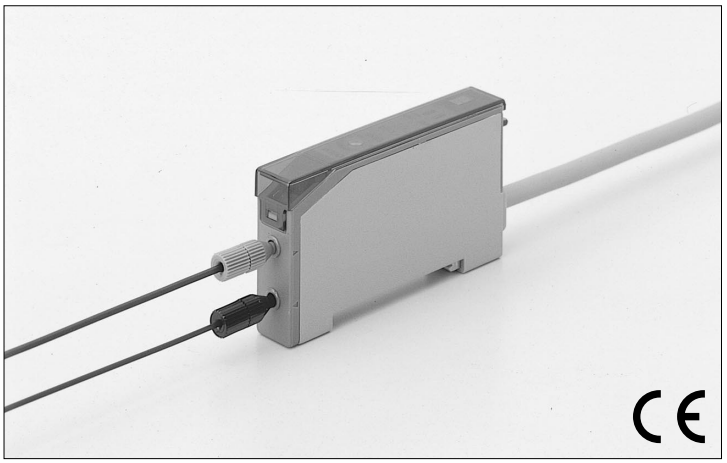
NAiS

MANUAL SETTING TYPE
OPTICAL FIBER
PHOTOELECTRIC SENSORS

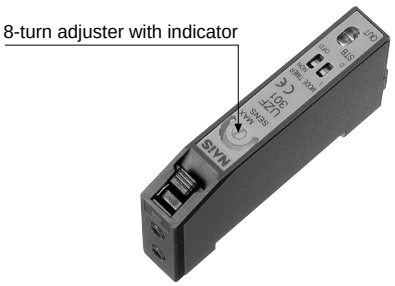
# UZF3 Series

## THE BEST SENSING PERFORMANCE IN THE SMALLEST BODY



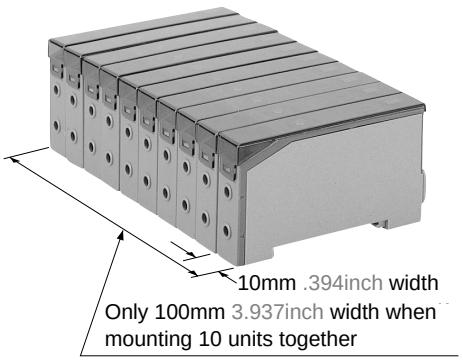
### 8-turn Adjuster with Indicator

Wide adjuster range of 8 turns permits precision setting.
The indicator shows the sensitivity setting.



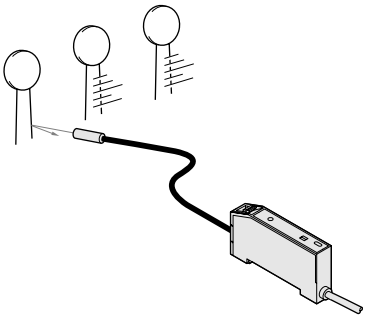

### Compact Size ! Width : 10mm .394inch

Saves space.



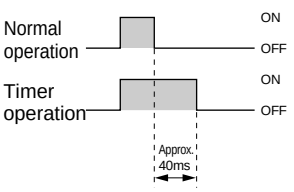

### Ultra-high Speed Response : 30µs

High-speed sensing type **UZF321**, ignores ambient light thanks to its' modulated beam.
The response time of 30 µs (standard type : 0.3ms) allows detection of high-speed small objects.



### OFF-delay Timer Function

Equipped with a fixed off-delay timer of approx. 40ms.
It is useful when the input processing time of the connected controller is slow, or signal width is short such as when the sensor detects a high-speed small object.

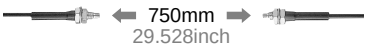



### High Sensing Performance

Long sensing range type **UZF311** attains 750mm 29.528inch sensing range with M4 thru-beam type fiber optic cable.
Sufficient sensing range can be achieved even in combination with ultra-small diameter fiber optic cable.
It is now feasible to use the green LED type or high-speed sensing type with the pinpoint spot lens.

#### Thru-beam type

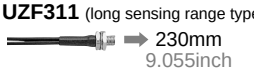
M4 standard x long sensing range fiber optic cable (**UZFTB8**) + **UZF311** (long sensing range type)




Ultra-small diameter fiber optic cable (**UZFTE2**) + **UZF312** (green LED type)

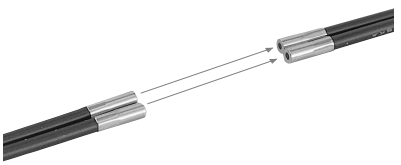

#### Reflective type

M6 standard x long sensing range fiber optic cable (**UZFR8B**) + **UZF311** (long sensing range type)



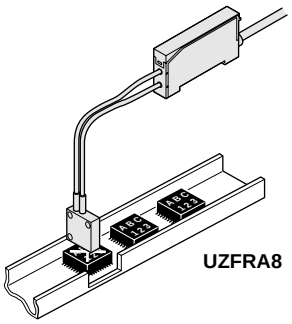

### Automatic Crosstalk Prevention Function

Two sets of fiber optic cable can be installed close together. (Except for **UZF321**, **UZF3215**)



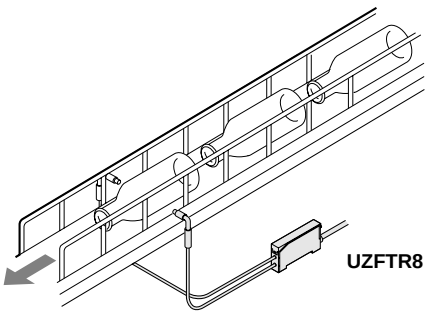
## APPLICATIONS

**Detection of IC bad marks**
A shift in printing doesn't affect the sensing as it senses wider area on objects.



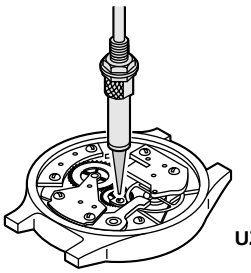
**UZFRA8**

**Detection of translucent resin**
Green LED type detects a small difference in light volume and is suitable for detection of translucent objects.



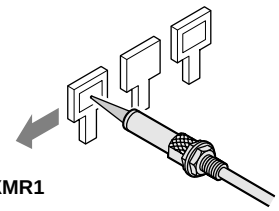
**UZFTR8**

**Presence sensing of object**
It reliably detects the small parts in a wrist watch.



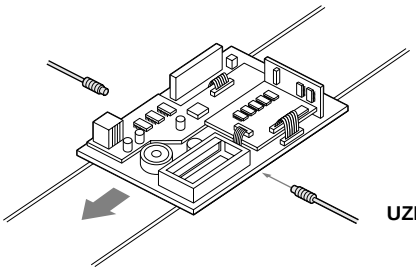
**UZFXMR1**

**Sensing of plating on electrode parts**
It can detect whether the parts are plated or not.



**UZFXMR1**

**Detection of large Print Circuit board**
It has 750mm 29.528inch long sensing range with M4 thru-beam mode fiber optic cable, so large size printed circuit board can be detected.



