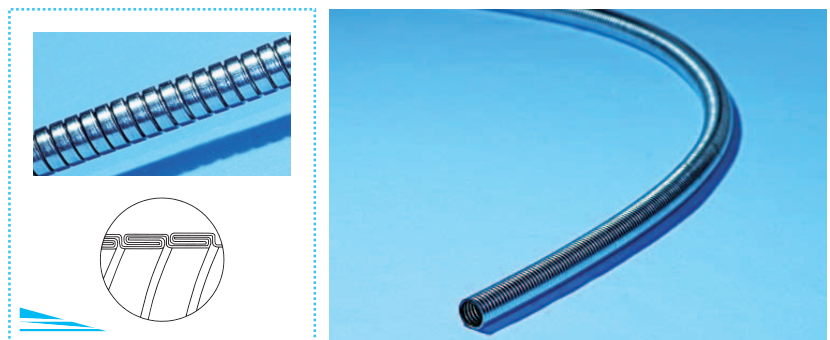
# Semi-Interlock Tube

## Features

- Strong interlocking
- Resists lateral pressure and pulling
- Non stretch
- Large bending radius and rigidity are optimum protection for quartz type Optical Fiber

## Applications

Protection for quartz type Optical Fiber.  
Production is scheduled after receiving order.  
(Some sizes are in standard stock.)



| ●Standard type |                     |                     |                            |                    |                    |                           |                | ●Polyethylen covered type |                     |                    |                    |                           |                |
|----------------|---------------------|---------------------|----------------------------|--------------------|--------------------|---------------------------|----------------|---------------------------|---------------------|--------------------|--------------------|---------------------------|----------------|
| Model          | ID<br>± 0.2mm(inch) | OD<br>± 0.2mm(inch) | Bending Radius<br>± 15(mm) | Standard Length(m) | Approx Weight(g/m) | Max Length one stretch(m) | Standard stock | Model                     | OD<br>± 0.2mm(inch) | Standard Length(m) | Approx Weight(g/m) | Max Length one stretch(m) | Standard stock |
| SX-4N          | 4.0(0.157)          | 5.8(0.228)          | 35                         | 100                | Please ask         |                           | ○              | SXPE-4N                   | 7.0(0.276)          | 100                | Please ask         |                           | ▲              |
| SX-5N          | 5.0(0.197)          | 6.7(0.264)          | 50                         | 100                | Please ask         |                           | ○              | SXPE-5N                   | 7.7(0.303)          | 100                | Please ask         |                           | ▲              |
| SX-6N          | 6.0(0.236)          | 7.9(0.311)          | 50                         | 100                | Please ask         |                           | ▲              | SXPE-6N                   | 9.4(0.370)          | 100                | Please ask         |                           | ▲              |
| SX-7N          | 7.0(0.276)          | 8.9(0.350)          | 60                         | 100                | Please ask         |                           | ▲              | SXPE-7N                   | 10.4(0.409)         | 100                | Please ask         |                           | ▲              |
| SX-8N          | 8.0(0.315)          | 9.8(0.386)          | 70                         | 100                | Please ask         |                           | ○              | SXPE-8N                   | 11.7(0.461)         | 100                | Please ask         |                           | ▲              |
| SX-9N          | 9.5(0.374)          | 12.0(0.472)         | 80                         | 50                 | Please ask         |                           | ○              | SXPE-9N                   | 13.5(0.531)         | 50                 | Please ask         |                           | ▲              |
| SX-13N         | 12.5±0.3(0.492)     | 15.0±0.3(0.591)     | 90±20                      | 50                 | Please ask         |                           | ▲              | SXPE-13N                  | 16.5(0.650)         | 50                 | Please ask         |                           | ▲              |
| SX-15N         | 15.8±0.3(0.622)     | 18.3±0.3(0.720)     | 90±30                      | 50                 | Please ask         |                           | ▲              | SXPE-15N                  | 20.0±0.4(0.787)     | 50                 | Please ask         |                           | ▲              |
| SX-19N         | 19.1±0.3(0.752)     | 22.1±0.3(0.870)     | 95±30                      | 30                 | Please ask         |                           | ▲              | SXPE-19N                  | 24.0±0.4(0.945)     | 30                 | Please ask         |                           | ▲              |
| SX-25N         | 25.4±0.4(1.000)     | 28.5±0.5(1.122)     | 110±40                     | 30                 | Please ask         |                           | ▲              | SXPE-25N                  | 30.5±0.5(1.201)     | 30                 | Please ask         |                           | ▲              |

SX-10N to 75N are made for a special order. Please inquiry.

※Standard stock ○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us



### Features

- No interlocking, only spring-like coiled stainless steel
- Superior pliability
- Resists lateral pressure
- Thin
- No limitation for the inner or outer diameters
- Normally used with PVC sheathing or stainless steel braiding on outside to prevent stretching.

### About Standard Length

- Length is approx. 100m by connecting a couple of short products.
- 10 to 16 m per piece
- Longer product (over 100m, depends on material and finished product) is available upon the special order. Please contact us for details.

### Note

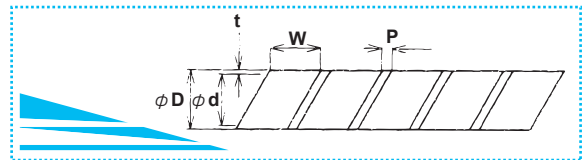
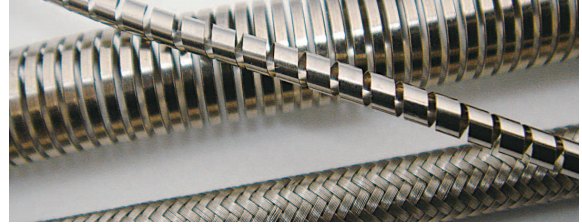
1. Available manufacturing inner diameter range is minimum  $\phi 0.1$  to maximum  $\phi 22$  approx. Product is scheduled after receiving orders. (Some of are in stock)
2. Available for specified length.
3. D2 (PVC sheathing type) showed the diameter after finishing the sheathing.
4. Extra sturdy for lateral pressure product, Double Liner structure is also available.

### Materials

Liner: Stainless Steel, SK Material, Flat Wire  
 Sheathing: Polyethylene (PVC), Stainless Steel Braiding

### Applications

- Endoscopes (medical equipment)
- Optical fiber and sensor cable protection
- Concrete vibrator and breaker
- Guide pipe in lawnmowers (SK Material, Flat Wire).



| Standard type       |                |                |                           |                       |               |                    |                           |               |                        | PVC coating type |    |                    |                           |       |
|---------------------|----------------|----------------|---------------------------|-----------------------|---------------|--------------------|---------------------------|---------------|------------------------|------------------|----|--------------------|---------------------------|-------|
| Model L-d-D-W-P     | ID mm(inch)(d) | OD mm(inch)(D) | Material Thickness(mm)(t) | Material Width(mm)(W) | Pitch (mm)(P) | Approx Weight(g/m) | Max Length one stretch(m) | stock         | Model L-d-D-d2-W-P     | mm(inch)(d2)     | OD | Approx Weight(g/m) | Max Length one stretch(m) | stock |
| L-0.23-0.33-0.1-0.1 | 0.23(0.0092)   | 0.33(0.0132)   | 0.05                      | 0.1                   | 0.1           |                    | Please ask                | special order | -                      | -                | -  | -                  | -                         | -     |
| L-0.7-0.8-1.2-0.3   | 0.7(0.028)     | 0.8(0.031)     | 0.05                      | 1.2                   | 0.3           | 3                  | 10                        | ▲             | LP-0.7-0.8-1.2-1.2-0.3 | 1.2(0.047)       |    | 4                  | 10                        | ▲     |
| L-1.7-2.0-1.2-0.2   | 1.7(0.067)     | 2.0(0.079)     | 0.15                      | 1.2                   | 0.2           | 7                  | 15                        | ▲             | LP-1.7-2.0-2.4-1.2-0.2 | 2.4(0.094)       |    | 8                  | 15                        | ○     |
| L-2.2-2.6-1.2-0.2   | 2.2(0.087)     | 2.6(0.102)     | 0.2                       | 1.2                   | 0.2           | 12                 | 15                        | ▲             | LP-2.2-2.6-3.2-1.2-0.3 | 3.2(0.126)       |    | 14                 | 15                        | ▲     |
| L-2.8-3.2-1.2-0.3   | 2.8(0.110)     | 3.2(0.126)     | 0.2                       | 1.2                   | 0.3           | 17                 | 15                        | ○             | LP-2.8-3.2-4.2-1.2-0.3 | 4.2(0.165)       |    | 19                 | 15                        | ○     |
| L-3.1-3.5-1.2-0.3   | 3.1(0.122)     | 3.5(0.138)     | 0.2                       | 1.2                   | 0.3           | 20                 | 15                        | ▲             | LP-3.1-3.5-4.1-1.2-0.3 | 4.1(0.161)       |    | 22                 | 15                        | ▲     |
| L-3.5-3.9-2.0-0.1   | 3.5(0.138)     | 4.1(0.161)     | 0.2                       | 2                     | 0.1           | 25                 | 20                        | ▲             | LP-3.5-3.9-4.7-1.2-0.1 | 4.7(0.185)       |    | 29                 | 20                        | ▲     |
| L-4.0-4.6-2.0-0.3   | 4.0(0.157)     | 4.6(0.181)     | 0.3                       | 2                     | 0.3           | 30                 | 15                        | ○             | LP-4.0-4.6-5.4-2.0-0.3 | 5.4(0.213)       |    | 37                 | 15                        | ○     |
| L-5.0-5.6-2.0-0.3   | 5.0(0.197)     | 5.6(0.220)     | 0.3                       | 2                     | 0.3           | 42                 | 15                        | ○             | LP-5.0-5.6-6.5-2.0-0.3 | 6.5(0.256)       |    | 50                 | 15                        | ○     |
| L-7.0-7.6-2.0-0.3   | 7.0(0.276)     | 7.6(0.299)     | 0.3                       | 2                     | 0.3           | 48                 | 10                        | ○             | LP-7.0-7.6-8.5-2.0-0.3 | 8.5(0.335)       |    | 63                 | 10                        | ○     |

※Standard stock ○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

# Liner Braid Tube

### Features

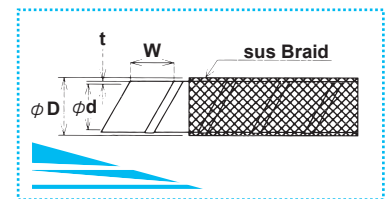
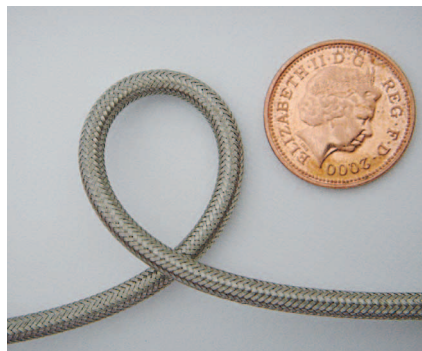
- Stainless steel braid sheathing on liner tube
- Superior pliability
- Non stretch
- Micro-diameter has very small bending radius
- Optimum protection for optical fiber and cable

### Materials

Liner: Stainless Steel  
 Braid: Stainless Steel  
 Sheathing: Soft Vinyl-Chloride (PVC), Polyolefin Polyethylene

### About Standard Length

- Length is approx. 100m by connecting a couple of short products.
- 10 to 16 m per piece
- Longer product (over 100m, depends on material and finished product) is available upon the special order. Please contact us for details.



### Note

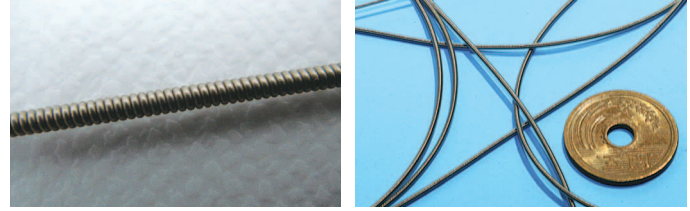
1. Other sizes are available for manufacturing.
2. Please consult us for edge trimming of the finished product since the braided sheathing would be open and unbraided after cut it off.

| Model L-d-d1-D-W-P     | ID mm(inch)(d) | OD mm(inch)(D) | Material Thickness(mm)(t) | Material Width(mm)(W) | Pitch (mm)(P) | Braid wire diameter phi (mm) | Bending Radius(mm) | Approx Weight(g/m) | Max Length one stretch(m) | stock |
|------------------------|----------------|----------------|---------------------------|-----------------------|---------------|------------------------------|--------------------|--------------------|---------------------------|-------|
| LB-1.7-2.0-2.4-1.2-0.2 | 1.7(0.067)     | 2.4(0.094)     | 0.15                      | 1.2                   | 0.2           | 0.07                         | 9                  | 8                  | 15                        | ▲     |
| LB-2.1-2.5-2.9-2-0.2   | 2.1(0.083)     | 2.9(0.114)     | 0.2                       | 2                     | 0.2           | 0.07                         | 10                 | 15                 | 15                        | ○     |
| LB-2.8-3.2-3.6-2-0.3   | 2.8(0.110)     | 3.6(0.142)     | 0.2                       | 2                     | 0.3           | 0.07                         | 12                 | 23                 | 15                        | ○     |
| LB-3.2-3.6-4.0-2-0.2   | 3.2(0.126)     | 4.0(0.157)     | 0.2                       | 2                     | 0.2           | 0.07                         | 13                 | 23                 | 15                        | ○     |
| LB-4.0-4.6-5.0-2-0.2   | 4.0(0.157)     | 5.0(0.197)     | 0.3                       | 2                     | 0.2           | 0.07                         | 15                 | 28                 | 15                        | ▲     |

※Standard stock ○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

## ■ Features

This is a densely coiled round wire providing spring like capabilities. When coiled, holding a few wire rods, it can be used as an ultra flexible wire guide. This product is strong for tension load and suitable for as an outer support for Endoscope applications in medical and industrial environments.

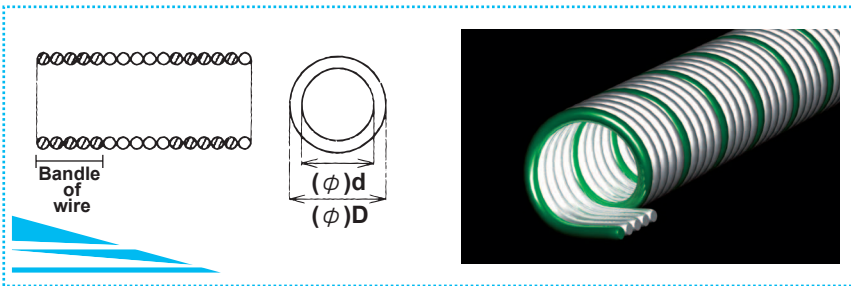


## ■ Applications

As strain relief product for medical and industrial endoscopes. Standard part material rod diameters: (φ)0.15,0.2,0.4,0.45,0.5

| Model        | IDmm(inch)(d) | ODmm(inch)(D) | Bundle of wire | Approx Weight(g/m) | Max Lengthone stretch(m) | Stock |
|--------------|---------------|---------------|----------------|--------------------|--------------------------|-------|
| SP-0.6-1.0-5 | 0.6(0.024)    | 1.0(0.039)    | 5              | Please ask         |                          | ▲     |
| SP-1.0-1.4-5 | 1.0(0.039)    | 1.4(0.055)    | 5              | Please ask         |                          | ▲     |
| SP-1.5-1.9-5 | 1.5(0.059)    | 1.9(0.075)    | 5              | Please ask         |                          | ▲     |
| SP-10-14-5   | 10.0(0.394)   | 14.0(0.551)   | 5              | Please ask         |                          | ▲     |

※Standard stock ○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us



# Flexible Shaft (Hollow type available <custom order>)

## ■ Features

For rotating mechanisms, adhesively coiling steel or piano wire as the figure, coiling thin wire rod in inside and thick wire rod in outside each to the opposite directions is give a pliability and a strength to transmit the torque. Hollow type is also available. It does not uncoiled by processed anti-backlash when cut it off. Production will be scheduled after receiving orders.

## ■ Applications

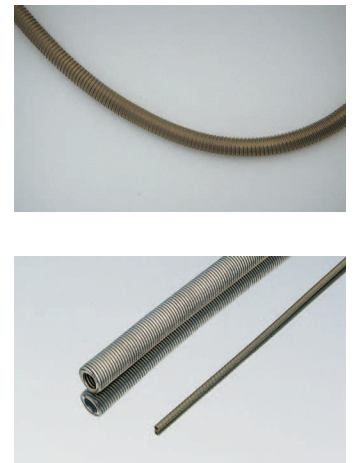
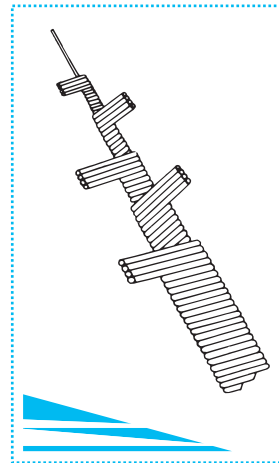
Surgical drills and equipment that requires flexible connections.

## ■ Materials

Piano wire, Hard Steel wire, SUS304

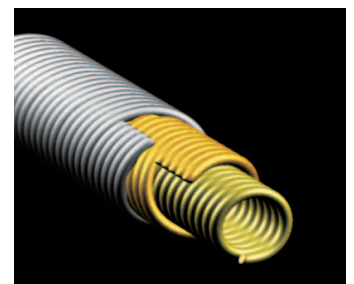
## ■ Minimum bending radius in use

min. bending  $R \leq 20 \times$  Outer Diameter (approx.)  
 Standard material diameter: (φ)0.12, 0.15, 0.18, 0.2 (SUS Steel Wire) (φ)0.3, 0.35, 0.4, 0.6, 0.7, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0, 2.3, 2.6, 3.2 (Hard Steel Wire & SUS wire)



| Model | ODmm(inch)  | Minimum Bending Radius(mm) | Approx Weight /m(g) | Max Lengthone stretch(m) | Stock |
|-------|-------------|----------------------------|---------------------|--------------------------|-------|
| FS-3  | 3.0(0.118)  | 50                         | 44                  | Please ask               | ▲     |
| FS-4  | 4.0(0.157)  | 60                         | 78                  | Please ask               | ▲     |
| FS-5  | 5.0(0.197)  | 60                         | 123                 | Please ask               | ▲     |
| FS-6  | 6.0(0.236)  | 100                        | 168                 | Please ask               | ▲     |
| FS-8  | 8.0(0.315)  | 130                        | 329                 | Please ask               | ▲     |
| FS-10 | 10.0(0.394) | 150                        | 480                 | Please ask               | ▲     |
| FS-13 | 13.0(0.512) | 180                        | 830                 | Please ask               | ▲     |
| FS-15 | 15.0(0.591) | 250                        | 1080                | Please ask               | ▲     |

※Standard stock ○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us





### ■ Features

- Maintains how it is bent and formed
- Non stretch and manufactured with a cotton thread for prevent requid leaking.
- Excellent vibration absorption.
- Can be painted, plated or have PVC sheathing applied. This is a standard stocked item. (Some of are produced after receiving orders.)