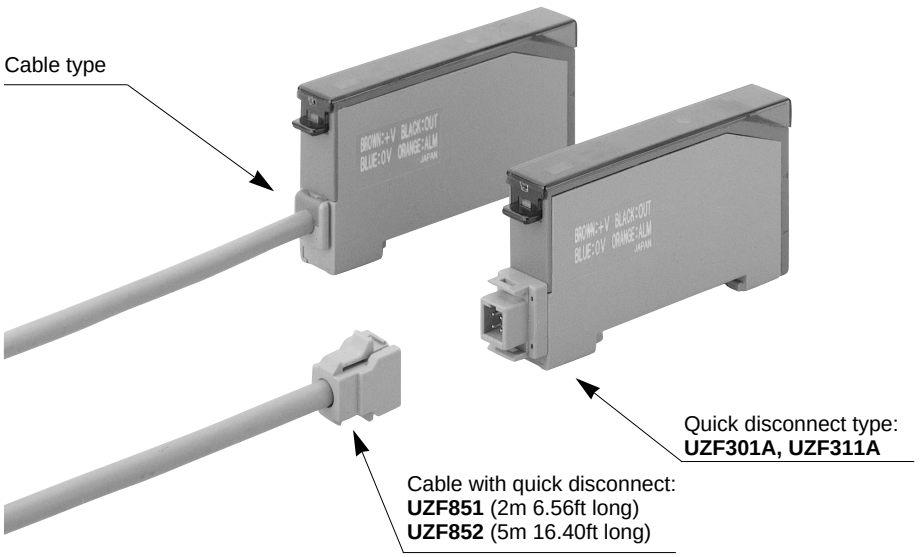
**UZFTB8**

## Wide Variation

**UZF3** series – a variety of sensors:

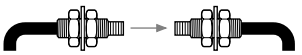
**UZF301** .....Sensitive type, suitable for sensing small differences
**UZF312** .....Green LED type, suitable for distinguishing red from white
**UZF311** .....Long sensing range type, suitable for long range sensing
**UZF321** .....High-speed sensing type, suitable for sensing high-speed objects

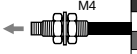
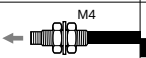
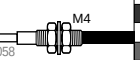
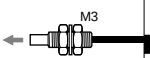
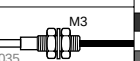
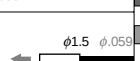
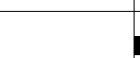
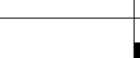
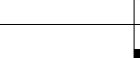
**UZF301A** and **UZF311A** are available with cable or with a quick disconnect.



## ORDER GUIDE

**For general use fiber optic cable [ Thru-beam type (one set consists of two pcs.) ]**



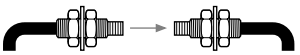
| | Shape of sensing probe (mm inch) | Sensing range (*2) ■:UZF301 ■:UZF312 ■:UZF311 ■:UZF321 | Min. sensing object [on optimum condition (*1)] ❶UZF301 ❷UZF312 ❸UZF311 ❹UZF321 | Features | Fiber optic cable length | Model No. |
|---|---|---|---|---|---|---|
| Long sensing range | Lens applicable<br>  | 300mm 11.811inch<br>115mm 4.528inch<br>750mm 29.528inch<br>150mm 5.906inch | ❶ϕ0.15mm ϕ.006inch opaque object<br>❷ϕ0.15mm ϕ.006inch opaque object<br>❸ϕ0.15mm ϕ.006inch opaque object<br>❹ϕ0.15mm ϕ.006inch opaque object | • Sensing range is about double of that of conventional model. | Freely cuttable 2m 6.562ft | **UZFTB8** |
| Standard | Lens applicable<br>  | 160mm 6.299inch<br>60mm 2.362inch<br>400mm 15.748inch<br>80mm 3.150inch | ❶ϕ0.08mm ϕ.003inch opaque object<br>❷ϕ0.08mm ϕ.003inch opaque object<br>❸ϕ0.08mm ϕ.003inch opaque object<br>❹ϕ0.08mm ϕ.003inch opaque object | • Freely cuttable type | Freely cuttable 2m 6.562ft | **UZFTF8** |
| | With sleeve<br>  | | | | | **UZFTF89** Sleeve 90mm 3.543inch |
| | | | | | | **UZFTF84** Sleeve 40mm 1.575inch |
| |  | | | | | **UZFTS8** |
| Small sensing probe | Lens applicable<br> | 160mm 6.299inch<br>60mm 2.362inch<br>400mm 15.748inch<br>80mm 3.150inch | ❶ϕ0.08mm ϕ.003inch opaque object<br>❷ϕ0.08mm ϕ.003inch opaque object<br>❸ϕ0.08mm ϕ.003inch opaque object<br>❹ϕ0.08mm ϕ.003inch opaque object | • Same sensing range as the standard with a smaller sensing probe | Freely cuttable 2m 6.562ft | **UZFTT8** |
| Small diameter |  | 48mm 1.890inch<br>15mm .591inch<br>120mm 4.724inch<br>25mm .984inch | ❶ϕ0.05mm ϕ.002inch opaque object<br>❷ϕ0.05mm ϕ.002inch opaque object<br>❸ϕ0.05mm ϕ.002inch opaque object<br>❹ϕ0.05mm ϕ.002inch opaque object | • Suitable for sensing in the intricate apparatus<br>• Freely cuttable type | Freely cuttable 2m 6.562ft | **UZFTF4** |
| | With sleeve<br>  | | | | | **UZFTF49** Sleeve 90mm 3.543inch |
| | | | | | | **UZFTF44** Sleeve 40mm 1.575inch |
| |  | | | | | **UZFTS4** |
| Flexible | Lens applicable<br>Small diameter<br>  | 48mm 1.890inch<br>15mm .591inch<br>120mm 4.724inch<br>25mm .984inch | ❶ϕ0.08mm ϕ.003inch opaque object<br>❷ϕ0.08mm ϕ.003inch opaque object<br>❸ϕ0.08mm ϕ.003inch opaque object<br>❹ϕ0.08mm ϕ.003inch opaque object | • Small diameter sensing probe coiled cable | 2m 6.562ft | **UZFTC4** |
| | Lens applicable<br>  | 160mm 6.299inch<br>60mm 2.362inch<br>400mm 15.748inch<br>80mm 3.150inch | ❶ϕ0.08mm ϕ.003inch opaque object<br>❷ϕ0.12mm ϕ.005inch opaque object<br>❸ϕ0.08mm ϕ.003inch opaque object<br>❹ϕ0.12mm ϕ.005inch opaque object | • Allowable bending radius : R4mm R.157inch<br>• Bending durability : one million times min. | Freely cuttable 2m 6.562ft | **UZFTP8** |
| | Small diameter<br>  | 48mm 1.890inch<br>15mm .591inch<br>120mm 4.724inch<br>25mm .984inch | ❶ϕ0.05mm ϕ.002inch opaque object<br>❷ϕ0.05mm ϕ.002inch opaque object<br>❸ϕ0.05mm ϕ.002inch opaque object<br>❹ϕ0.05mm ϕ.002inch opaque object | | | **UZFTP4** |
| | Small diameter<br>  | 52mm 2.047inch<br>18mm .709inch<br>130mm 5.118inch<br>30mm 1.181inch | ❶ϕ0.05mm ϕ.002inch opaque object<br>❷ϕ0.05mm ϕ.002inch opaque object<br>❸ϕ0.05mm ϕ.002inch opaque object<br>❹ϕ0.05mm ϕ.002inch opaque object | | 1m 3.281ft | **UZFTP2** |

**(*1) : The optimum condition is that the sensing output is the condition set the sensitivity to the beam-receiving operation level without the sensing object.**

(*2) : As for freely cuttable fiber optic cables, note that sensing ranges may be reduced up to 20% depending on the cut condition.