### ■ Note

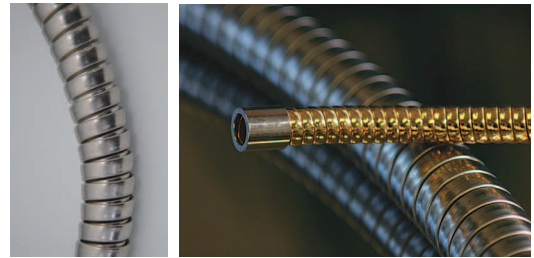
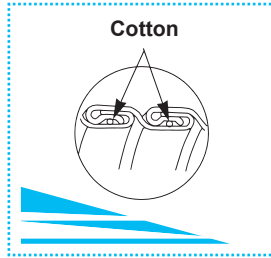
Without packing.  
All other types are available without packing.  
Add NP after the IS for No Packing.  
(Example: ISNP-9N)  
Length is 10 - 16m/pc.  
Please contact us for terminal fittings and tube specifications if other than the standard product

### ■ Applications

- Optical Fiber protection
- Light guides
- Microphone stands
- Exhaust pipes
- Fine particle delivery pipes
- Gas water heaters
- Water purifiers and treatment equipment
- Flexible faucets
- Buried pipeline protection

### ■ Materials

Stainless steel



| ● Standard type |                     |                     |                            |                    |                    |                           |                | ● PVC coating type |                     |                    |                    |                           |                |  |  |
|-----------------|---------------------|---------------------|----------------------------|--------------------|--------------------|---------------------------|----------------|--------------------|---------------------|--------------------|--------------------|---------------------------|----------------|--|--|
| Model           | ID<br>± 0.2mm(inch) | OD<br>± 0.3mm(inch) | Bending Radius<br>± 30(mm) | Standard Length(m) | Approx Weight(g/m) | Max Length one stretch(m) | Standard stock | Model              | ID<br>± 0.3mm(inch) | Standard Length(m) | Approx Weight(g/m) | Max Length one stretch(m) | Standard stock |  |  |
| IS-4N           | 4.0(0.157)          | 6.1(0.240)          | 35                         | 10                 | 70                 | 20                        | ○              | ISP-4N             | 7.2(0.283)          | 100                | 90                 | 20                        | ▲              |  |  |
| IS-5N           | 5.0(0.197)          | 7.2(0.283)          | 50                         | 100                | 120                | 20                        | ○              | ISP-5N             | 8.4(0.331)          | 100                | 160                | 20                        | ▲              |  |  |
| IS-6N           | 6.0(0.236)          | 8.4(0.331)          | 55                         | 100                | 130                | 20                        | ▲              | ISP-6N             | 9.6(0.378)          | 100                | 160                | 20                        | ▲              |  |  |
| IS-7N           | 7.0(0.276)          | 9.2(0.362)          | 55                         | 100                | 140                | 20                        | ▲              | ISP-7N             | 10.7(0.421)         | 100                | 200                | 20                        | ▲              |  |  |
| IS-8N           | 8.0(0.315)          | 10.5(0.413)         | 55                         | 100                | 160                | 20                        | ○              | ISP-8N             | 12.0(0.472)         | 100                | 210                | 20                        | ▲              |  |  |
| IS-9NT          | 9.5(0.374)          | 12.5(0.492)         | 45                         | 50                 | 180                | 20                        | ○              | ISP-9NT            | 14.0(0.551)         | 50                 | 240                | 20                        | ▲              |  |  |
| IS-9N-120G      | 9.5(0.374)          | 12.7(0.500)         | 45                         | 50                 | 180                | 20                        | ○              | ISP-9N-120G        | 14.0(0.551)         | 50                 | 240                | 20                        | ▲              |  |  |
| IS-9N           | 9.9(0.390)          | 12.7(0.500)         | 60                         | 50                 | 180                | 20                        | ○              | ISP-9N             | 14.0(0.551)         | 50                 | 340                | 20                        | ▲              |  |  |
| IS-13N          | 12.5(0.492)         | 15.3(0.602)         | 70                         | 50                 | 255                | 20                        | ○              | ISP-13N            | 17.0(0.669)         | 50                 | 400                | 20                        | ▲              |  |  |
| IS-15N          | 15.8±0.3(0.622)     | 18.6(0.732)         | 70                         | 50                 | 280                | 20                        | ○              | ISP-15N            | 21.0±0.4(0.827)     | 50                 | 460                | 20                        | ▲              |  |  |
| IS-19N          | 19.1±0.5(0.752)     | 22.1±0.5(0.870)     | 90±20                      | 50                 | 330                | 20                        | ▲              | ISP-19N            | 24.5±0.5(0.965)     | 50                 | 570                | 20                        | ▲              |  |  |
| IS-25N          | 25.4±0.5(1.000)     | 28.9±0.5(1.138)     | 110±20                     | 30                 | 430                | 20                        | ▲              | ISP-25N            | 32.0±0.5(1.260)     | 30                 |                    | Please ask                | ▲              |  |  |
| IS-31N          | 31.8±0.5(1.252)     | 37.5±0.5(1.476)     | 350±35                     | 30                 |                    |                           |                | ISP-31N            | 41.8±0.5(1.646)     | 30                 |                    | Please ask                | ▲              |  |  |
| IS-39N          | 38.1±0.5(1.500)     | 43.6±0.5(1.717)     | 350±35                     | 30                 |                    |                           |                | ISP-39N            | 48.0±0.5(1.890)     | 30                 |                    | Please ask                | ▲              |  |  |
| IS-51N          | 50.8±0.5(2.000)     | 56.3±0.5(2.217)     | 400±40                     | 10                 |                    |                           |                |                    |                     |                    |                    |                           |                |  |  |
| IS-63N          | 63.5±0.8(2.500)     | 69.0±0.8(2.717)     | 450±45                     | 10                 |                    |                           |                |                    |                     |                    |                    |                           |                |  |  |
| IS-75N          | 76.4±0.8(3.008)     | 82.0±0.8(3.228)     | 600±60                     | 10                 |                    |                           |                |                    |                     |                    |                    |                           |                |  |  |
| IS-90N          | 89.0±0.8(3.504)     | 95.0±0.8(3.740)     | 700±70                     | 10                 |                    |                           |                |                    |                     |                    |                    |                           |                |  |  |
| IS-100N         | 101.0±1.0(3.976)    | 107.0±1.0(4.213)    | 800±100                    | 10                 |                    |                           |                |                    |                     |                    |                    |                           |                |  |  |

※Standard stock ○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

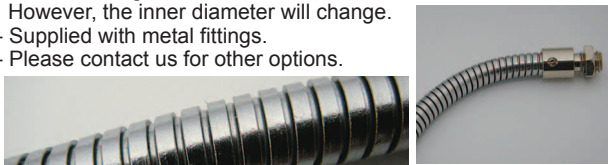
# Stand Tube (Gooseneck Tube)

### ■ Features

- Combination of round and triangle rods.
- Can be bent smoothly
- Holds the bending condition.
- Can be enhanced working load by inserting a sub-strength material
- Exterior can be improved with metal plating, painting or PVC sheathing

### ■ Note

- Available to produce approx. CD-25
- Fixed bending radius will be available at rated firmness. However, the inner diameter will change.
- Supplied with metal fittings.
- Please contact us for other options.



### ■ Applications

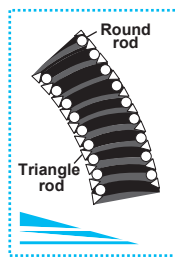
- Light guide
- Microphone stand
- Light stand
- Fixed Auto accessories

### ■ Materials

Hard and Soft steel wire rods

### ■ Surface treatment

- Plating (chrome, black chrome, nickel, zinc)
- Painting (splaying, burnt)



| Model | ID<br>± 0.2mm(inch) | OD<br>± 0.2mm(inch) | Bend Radius    | Max Length with plated(mm) | Standard stock |
|-------|---------------------|---------------------|----------------|----------------------------|----------------|
| CD-5  | 1.5(0.059)          | 5.0(0.197)          |                |                            | ▲              |
| CD-6  | 2.8(0.110)          | 6.0(0.236)          |                |                            | ▲              |
| CD-7  | 3.5(0.138)          | 7.0(0.276)          |                |                            | ▲              |
| CD-9  | 4.5(0.177)          | 9.0(0.354)          |                |                            | ▲              |
| CD-10 | 5.0(0.197)          | 10.0(0.394)         | Please inquire | 950                        | ▲              |
| CD-11 | 5.5(0.217)          | 11.0(0.433)         |                |                            | ▲              |
| CD-13 | 6.0(0.236)          | 13.0(0.512)         |                |                            | ▲              |
| CD-15 | 8.0(0.315)          | 15.0(0.591)         |                |                            | ▲              |
| CD-20 | 10.0(0.394)         | 20.0(0.787)         |                |                            | ▲              |
| CD-22 | 12.0(0.472)         | 22.0(0.866)         |                |                            | ▲              |

※Standard stock ○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

# Micro-stand Tube

### ■ Features

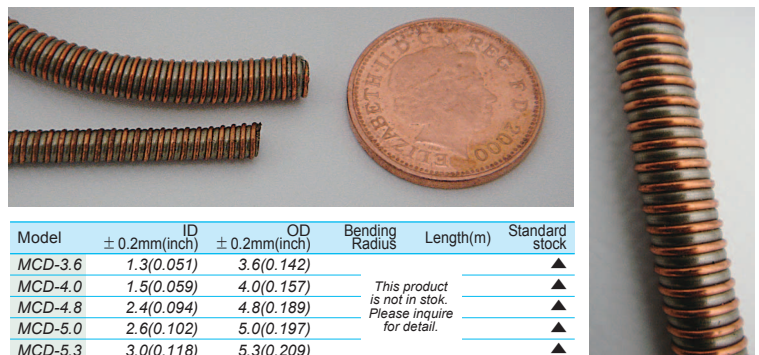
- Small outer diameter
- Light weight product
- Bends smoothly
- Holds the bent form
- Sheathed with heat shrink tubing, making it airtight with an attractive exterior.

### ■ Applications

- Microphone holder in headset
- Light guide in LED and other lightweight goods
- Fixed tube for regulator in Oxygen inhalator

### ■ Materials

Stainless steel and copper wire



| Model   | ID<br>± 0.2mm(inch) | OD<br>± 0.2mm(inch) | Bending Radius | Length(m) | Standard stock |
|---------|---------------------|---------------------|----------------|-----------|----------------|
| MCD-3.6 | 1.3(0.051)          | 3.6(0.142)          |                |           | ▲              |
| MCD-4.0 | 1.5(0.059)          | 4.0(0.157)          |                |           | ▲              |
| MCD-4.8 | 2.4(0.094)          | 4.8(0.189)          |                |           | ▲              |
| MCD-5.0 | 2.6(0.102)          | 5.0(0.197)          |                |           | ▲              |
| MCD-5.3 | 3.0(0.118)          | 5.3(0.209)          |                |           | ▲              |

※Standard stock ○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

### Features

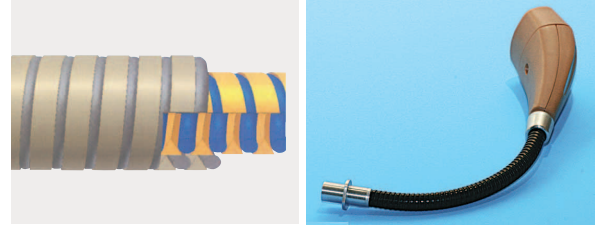
- Double layer structured Stand Tube
- Excellent ability for shaping
- Suited for environments where there is vibration or stability is required
- Successfully passed in-house repetition bending tests of over 230,000
- Suitable for Food processing equipment and Medical equipment

### Applications

Shape retaining tube for Aircraft, Auto and Lighting accessories.

### Material

Stainless steel (Available to produce with hard steel wire also.)



| Model       | ID<br>± 0.2mm(inch) | OD<br>± 0.2mm(inch) | Bending<br>Radius  | Approx<br>Weight(g/m) | Max Length<br>one stretch(m) | Standard<br>stock |
|-------------|---------------------|---------------------|--------------------|-----------------------|------------------------------|-------------------|
| WCD-12(SUS) | 4.0(0.157)          | 11.6(0.457)         | Please<br>inquire. |                       | 10                           | ▲                 |
| WCD-13(SS)  | 5.0(0.197)          | 12.8(0.504)         |                    |                       |                              | ▲                 |

※Standard stock ○=HAGITEC's standard stock item.  
Stock quantity will be 10 to 500m. ▲=contact us

Flexible Conduit

# Decavon Tube

### Features

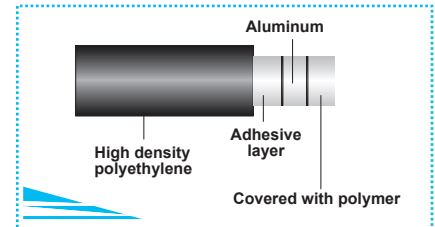
- Maintains bending forms
- Aluminum pipe in the core, covered with high-density polyethylene
- Light weight tube bends smoothly
- Holds small bending radius
- Suitable for protection of cables and various accessories that require holding a shape and mounting
- As a delivery pipe for air, it has an individual joint that makes it easier for piping and connecting to the housing.

### Terms for usage

Fluid: Air  
 Range of temperature: -40°C ~ +60°C  
 Connector: Special joint Quick-seal for Decavon Tube  
 △Do not use any other joint.  
 Negative pressure capability: Flatten at negative pressure but does not deformed  
 Size: 20m, 100m  
 Standard color: ●Black

### Applications

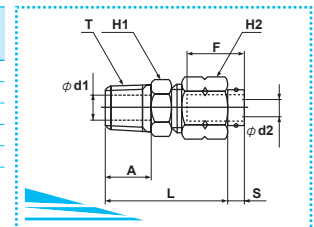
- Microphone holder in headset
- LED, Lightweight light guides
- Fixed regulator tube for Oxygen inhalator



| Model   | ID(mm) | OD(mm) | Max.Applicable Pressure<br>(Mpa at 20°C) | Min.Bending<br>Radius(mm) | Weight(g/m) |
|---------|--------|--------|--|---------------------------|-------------|
| 1300-6  | 4.0    | 6.0    | 1.0                                      | 20                        | 21          |
| 1300-10 | 6.8    | 10.0   | 1.0                                      | 40                        | 47.0        |

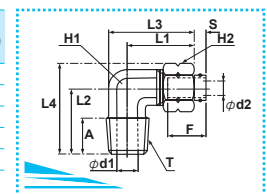
## Straight Connector

| Model      | Applicable<br>Decavon<br>Tube | T Screw<br>size | L (mm) | A (mm) | F<br>Tube<br>Insertion<br>Length<br>(mm) | H1<br>Dual<br>Surface<br>Width<br>(mm) | H2<br>Dual<br>Surface<br>Width<br>(mm) | S (mm) | d1 (mm) | d2 (mm) | Weight (g) |
|------------|-------------------------------|-----------------|--------|--------|--|--|--|--------|---------|---------|------------|
| DC6-PT1/8  | 1300-6                        | R1/8            | 28.0   | 11.0   | 15.0                                     | 10.0                                   | 12.0                                   | 4.5    | 5.0     | 2.7     | 14.5       |
| DC6-PT1/4  | 1300-6                        | R1/4            | 30.0   | 12.0   | 15.0                                     | 14.0                                   | 12.0                                   | 4.5    | 7.0     | 2.7     | 22.0       |
| DC10-PT1/8 | 1300-10                       | R1/8            | 30.0   | 11.0   | 18.0                                     | 17.0                                   | 17.0                                   | 4.5    | 5.0     | 5.6     | 28.0       |
| DC10-PT1/4 | 1300-10                       | R1/4            | 31.0   | 12.0   | 18.0                                     | 17.0                                   | 17.0                                   | 4.5    | 7.0     | 5.6     | 32.0       |
| DC10-PT3/8 | 1300-10                       | R3/8            | 32.0   | 13.0   | 18.0                                     | 17.0                                   | 17.0                                   | 4.5    | 9.0     | 5.6     | 38.0       |



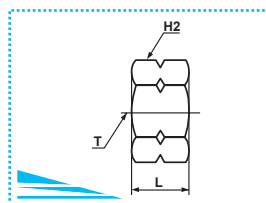
## 90° Angle Connector

| Model      | Applicable<br>Decavon<br>Tube | T Screw<br>size | L1 (mm) | L2 (mm) | L3 (mm) | L4 (mm) | A (mm) | F<br>Tube<br>Insertion<br>Length<br>(mm) | H1<br>Dual<br>Surface<br>Width<br>(mm) | H2<br>Dual<br>Surface<br>Width<br>(mm) | S (mm) | d1 (mm) | d2 (mm) | Weight (g) |
|------------|-------------------------------|-----------------|---------|---------|---------|---------|--------|--|--|--|--------|---------|---------|------------|
| DL6-PT1/8  | 1300-6                        | R1/8            | 20.5    | 18.5    | 26.0    | 25.5    | 11.0   | 15.0                                     | 10.0                                   | 12.0                                   | 4.5    | 5.0     | 2.7     | 21.0       |
| DL6-PT1/4  | 1300-6                        | R1/4            | 23.0    | 22.0    | 30.0    | 29.0    | 12.0   | 15.0                                     | 12.0                                   | 12.0                                   | 4.5    | 7.0     | 2.7     | 31.0       |
| DL10-PT1/8 | 1300-10                       | R1/8            | 27.0    | 22.0    | 35.0    | 32.0    | 11.0   | 18.0                                     | 14.0                                   | 17.0                                   | 4.5    | 5.0     | 5.6     | 42.0       |
| DL10-PT1/4 | 1300-10                       | R1/4            | 27.0    | 25.0    | 35.0    | 35.0    | 12.0   | 18.0                                     | 14.0                                   | 17.0                                   | 4.5    | 7.0     | 5.6     | 50.0       |
| DL10-PT3/8 | 1300-10                       | R3/8            | 27.0    | 26.0    | 35.0    | 36.0    | 13.0   | 18.0                                     | 14.0                                   | 17.0                                   | 4.5    | 9.0     | 5.6     | 53.0       |



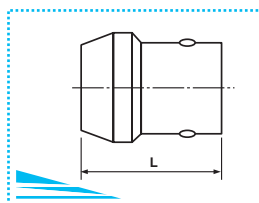
## Nut

| Model | Applicable<br>Decavon<br>Tube | T Screw<br>size | L (mm) | H2 (mm) | Weight (g) |
|-------|-------------------------------|-----------------|--------|---------|------------|
| N6    | 1300-6                        | M10 × 1         | 9.0    | 12.0    | 5.0        |
| N10   | 1300-10                       | M15 × 1         | 10.0   | 17.0    | 9.0        |



## Nylon Sleeve

| Model | Applicable<br>Decavon<br>Tube | L (mm) |
|-------|-------------------------------|--------|
| SN6   | 1300-6                        | 11.0   |
| SN10  | 1300-10                       | 12.0   |



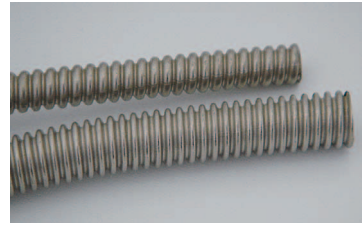


### Features

- Thin corrugated stainless steel welded pipe is superior, as follows:
- Air tight
  - Absorbs vibration
  - High pressure characteristics
  - Can be formed as needed
  - Strength for high-pressure can be increased with the use of a stainless steel armored braid
  - Manufactured per specified lengths
  - Metal fittings can be silver soldered per customized orders

### Applications

Optical fiber protection, delivery pipe for fluid, gas, oil, vapor and vacuum equipment.



| Model | ID mm(inch) | OD mm(inch) | Thickness (mm) | Bending Radius (mm) | Rep. Bend Radius (mm) | Applicable pressure (single layer braided) (kg/cm <sup>2</sup> ) | Length (mm) | Burst Pressure (single layer blade) (kg/cm <sup>2</sup> ) | Standard stock |
|-------|-------------|-------------|----------------|---------------------|-----------------------|--|-------------|---|----------------|
| CT-8  | 7.2(0.283)  | 11.0(0.434) | 0.25           | 30                  | 100                   | 70   | 5000        | 350   | ▲              |
| CT-10 | 10.5(0.413) | 15.0(0.590) | 0.25           | 40                  | 135                   | 50   | 5000        | 350   | ▲              |
| CT-15 | 13.2(0.520) | 18.5(0.728) | 0.25           | 50                  | 140                   | 45   | 5000        | 230   | ▲              |
| CT-20 | 19.2(0.756) | 25.5(1.0)   | 0.3            | 60                  | 200                   | 30   | 5000        | 200   | ▲              |
| CT-25 | 25.0(0.984) | 32.6(1.283) | 0.35           | 70                  | 230                   | 25   | 5000        | 100   | ▲              |
| CT-32 | 32.3(0.127) | 41.0(1.614) | 0.35           | 80                  | 255                   | 20   | 5000        | 100   | ▲              |
| CT-40 | 38.5(1.516) | 47.5(1.870) | 0.4            | 90                  | 355                   | 15   | 5000        | 100   | ▲              |
| CT-50 | 51.5(2.028) | 61.5(2.421) | 0.4            | 110                 | 410                   | 10   | 5000        | 65  | ▲              |
| CT-65 | 63.5(2.500) | 76.5(3.011) | 0.4            | 140                 | 420                   | 10   | 5000        | 45  | ▲              |

※Standard stock ○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

# Micro-Flexible Tube

### Features

- With the use of SUS316, it will:
- Resists rusting
  - Withstands pressure, high and low temperatures

Armored stainless steel braid will increase its high pressure abilities.