## ORDER GUIDE

**For environmental-resistant use fiber optic cable [ Thru-beam type (one set consists of two pcs.) ]**



| | Shape of sensing probe (mm inch) | Sensing range (*3) ■:UZF301 ■:UZF312 ■:UZF311 ■:UZF321 | Min. sensing object [on optimum condition (*1)] ❶UZF301 ❷UZF312 ❸UZF311 ❹UZF321 | Features | Fiber optic cable length | Model No. |
|---|---|---|---|---|---|---|
| Heat-resistant | Lens applicable M4 | 140mm 5.512inch | ❶ϕ0.08mm ϕ.003inch opaque object<br>❷ϕ0.08mm ϕ.003inch opaque object<br>❸ϕ0.08mm ϕ.003inch opaque object<br>❹ϕ0.08mm ϕ.003inch opaque object | • Heat-resistant : 350°C 662°F<br>Cold-resistant : −60°C −76°F | 2m 6.562ft | **UZFTH7** |
| | With sleeve M4 ϕ2.1 ϕ.083 | 50mm 1.969inch<br>350mm 13.780inch | | | | **UZFTH76** Sleeve 60mm 2.362inch |
| | Lens applicable M4 | 70mm 2.756inch | | • Silicon housing makes cable lead-around easy.<br>• Heat-resistant : 200°C 392°F<br>Cold-resistant : −60°C −76°F | 1m 3.281ft | **UZFTH6** |
| | Lens applicable M4 | 220mm 8.661inch<br>80mm 3.150inch<br>550mm 21.654inch<br>110mm 4.331inch | ❶ϕ0.15mm ϕ.006inch opaque object<br>❷ϕ0.15mm ϕ.006inch opaque object<br>❸ϕ0.15mm ϕ.006inch opaque object<br>❹ϕ0.15mm ϕ.006inch opaque object | • Heat-resistant : 130°C 266°F<br>Cold-resistant : −60°C −76°F<br>• Freely cuttable type | Freely cuttable 2m 6.562ft | **UZFTH8** |
| Chemical-resistant | ϕ5.5 ϕ.271 | 680mm 26.772inch<br>220mm 8.661inch<br>1,700mm 66.929inch<br>340mm 13.386inch | ❶ϕ0.5mm ϕ.020inch opaque object<br>❷ϕ0.5mm ϕ.020inch opaque object<br>❸ϕ0.5mm ϕ.020inch opaque object<br>❹ϕ0.5mm ϕ.020inch opaque object | • For the application in liquid chemical<br>• Heat-resistant specification (115°C 239°F)<br>• Long sensing range type with lens | 2m 6.562ft (Bending R : 30mm 1.181inch) | **UZFTL8Y** |
| | ϕ5.5 ϕ.217 | 200mm 7.874inch<br>70mm 2.756inch<br>500mm 19.685inch<br>100mm 3.937inch | ❶ϕ0.5mm ϕ.020inch opaque object<br>❷ϕ0.5mm ϕ.020inch opaque object<br>❸ϕ0.5mm ϕ.020inch opaque object<br>❹ϕ0.5mm ϕ.020inch opaque object | • For the application in liquid chemical<br>• Heat-resistant specification (115°C 239°F)<br>• Side-view type | 2m 6.562ft (Bending R : 30mm 1.181inch) | **UZFTV8Y** |
| Vacuum-resistant (*2) | Lens applicable M4 | 110mm 4.331inch<br>275mm 10.827inch<br>60mm 2.362inch | ❶ϕ0.1mm ϕ.004inch opaque object<br>❸ϕ0.1mm ϕ.004inch opaque object<br>❹ϕ0.1mm ϕ.004inch opaque object | • For the application in vacuum area<br>• Heat-resistant : 120°C 248°F | 1m 3.281ft (Bending R : 200mm 7.874inch) | **UZFT6V** |
| | | 52mm 2.047inch<br>130mm 5.118inch<br>30mm 1.181inch | ❶ϕ0.1mm ϕ.004inch opaque object<br>❸ϕ0.1mm ϕ.004inch opaque object<br>❹ϕ0.1mm ϕ.004inch opaque object | | 1m 3.281ft (Bending R : 30mm 1.181inch) | **UZFT60V** |

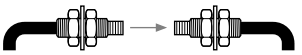
**(*1) : The optimum condition is that the sensing output is the condition set the sensitivity to the beam-receiving operation level without the sensing object.**

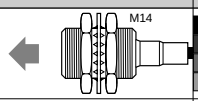
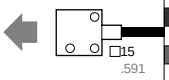
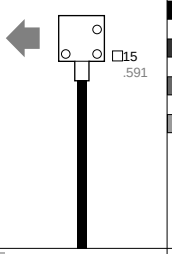
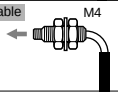
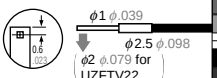
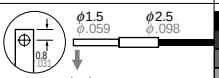
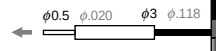
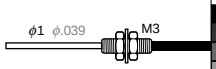
**(*2) : When vacuum-resistant fiber optic cable is used, be sure to use the followings together.**
**UZFTJ6 : Fiber optic cable on atmospheric side (One set consists of two pcs.)**
**UZFVBR1 : Photo terminal (One set consists of two pcs.)**

(*3) : As for freely cuttable fiber optic cables, note that sensing ranges may be reduced up to 20% depending on the cut condition.

## ORDER GUIDE

**For special application use fiber optic cable [Thru-beam type (one set consists of two pcs.) ]**



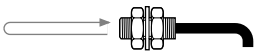
| | Shape of sensing probe (mm inch) | Sensing range (*2) ■:UZF301 ■:UZF312 ■:UZF311 ■:UZF321 | Min. sensing object [on optimum condition (*1)] ❶UZF301 ❷UZF312 ❸UZF311 ❹UZF321 | Features | Fiber optic cable length | Model No. |
|---|---|---|---|---|---|---|
| Long sensing range with lens |  | 5,000mm 196.850inch<br>2,800mm 110.236inch<br>13,000mm 511.811inch<br>3,500mm 137.795inch | ❶ϕ1mm ϕ.039inch opaque object<br>❷ϕ1mm ϕ.039inch opaque object<br>❸ϕ1mm ϕ.039inch opaque object<br>❹ϕ1mm ϕ.039inch opaque object | • By applying large diameter lens, a long sensing range is achieved.<br>• Fiber optic cable length is 10m 32.808ft long | Freely cuttable 10m 32.808ft | **UZFTL9** |
| |  | 400mm 15.748inch<br>150mm 5.906inch<br>1,000mm 39.370inch<br>200mm 7.874inch | ❶ϕ0.15mm ϕ.006inch opaque object<br>❷ϕ0.15mm ϕ.006inch opaque object<br>❸ϕ0.15mm ϕ.006inch opaque object<br>❹ϕ0.15mm ϕ.006inch opaque object | • A long sensing range is achieved with a very small sensing probe of ϕ2.5mm ϕ.098inch. | Freely cuttable 2m 6.562ft | **UZFTL8** |
| Array | Top sensing<br>  | 140mm 5.512inch<br>50mm 1.969inch<br>350mm 13.780inch<br>70mm 2.756inch | Vertical ϕ0.6mm ϕ.024inch opaque object<br>❶Horizontal ϕ0.04mm ϕ.002inch opaque object<br>Vertical ϕ0.6mm ϕ.024inch opaque object<br>❷Horizontal ϕ0.04mm ϕ.002inch opaque object<br>Vertical ϕ0.6mm ϕ.024inch opaque object<br>❸Horizontal ϕ0.04mm ϕ.002inch opaque object<br>Vertical ϕ0.6mm ϕ.024inch opaque object<br>❹Horizontal ϕ0.04mm ϕ.002inch opaque object | • Arrayed beam does not miss by detecting object regardless of its position. | Freely cuttable 2m 6.562ft | **UZFTA8** |
| | Side sensing<br>  | 110mm 4.331inch<br>40mm 1.772inch<br>275mm 10.827inch<br>60mm 2.362inch | Vertical ϕ0.6mm ϕ.024inch opaque object<br>❶Horizontal ϕ0.04mm ϕ.002inch opaque object<br>Vertical ϕ0.6mm ϕ.024inch opaque object<br>❷Horizontal ϕ0.04mm ϕ.002inch opaque object<br>Vertical ϕ0.6mm ϕ.024inch opaque object<br>❸Horizontal ϕ0.04mm ϕ.002inch opaque object<br>Vertical ϕ0.6mm ϕ.024inch opaque object<br>❹Horizontal ϕ0.04mm ϕ.002inch opaque object | | | **UZFTA8E** |
| Elbow | Lens applicable  | 110mm 4.331inch<br>45mm 1.772inch<br>275mm 10.827inch<br>60mm 2.362inch | ❶ϕ0.08mm ϕ.003inch opaque object<br>❷ϕ0.12mm ϕ.005inch opaque object<br>❸ϕ0.08mm ϕ.003inch opaque object<br>❹ϕ0.12mm ϕ.005inch opaque object | • Installation is simple as the sensing probe is bent 90 degrees and has 5mm .197inch radius. | Freely cuttable 2m 6.562ft | **UZFTR8** |
| Side-view | Small diameter<br>  <br>Sleeve part cannot be bent. | 70mm 2.756inch<br>18mm .709inch<br>175mm 6.890inch<br>38mm 1.496inch | ❶ϕ0.08mm ϕ.003inch opaque object<br>❷ϕ0.12mm ϕ.005inch opaque object<br>❸ϕ0.08mm ϕ.003inch opaque object<br>❹ϕ0.12mm ϕ.005inch opaque object | • Side sensing method saves installation space. | 1m 3.281ft | **UZFTV22** |
| | Sleeve part cannot be bent. | 30mm 1.181inch<br>10mm .394inch<br>75mm 2.953inch<br>15mm .591inch | ❶ϕ0.03mm ϕ.001inch opaque object<br>❷ϕ0.08mm ϕ.003inch opaque object<br>❸ϕ0.03mm ϕ.001inch opaque object<br>❹ϕ0.08mm ϕ.003inch opaque object | | Freely cuttable 2m 6.562ft | **UZFTV41** |
| |  <br>Sleeve part cannot be bent. | 100mm 3.937inch<br>35mm 1.378inch<br>250mm 9.843inch<br>50mm 1.969inch | ❶ϕ0.08mm ϕ.003inch opaque object<br>❷ϕ0.08mm ϕ.003inch opaque object<br>❸ϕ0.08mm ϕ.003inch opaque object<br>❹ϕ0.08mm ϕ.003inch opaque object | | | **UZFTV82** |
| Ultra-small diameter |  <br>Sleeve part cannot be bent. | 7mm .276inch | ❸ϕ0.01mm ϕ.0004inch opaque object | • Ultra-small diameter, and diameter of ϕ0.125mm ϕ.005inch | 500mm 19.685inch | **UZFTE1** |
| |  <br>Sleeve part cannot be bent. | 12mm .472inch<br>30mm 1.181inch<br>6mm .236inch | ❶ϕ0.02mm ϕ.001inch opaque object<br>❸ϕ0.02mm ϕ.001inch opaque object<br>❹ϕ0.03mm ϕ.001inch opaque object | • Ultra-small diameter, and diameter of ϕ0.25mm ϕ.010inch | 1m 3.281ft | **UZFTE2** |
| Narrow-view |  <br>Sleeve part cannot be bent. | 70mm 2.756inch<br>18mm .709inch<br>175mm 6.890inch<br>38mm 1.496inch | ❶ϕ0.05mm ϕ.002inch opaque object<br>❷ϕ0.05mm ϕ.002inch opaque object<br>❸ϕ0.05mm ϕ.002inch opaque object<br>❹ϕ0.05mm ϕ.002inch opaque object | • The spread of beam is one-sixth of conventional model, so that it doesn't cause crosstalk. | 1m 3.281ft | **UZFTK22** |

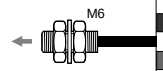
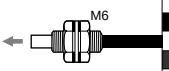
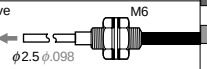
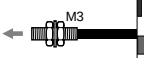
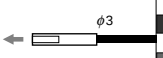
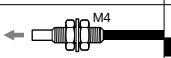
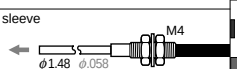
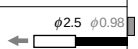
**(*1) : The optimum condition is that the sensing output is the condition set the sensitivity to the beam-receiving operation level without the sensing object.**

(*2) : As for freely cuttable fiber optic cables, note that sensing ranges may be reduced up to 20% depending on the cut condition.

## ORDER GUIDE

### For general use fiber optic cable [reflective type]



| | Shape of sensing probe (mm inch) | Sensing range (*3) ■:UZF301 ■:UZF312 ■:UZF311 ■:UZF321 | Min. sensing object [on optimum condition (*2)] ❶UZF301 ❷UZF312 ❸UZF311 ❹UZF321 | Features | Fiber optic cable length | Model No. |
|---|---|---|---|---|---|---|
| Long sensing range |  | 95mm 3.740inch<br>40mm 1.575inch<br>230mm 9.055inch<br>60mm 2.362inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❷ϕ0.05mm ϕ.002inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.03mm ϕ.001inch gold wire | • Long sensing range<br>• Freely cuttable type | Freely cuttable 2m 6.562ft | **UZFR8B** |
| Standard | Coaxial  | 60mm 2.362inch<br>23mm .906inch<br>150mm 5.906inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❷ϕ0.03mm ϕ.001inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.02mm ϕ.001inch gold wire | • Suitable for green LED type | 500mm 19.685inch | **UZFRF5** |
| | | | | • Freely cuttable type | Freely cuttable 2m 6.562ft | **UZFRF8** |
| | With sleeve  | 30mm 1.181inch | | | | **UZFRF89** Sleeve 90mm 3.543inch<br>**UZFRF84** Sleeve 40mm 1.575inch |
| Small sensing probe |  | 60mm 2.362inch<br>23mm .906inch<br>150mm 5.906inch<br>30mm 1.181inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❷ϕ0.03mm ϕ.001inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.02mm ϕ.001inch gold wire | • Same sensing range as the standard with small sensing probe | Freely cuttable 2m 6.562ft | **UZFRT8** |
| | Small diameter  | 18mm .709inch<br>6mm .236inch<br>45mm 1.772inch<br>10mm .394inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❷ϕ0.05mm ϕ.002inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.03mm ϕ.001inch gold wire | | | **UZFRT4** |
| |  | 60mm 2.362inch<br>23mm .906inch<br>150mm 5.906inch<br>30mm 1.181inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❷ϕ0.03mm ϕ.001inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.02mm ϕ.001inch gold wire | | | **UZFRS8** |
| Small diameter |  | 18mm .709inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❷ϕ0.05mm ϕ.002inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.03mm ϕ.001inch gold wire | • Suitable for sensing in the intricate apparatus<br>• Freely cuttable type | Freely cuttable 2m 6.562ft | **UZFRF4** |
| | With sleeve  | 6mm .236inch<br>45mm 1.772inch | | | | **UZFRF49** Sleeve 90mm 3.543inch<br>**UZFRF44** Sleeve 40mm 1.575inch |
| |  | 10mm .394inch | | | | **UZFRS4** |
| Flexible |  | 44mm 1.732inch<br>16mm .630inch<br>110mm 4.331inch<br>25mm .984inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❷ϕ0.05mm ϕ.002inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.03mm ϕ.001inch gold wire | • Allowable bending radius : R4mm R.157inch<br>• Bending durability : one million times min. | Freely cuttable 2m 6.562ft | **UZFRP8** |
| | Small diameter  | 7mm .276inch<br>18mm .709inch<br>4mm .157inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.02mm ϕ.001inch gold wire | | | **UZFRP4** |
| | Small diameter  | 10mm .394inch<br>3mm .118inch<br>25mm .984inch<br>5mm .197inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❷ϕ0.03mm ϕ.001inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.02mm ϕ.001inch gold wire | | 1m 3.281ft | **UZFRP2** |