### Applications

- For high precision mechanical equipment such as,
- Semiconductor and LCD panel manufacturing devices
  - Pharmaceutical processing equipment
  - Bio product equipment and food processing equipment where durability, pressure tightness and safety are demands
  - Optical fiber protection which requires air-tightness
  - Medical devices (blood cooling of cryogenic heat changer)
  - Delivery pipe for fluid, oil, vapor and air vacuum equipment

### Test Data

Working pressure:  
Ultra High Vacuum - max. 0.5 mpa

### Leak Allowance

Less than 1.33 x 10<sup>-10</sup>Pam<sup>2</sup>/S

### Size of metal fittings

φ 3.18, φ 6.35, and Special metal fittings

### Material

SUS316L



| Model   | ID mm(inch) | OD mm(inch) | Approx Weight(g/m) | Standard stock |
|---------|-------------|-------------|--------------------|----------------|
| MF-3A   | 3.5(0.138)  | 5.0(0.197)  | 30                 | ▲              |
| MF-4.5A | 4.5(0.177)  | 7.0(0.276)  | 65                 | ▲              |
| MF-6A   | 5.5(0.217)  | 8.5(0.335)  | 70                 | ▲              |

※Standard stock

○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

# Screw Tube

### Features

- Smooth and flat surface of the tube
- Excellent ability for fluid rectification and heat exchange
- Pliable characteristics
- Increased heat exchange by using high heat conductivity material
- Can be manufactured and sold in specified lengths
- Can be processed with silver soldered metal fittings

### Applications

- Optical fiber protection that requires air-tightness
- Cryogenic heat changer for artificial heart and lung devices
- Heat exchanger in water-cooling types of PCs
- Delivery pipes for fluid, oil, vapor and air vacuum.

### Materials

Stainless steel, Aluminum, Copper, and etc.

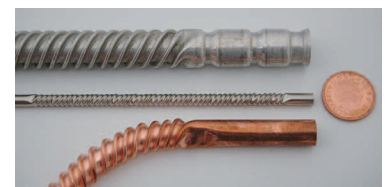
### Size

Bore diameter  
φ 2 ~ 20 are available

### Specifications

Teflon coating, chemical polishing and others

This product has the best heat exchange capabilities for all the flexible tubes. Production will be scheduled after receiving order.



| Model | ID ±0.2mm(inch) | OD ±0.2mm(inch) | Thickness (mm) | Minimum Bending Radius ±0.5(mm) | Maximum work Pressure rated (Kg/cm <sup>2</sup> ) | Burst pressure (Kg/cm <sup>2</sup> ) | Maximum Length (mm) | Standard stock |
|-------|-----------------|-----------------|----------------|---------------------------------|---|--------------------------------------|---------------------|----------------|
| S-2   | 2.0(0.079)      | 3.1(0.122)      | 0.12           | 9                               | 10  | -                                    | 550(screw/500)      | ▲              |
| S-7.5 | 4.5(0.177)      | 7.5(0.295)      | 0.25           | 25                              | 8   | 20                                   | 2000(screw/1800)    | ▲              |
| S-11  | 7.5(0.295)      | 11.0(0.433)     | 0.25           | 40                              | 8   | 20                                   | 2000(screw/1800)    | ▲              |
| S-15  | 9.0(0.354)      | 15.0(0.591)     | 0.25           | -                               | 7   | 18                                   | 2000(screw/1800)    | ▲              |
| S-18  | 13.0(0.512)     | 18.0(0.709)     | 0.3            | -                               | 5   | 15                                   | 2000(screw/1800)    | ▲              |

※Standard stock ○=HAGITEC's standard stock item. Stock quantity will be 10 to 500m. ▲=contact us

**■ Features**

- Suitable for shower hose and pullout faucets
- Most durable for pulling type loads

**■ Our product is made of**

- Flattened Semi-interlocking design for an unlocked structure
- Thin. Light weight material
- Smooth surfaces for noise reduction
- High flexibility for easy manipulation
- Chemically polished for superior cosmetics
- Can be manufactured with a resin inner tube and joint connector making the product as one unit.

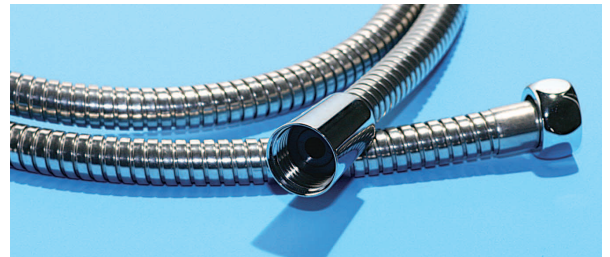
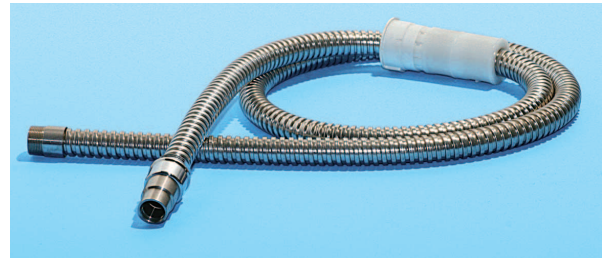
**■ Material**

Stainless steel

**■ Structures**

Semi-interlocking or Casing

| Model   | IDmm(inch)          | ODmm(inch)          | Bending Radius(mm) |
|---------|---------------------|---------------------|--------------------|
| SASH-14 | 11.8± 0.2(0.465)    | 14.0± 0.1(0.551)    | 40                 |
| SASH-16 | 11.3+0.2-0.1(0.445) | 16.0+0.1-0.2(0.630) | 40                 |



# Delivery Hose (Outlet Tube)

**■ Features**

- No leaking under no water pressure use by cotton thread inside of the stainless interlocking tube.
- Maintains bending formations
- Direction of the spout is easily changed
- Can be cut to required lengths and burrs removed
- Can be supplied tube only or with terminal nozzle and connector (box nut/cap nut) as a unit.

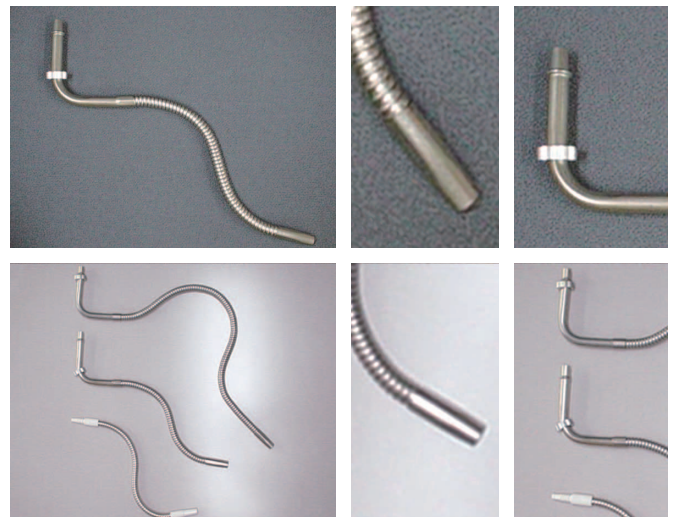
**■ Applications**

- Gas Water Heater
- Water purifier
- Spout in water treatment equipment

**■ Material**

Stainless steel

| Model     | ID± 0.2mm(inch) | OD± 0.2mm(inch) | Bending Radius(mm) |
|-----------|-----------------|-----------------|--------------------|
| ISDH-10.5 | 8.0(0.315)      | 10.5(0.413)     | 40~60              |
| ISDH-12.5 | 10.0(0.394)     | 12.5(0.492)     | 40~60              |
| ISDH-13.5 | 11.0(0.433)     | 13.5(0.531)     | 40~60              |



## Applications





### ■ Coating processing what used resin and rubber the purposes for

- Mistproof
- Oil resistant
- Cosmetic appearance
- Additional strength
- Electrical Insulation

### ■ Processed with a resin and rubber coating making it

- Mistproof
- Oil-proof/resistant
- Attractive appearance
- Additional strength
- Superior insulation

The following chart showed only parts of available materials. Please consult for your specifications, minimum lot, delivery date, and materials (Heat or Chemical resistance).

The following charts show parts and materials. Please contact us with your specifications, minimum lot, delivery date, and required material type (Heat or Chemical resistance).

Ordering Instruction: Add material code after alphabetical Model  
 Example: KSSi-\_\_\_N (enter inner diameter of tube before N)  
 if the Casing tube needs Silicon (Si) sheathing.

| Material type (code)            | Characteristic                | Color   | Resin feature   | Surface Appearance       |
|---------------------------------|-------------------------------|---|---|--------------------------|
| PVC/Vinyl chloride (P)          | Soft                          | ●Black (standard), ●Gray, ○White, ○Ivory, ●Red, ●Blue, ●Yellow, ●Green, ●Orange, ○Clear | -Pliable<br>-Chemical resistant<br>-Heat resistance up to 60°C<br>-High oil resistance  | Glossy or Matte or Clear |
|                                 | Soft hard type                | ●Black  | -Slightly hard<br>-Smooth surface<br>-Chemical resistant<br>-Heat resistance up to 60°C<br>- Resistant to oil                 | Glossy                   |
|                                 | Flame resistance              | ●Black, ●Gray, ○White, ●Pink, ●Red, ●Blue, ●Yellow, ●Green, ●Orange                     | -Pliable<br>-Chemical resistant<br>-Heat resistance up to 60°C<br>-High oil resistance  | Glossy                   |
|                                 | Flame resistance, UL standard | ●Black  | -Pliable<br>-Chemical resistant<br>-Heat resistance up to 105°C<br>-High oil resistance                                       | Matte                    |
| Polyethylene (PE)               | Low density (LDPE)            | ●Black  | -Harder than soft hard type<br>-Smooth surface<br>-Chemical resistant<br>-Heat resistance up to 70°C<br>-High oil resistance  | Glossy                   |
| Polyester Elastomer (TEEE)      |                               | ●Black  | -Pliable<br>-Weatherproof<br>-Heat resistance up to 120°C   | Glossy                   |
| Silicon Rubber (Si)             |                               | ●Black, ●Gray   | -Pliable<br>-Heat resistance up to 180°C  | Matte                    |
| Fluorocarbon Resin (FEP) (ETFE) |                               | ●Black  | -Less Pliable<br>-Excellent chemical and oil resistance<br>-Smooth surface and anti-attrition<br>-Heat resistance up to 220°C | Glossy                   |
| Polyurethane (PU)               | Ester grade                   | ●Black  | -Pliable<br>-Abrasion resistant<br>-Heat resistance up to 70°C  | Glossy                   |
|                                 | Ether grade                   | ●Black, ○Ivory  | -Pliable<br>-Abrasion resistant<br>-Water soluble<br>-Heat resistance up to 70°C  | Glossy                   |
| Olefin Elastomer (O)            |                               | ●Black  | -Pliable<br>-Weatherproof<br>-Heat resistance up to 60°C  | Matte                    |

## Flexible Tube Materials (Fiber Protector)

We will make samples of various protector tubes with your specification and applications. Please contact us for delivery and minimum lot.

| Material         | Type  | Application   | Feature   | Applicable Tube Type                      |
|------------------|---|---|---|---|
| Stainless Steel  | SUS304 (standard), 303, 316, 430                            | -General industrial<br>-Medical                       | -Rigid<br>-Rustless   | Almost of all                             |
| Aluminum         |   | -General industrial<br>-Medical                       | -Rustless<br>-Anti-static<br>-Light-weight but less sturdy<br>-Excellent thermal conduction | -Casing<br>-Semi-Interlock<br>-Screw Tube |
| Titanium         |   | -General industrial<br>-Medical<br>-Space engineering | -Rigid<br>-Anti-static<br>-Lighter than Stainless steel                                     | -Casing                                   |
| Bronze phosphate | C5341   | -Noise countermeasure                                 | -Less rigid<br>-Excellent thermal conduction  | Almost of all                             |
| Copper           |   | -Noise countermeasure                                 | -Less rigid<br>-Excellent thermal conduction  | Almost of all                             |
| Brass            |   | -Noise countermeasure                                 | -Rigid than copper<br>-Excellent thermal conduction   | Almost of all                             |
| Steel            | -Galvanized steel strip<br>-SK material<br>(hardened steel) | -General industrial                                   | -Affordable price<br>-Heavy<br>-Rusty<br>-Generally need to be sheathed                     | Almost of all                             |

## Other

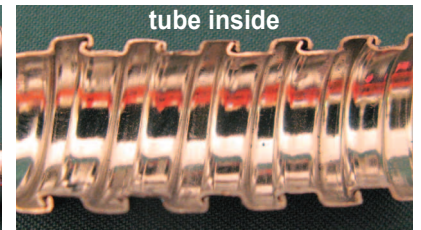
Extra washing or polishing offer better quality

### Double washing

Offer tubes with double washing with detergent for high precision application.

### Chemical polishing

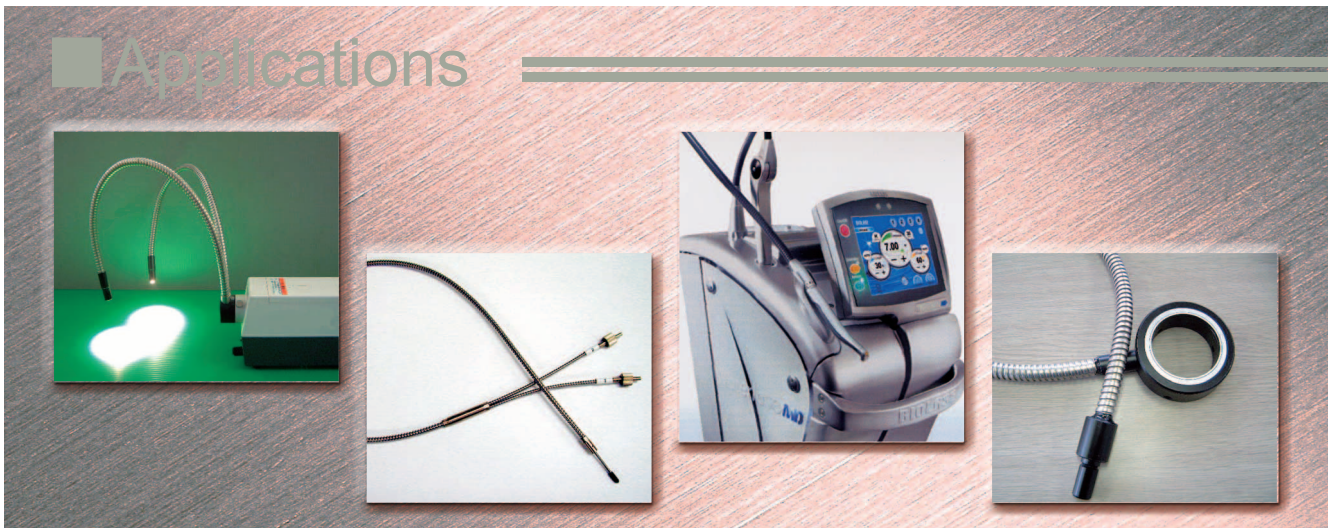
Offer tubes with Chemical polish, Extra shine for optical application.



※Special polishing for semiconducting application quality is also available.

## Applications

We possible to deliver flexible tubes with plastic reel for easy handling and keep clean.





**Fiber Protection connectors can be used to connect to various manufactures of**

- Proximity switch
- Photoelectric switch
- Heatproof temperature sensor

The connector is fastened to the sensor head. The panel connector is secured on chassis and panel. End cap insertion for tube terminal processing, Amplifier connector for fixed on amplifier, and etc.

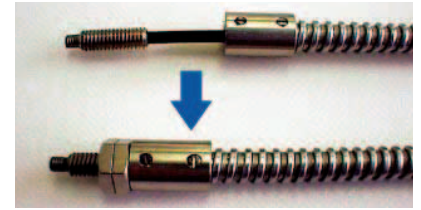
**There are basically three ways of attaching to the tubes**

- Machine screwed
- Pin locked
- Adhesive

We also design and manufacture custom made connectors upon a request.

**Note**

The Fiber Protection Connector is able to be used with the Casing Tube, Interlocking Tube and Casing + PVC Tube. Please contact us for other applications.



# Screw Head Connector

**1. Screw type:**

Secured by pins after screwed on to tube

**Features**

- Terminal treatment
- Prevent damaging to Optical Fiber and cable
- Easy for assembly and removal with the screw
- Resists high heat environment.

**Applications**

- As the protection sensors and cable in:
  - Measurement device-Sensor instruments
  - Robots-Parts in amusement equipments

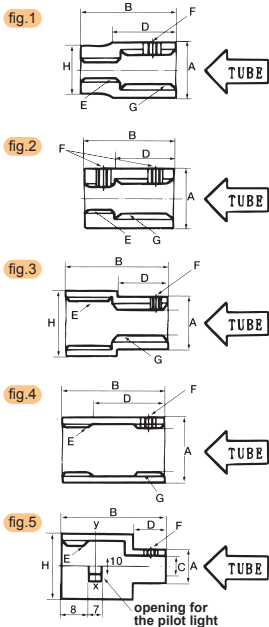
**Note**

KS8NS and M30 have a window for the function indication light.