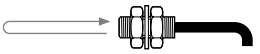
(*1) : The sensing range is the figure using an object of non-glossy white paper (100×100mm 3.937×3.937inch, standard of long sensing range type : 200×200mm 7.874×7.874inch, side- view type of small diameter type : 50×50mm 1.969×1.969inch, narrow-view type : 10×10mm .394×.394inch).

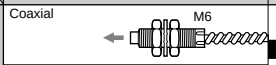
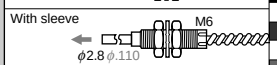
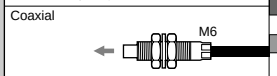
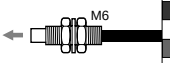
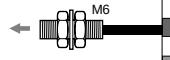
**(*2) : Minimum sensing object is the value by the maximum sensitivity. Note that this setting distance is different from the rated sensing distance.**

(*3) : As for freely cuttable fiber optic cables, note that sensing ranges may be reduced up to 20% depending on the cut condition.

## ORDER GUIDE

**For environmental-resistant use fiber optic cable [reflective type]**



| | Shape of sensing probe (mm inch) | Sensing range (*1) (*4) ■:UZF301 ■:UZF312 ■:UZF311 ■:UZF321 | Min. sensing object [at the maximum sensitivity (*2)] ❶UZF301 ❷UZF312 ❸UZF311 ❹UZF321 | Features | Fiber optic cable length | Model No. |
|---|---|---|---|---|---|---|
| Heat-resistant | Coaxial<br>  | 60mm 2.362inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❷ϕ0.03mm ϕ.001inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.02mm ϕ.001inch gold wire | • Heat-resistant : 350°C 662°F<br>Cold-resistant : −60°C −76°F | 2m 6.562ft | **UZFRH7** |
| | With sleeve<br>  | 18mm .709inch<br>170mm 6.693inch | | | | **UZFRH76** Sleeve 60mm 2.362inch |
| | Coaxial<br>  | 30mm 1.181inch | | • Silicon housing makes cable lead-around easy.<br>• Heat-resistant : 200°C 392°F<br>Cold-resistant : −60°C −76°F | 1m 3.281ft | **UZFRH6** |
| |  | 70mm 2.756inch<br>26mm 1.024inch<br>180mm 7.087inch<br>36mm 1.417inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❷ϕ0.12mm ϕ.005inch copper wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.08mm ϕ.003inch gold wire | • Heat-resistant : 130°C 266°F<br>• Cold-resistant : −60°C −76°F<br>• Freely cuttable type | Freely cuttable 2m 6.562ft | **UZFRH8** |
| Vacuum-resistant (*3) |  | 32mm 1.260inch<br>80mm 3.150inch<br>18mm .709inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.02mm ϕ.001inch gold wire | • For the application in vacuum area<br>• Heat-resistant : 120°C 248°F | 1m 3.281ft | **UZFR6V** |

(*1) : The sensing range is the figure using an object of non-glossy white paper (100×100mm 3.937×3.937inch, standard of long sensing range type : 200×200mm 7.874×7.874inch, side- view type of small diameter type : 50×50mm 1.969×1.969inch, narrow-view type : 10×10mm .394×.394inch).

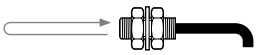
**(*2) : Minimum sensing object is the value by the maximum sensitivity. Note that this setting distance is different from the rated sensing distance.**

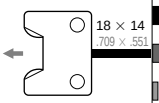
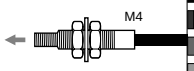
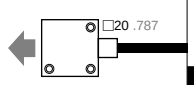
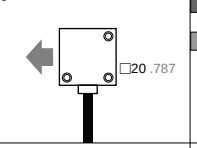
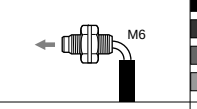
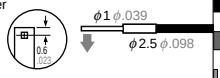
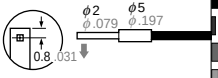
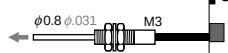
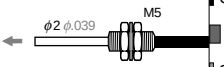
**(*3) : When vacuum-resistant fiber optic cable is used, be sure to use the followings together.**
**UZFTJ6 : Fiber optic cable on atmospheric side (One set consists of two pcs.)**
**UZFVBR1 : Photo terminal (One set consists of two pcs.)**

(*4) : As for freely cuttable fiber optic cables, note that sensing ranges may be reduced up to 20% depending on the cut condition.

## ORDER GUIDE

### For special applications use fiber optic cable [reflective type]



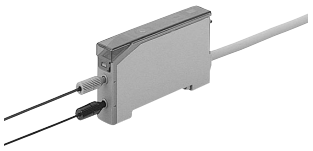
| | Shape of sensing probe (mm inch) | Sensing range (*1) (*3) ■:UZF301 ■:UZF312 ■:UZF311 ■:UZF321 | Min. sensing object [at the maximum sensitivity (*2)] ❶UZF301 ❷UZF312 ❸UZF311 ❹UZF321 | Features | Fiber optic cable length | Model No. |
|---|---|---|---|---|---|---|
| Fixed-focus |   | 5 to 10mm .197 to .394inch<br>4.5 to 12mm .177 to .472inch (center : 6mm .236inch)<br>5 to 8mm .197 to .315inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.02mm ϕ.0008inch gold wire | • Sensing performance is not affected by color or surface condition of the object. | Freely cuttable 2m 6.562ft | **UZFRL4** |
| High precision (Coaxial) | Lens applicable<br>Coaxial<br>   | 22mm .866inch<br>9mm .354inch<br>55mm 2.165inch<br>12mm .472inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❷ϕ0.03mm ϕ.001inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.02mm ϕ.0008inch gold wire | • A highly precise positioning is possible with coaxial reflective mode. | Freely cuttable 2m 6.562ft | **UZFRG4** |
| | Lens applicable<br>Coaxial • Small diameter<br>   | 8mm .315inch<br>20mm .787inch<br>4mm .157inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.02mm ϕ.0008inch gold wire | • Approx. ϕ0.3mm ϕ.012inch is achieved by means of combining with ultra-small spot lens **UZFXMR3**. | 500mm 19.685inch | **UZFREG1** |
| Array | Top sensing<br>   | 46mm 1.811inch<br>17mm .669inch | ❶Vertical ϕ0.1mm ϕ.004inch copper wire Horizontal ϕ0.01mm ϕ.0004inch gold wire<br>❷Vertical ϕ0.3mm ϕ.012inch copper wire Horizontal ϕ0.01mm ϕ.0004inch gold wire<br>❸Vertical ϕ0.1mm ϕ.004inch copper wire Horizontal ϕ0.01mm ϕ.0004inch gold wire<br>❹Vertical ϕ0.2mm ϕ.008inch copper wire Horizontal ϕ0.01mm ϕ.0004inch gold wire | • Arrayed beams meet various sensing demand. | Freely cuttable 2m 6.562ft | **UZFRA8** |
| | Side sensing<br>   | 115mm 4.528inch<br>26mm 1.024inch | | | | **UZFRA8E** |
| Elbow |   | 36mm 1.417inch<br>13mm .512inch<br>90mm 3.543inch<br>20mm .787inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❷ϕ0.05mm ϕ.002inch copperwire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.03mm ϕ.001inch gold wire | • Installation is simple as sensing probe is bent 90 degrees and has 5mm .197inch radius. | Freely cuttable 2m 6.562ft | **UZFRR8** |
| Side-view | Small diameter<br>  <br>Sleeve part cannot be bent. | 11mm .433inch<br>27mm 1.063inch<br>6mm .236inch | ❶ϕ0.01mm ϕ.0004inch gold wire<br>❸ϕ0.01mm ϕ.0004inch gold wire<br>❹ϕ0.02mm ϕ.0008inch gold wire | • Side sensing method saves installation space. | Freely cuttable 2m 6.562ft | **UZFRV41** |
| |  <br>Sleeve part cannot be bent. | 18mm .709inch<br>6mm .236inch<br>45mm 1.772inch<br>10mm .394inch | ❶ϕ0.1mm ϕ.004inch copper wire<br>❷ϕ0.5mm ϕ.020inch copper wire<br>❸ϕ0.1mm ϕ.004inch copper wire<br>❹ϕ0.3mm ϕ.012inch copper wire | | | **UZFRV82** |
| Ultra-small diameter |  <br>Sleeve part cannot be bent. | 2.5mm .098inch | ❸ϕ0.01mm ϕ.0004inch gold wire | • Suitable for sensing in the intricate apparatus | 500mm 19.685inch | **UZFRE11** |
| | Coaxial<br>  <br>Sleeve part cannot be bent. | 8mm .315inch<br>20mm .787inch<br>4mm .157inch | ❶ϕ0.01mm ϕ.004inch gold wire<br>❸ϕ0.01mm ϕ.004inch gold wire<br>❹ϕ0.02mm ϕ.0008inch gold wire | • A highly precise positioning is possible with coaxial reflective type. | 1m 3.281ft | **UZFRE21** |
| Narrow-view | Coaxial<br>  <br>Sleeve part cannot be bent. | 6mm .236inch<br>15mm .591inch<br>3mm .118inch | ❶ϕ0.02mm ϕ.0008inch gold wire<br>❸ϕ0.02mm ϕ.0008inch gold wire<br>❹ϕ0.02mm ϕ.0008inch gold wire | • The spread of beam is one-sixth of a conventional model. It is effective for the detection in the narrow space. | 1m 3.281ft | **UZFRK22** |

(*1) : The sensing range is the figure using an object of non-glossy white paper (100×100mm 3.937×3.937inch, standard of long sensing range type : 200×200mm 7.874×7.874inch, side- view type of small diameter type : 50×50mm 1.969×1.969inch, narrow-view type : 10×10mm .394×.394inch).

**(*2) : Minimum sensing object is the value by the maximum sensitivity. Note that this setting distance is different from the rated sensing distance.**

(*3) : As for freely cuttable fiber optic cables, note that sensing ranges may be reduced up to 20% depending on the cut condition.

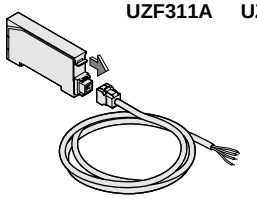
## ORDER GUIDE

| | Appearance | Model No. | Output | Response time | Emitting element |
|---|---|---|---|---|---|
| Sensitive type |  | **UZF301** | NPN open-collector transistor | Less than 0.3ms | Red LED |
| | | **UZF3015** | PNP open-collector transistor | | |
| Green LED type | | **UZF312** | NPN open-collector transistor | Less than 0.8ms | Green LED |
| Long sensing range type | | **UZF311** | NPN open-collector transistor | Less than 0.4ms | Red LED |
| | | **UZF3115** | PNP open-collector transistor | | |
| High-speed type | | **UZF321** | NPN open-collector transistor | Less than 30µs | Red LED |
| | | **UZF3215** | PNP open-collector transistor | | |

**Connector type**

Connector type is available for Sensitive type and Long sensing range type.
When ordering this type, add suffix "**A**" at the end of model number (only for NPN output type).
Model No. : **UZF301A** (Sensitive type), **UZF311A** (Long sensing range type)
Applicable with Cable with a connector **UZF851**, **UZF852**.

**UZF301A** **UZF3015A**
**UZF311A** **UZF3115A** **UZF3215A**



Cable with a connector
**UZF851** (2m 6.56ft long)
**UZF852** (5m 16.40ft long)

## SPECIFICATIONS

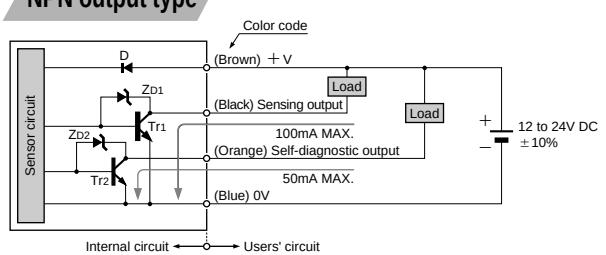
### Amplifier

| Item \ Type | | NPN output | | | | PNP output | | |
|---|---|---|---|---|---|---|---|---|
| | | Standard type | Green LED type | Long sensing range type | High-speed type | Sensitive type | Long sensing range type | High-speed type |
| Model No. | | **UZF301** | **UZF312** | **UZF311** | **UZF321** | **UZF3015** | **UZF3115** | **UZF3215** |
| Supply voltage | | 12 to 24V DC ± 10%  Ripple P-P : 10% or less | | | | | | |
| Consumption | | 35mA or less | | | | | | |
| Sensing output | | NPN open-collector transistor<br>Sink current : 100mA max.<br>Applied voltage : 30V DC or less<br>Residual voltage : 1.5V or less (at 100mA sink current)<br>0.4V or less (at 16mA sink current) | | | | PNP open-collector transistor<br>Source current : 100mA max.<br>Applied voltage : 30V DC or less<br>Residual voltage : 1.5V or less (at 100mA source current) | | |
| | Output operation | Selectable for Light - ON/Dark - ON by the switch | | | | | | |
| | Short-circuit protection | Equipped | | | | | | |
| Self-diagnostic output | | NPN open-collector transistor<br>Sink current : 50mA max.<br>Applied voltage: 30V DC or less<br>Residual voltage : 1V or less (at 50mA sink current)<br>0.4V or less (at 16mA sink current) | | | | PNP open-collector transistor<br>Source current : 50mA max.<br>Applied voltage: 30V DC or less<br>Residual voltage : 1.5V or less (at 100mA source current) | | |
| | Output operation | ON under the unstable sensing condition | | | | | | |
| | Short-circuit protection | —— | | | | | | |
| Response time | | 0.3ms or less | 0.8ms or less | 0.4ms or less | 30µs or less | 0.3ms or less | 0.4ms or less | 30µs or less |
| Operation indicator | | Red LED (lights on when the sensing output is ON) | | | | | | |
| Stable operation indicator | | Green LED (lights on under the stable “Light” condition and the stable “Dark” condition) | | | | | | |
| Sensitivity adjuster | | 8-turn adjuster with the indicator | | | | | | |
| Automatic crosstalk prevention function | | Equipped | | —— | | Equipped | | —— |
| Timer function | | Equipped with approx. 40ms fixed OFF-delay timer (selection of valid or void) | | | | | | |
| Environmental resistance | Ambient temperature | −10 to +55°C −14 to +131°F (no dew condensation nor icing allowed),  Storage : −20 to +70°C −4 to +158°F | | | | | | |
| | Ambient humidity | 35 to 85% RH,  Storage : 35 to 85% RH | | | | | | |
| | Ambient light | Sun light : 10,000ℓx at the light-receiving face, Incandescent : 3,500ℓx at the light-receiving face | | | | | | |
| | Noise | Power line : 240Vp with 10ms cycle and 0.5µs pulse duration, Radiation : 300Vp with 10ms cycle and 0.5µs pulse duration (by a noise simulator) | | | | | | |
| | Withstand voltage | 1,000V AC applied between the live parts and enclosure for 1 min. (*1) | | | | | | |
| | Insulation | 20MΩ or more when 250V DC applied between the live parts and enclosure (*1) | | | | | | |
| | Vibration | 0.75mm .030inch amplitude at the frequency of 10 to 150Hz in each of X, Y and Z directions  for 2 hours in the power OFF state | | | | | | |
| | Shock | 100m/s$^2$ {approx. 10G} impulse in each of X, Y and Z directions for 5 times each in the power OFF state | | | | | | |
| Emitting element | | Red LED (modulated) | Green LED (modulated) | Red LED (modulated) | | | | |
| Material | | Enclosure : Heat-resistant ABS,  Cover : Polycarbonate,  Fiber optic cable lock lever : PPS | | | | | | |
| Cable | | 0.2mm$^2$ × 4 cores of cabtyre cable of 2m 6.56ft long | | | | | | |
| Cable extension | | Extendable up to 100m 328.08ft using 0.3mm$^2$ or more cable | | | | | | |
| Weight | | Approx. 60g 2.12oz | | | | | | |
| Accessories | | **UZF811** (mounting bracket) : 1 pc.,  Screwdriver for the sensitivity adjustment : 1 pc. | | | | | | |