**Material**

Nickel plated on brass

Pack : 30pcs per each size



| ● Sensor Head connector |         |        |         |        |                               |                           |         |                 |     |                      |                |  |
|-------------------------|---------|--------|---------|--------|-------------------------------|---------------------------|---------|-----------------|-----|----------------------|----------------|--|
| Model                   | φA (mm) | B (mm) | φC (mm) | D (mm) | E Sensor Unit (M x pitch)(mm) | F set pin (M x pitch)(mm) | φH (mm) | G matching tube | fig | Approx Weight(g/pcs) | Standard Stock |  |
| KS3NS-M3                | 7       | 12     | -       | 7      | M3×0.5                        | M2×0.4                    | 6       | KS-3N · KS3.2N  | 1   | 2.1                  | ○              |  |
| KS3NS-M4                | 7       | 12     | -       | 7      | M4×0.7                        | M2×0.4                    | 6       | KS-3N · KS3.2N  | 1   | 2.0                  | ○              |  |
| KS3NS-M8                | 7       | 12     | -       | 6      | M8×1                          | M2×0.4                    | 10      | KS-3N · KS3.2N  | 3   | 2.8                  | ○              |  |
| KS4NS-M3                | 8       | 12     | -       | 8      | M3×0.5                        | M2×0.4                    | -       | KS-4N           | 2   | 2.7                  | ○              |  |
| KS4NS-M4                | 8       | 12     | -       | 8      | M4×0.7                        | M2×0.4                    | -       | KS-4N           | 2   | 2.5                  | ○              |  |
| KS4NS-M5                | 8       | 12     | -       | 8      | M5×0.5                        | M2×0.4                    | -       | KS-4N           | 2   | 2.4                  | ○              |  |
| KS4NS-M8                | 8       | 20     | -       | 9      | M8×1                          | M2×0.4                    | 10      | KS-4N           | 3   | 4.6                  | ○              |  |
| KS4NS-M10               | 8       | 20     | -       | 10     | M10×1                         | M2×0.4                    | 12      | KS-4N           | 3   | 5.4                  | ○              |  |
| KS4NS-M14               | 8       | 20     | -       | 10     | M14×1                         | M2×0.4                    | 16      | KS-4N           | 3   | 8.8                  | ○              |  |
| KS4NS-M16               | 8       | 20     | -       | 10     | M16×1                         | M2×0.4                    | 18      | KS-4N           | 3   | 9.8                  | ○              |  |
| KS5NS-M4                | 9       | 12     | -       | 8      | M4×0.7                        | M2×0.4                    | -       | KS-5N           | 2   | 3.3                  | ○              |  |
| KS5NS-M6                | 9       | 12     | -       | 8      | M6×0.75                       | M2×0.4                    | -       | KS-5N           | 2   | 2.8                  | ○              |  |
| KS5NS-M8                | 10      | 15     | -       | 10     | M8×1                          | M2×0.4                    | -       | KS-5N           | 4   | 4.5                  | ○              |  |
| KS5NS-M10               | 10      | 20     | -       | 10     | M10×1                         | M2×0.4                    | 12      | KS-5N           | 3   | 6.9                  | ○              |  |
| KS5NS-M8T               | 10      | 30     | -       | 25     | M8×1                          | M2×0.4                    | -       | KS-5N           | 4   | 9.2                  | ○              |  |
| KS6NS-M12               | 10      | 20     | -       | 10     | M12×1                         | M2×0.4                    | 14      | KS-6N           | 3   | 6.6                  | ○              |  |
| KS7NS-M6                | 11      | 15     | -       | 10     | M6×0.75                       | M2×0.4                    | -       | KS-7N           | 2   | 5.2                  | ○              |  |
| KS7NS-M12               | 14      | 31     | -       | 26     | M12×1                         | M2×0.4                    | -       | KS-7N           | 4   | 13.7                 | ○              |  |
| KS8NS-M18               | 13      | 42     | 10.5    | 10     | M18×1                         | M2×0.4                    | 21      | KS-8N           | 5   | 35.9                 | ○              |  |
| KS8NS-M30               | 13      | 43     | 10.5    | 10     | M30×1.5                       | M2×0.4                    | 34      | KS-8N           | 5   | 84.6                 | ○              |  |

※Standard stock quantity will be 10 to 1000P.(Depend on item)

**2. Adhesion type:**

Adhesive is applied to the tube during assembly Can be used for interlocking type tube

**Features**

- Terminal treatment
- Prevent damaging to Optical Fiber and cable
- Vibration resistant
- Cost effective.

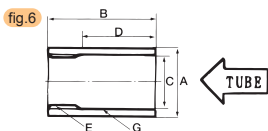
**Applications**

- Protects sensors and cable in:
  - Measurement device
  - Sensor instruments
  - Robots
  - Parts in amusement equipments

**Material**

Nickel plated on brass

Pack : 30pcs per each size



| ● Sensor Head connector |        |       |        |       |                               |                 |     |                      |                |
|-------------------------|--------|-------|--------|-------|-------------------------------|-----------------|-----|----------------------|----------------|
| Model                   | φA(mm) | B(mm) | φC(mm) | D(mm) | E Sensor Unit (M x pitch)(mm) | G matching tube | fig | Approx Weight(g/pcs) | Standard Stock |
| KS3NB-M3                | 6      | 12    | 5      | 8     | M3×0.5                        | KS-3N · KS-3.2N | 6   | 1.3                  | ○              |
| KS3NB-M4                | 6      | 12    | 5      | 8     | M4×0.7                        | KS-3N · KS-3.2N | 6   | 1.1                  | ○              |
| KS4NB-M3                | 7      | 12    | 5.9    | 8     | M3×0.5                        | KS-4N · IS-4N   | 6   | 1.8                  | ○              |
| KS4NB-M4                | 7      | 12    | 5.9    | 8     | M4×0.7                        | KS-4N · IS-4N   | 6   | 1.6                  | ○              |
| KS5NB-M4                | 8.5    | 12    | 7.3    | 8     | M4×0.7                        | KS-5N · IS-5N   | 6   | 2.3                  | ○              |
| KS5NB-M6                | 8.5    | 12    | 7.3    | 8     | M6×0.75                       | KS-5N · IS-5N   | 6   | 2.1                  | ○              |

※Standard stock quantity will be 10 to 1000P.(Depend on item)

## Screwed type

Secured by pins after screwed on to tube

### Features

- For Terminal treatment.
- Prevent damaging to Optical Fiber and cable
- Easy for assembly and removal with the screw
- Resists high heat environment.

### Applications

- As the protection sensors and cable in:
- Measurement device
  - Sensor instruments
  - Robots
  - Parts in amusement equipments

### Material

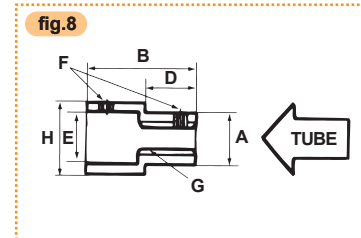
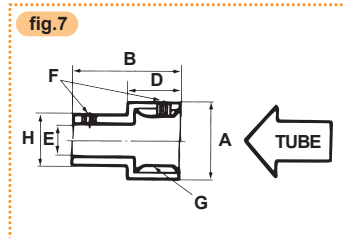
Nickel plated on brass

### Note

Please refer below for type of pin in column F in the chart.

### Pin type

- \* 1.5 mm L. Standard Slotted Screw
- \*\* 2mm L. Slotted Screw with a pointed tip
- \*\*\* 2.5mm L Hex Head Lag Screw



| Model     | φA (mm) | B (mm) | D (mm) | φE (mm) | F set pin (M x pitch)(mm) | φH (mm) | G matching tube | fig | Approx Weight(g/pcs) | Standard Stock |
|-----------|---------|--------|--------|---------|---------------------------|---------|-----------------|-----|----------------------|----------------|
| KS3NS-2.8 | 7       | 17     | 9      | 2.9     | M2×0.4                    | 5       | KS-3N · KS-3.2N | 7   | 2.3                  | ○              |
| KS4NS-3   | 8       | 17     | 9      | 3.1     | M2×0.4                    | 5       | KS-4N           | 7   | 2.7                  | ○              |
| KS4NS-3.8 | 8       | 17     | 9      | 3.9     | M2×0.4                    | 6       | KS-4N           | 7   | 2.8                  | ○              |
| KS4NS-5.4 | 8       | 17     | 9      | 5.5     | M2×0.4                    | 7.5     | KS-4N           | 7   | 3.0                  | ○              |
| KS34NS-8  | 8       | 17     | 9      | 8.1     | M2×0.4                    | 11      | KS-4N           | 8   | 4.6                  | ○              |
| KS4NS-9.4 | 8       | 17     | 9      | 9.5     | M2×0.4                    | 12      | KS-4N           | 8   | 4.8                  | ○              |
| KS5NS-5   | 9       | 12     | -      | 5       | M2×0.4                    | 9       | KS-5N           | 8   | 3.0                  | ○              |
| KS6NS-5.4 | 11      | 17     | 8      | 5.5     | M2×0.4                    | 8       | KS-6N           | 7   | 5.1                  | ○              |

※Standard stock quantity will be 10 to 1000P.(Depend on item)

# End Cap

## 1. Screwed type:

Secured by pins after End Cap is screwed on to tube.

### Features

- For Terminal treatment.
- Prevent damaging to Optical Fiber and cable
- Easy for assembly and removal with screw
- Resists high heat environment.

### Material

Nickel plated on brass

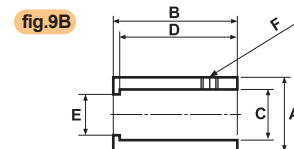
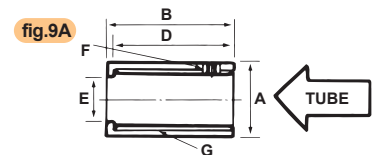
### Applications

- As sensors and cables protection in:
- Measurement device
  - Sensor instruments
  - Robots
  - Parts in amusement equipments



| Model   | φA(mm) | B(mm) | C(mm) | D(mm) | φE(mm) | F set pin (M x pitch)(mm) | G matching tube   | fig | Approx Weight(g/pcs) | Standard Stock |
|---------|--------|-------|-------|-------|--------|---------------------------|-------------------|-----|----------------------|----------------|
| KBS-1.8 | 5      | 8     | 3.1   | 7     | 1.8    | M2×0.4                    | KS-1.8N           | 9B  | -                    | ×              |
| KBS-2.6 | 6      | 8     | 4     | 7     | 2.6    | M2×0.4                    | KS-2.2N · KS-2.6N | 9B  | 1.0                  | ○              |
| KBS-3   | 7      | 8     | -     | 7     | 3.2    | M2×0.4                    | KS-3N · KS-3.2N   | 9A  | 1.4                  | ○              |
| KBS-4   | 8      | 10    | -     | 9     | 4      | M2×0.4                    | KS-4N             | 9A  | 2.0                  | ○              |
| KBS-5   | 9      | 10    | -     | 9     | 5      | M2×0.4                    | KS-5N             | 9A  | 2.3                  | ○              |
| KBS-6   | 10     | 10    | -     | 9     | 6      | M2×0.4                    | KS-6N             | 9A  | 2.4                  | ○              |
| KBS-7   | 11     | 10    | -     | 9     | 7      | M2×0.4                    | KS-7N             | 9A  | 2.6                  | ○              |
| KBS-8   | 12     | 10    | -     | 9     | 8      | M2×0.4                    | KS-8N             | 9A  | 2.8                  | ○              |
| KBS-9   | 15     | 14    | -     | 12    | 9.5    | M2×0.4                    | KS-9N             | 9A  | 6.5                  | ○              |
| KBS-10  | 15     | 14    | -     | 12    | 9.5    | M2×0.4                    | KS-10N            | 9A  | 6.5                  | ○              |
| KBS-11  | 17     | 14    | -     | 12    | 11     | M3                        | KS-11N            | 9A  | 9.1                  | ○              |
| KBS-13  | 19     | 16    | -     | 14    | 13     | M3                        | KS-13N            | 9A  | 11.3                 | ○              |
| KBS-14  | 20     | 18    | -     | 16    | 14     | M3                        | KS-14N            | 9A  | 13.3                 | ○              |
| KBS-15  | 22     | 18    | -     | 16    | 15.8   | M3                        | KS-15N            | 9A  | 13.2                 | ○              |
| KBS-19  | 26     | 20    | -     | 18    | 19.1   | M3×2P                     | KS-19N            | 9A  | -                    | ×              |

※Standard stock quantity will be 10 to 1000P.(Depend on item)



## 2. Adhesion type:

Adhere on the tube to secure.  
Can be used for Interlock type tube.

### Features

- For Terminal treatment.
- Prevent damaging to Optical Fiber and cable
- Outer diameter of the cap is small
- Vibration resistance
- Cost saving.

### Applications

- As sensors and cables protection in:
- Measurement device
  - Sensor instruments
  - Robots
  - Parts in amusement equipments

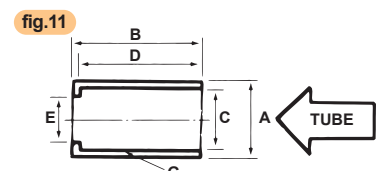
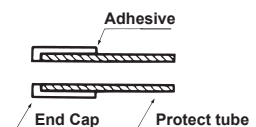
### Material

Nickel plated on brass



| Model  | φA(mm) | B(mm) | φC(mm) | D(mm) | φE(mm) | G matching tube   | fig | Approx Weight(g/pcs) | Standard Stock |
|--------|--------|-------|--------|-------|--------|-------------------|-----|----------------------|----------------|
| KB-1.8 | 3.5    | 7     | 3.05   | 6     | 1.8    | KS-1.5N · KS-1.8N | 11  | 0.17                 | ○              |
| KB-2.6 | 5      | 10    | 4      | 9     | 2.6    | KS-2.2N · KS-2.6N | 11  | 0.7                  | ○              |
| KB-3   | 6      | 12    | 5      | 9     | 3.2    | KS-3N · KS-3.2N   | 11  | 1.2                  | ○              |
| KB-4   | 7      | 12    | 5.9    | 11    | 4      | KS-4N · IS-4N     | 11  | 1.2                  | ○              |
| KB-5   | 8.5    | 12    | 7.3    | 11    | 5      | KS-5N · IS-5N     | 11  | 1.7                  | ○              |
| KB-6   | 10     | 12    | 8.3    | 11    | 6      | KS-6N · IS-6N     | 11  | 2.6                  | ○              |
| KB-7   | 11     | 12    | 9.3    | 11    | 7      | KS-7N · IS-7N     | 11  | 2.9                  | ○              |
| KB-8   | 12     | 12    | 10.5   | 11    | 8      | KS-8N · IS-8N     | 11  | 2.9                  | ○              |
| KB-9   | 14     | 14    | 12.6   | 13    | 9.5    | KS-9N · IS-9N     | 11  | 3.9                  | ○              |
| KB-10  | 14.5   | 15    | 13.1   | 14    | 10     | KS-10N            | 11  | 4.3                  | ○              |
| KB-11  | 15.5   | 16    | 14.1   | 15    | 11     | KS-11N            | 11  | 4.9                  | ○              |
| KB-13  | 17     | 18    | 16     | 16    | 13     | KS-13N · IS-13N   | 11  | 6.5                  | ○              |
| KB-14  | 19     | 20    | 17     | 18    | 14     | KS-14N            | 11  | 10.6                 | ○              |
| KB-15  | 21     | 20    | 19.2   | 18    | 15.8   | KS-15N · IS-15N   | 11  | 11.3                 | ○              |

※Standard stock quantity will be 10 to 1000P.(Depend on item)





Secured by pins after connector is screwed on to tube.  
There is also the one for Interlock tube.

### Features

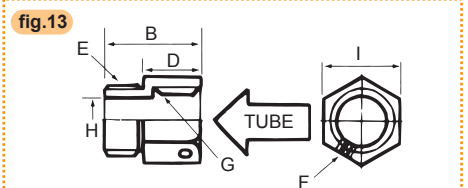
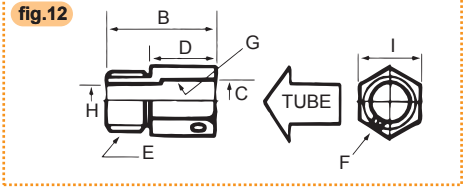
- For Terminal treatment in a panel and a box
- Prevent damaging to Optical Fiber and cable
- Can be used as panel mounting also
- Easy for assembly and removal with screw
- Resists for high heat environment

### Applications

- As the protection of sensors and cable in:
- Measurement tools
  - Sensor instruments
  - Robots
  - Parts in amusement equipments

### Material

Nickel plated on brass



※ "F" KPB-11~19 2-M3(180°)

| Model   | B(mm) | φ C(mm) | D(mm) | E pannel screw (M x pitch)(mm) | F set pin (M x pitch)(mm) | φ H(mm) | l(mm) | G matching tube   | fig | Approx Weight(g/pcs) | Standard Stock |
|---------|-------|---------|-------|--------------------------------|---------------------------|---------|-------|-------------------|-----|----------------------|----------------|
| KPB-1.8 | 14    | 3.1     | 8     | M4×0.7                         | M2×0.4                    | 1.8     | 4     | KS-1.5N · KS-1.8N | 12  | 0.75                 | ○              |
| KPB-2.6 | 14    | 4       | 8     | M5×0.8                         | M2×0.4                    | 2.6     | 5     | KS-2.2N · KS-2.6N | 12  | 2.5                  | ○              |
| KPB-3   | 14    | -       | 8     | M5×0.8                         | M2×0.4                    | 3.2     | 6.5   | KS-3N · KS-3.2N   | 13  | 2.5                  | ○              |
| KPB-4   | 14    | -       | 8     | M6×1                           | M2×0.4                    | 4       | 8     | KS-4N             | 13  | 3.6                  | ○              |
| KPB-5   | 14    | -       | 8     | M8×0.75                        | M2×0.4                    | 5       | 9     | KS-5N             | 13  | 6.4                  | ○              |
| KPB-6   | 18    | -       | 10    | M8×0.75                        | M2×0.4                    | 6.1     | 10    | KS-6N             | 13  | 14.5                 | ○              |
| KPB-7   | 18    | -       | 10    | M10×1                          | M2×0.4                    | 7       | 12    | KS-7N             | 13  | 15.2                 | ○              |
| KPB-8   | 17    | -       | 9     | M12×1                          | M2×0.4                    | 8       | 13    | KS-8N             | 13  | 9.1                  | ○              |
| KPB-9   | 20    | -       | 12    | M14×1                          | M2×0.4                    | 9.5     | 17    | KS-9N             | 13  | 19.1                 | ○              |
| KPB-10  | 20    | -       | 12    | M14×1                          | M2×0.4                    | 9.5     | 17    | KS-10N            | 13  | 19.1                 | ○              |
| KPB-11  | 23    | -       | 14    | M16×1                          | M3×2P                     | 11      | 19    | KS-11N            | 13  | 24.8                 | ○              |
| KPB-13  | 26    | -       | 15    | PF1/2                          | M3×2P                     | 13      | 23    | KS-13N            | 13  | 46.8                 | ○              |
| KPB-14  | 26    | -       | 15    | PF1/2                          | M3×2P                     | 14      | 23    | KS-14N            | 13  | 39.4                 | ○              |
| KPB-15  | 27    | -       | 16    | PF1/2                          | M3×2P                     | 15.8    | 24    | KS-15N            | 13  | 36.9                 | ○              |
| KPB-19  | 33    | -       | 18    | PF3/4                          | M3×2P                     | 19      | 29    | KS-19N            | 13  | -                    | ×              |

※Standard stock quantity will be 10 to 1000P.(Depend on item)

### For Interlocked Tube

| Model | B(mm) | D(mm) | E pannel screw (M x pitch)(mm) | F set pin (M x pitch)(mm) | φ H(mm) | l(mm) | G matching tube | fig | Approx Weight(g/pcs) | Standard Stock |
|-------|-------|-------|--------------------------------|---------------------------|---------|-------|-----------------|-----|----------------------|----------------|
| IPB-4 | 14    | 8     | M6×1                           | M2×0.4                    | 4       | 9     | IS-4N           | 12  | -                    | ×              |
| IPB-5 | 14    | 8     | M8×0.75                        | M2×0.4                    | 5       | 10    | IS-5N           | 12  | -                    | ×              |
| IPB-8 | 17    | 9     | M12×1                          | M2×0.4                    | 8       | 13    | IS-8N           | 13  | -                    | ×              |
| IPB-9 | 20    | 12    | M14×1                          | M2×0.4                    | 9.9     | 17    | IS-9N           | 13  | -                    | ×              |

※Standard stock quantity will be 10 to 1000P.(Depend on item)

# Locknut for Panel Connector

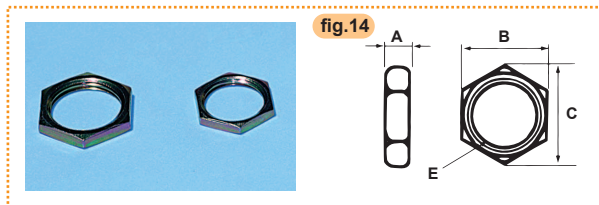
### Materials

Zink Chromate plated on Steel

### PF1/2 and PF 3/4

SPC + plating

| Model   | A(mm) | B(mm) | C(mm) | Matching Panel Connector | fig |
|---------|-------|-------|-------|--------------------------|-----|
| M4×0.7  | 3.2   | 7     | 8.1   | KPB-1.8                  | 14  |
| M5×0.8  | 3.2   | 8     | 9.2   | KPB-2.6 · KPB-3          | 14  |
| M6×1    | 2.2   | 8     | 9     | KPB-4                    | 14  |
| M8×0.75 | 2     | 11    | 12.7  | KPB-5 · KPB-6            | 14  |
| M10×1   | 2     | 14    | 16    | KPB-7                    | 14  |
| M12×1   | 2     | 14    | 16    | KPB-8                    | 14  |
| M14×1   | 2.5   | 17    | 19.6  | KPB-9 · KPB-10           | 14  |
| M16×1   | 2.5   | 19    | 21.5  | KPB-11                   | 14  |
| PF1/2   | 4     | -     | 28.5  | KPB-13~15                | 15  |
| PF3/4   | 3.8   | -     | 33    | KPB-19                   | 15  |



Secured by pins after connector is screwed on to tube.  
There is also the one for Interlock tube.

### Features

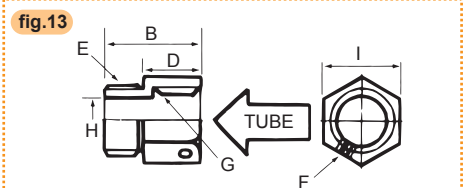
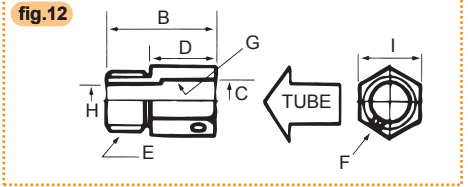
- For Terminal treatment in a panel and a box
- Prevent damaging to Optical Fiber and cable
- Can be used as panel mounting also
- Easy for assembly and removal with screw
- Resists for high heat environment

### Applications

- As the protection of sensors and cable in:
- Measurement tools
  - Sensor instruments
  - Robots
  - Parts in amusement equipments

### Material

Nickel plated on brass



※ "F" KPB-11~19 2-M3(180°)

| Model   | B(mm) | φ C(mm) | D(mm) | E pannel screw (M x pitch)(mm) | F set pin (M x pitch)(mm) | φ H(mm) | l(mm) | G matching tube   | fig | Approx Weight(g/pcs) | Standard Stock |
|---------|-------|---------|-------|--------------------------------|---------------------------|---------|-------|-------------------|-----|----------------------|----------------|
| KPB-1.8 | 14    | 3.1     | 8     | M4×0.7                         | M2×0.4                    | 1.8     | 4     | KS-1.5N · KS-1.8N | 12  | 0.75                 | ○              |
| KPB-2.6 | 14    | 4       | 8     | M5×0.8                         | M2×0.4                    | 2.6     | 5     | KS-2.2N · KS-2.6N | 12  | 2.5                  | ○              |
| KPB-3   | 14    | -       | 8     | M5×0.8                         | M2×0.4                    | 3.2     | 6.5   | KS-3N · KS-3.2N   | 13  | 2.5                  | ○              |
| KPB-4   | 14    | -       | 8     | M6×1                           | M2×0.4                    | 4       | 8     | KS-4N             | 13  | 3.6                  | ○              |
| KPB-5   | 14    | -       | 8     | M8×0.75                        | M2×0.4                    | 5       | 9     | KS-5N             | 13  | 6.4                  | ○              |
| KPB-6   | 18    | -       | 10    | M8×0.75                        | M2×0.4                    | 6.1     | 10    | KS-6N             | 13  | 14.5                 | ○              |
| KPB-7   | 18    | -       | 10    | M10×1                          | M2×0.4                    | 7       | 12    | KS-7N             | 13  | 15.2                 | ○              |
| KPB-8   | 17    | -       | 9     | M12×1                          | M2×0.4                    | 8       | 13    | KS-8N             | 13  | 9.1                  | ○              |
| KPB-9   | 20    | -       | 12    | M14×1                          | M2×0.4                    | 9.5     | 17    | KS-9N             | 13  | 19.1                 | ○              |
| KPB-10  | 20    | -       | 12    | M14×1                          | M2×0.4                    | 9.5     | 17    | KS-10N            | 13  | 19.1                 | ○              |
| KPB-11  | 23    | -       | 14    | M16×1                          | M3×2P                     | 11      | 19    | KS-11N            | 13  | 24.8                 | ○              |
| KPB-13  | 26    | -       | 15    | PF1/2                          | M3×2P                     | 13      | 23    | KS-13N            | 13  | 46.8                 | ○              |
| KPB-14  | 26    | -       | 15    | PF1/2                          | M3×2P                     | 14      | 23    | KS-14N            | 13  | 39.4                 | ○              |
| KPB-15  | 27    | -       | 16    | PF1/2                          | M3×2P                     | 15.8    | 24    | KS-15N            | 13  | 36.9                 | ○              |
| KPB-19  | 33    | -       | 18    | PF3/4                          | M3×2P                     | 19      | 29    | KS-19N            | 13  | -                    | ×              |

※Standard stock quantity will be 10 to 1000P.(Depend on item)

### For Interlocked Tube

| Model | B(mm) | D(mm) | E pannel screw (M x pitch)(mm) | F set pin (M x pitch)(mm) | φ H(mm) | l(mm) | G matching tube | fig | Approx Weight(g/pcs) | Standard Stock |
|-------|-------|-------|--------------------------------|---------------------------|---------|-------|-----------------|-----|----------------------|----------------|
| IPB-4 | 14    | 8     | M6×1                           | M2×0.4                    | 4       | 9     | IS-4N           | 12  | -                    | ×              |
| IPB-5 | 14    | 8     | M8×0.75                        | M2×0.4                    | 5       | 10    | IS-5N           | 12  | -                    | ×              |
| IPB-8 | 17    | 9     | M12×1                          | M2×0.4                    | 8       | 13    | IS-8N           | 13  | -                    | ×              |
| IPB-9 | 20    | 12    | M14×1                          | M2×0.4                    | 9.9     | 17    | IS-9N           | 13  | -                    | ×              |

※Standard stock quantity will be 10 to 1000P.(Depend on item)

# Locknut for Panel Connector

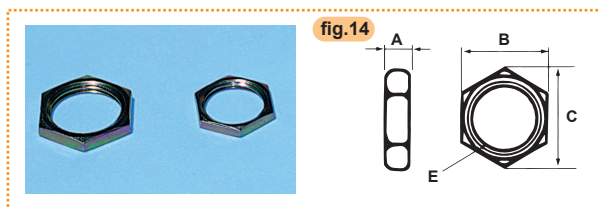
### Materials

Zink Chromate plated on Steel

### PF1/2 and PF 3/4

SPC + plating

| Model   | A(mm) | B(mm) | C(mm) | Matching Panel Connector | fig |
|---------|-------|-------|-------|--------------------------|-----|
| M4×0.7  | 3.2   | 7     | 8.1   | KPB-1.8                  | 14  |
| M5×0.8  | 3.2   | 8     | 9.2   | KPB-2.6 · KPB-3          | 14  |
| M6×1    | 2.2   | 8     | 9     | KPB-4                    | 14  |
| M8×0.75 | 2     | 11    | 12.7  | KPB-5 · KPB-6            | 14  |
| M10×1   | 2     | 14    | 16    | KPB-7                    | 14  |
| M12×1   | 2     | 14    | 16    | KPB-8                    | 14  |
| M14×1   | 2.5   | 17    | 19.6  | KPB-9 · KPB-10           | 14  |
| M16×1   | 2.5   | 19    | 21.5  | KPB-11                   | 14  |
| PF1/2   | 4     | -     | 28.5  | KPB-13~15                | 15  |
| PF3/4   | 3.8   | -     | 33    | KPB-19                   | 15  |





### Features

- The sensor head is completely protected to the amplifier unit.  
(For the terminal fitting outer diameter 7.2 (φ) in sensor unit)
- Reflective type
- Transmission type

### Material

Nickel Plated on Brass

#### For Reflective Type

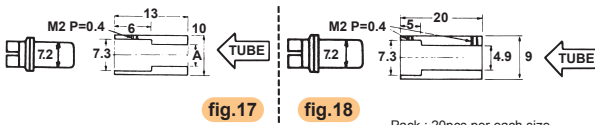


fig.17

fig.18

Pack : 20pcs per each size

| Model | φ A(mm) | Fitting Tube    | fig |
|-------|---------|-----------------|-----|
| KAB-3 | -       | KS-3N · KS-3.2N | 18  |
| KAB-4 | 5.9     | KS-4N           | 17  |
| KAB-5 | 7.3     | KS-5N           | 17  |

#### For Transmission Type

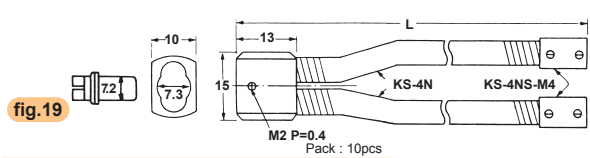


fig.19

| Model  | Fitting Tube | fig |
|--------|--------------|-----|
| KAWB-4 | KS-4N        | 19  |

# Insert

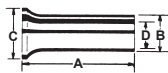
### Adhesion Type: Bonded insert in tube

#### Features

- Tube tailing
- Mounted inside the tube for protection of the Optical fiber and cable from damage.

#### Materials

- Electrolysis + Tin Plating
- KIN-6 is Stainless steel
- KIN-9 is Steel + Plating



#### Note

1. KIN-13 ~75 are available.  
Please contact us.(Material:Steel + Plating)
2. Can be used for KSP and other types.
3. Cannot be used with End Cap or Panel Connector.

Pack : 50pcs per each size

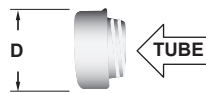
| Model   | A(mm) | φ B(mm) | φ C(mm) | φ D(mm) | Matching tube |
|---------|-------|---------|---------|---------|---------------|
| KIN-1.5 | 6.0   | 1.3     | 2.1     | 1.0     | KS-1.5N       |
| KIN-1.8 | 6.0   | 1.7     | 2.5     | 1.4     | KS-1.8N       |
| KIN-2.2 | 7.0   | 2.0     | 2.8     | 1.7     | KS-2.2N       |
| KIN-2.6 | 10.6  | 2.6     | 3.8     | 2.2     | KS-2.6N       |
| KIN-3.2 | 9.0   | 3.2     | 4.0     | 2.8     | KS-3.2N       |
| KIN-4   | 12.0  | 3.9     | 4.7     | 3.5     | KS-4N         |
| KIN-5   | 15.5  | 5.0     | 6.8     | 4.6     | KS-5N         |
| KIN-6   | 10.0  | 5.9     | 8.2     | 5.3     | KS-6N         |
| KIN-7   | 12.0  | 6.3     | 7.5     | 5.9     | KS-7N         |
| KIN-8   | 20.0  | 7.9     | 10.6    | 7.3     | KS-8N         |
| KIN-9   | 20.0  | 9.5     | 11.8    | 8.5     | KS-9N         |

### Screw Type:

#### Fastener screw used to secure the tube

#### Materials

SPC + Plating



#### Note

Please indicate the material type when you place an order.

Pack : 20pcs per each size

| Model    | φ D(mm) | Matching tube    |
|----------|---------|------------------|
| MAS-10IN | 17.8    | KS-10N · KSP-10N |
| MAS-12IN | 20.3    | KS-13N · KSP-13N |
| MAS-16IN | 23.6    | KS-15N · KSP-15N |
| MAS-22IN | 29.0    | KS-22N · KSP-22N |
| MAS-28IN | 35.7    | KS-28N · KSP-28N |
| MAS-36IN | 44.8    | KS-36N · KSP-36N |

### Type I: Panel Connector with Box Nut

Product Name: MAS Connector

#### Feature

- Prevents falling off and slipping out  
(Use screw type for Insert & Holder)

#### Protection Grade

Over IP55F on Die Casting and Nylon

#### Materials

Die Cast:

Zinc Die Cast + Electro-galvanizing  
(45° is Brass only)

Plastic:66 Nylon resin in Black



#### Note

1. When using tube and casing type, make the outer diameter thicker by taping as shown in the above figure and align the polyethylene holder.
2. For KSP, it will be waterproof and unnecessary for taping.

### Type II: Panel Connector with Box Nut

Product Names:Skin Top / Skin Top MS / Skin Top Spiral

#### Features

- Can be fastened with Fiber Protectors in a panel
- For KSP, it will be completely waterproof  
(Waterproof grade:IP-68)

#### Material

Plastic or Metal

#### Note

Please select the tube outer diameter size for fitting into the clamp.  
Please contact us for product details and sizes.

| ●Straight Connector |           | ●45° Angle Connector |            | ●90° Angle Connector |           | Screw size | A(mm) | B(mm) | Matching Tube    |
|---------------------|-----------|----------------------|------------|----------------------|-----------|------------|-------|-------|------------------|
| Die cast            | 66 Nylon  | Brass                | 66 Nylon   | Die cast             | 66 Nylon  |            |       |       |                  |
| MAS-SG10Z           | MAS-SG10N | MAS-HAG10            | MAS-HAG10N | MAS-AG10Z            | MAS-AG10N | G16        | 20.9  | 15.2  | KS-10N · KSP-10N |
| MAS-SG12Z           | MAS-SG12N | MAS-HAG12            | MAS-HAG12N | MAS-AG12Z            | MAS-AG12N | G16        | 20.9  | 17.7  | KS-13N · KSP-13N |
| MAS-SG16Z           | MAS-SG16N | MAS-HAG16            | MAS-HAG16N | MAS-AG16Z            | MAS-AG16N | G16        | 20.9  | 21    | KS-15N · KSP-15N |
| MAS-SG22Z           | MAS-SG22N | MAS-HAG22            | MAS-HAG22N | MAS-AG22Z            | MAS-AG22N | G22        | 26.4  | 26.5  | KS-22N · KSP-22N |
| MAS-SG28Z           | MAS-SG28N | MAS-HAG28            | MAS-HAG28N | MAS-AG28Z            | MAS-AG28N | G28        | 33.2  | 33    | KS-28N · KSP-28N |
| MAS-SG36Z           | MAS-SG36N | MAS-HAG36            | -          | MAS-AG36Z            | MAS-AG36N | G36        | 41.9  | 42    | KS-36N · KSP-36N |

**Feature**

Anchor for the Fiber Protection Tube (Holds down the End Cap and tube)

**Material**

Polished steel plate

Pack : 100pcs per each size

| Model  | A(mm) | B(mm) | C(mm) | φD(mm) | Matching Tube        |
|--------|-------|-------|-------|--------|----------------------|
| PZ0104 | 4     | 15.8  | 10    | 4.5    | KS-2.2N · KS-2.6N    |
| PZ0106 | 6     | 17.8  | 10    | 4.5    | KS-3N · 3.2N · KS-4N |
| PZ0108 | 8     | 23.0  | 12    | 5.5    | KS-5N · KS-6N        |
| PZ0110 | 10    | 25.0  | 12    | 5.5    | KS-7N · KS-8N        |
| PZ0112 | 12    | 27.0  | 14    | 5.5    | KS-9N                |
| PZ0114 | 14    | 32.7  | 16    | 5.5    | KS-10N               |
| PZ0115 | 15    | 33.7  | 16    | 7.5    | KS-11N               |
| PZ0116 | 16    | 34.9  | 18    | 7.5    | KS-13N               |
| PZ0118 | 18    | 41.4  | 20    | 9.0    | KS-14N               |
| PZ0120 | 20    | 43.4  | 20    | 9.0    | KS-15N               |
| PZ1122 | 22    | 66.0  | 25    | 9.0    | -                    |
| PZ1125 | 25    | 70.0  | 25    | 9.0    | KS-22N               |
| PZ1128 | 28    | 78.0  | 30    | 10.0   | -                    |
| PZ1130 | 30    | 80.0  | 30    | 10.0   | KS-25N               |

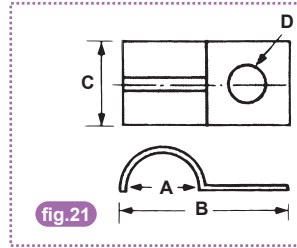


fig.21

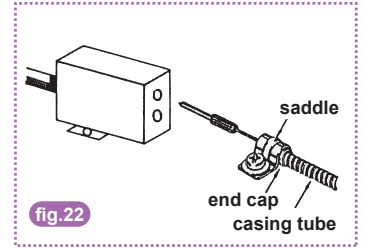


fig.22

**Note**

1. Taping for a thicker tube if the tube is too loose.
2. Select tube outer diameter size smaller than (A) in fig. 21.
3. Available with a stainless steel saddle.

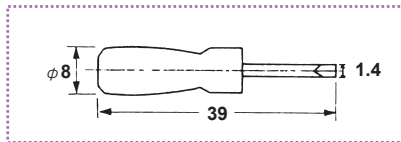
Slotted Screw Driver

**Feature**

For M2 screw

**Model**

D-M2



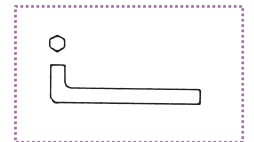
Hex Key wrench

**Feature**

For M2 Hex Head Lag screw

**Model**

D6-M2



Set pin

**Feature**

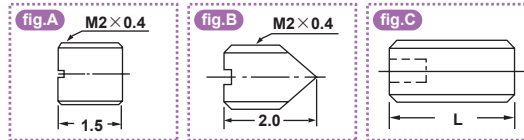
For fastened Sensor Head, End Cap and Panel Connector

**Material**

Raw steel + Stainless Plating

**Note**

Screw size applied per the Fiber Protection Connector chart in Page 15, column F



| Model     | Type of the tip    | fig |
|-----------|--------------------|-----|
| M2×1.5L - | Slotted screw      | A   |
| M2×2L -   | Slotted screw      | B   |
| M2×2.5L   | Hex Head Lag screw | C   |
| M2×4L     | Hex Head Lag screw | C   |
| M2×3L     | Hex Head Lag screw | C   |

Adhesive

**Feature**

Adhesive tube and connector

**Material**

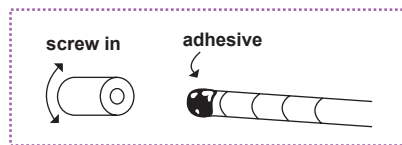
Chemical equation type

**Material**

High super-5

**Note**

1. Apply adequate adhesive on to the tube and screw the connector on to the tube.
2. Allow at least 5 minutes for the glue to hard before using.
3. Does not adhere Polyethylene, Polypropylene, Nylon, Vinyl Chloride, Fluorocarbon, and Rubber.