(*1): Data of withstand voltage and insulation resistance are for the amplifier itself.

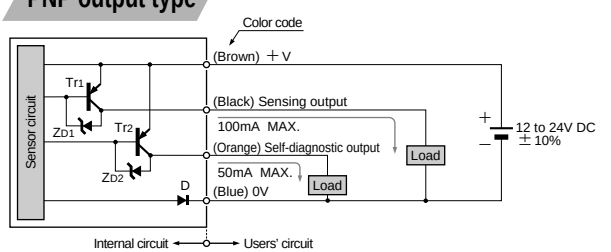
## TYPICAL WIRING DIAGRAMS

### NPN output type




Symbol... D : Reverse polarity protection diode
$Z_{D1}$, $Z_{D2}$ : Surge absorption zener diode
$T_{r1}$, $Z_{r2}$ : NPN output transistor

### PNP output type



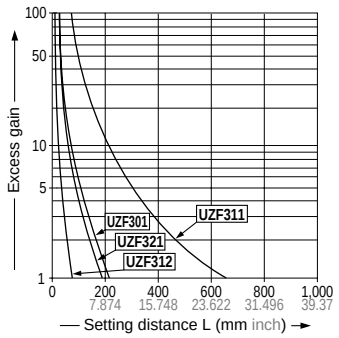

Symbol... D : Reverse polarity protection diode
$Z_{D1}$, $Z_{D2}$ : Surge absorption zener diode
$T_{r1}$, $Z_{r2}$ : PNP output transistor