Fiber Protector Cutting Tool

**Feature**

For cutting tube

**Model**

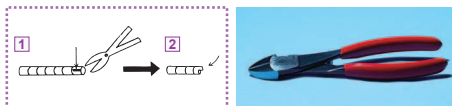
HG-175

**Material**

Alloy steel

**Note**

1. Hold the cutter 90° angle to the tube and cut the tube.
2. Position the cutter to tube so as to cut one pitch width (3~4mm).  
Trim the cut area with a radius as shown in fig 2.



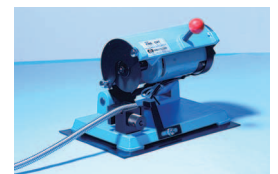
Fiber Protector Electric Cutting Tool

**Feature**

- The tube is cut straight and neatly.
- Maximum cutting diameter (φ 15.8)
- Comes with 5 extra blades

**Model**

S-2





## Usage

Sensor protection tubes of various lengths.

## Connector

Screw type:

- Easy to screw on and off as needed.
- Applicable for high temperature uses

## Adhesion type

- Outer diameter of connector is small
- Vibration resistance
- Cost saver

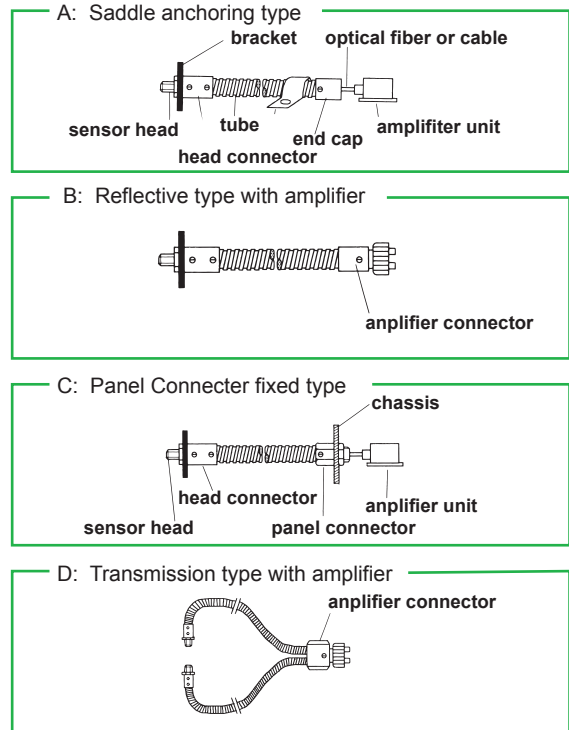
## How to select

1. Pick screw or adhesive type.
2. Select head connector according to configuration of sensor unit (screw size x pitch, cylindrical outer diameter) and outer diameter of optical fiber and cable.
3. Refer the instruction example and pick the terminal fitting.
4. Pick Tube (Select diameter larger than fiber diameter).

## Note

Please consult us with model and type of sensor you want to use if you would like assistance with the selection. We will be pleased to assist you. Also contact us if you cannot find the correct connector for your sensor head configuration or non-free cut type.

(The tube is used to protect the Sensor)



# How to order

## 1. When assembling at our factory:

The tube will be cut into specified length, de-burred and assembled.  
Minimum lot: 1 pc.  
(L=500mm and 1000mm are standard lengths.  
Custom lengths can be provided.)

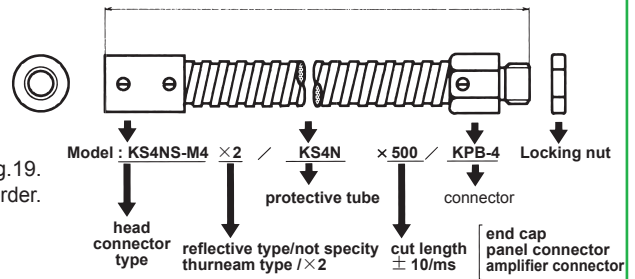
### Note

#### Regarding Transmission Types:

- KAWB-4 will be attached to the configuration shown on page 18, fig.19.
- Other Transmission Types comes two identical products in a set per order.

#### Regarding adhesion Type:

Heat resistance between -40 ~ +100°C on finished product.  
Adhesive, High Super 5 in this catalog should be used at room temperature.



## 2. Assembly by users:

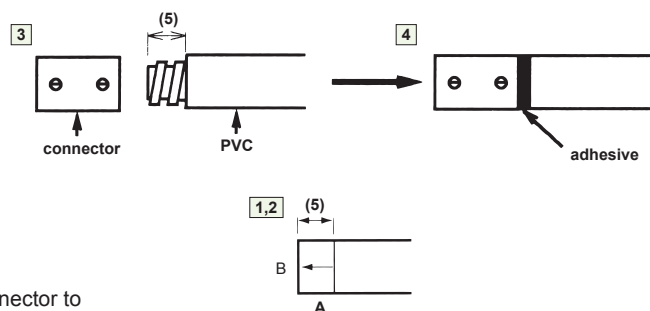
Please separately order Tube and Connector.  
Minimum order lot for tube: 10m  
Minimum order for connector: 1

### Note

How to put the connector on a mistproof type tube, KSP:

1. Using a knife cut PVC 5mm (A) from the edge of the tube.
2. Slit, starting at (A) to (B).
3. Peel off the PVC from the tube terminal.
4. Screw the connector on to tube.

Apply small amounts of adhesive between tube and screw connector to enhance strength.





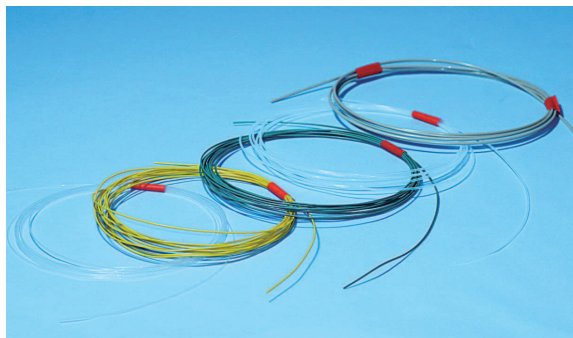
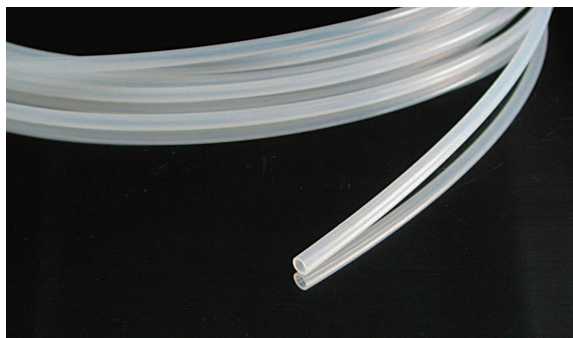
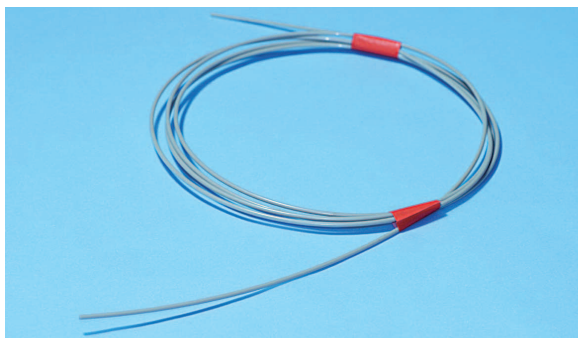
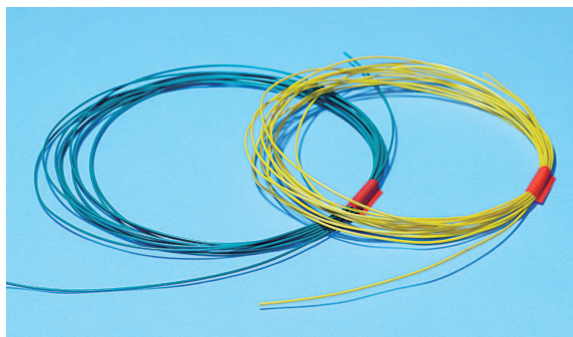
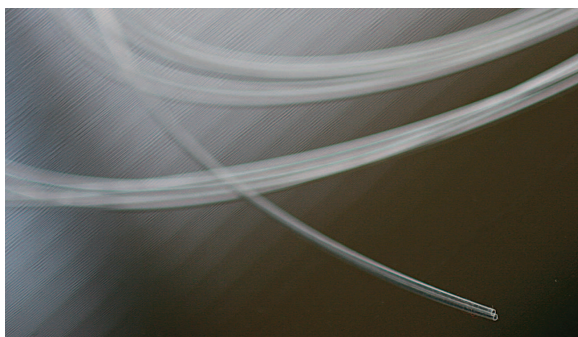
We will manufacture various resin and rubber tubes in special size upon a request.

## ■ Size

0.03mm up to 25.4mm in increments of 0.1mm

## ■ Applications

- Optical fiber protection
- Electrical application
- Air and fluid delivery
- Semiconductor equipments
- Chemical experimentation





| Material Type (Code)         | Grade  | Minimum Inner Diameter | Features  | Temperature in use | Applications   | Natural color (Available color)                   |
|------------------------------|--|------------------------|---|--------------------|--|---|
| Vinyl chloride (PVC)         | Soft   | 0.5mm ~                | Pliable   | -20~80°C           | Optic fiber protector  | Clear, Black (Others)                             |
|                              | Hard   | 0.4mm ~                | The most resin for general purpose  | -20~80°C           | Machine tools  |   |
|                              | Flame resistance   | 0.5mm ~                | Chemical resistance   | -20~105°C          | Medical equipments   |   |
| Polyester Elastomer (PETP)   |  | 0.2mm~                 | Greater heat-resistance<br>long lasting<br>Resilient<br>Flame resistance                          | -50~150°C          | Optic fiber protector and etc.                               | Opal,<br>(11 other colors)                        |
| Fluorocarbon resin           | PTFE   | 0.051mm~               | Heat-resistance<br>Solvent,<br>chemical resistance  | -65~288°C          | Medical, semiconductor,<br>physics & chemical lab equipments | Opal<br>(Contact us for other colors.)            |
|                              | PFA  | 0.1mm~                 | Heat-resistance<br>Solvent resistance,<br>especially for chemical<br>Gas leak proof, High clarity | -65~260°C          | Medical, semiconductor,<br>physics & chemical lab equipments | Translucent<br>(Green, Yellow,<br>Blue, Red, etc) |
|                              | FEP  | 0.3mm~                 | Heat, solvent resistance<br>especially for chemical<br>Higher clarity than PFA<br>Gas leak proof  | -65~200°C          | Medical, semiconductor,<br>physics & chemical lab equipments | Translucent<br>(Green, Yellow,<br>Blue, Red, etc) |
|                              | ETFE   | 0.3mm~                 | Heat resistance<br>Solvent resistance,<br>especially for chemical<br>Gas leak proof               | -100~150°C         | Medical, semiconductor,<br>physics & chemical lab equipments | Translucent                                       |
|                              | PVDF   | 0.3mm~                 | Heat and solvent resistance,<br>especially for chemical<br>High in gas leak proof                 | -65~150°C          | Medical equipments<br>Physic & Chemistry lab equipments      | Translucent                                       |
|                              | THV200   | 0.5mm~                 | Most pliable in<br>fluorine type  | -20~80°C           | Machine tools  | Clear (Black)                                     |
|                              | THV400   |                        | Optimum transference for<br>liquid as in high clarity   | -20~110°C          | Laboratory equipments  |   |
|                              | THV500   |                        |   | -20~150°C          | Medical equipments   |   |
| Polyurethane (TPU)           | Ester  | 0.5mm~                 | Pliable & resilient   | -40~88°C           | Machine tools  | Clear, black<br>(Contact us for other colors)     |
|                              | Ether  |                        | Abrasion resistance<br>characteristic can be used<br>for the air piping<br>of the moving element. |                    | Laboratory equipments  |   |
|                              | Caproate   |                        | Medical equipments  |                    |  |   |
| Polyamide (PA)               | 6 PA   | 0.35mm~                | Superior resistance<br>for alkaline   | -40~100°C          | Optic fiber protector<br>Machine tools<br>Medical equipments | Opal (Contact us<br>for other color)              |
|                              | 66 PA  |                        | Weak for acid<br>Weatherproof   |                    |  | Opal (Contact us<br>for other color)              |
|                              | 11 PA  |                        | Mechanical strenght<br>is strong  |                    |  | Opal (Contact us<br>for other color)              |
|                              | 12 PA  |                        | Slide surface but high<br>in moisture absorption  |                    |  | Opal (Contact us<br>for other color)              |
| Polyethylene (PE)            | Low density (LDPE)   | 0.3mm~                 | High in chemical resistance<br>Sliding surface  | -30~80°C           | Medical equipments   | Opal (Contact us<br>for other color)              |
|                              | High density (HDPE)  |                        |   | -50~100°C          | Physics & chemical lab equipments                            |   |
| Polypropylene (PP)           |  | 0.3mm~                 | High in chemical resistance<br>Sliding surface  | -5~110°C           | Medical equipments<br>Physics & chemical lab equipments      | Opal (Contact us<br>for other color)              |
| Polyetherether ketone (PEEK) |  | 0.03mm~                | Radiation<br>and heat resistance<br>Sliding surface<br>Weak in strong acid                        | -50~260°C          | Machine tools<br>Optic fiber protector<br>Medical equipments | Grayish brown                                     |
| Other experienced materials  | Polyether sulfone (PES), Polyamide imid (PAI),<br>Polyphenylene sulfide (PPS)<br>Polycarbonate (PC), ABS, Acrylic (PMMA),<br>Polyacetar (POM), Poly-butylene terephthalate (PBT)<br>and etc. |                        |   |                    |  |   |



Production will be scheduled after receiving order.

## 1. For Endoscope Manipulation (Spring Tube)

### ■Application

The flexible tube is used to manipulate the lens angle during insertion of the Endoscope.

### ■Minimum Size

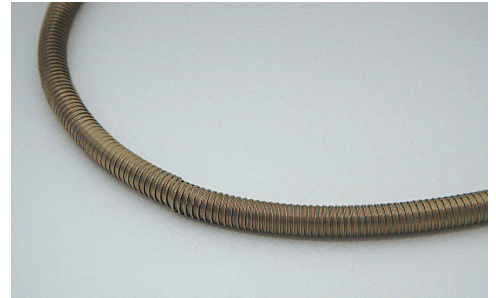
Inner diameter:  $\phi 0.6$  mm~

### ■Outer diameter

$\phi 1.4$  mm~

### ■Material

Stainless steel



## 2. For Endoscope housing (Braiding on Mono-coil)

### ■Minimum Size

Inner diameter: please inquire

### ■Outer diameter

Please inquire

### ■Material

Stainless steel



## 3. For Endoscope Optical Fiber protection (Mono-coil)

### ■Application

for the protection and guidance of the Optical Fiber used with the Endoscope

### ■Minimum Size

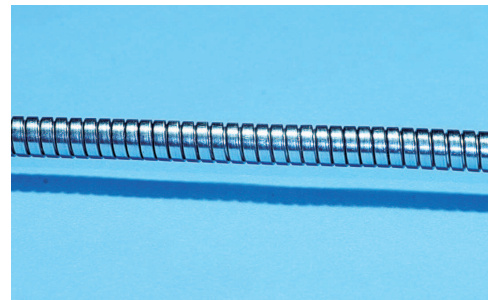
Inner diameter:  $\phi 0.1$ mm~

### ■Outer diameter

$\phi 0.15$ mm~

### ■Material

Stainless steel



## 4. For Catheter protection (Spring Tube - Extra fine S-coil)

### ■Application

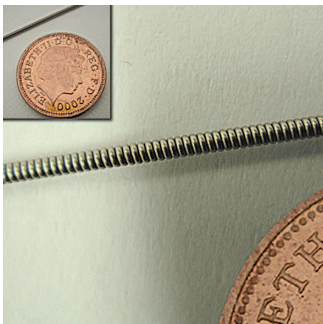
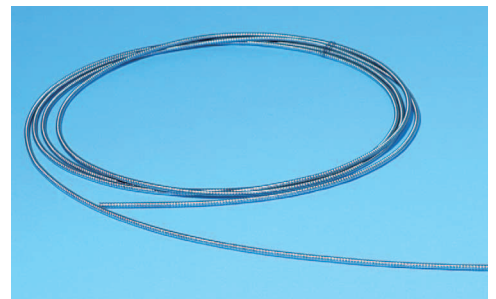
as a guide tube for variable catheter

### ■Minimum Size

$\phi 0.1$  mm~

### ■Material

Stainless steel





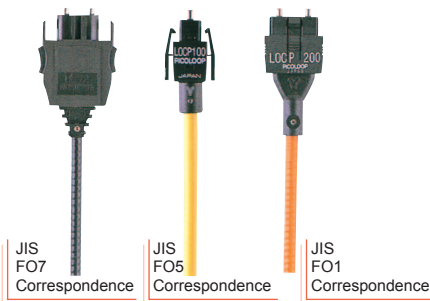


'PICOLOOP'...Optical fiber safe in a metal tube...adds a new dimension to network security. Lighter,smaller,and more cost efficient - it's just as easy to install as electronic circuits.

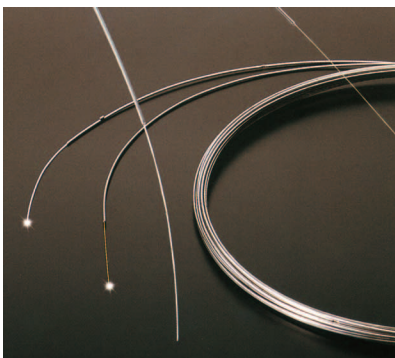
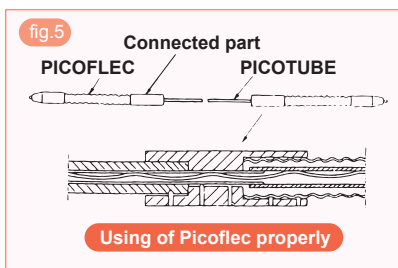


SC JIS FO4 Correspondence

It pulls, and is strong in the side pressure and the disconnection. It is possible to identify it by eight colors.



Picocable type of MPC



With PICOLOOP layouts can be wired in much the same way as ordinary electronic cable installations, and PICOLOOP does not require the careful handling generally needed with conventional optical fiber systems.

PICOFLEC is version of PICOLOOP in a highly flexible metal tube with heavy duty optical connectors to match. It can be supplied in different connector types to meet specific needs.

PICOCABLE is supplied in continuous semiseamless tubing and is suitable for long distance communication purposes. It can be supplied in lengths of up to several km without joints.

PICOLOOP fiber cables and accessories are designed for top performance, reliability and easy installation for a wide range of applications.

'PICOSENSOR' is a heat resistant optical fiber in a semiseamless metal tube, and is capable of resisting temperature as high as 300 degrees C. It is now being used in many new temperature sensing applications.

◎Features of PICOLOOP

1.PICOFLEC

- ① Optical fiber cable is inserted in protective flexible stainless steel tube and then covered by a sheath of fire-retardant pvc.
- ② Any single or combination of strands can be inserted into a PICOFLEC: such as GI, SM, DSF, MGF, PCF, HPCF, APF, or fiber ribbon.
- ③ The RAINBOW SERIES are available for circuit color-discriminated purposes. These are supplied in eight individual colors : ● red, ● orange, ● yellow, ● green, ● blue, ● white, ● grey and ● black.
- ④ Several types of heavy duty optical connectors strengthened by protective sleeves can be supplied. These prevent the fiber from breaking at the terminal. Connectors conform to JIS F01, JIS F04, JIS F05, JIS F07, and JIS F08
- ⑤ Cables and connectors with up to eight strands are available as standard items.
- ⑥ Length of over 500 meters can be supplied.
- ⑦ This Products can protect optical fiber from be bitten by a rat and attacked by small animals.

2.PICOFLEC

- ① PICOCABLE is available in any material, wall thickness and diameters as required. Typical selections are stainless steel, Incoloy, Inconel, nickel, copper, titanium, aluminum.
- ② Any combination of optical fiber and number of strands can be inserted : GI, SM, DSF, MGF, PCF, HPCF, APF, fiber ribbon.
- ③ Various types of cable configurations are available to meet laying conditions : such as FPC, KPC, and SS MPC types.
- ④ PICOCABLE armored construction enables it to be laid in difficult locations at remarkably lower cost than conventional fiber cable.
- ⑤ No special expertise is necessary for installation. It can be laid in much the same way as ordinary electronic cable.
- ⑥ Special tools are offered for cutting semiseamless metal tube.

3.PICOSENSOR

Optical fiber temperature sensor systems have been developed that have a wide operating range, and optical fiber temperature sensor can be supplied that satisfy the needs of many industries.

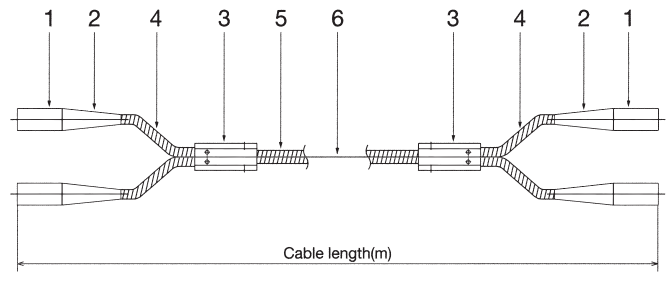
Metal tube availability: Stainless steel, Incoloy, Inconel, nickel, copper, titanium, aluminum.

Applicable temperature range: -196°C to 300°C.



Complete solutions to eliminate the closest possible attention to side pressure, tensile and bending strength. PICOCOR and connectors are best combined. Employment of thinned branching tubes and PICOCOR offers minimum space and high mount density anytime.

- 1)Optical Connector
- 2)Cord bush
- 3)Splitter
- 4)Branching tube (PICOFLEC)
- 5)Main flexible tube (PICOFLEC)
- 6)Optical Fiber
- 7)Protection Cap



### Standard Ordering Code

PLJ

| Number of Both-ended connectors |                      | Connector specification |             | Optical fiber specification |         |      | Optical fiber polishing specification |      | Main flexible tube type |      | Flexible tube color  |      | Cable length     |  |                      |                      |                      |                      |
|---------------------------------|----------------------|-------------------------|-------------|-----------------------------|---------|------|---------------------------------------|------|-------------------------|------|--|------|------------------|--|----------------------|----------------------|----------------------|----------------------|
| Type                            | Code                 | Type                    | Designation | Code                        | Type    | Code | Type                                  | Code | Type                    | Code | Type   | Code | Length (unit: m) |  |                      |                      |                      |                      |
| FC                              | FC                   | GI                      | 50/125      | G1                          | PC      | P    | KSP-1.8N                              | 18   | Black                   | B    | <table border="1"> <tr><td colspan="2">Length (unit: m)</td></tr> <tr><td><input type="text"/></td><td><input type="text"/></td></tr> <tr><td><input type="text"/></td><td><input type="text"/></td></tr> </table> |      | Length (unit: m) |  | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Length (unit: m)                |                      |                         |             |                             |         |      |                                       |      |                         |      |  |      |                  |  |                      |                      |                      |                      |
| <input type="text"/>            | <input type="text"/> |                         |             |                             |         |      |                                       |      |                         |      |  |      |                  |  |                      |                      |                      |                      |
| <input type="text"/>            | <input type="text"/> |                         |             |                             |         |      |                                       |      |                         |      |  |      |                  |  |                      |                      |                      |                      |
| SC                              | SC                   |                         | 80/125*     | G2                          | Flat    | H    | KSP-2.6N                              | 26   | Green                   | G    |  |      |                  |  |                      |                      |                      |                      |
| DSC                             | DSC                  |                         | 200/250*    | G3                          | APC(8°) | AC   | KSP-3N                                | 30   | Blue                    | Y    |  |      |                  |  |                      |                      |                      |                      |
| ST                              | ST                   |                         | 400/500*    | G4                          | SPC     | SP   | KSP-4N                                | 40   | Yellow                  | S    |  |      |                  |  |                      |                      |                      |                      |
| DP                              | DP                   |                         | 62.5/125    | G5                          | AdPC    | Ad   | KSP-6N                                | 60   | Orange                  | D    |  |      |                  |  |                      |                      |                      |                      |
| DL                              | DL                   | SM                      | 10/125      | S1                          |         |      |                                       |      | Red                     | R    |  |      |                  |  |                      |                      |                      |                      |
| CF2001                          | 21                   |                         | 8/125       | S2                          |         |      |                                       |      | White                   | H    |  |      |                  |  |                      |                      |                      |                      |
| CF1001                          | 11                   | MGF                     | 200/250     | M1                          |         |      |                                       |      | Gray                    | N    |  |      |                  |  |                      |                      |                      |                      |
| FDDI                            | MA                   | HPCF                    | 200/230     | H1                          |         |      |                                       |      | Right green             | K    |  |      |                  |  |                      |                      |                      |                      |
| FDDI                            | MB                   |                         | 200/250     | H2                          |         |      |                                       |      | Pink                    | P    |  |      |                  |  |                      |                      |                      |                      |
| FDDI                            | MM                   | (*customized product)   |             |                             |         |      |                                       |      |                         |      |  |      |                  |  |                      |                      |                      |                      |
| FDDI                            | MS                   |                         |             |                             |         |      |                                       |      |                         |      |  |      |                  |  |                      |                      |                      |                      |
| LC                              | LC                   |                         |             |                             |         |      |                                       |      |                         |      |  |      |                  |  |                      |                      |                      |                      |
| DLC                             | DLC                  |                         |             |                             |         |      |                                       |      |                         |      |  |      |                  |  |                      |                      |                      |                      |

※MF10 are also available

[Products Designation Example]  
2 single mode fibers, SC connectors,  
Main flexible KS-2.6N yellow, L=10m  
PLJ2/2SCS1P26Y0010

### PICOFLEC technical information

Flexible tube spec. sheet(unit,mm)

| Symbol                 | KSP-1.8N            | KSP-2.6N          | KSP-3.0N          | KSP-4.0N          | KSP-6N             |
|------------------------|---------------------|-------------------|-------------------|-------------------|--------------------|
| Material               | SUS304BA PVC sheath |                   |                   |                   |                    |
| Inner diameter         | $\phi 1.8\pm 0.2$   | $\phi 2.6\pm 0.2$ | $\phi 3.0\pm 0.2$ | $\phi 4.0\pm 0.2$ | $\phi 6.0\pm 0.2$  |
| Outer diameter         | $\phi 2.9\pm 0.2$   | $\phi 3.8\pm 0.2$ | $\phi 4.6\pm 0.2$ | $\phi 5.6\pm 0.2$ | $\phi 8.1\pm 0.2$  |
| Minimum bending radius | R40 $\pm 5$         | R40 $\pm 5$       | R40 $\pm 5$       | R40 $\pm 5$       | R40 $\pm 5$        |
| Shath outer diameter   | $\phi 3.5\pm 0.2$   | $\phi 4.8\pm 0.2$ | $\phi 6.0\pm 0.2$ | $\phi 7.0\pm 0.2$ | $\phi 10.0\pm 0.2$ |

Cable length tolerance

|                       | Length        | Tolerance  |
|-----------------------|---------------|------------|
| Cable length          | Less than 10m | +200-0(mm) |
|                       | 10m or more   | +5-0(%)    |
| Branching tube length | Less than 10m | +100-0(mm) |
|                       | 10m or more   | +5-0(%)    |

### Connector Polishing Specification Table

| Optical fiber       | SM10/125   |            |            |            |            | GI 50/125,GI 62.5/125 |            |            | PCF200/300 |            | PCF200/300 |   |
|---------------------|------------|------------|------------|------------|------------|-----------------------|------------|------------|------------|------------|------------|---|
|                     | Flat       | PC         | SPC        | AdPC       | APC        | Flat                  | PC         | SPC        | Flat       | Flat       | Flat       |   |
| PLJ Type            |            |            |            |            |            |                       |            |            |            |            |            |   |
| FC                  | O          | O          | O          | O          | O          | O                     | O          | O          | O          | O          | O          | O |
| SC                  | O          | O          | O          | O          | O          | O                     | O          | O          | O          | O          | O          | O |
| DSC                 | O          | O          | O          | O          | O          | O                     | O          | O          | O          | O          | O          | O |
| ST                  | O          | O          | O          | O          | O          | O                     | O          | O          | O          | O          | O          | O |
| FDDI                | O          | O          | O          | O          | O          | O                     | O          | O          | O          | O          | O          | O |
| LOCP200             |            |            |            |            |            |                       |            |            | O          |            |            |   |
| CF-2001H            |            |            |            |            |            |                       |            |            |            | O          |            |   |
| DL72ME              |            |            |            |            |            |                       |            |            |            |            | O          |   |
| PLC Type            |            |            |            |            |            |                       |            |            |            |            |            |   |
| DP                  | O          | O          | O          | O          | O          | O                     | O          | O          |            |            |            |   |
| LC                  | O          | O          | O          | △          | O          | O                     | O          | O          |            |            |            |   |
| FC                  | O          | O          | O          | O          | O          | O                     | O          | O          |            |            |            |   |
| SC                  | O          | O          | O          | O          | O          | O                     | O          | O          |            |            |            |   |
| DSC                 | O          | O          | O          | O          | O          | O                     | O          | O          |            |            |            |   |
| ST                  | O          | O          | O          | O          | O          | O                     | O          | O          |            |            |            |   |
| MU                  | O          | O          | O          | O          | O          | O                     | O          | O          |            |            |            |   |
| Insertion loss(db)  | 1.0 $\geq$ | 0.5 $\geq$ | 0.5 $\geq$ | 0.5 $\geq$ | 0.5 $\geq$ | 1.0 $\geq$            | 0.3 $\geq$ | 0.5 $\geq$ | 2.5 $\geq$ | 2.5 $\geq$ | 2.5 $\geq$ |   |
| Reflection loss(db) |            | 25 $\leq$  | 40 $\leq$  | 40 $\leq$  | 60 $\leq$  |                       | 22 $\leq$  | 35 $\leq$  |            |            |            |   |

△Please inquiry.

**FC connector**  
Conforming JIS-F01

PLJ-FC

PLC-FC

■FC connector Housing

**SC connector**  
Conforming to JIS F04

PLJ-SC

PLC-SC

■SC Connector Housing

**DSC connector**  
Conforming to JIS F04

PLJ-DSC

■DSC Connector Housing

**ST connector**  
Conforming to JIS F09

PLJ-ST

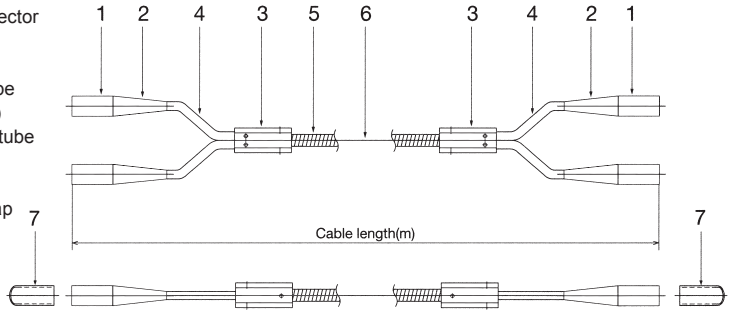
■ST Connector Housing





Complete solutions to eliminate the closest possible attention to side pressure, tensile and bending strength. PICOLOOP and connectors are best combined. Employment of thinned branching tubes and PICOCORD offers minimum space and high mount density anytime.

- 1) Optical Connector
- 2) Cord bush
- 3) Splitter
- 4) Branching tube (PICOCORD)
- 5) Main flexible tube (PICOFLEC)
- 6) Optical Fiber
- 7) Protection Cap



### Standard Ordering Code

PLC

Number of Both-ended connectors  
Branching tube color

| Type        | Code |    |    |
|-------------|------|----|----|
|             | φ3   | φ2 | φ1 |
| Black       | B    | -  | -  |
| Yellow      | Y    | Y  | Y  |
| Blue        | S    | S  | S  |
| Orange      | D    | D  | D  |
| Red         | R    | R  | R  |
| White       | H    | H  | -  |
| Gray        | N    | -  | -  |
| Right green | K    | K  | K  |

Connector specification

| Type  | Code  |
|-------|-------|
| FC    | FC    |
| SC    | SC    |
| ST    | ST    |
| MU    | MU    |
| LC    | LC    |
| DLC   | DLC   |
| DP    | DP    |
| DSC   | DSC   |
| SC2   | SC2   |
| MTRJ* | MTRJ* |

(\*customized product)

Optical fiber specification

| Type | Designation | Code |
|------|-------------|------|
| GI   | 50 / 125    | G1   |
|      | 62.5 / 125  | G5   |
| SM   | 10 / 125    | S1   |
|      | 8 / 125     | S2   |

Optical fiber polishing specification

| Type    | Code |
|---------|------|
| PC      | P    |
| Flat    | H    |
| APC(8°) | AP   |
| SPC     | SP   |
| AdPC    | Ad   |

Main flexible tube type

| Type     | Code |
|----------|------|
| KSP-1.8N | 18   |
| KSP-2.6N | 26   |
| KSP-3N   | 30   |
| KSP-4N   | 40   |
| KSP-6N   | 60   |

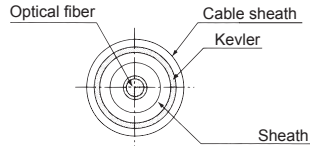
Flexible tube color

| Type        | Code |
|-------------|------|
| Black       | B    |
| Green       | G    |
| Yellow      | Y    |
| Blue        | S    |
| Orange      | D    |
| Red         | R    |
| White       | H    |
| Gray        | N    |
| Right green | K    |
| Pink        | P    |

Cable length

Length (unit: m)

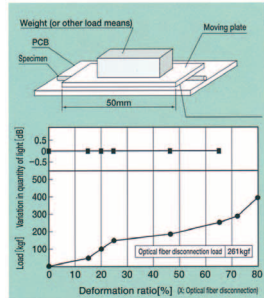
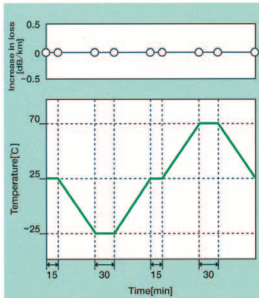
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|--|--|--|--|
|  |  |  |  |
|--|--|--|--|



[Products Designation Example]  
2 single mode fibers, SC connectors,  
Main flexible KS-2.6N yellow, L=10m

PLC2/2SCS1P26Y0010

### Main flexible tube Testing



**CF-2001H**  
Conforming to JIS-F07

CF-2001H Connector Housing

**DL connector**  
Conforming to JIS F08  
Sequencer controller

DL Connector Housing

**LC connector**

LC connector Housing

**PLC DLC**

PLC DLC connector Housing

**PLC-MU**  
Conforming to JIS F14

MU connector housing

**PLC-SC2**  
Conforming to JIS F04

SC2 Connector Housing

**MF10**

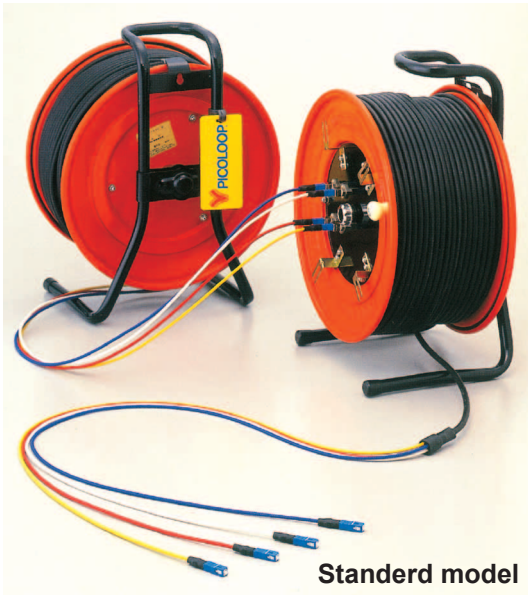
MF10 connector Housing



PICODRUM, as newly developed ; a Hybrid product reflecting global customer's requests for easy connection of optical fibers like electric wire extension cables.

Disconnection free / emergency free in optical fiber even under electric extension wire-like handling. The PICODRUM is designed for preliminary construction and short-distance connection of optical fibers.

PICOLOOP®



Standard model

## Features of PICODRUM

- Easy portability due to the integration of the PICOCABLE and the PICOFLEC into the PICODRUM eliminates restriction on construction sites.



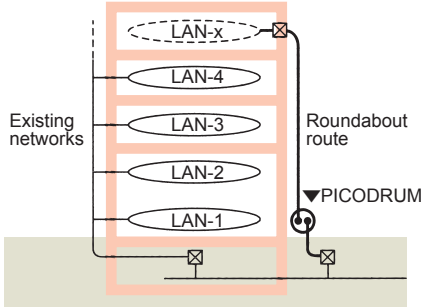
Waterproof model

- The combined use of one or more PICODRUMs expands and widens the optical fiber connection area.

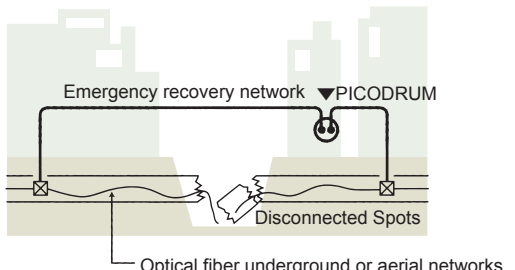
- Designed to be lightweight, at 10kg, the PICODRUM offers fail-safe and high efficient installation at elevated spots or unstable site

- WP type make it possible to use optical cable in the out side even rainy day cause of it's IP67 design.

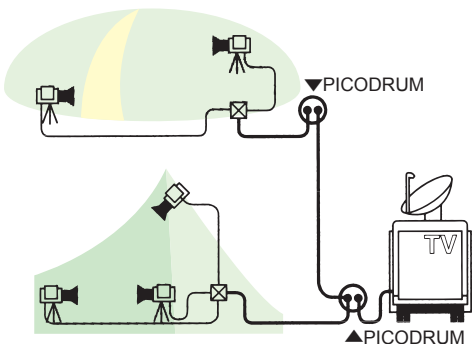
## Typical Application of the PICODRUM



Ex1 Preliminary LAN Networking Roundabout routing



Ex2 Public Communication Line Emergency Recovery



Ex3 Outdoor Relay Broadcast Network

## Specification table

| Model   | PICODRUM (Standard Model) |                 | PICODRUM WP (Waterproof Model) |                       |
|---|---------------------------|-----------------|--------------------------------|-----------------------|
|   | PDMS14-120                | PDMG14-120      | PDMWPS12-150 -MFR/MFP          | PDMWPG12-150 -MFR/MFP |
| Cable Length(m)                               | 120(up to 150m)           | 120(up to 150m) | 150                            | 150                   |
| Fiber Type                                    | SM 10/125                 | GI 50/125       | SM 10/125                      | GI 50/125             |
| Number of optical fiber                       | 4                         | 4               | 2                              | 2                     |
| Connector type                                | SC/FC/ST                  | SC/FC/ST        | MF10                           | MF10                  |
| Physical dimensions(mm)                       | 315 x D165                | 315 x D165      | 315 x D165                     | 315 x D165            |
| Net Weight(Kg)                                | Approx.10                 | Approx.10       | Approx.8                       | Approx.8              |
| Main Cable tension Strength (N)               | Approx.500                | Approx.500      | Approx.460                     | Approx.460            |
| Main Cable OD(mm) (Olefinic Elastomer sheath) | Approx.6.8                | Approx.6.8      | Approx.5.5                     | Approx.5.5            |

※Build in E/O converter type are also available. Please inquiry.  
 ※φ420 reel also available. length up to 300m.

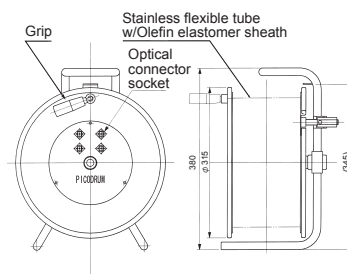
## Options

SC-ST Short Jumper  
 SC-FC Short Jumper

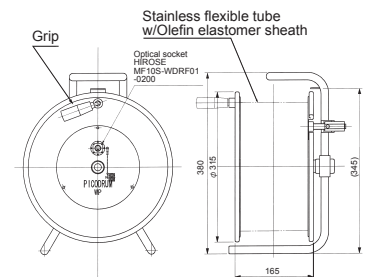
The SC type is a standard version for drum insertion connectors. Short jumpers types other than the SC type are also available.

FC-MFP Short Jumper  
 FC-MFR Short Jumper  
 SC-MFP Short Jumper  
 SC-MFR Short Jumper

The MF10 type is a standard version for drum insertion connectors. Short jumpers types other than the MF10 type are available. Also other than FC, SC types are available.



PICODRUM(Standard Model)

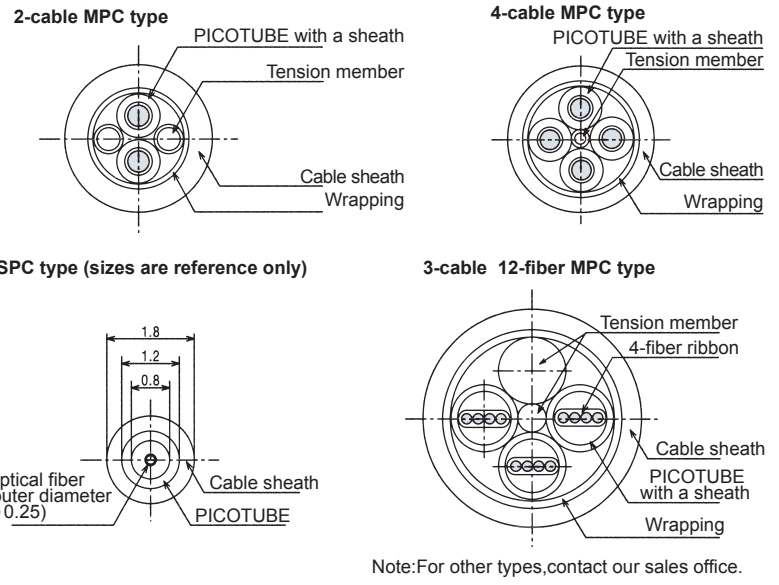


PICODRUM(Waterproof Model)



The PICOCABLE is a thin and lightweight cable to house optical fibers in the seamless metallic tube. Easy handling of cables and strength as high as corrugated cable enhancing environmental freedom and saving the total installation costs."

**Optical fiber insertion specifications**



Note: For other types, contact our sales office.

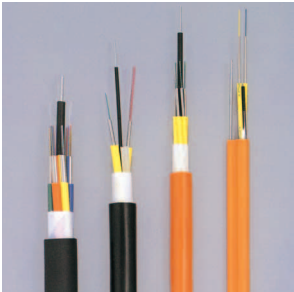
**Code Table**  
P L

|              |      |                     |      |                             |             |      |               |                |                  |  |
|--------------|------|---------------------|------|-----------------------------|-------------|------|---------------|----------------|------------------|--|
| Cable sheath |      | Cable configuration |      | Optical fiber specification |             |      | Q'ty of tubes | Q'ty of fibers | Cable length     |  |
| Type         | Code | Type                | Code | Type                        | Designation | Code | Q'ty of tubes | Q'ty of fibers | Length (unit: m) |  |
| PVC          | V    | SPC                 | SP   | GI                          | 50 / 125    | G1   | 1             |                | [ ][ ][ ][ ]     |  |
| PE           | E    | SSMPC               | SS   | SM                          | 62.5 / 125  | G5   | 2             |                |                  |  |
|              |      | MPC                 | MP   | HPCF                        | 10 / 125    | S1   | 3             |                |                  |  |
|              |      |                     |      |                             | 8 / 125     | S2   | 4             |                |                  |  |
|              |      |                     |      |                             | 200 / 230   | H1   | 6             |                |                  |  |
|              |      |                     |      |                             | 200 / 250*  | H2   | 8             |                |                  |  |
|              |      |                     |      | MGF                         | 200 / 250   | M1   |               |                |                  |  |

(\*Customized product)

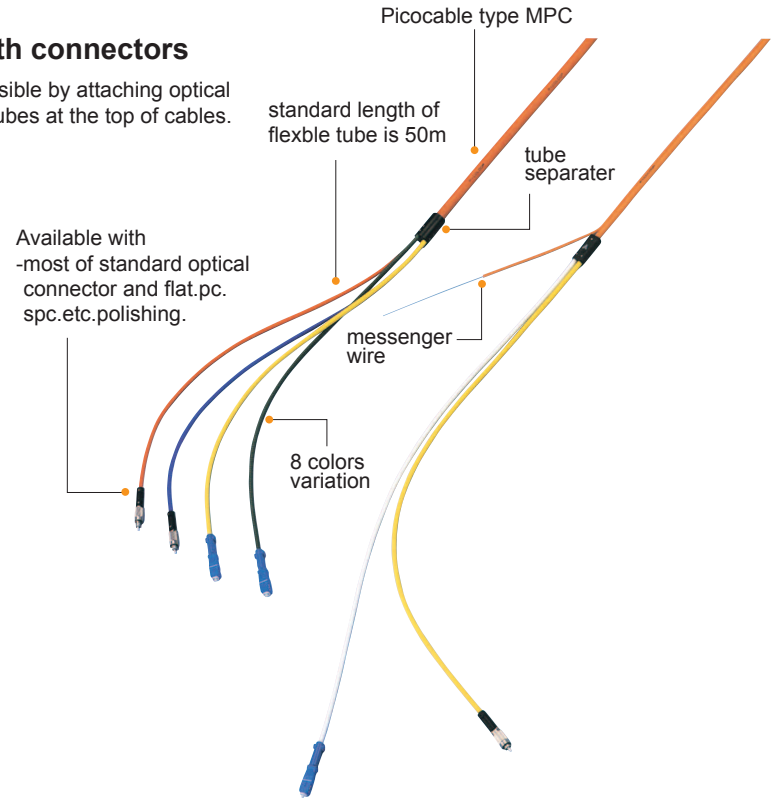
Example:  
 [1] [1] 1 fiber  
 [1] [2] 2 fibers  
 [2] [1] 2 fibers one tape  
 [4] [2] 4 fibers and 2 tapes

[Product Designation Example]  
2-cable MPC type  
PL-E-MP-S1-2-12-2000



**Picocables with connectors**

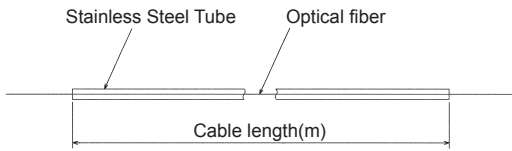
Ease of laying is possible by attaching optical connectors and flectubes at the top of cables.



**Features of PICOCABLE**

- Complete package of metallic tubes and optical fibers without restrictions on materials, size (diameter, thickness), types and number of fiber ribbons.
- Thin and lightweight, like electric wires.
- Perfect environmental freedom associated with outstanding water-tightness and air-tightness, allowing for direct burial applications.
- High resistance to side pressure and temperature changes eliminates environmental stress, strain and rodent damages.





**PICOTUBE Code Table**

| Material   |      | Inner diameter |      | Optical fiber specification |             |      | Configuration  |      | Number of fibers | Cable length  |
|------------|------|----------------|------|-----------------------------|-------------|------|----------------|------|------------------|---|
| Type       | Code | Type           | Code | Type                        | Designation | Code | Type           | Code | Q'ty             | Length(unit:m)  |
| SUS304     | 4    | φ 0.5          | 05   | GI                          | 50/125      | G1   | Raw/base cable | P1   | 1                | <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> |
| SUS316     | 6    | φ 0.7          | 07   |                             | 62.5/125    | G5   |                |      | 2                |   |
| Incoloy    | I    | φ 0.8          | 08   | SM                          | 10/125      | S1   | Fiber ribbon   | J1   | 3                |   |
| Titanium   | T    | φ 1.0          | 10   |                             | 8/125       | S2   |                |      | 4                |   |
| Aluminum   | A    | φ 1.2          | 12   | HPCF                        | 200/230     | H1   | 2-fiber ribbon | T2   | 6                |   |
| Copper     | C    | φ 1.4          | 14   |                             | 200/250*    | H2   |                |      | 8                |   |
| Soft steel | S    | φ 1.6          | 16   | MGF                         | 200/250     | M1   | 4-fiber ribbon | T4   |                  |   |
|            |      | φ 1.8          | 18   |                             |             |      |                |      |                  |   |
|            |      | φ 2.0          | 20   |                             |             |      |                |      |                  |   |
|            |      | φ 2.2          | 22   |                             |             |      |                |      |                  |   |
|            |      | φ 2.4          | 24   |                             |             |      |                |      |                  |   |
|            |      | φ 2.6          | 26   |                             |             |      |                |      |                  |   |
|            |      | φ 2.8          | 28   |                             |             |      |                |      |                  |   |
|            |      | φ 3.0          | 30   |                             |             |      |                |      |                  |   |

(\*Customized product)

**Stainless Steel Tube Specification Table**

| No.                               | 05              | 07    | 08    | 10    | 12    | 14    | 16    | 18    | 20    | 22    | 24    | 26    | 28    | 30    |
|-----------------------------------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Material                          | SUS304 · SUS316 |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Inner diameter(mm)                | φ 0.5           | φ 0.7 | φ 0.8 | φ 1.0 | φ 1.2 | φ 1.4 | φ 1.6 | φ 1.8 | φ 2.0 | φ 2.2 | φ 2.4 | φ 2.6 | φ 2.8 | φ 3.0 |
| Outer diameter(mm)                | φ 0.8           | φ 0.9 | φ 1.2 | φ 1.4 | φ 1.6 | φ 1.8 | φ 2.0 | φ 2.2 | φ 2.6 | φ 2.8 | φ 3.0 | φ 3.2 | φ 3.4 | φ 3.6 |
| Wall thickness(mm)                | 0.15            | 0.1   | 0.2   | 0.2   | 0.2   | 0.2   | 0.2   | 0.2   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   |
| Maximum cable length(m)           | 3,000           | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| Tensile strength(N)               | 59              | 49    | 118   | 147   | 167   | 196   | 216   | 245   | 421   | 461   | 490   | 529   | 568   | 608   |
| Permissible side pressure(N/50mm) | 2,156           | 1,274 | 1,960 | 1,666 | 1,470 | 1,274 | 1,176 | 980   | 1,274 | 1,176 | 1,176 | 1,078 | 980   | 1,176 |
| Approx. cable weight(kg/km)       | 2.4             | 1.9   | 5.9   | 6.0   | 7.0   | 8.0   | 8.9   | 9.9   | 17.1  | 18.6  | 20.1  | 21.6  | 23.1  | 24.6  |

\*1 For other materials, contact our sales office.

**Optical Fiber Insertion Specification Table**

| No.                    | 05      | 07      | 08           | 10           | 12           | 14           | 16 | 18 | 20           | 22 | 24 | 26 | 28 | 30 |
|------------------------|---------|---------|--------------|--------------|--------------|--------------|----|----|--------------|----|----|----|----|----|
| Optical fiber φ 0.25mm | 1 fiber | 1 fiber | 1 to 2 fiber | 1 to 4 fiber | 1 to 6 fiber | 1 to 6 fiber | -  | -  | -            | -  | -  | -  | -  | -  |
| SM/GI 4 fiber ribbon   | -       | -       | -            | -            | -            | 1 pcs        | -  | -  | 2 pcs        | -  | -  | -  | -  | -  |
| φ 0.5 mm fiber ribbon  | -       | -       | -            | -            | -            | -            | -  | -  | 1 to 2 fiber | -  | -  | -  | -  | -  |

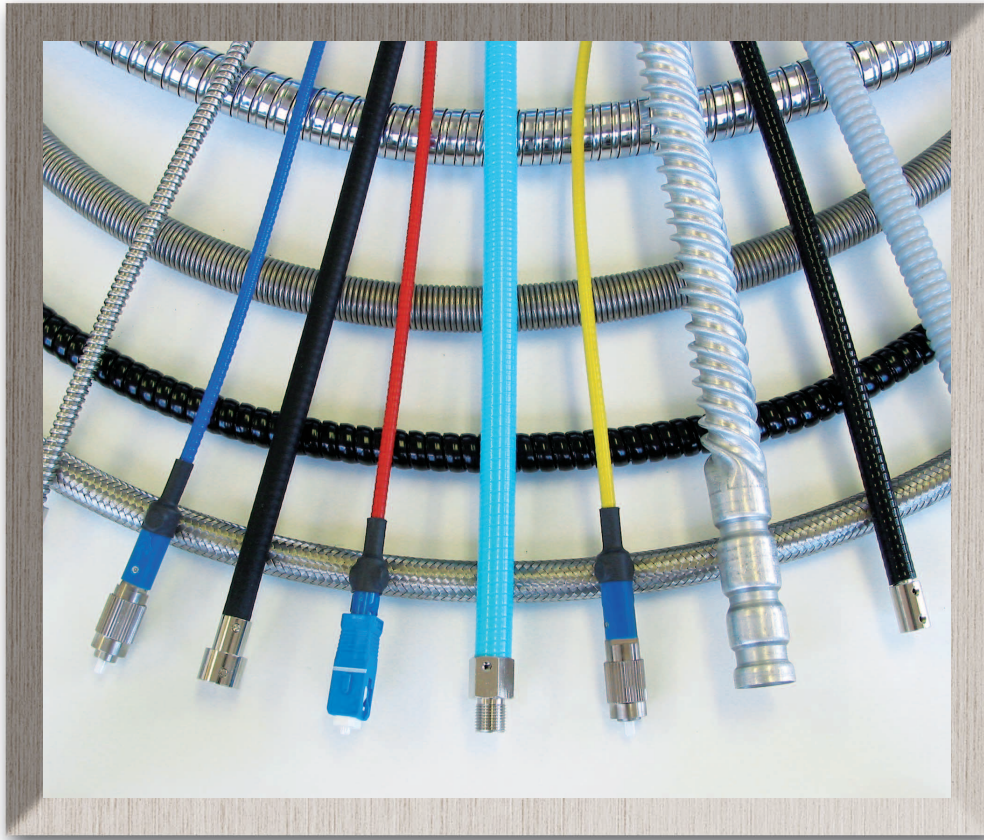
Insertion spec, diagram (Scale: 1/14)

**Typical Characteristics of Optical Fibers**

| SM Fiber                 |  |  |                       |
|--------------------------|--|--|-----------------------|
| Item                     | S1                                     | S2                                     |                       |
| Fiber                    | Material: Quartz                       | Material: Quartz                       |                       |
|                          | Mode fields diameter: 9.5 ± 1 μm       | Mode fields diameter: 8.5 ± 0.8 μm     |                       |
|                          | Mode fields eccentricity: 1 μm or less | Mode fields eccentricity: 1 μm or less |                       |
| Clad                     | Material: Quartz                       | Material: Quartz                       |                       |
|                          | Outer diameter: 125 ± 3 μm             | Outer diameter: 125 ± 2 μm             |                       |
| Insertion loss           | 1310 nm: 0.5dB/km or less              | 1550 nm: -                             | 0.25dB/km or less     |
| Interruption wavelength  | 1.10~1.28 μm                           | 1.53 μm or less                        |                       |
| Sheath                   | Material: Nylon                        | Material: Nylon                        |                       |
|                          | Outer diameter: 0.9 ± 0.1mm            | Outer diameter: 0.9 ± 0.1mm            |                       |
| All direction dispersion | -                                      | -                                      | 3.5ps/km · nm or less |

| GI fiber       |                             |                              |                     |
|----------------|-----------------------------|------------------------------|---------------------|
| Item           | G1                          | G5                           |                     |
| Fiber          | Material: Quartz            | Material: Quartz             |                     |
|                | Outer diameter: 50 ± 3 μm   | Outer diameter: 62.5 ± 3 μm  |                     |
| Clad           | Material: Quartz            | Material: Quartz             |                     |
|                | Outer diameter: 125 ± 3 μm  | Outer diameter: 125 ± 3 μm   |                     |
| Insertion loss | 850 nm: 3.0dB/km or less    | 1300 nm: 1.0dB/km or less    | 3.0dB/km or less    |
| Bandwidth      | 850 nm: 500MHz · km or more | 1300 nm: 600MHz · km or more | 200MHz · km or more |
| Sheath         | Material: Nylon             | Material: Nylon              |                     |
|                | Outer diameter: 0.9 ± 0.1mm | Outer diameter: 0.9 ± 0.1mm  |                     |

| HPCF Fiber     |                                  |                                  |                    |
|----------------|----------------------------------|----------------------------------|--------------------|
| Item           | H1                               | H2                               |                    |
| Fiber          | Material: Quartz                 | Material: Quartz                 |                    |
|                | Outer diameter: 200 ± 5 μm       | Outer diameter: 200 ± 5 μm       |                    |
| Clad           | Material: Acrylic fluoride resin | Material: Acrylic fluoride resin |                    |
|                | Outer diameter: 230 ± 5 μm       | Outer diameter: 250 ± 5 μm       |                    |
| Insertion loss | 810 nm: 6dB/km or less           | 810 nm: 10MHz · km or more       | 6dB/km or less     |
| Bandwidth      | 810 nm: 10MHz · km or more       | 810 nm: 10MHz · km or more       | 10MHz · km or more |
| Sheath         | Material: Fluoric resin          | Material: Fluoric resin          |                    |
|                | Outer diameter: 0.5 ± 0.1mm      | Outer diameter: 0.5 ± 0.1mm      |                    |



## Company History

- 1974 - Established in Tokyo
- 1984 - Started to sell stainless steel flexible tubes.  
Specifically with a small diameter stainless steel flexible tubes, used as an optical fiber protective tube.
  - Has business with major domestic optical fiber manufactures.
  - Developed overseas markets and also has business foreign Countries such as America, Germany, England, China, Korea, etc.
- 1990 - Started to sell protective tubes for shower hoses and delivery hoses for water purifiers, etc.
- 1998 - The Head office and factory were built and moved to Yotsukaido city in Chiba.
- 2000 - Developed and sold semi-interlocked tubes which are pliable and have a large bending radius in application for dentistry tools, laser welding and processing.
- 2003 - Started to sell lightweight and strong titanium flexible tubes for specific use.
- 2005 - Founded flexible tube factory in Hangzhou PR. China.



## Prospective:

HAGITEC Co. Ltd. will aim to be a pioneer of the stainless steel flexible tubes in the future, and develop new products that meet the needs of the users.





**HAGI**

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Distributor