## SENSING FIELDS (TYPICAL)

### Correlation between setting distance and excess gain

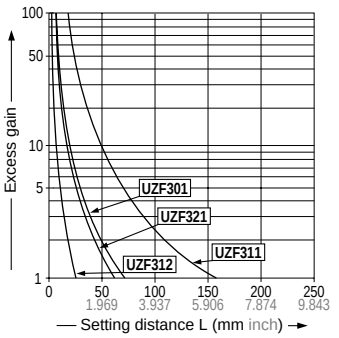
**UZFTF8** Thru-beam

**UZF301, 312, 311, 321**




**UZFRF8** Reflective

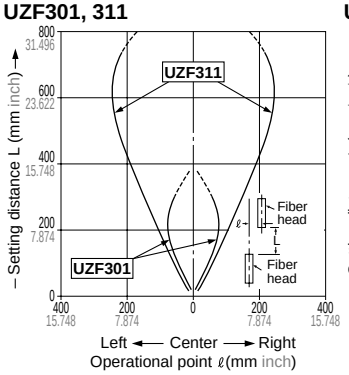
**UZF301, 312, 311, 321**



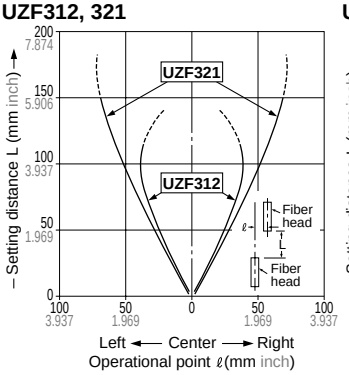

### Parallel deviations

**UZFTB8** Thru-beam

**UZF301, 311**

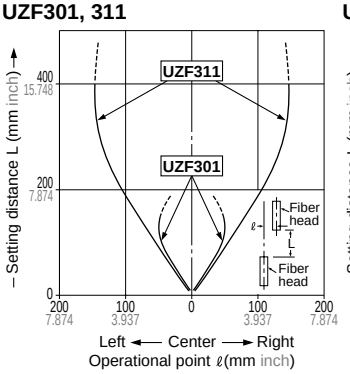



**UZF312, 321**

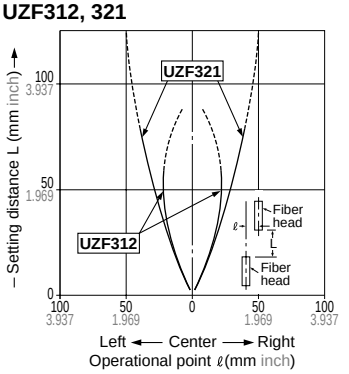



**UZFTF8, UZFTF89, UZFTF84 UZFTS8, UZFTT8** Thru-beam

**UZF301, 311**

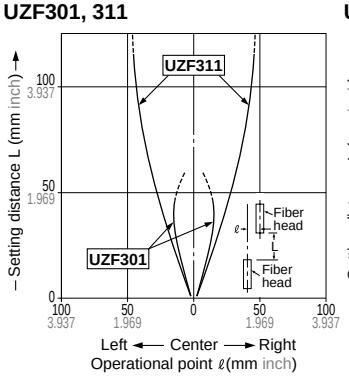



**UZF312, 321**

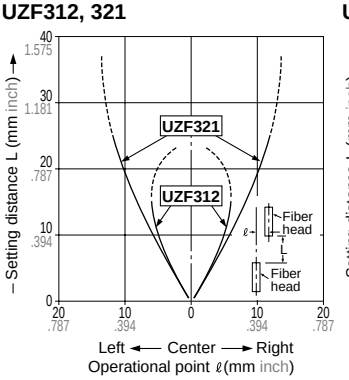



**UZFTF4, UZFTF49 UZFTF44, UZFTS4** Thru-beam

**UZF301, 311**

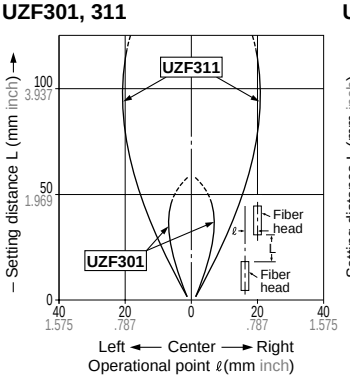



**UZF312, 321**

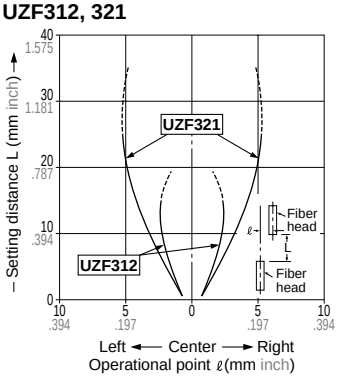



**UZFTC4** Thru-beam

**UZF301, 311**

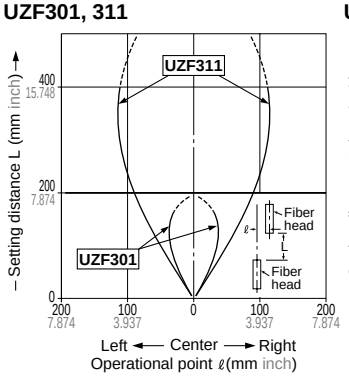



**UZF312, 321**

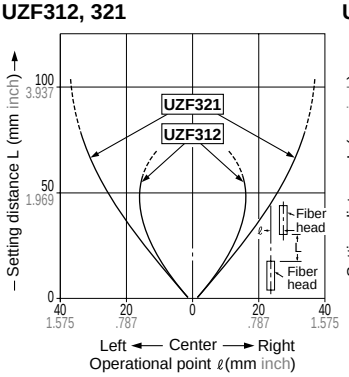



**UZFTP8** Thru-beam

**UZF301, 311**

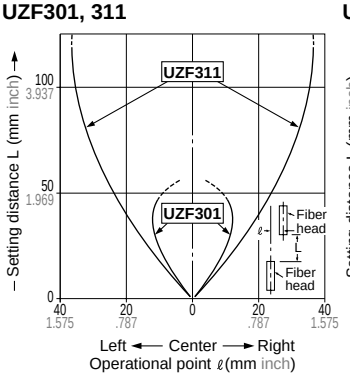



**UZF312, 321**

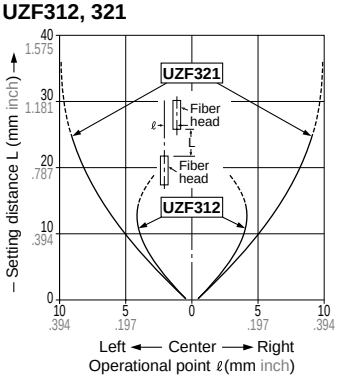



**UZFTP4** Thru-beam

**UZF301, 311**




**UZF312, 321**

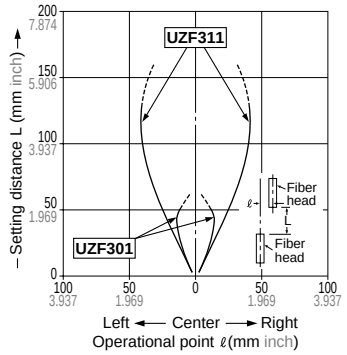


## SENSING FIELDS (TYPICAL)

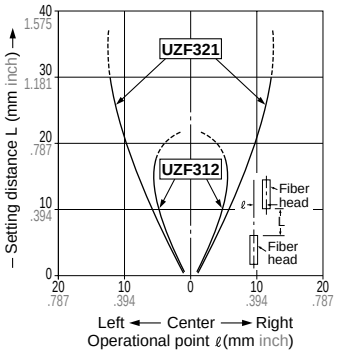
### Parallel deviations

#### UZFTP2 Thru-beam

**UZF301, 311**

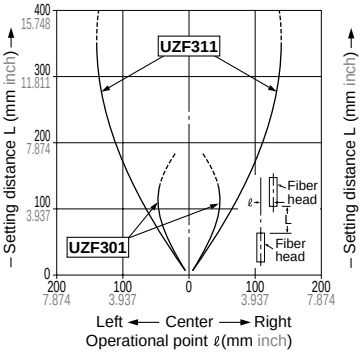



**UZF312, 321**

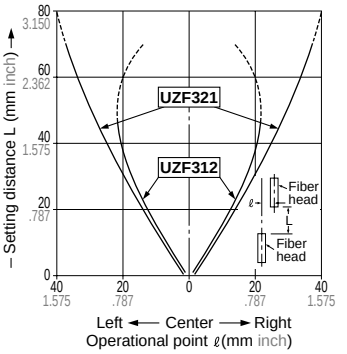



#### UZFTH7 UZFTH76 UZFTH6 Thru-beam

**UZF301, 311**

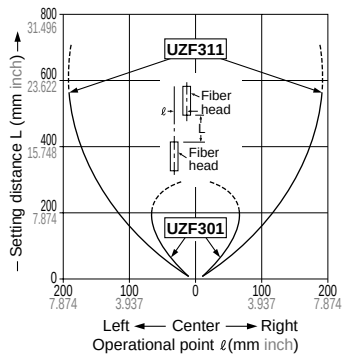



**UZF312, 321**

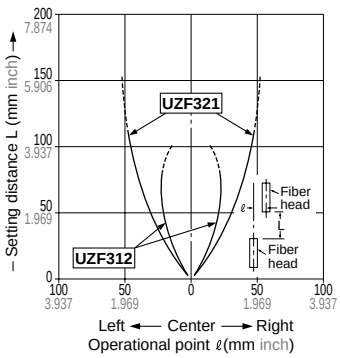



#### UZFTH8 Thru-beam

**UZF301, 311**

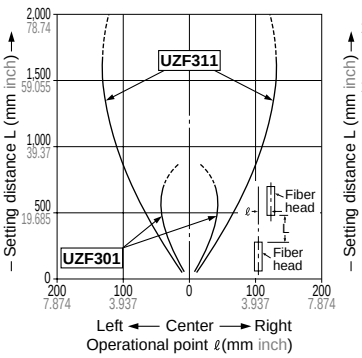



**UZF312, 321**

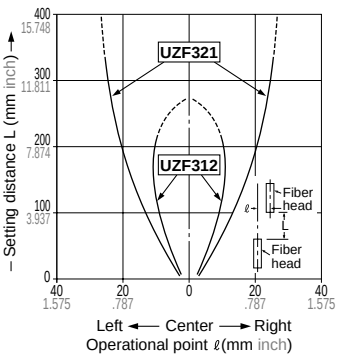



#### UZFTL8Y Thru-beam

**UZF301, 311**

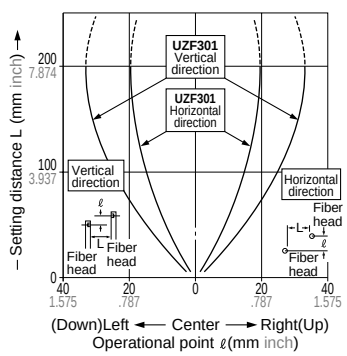



**UZF312, 321**

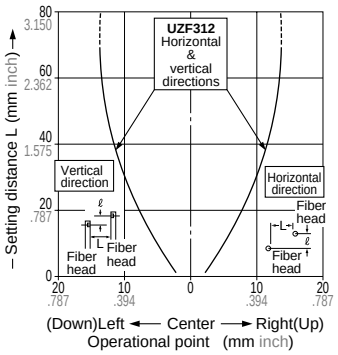



#### UZFTV8Y Thru-beam

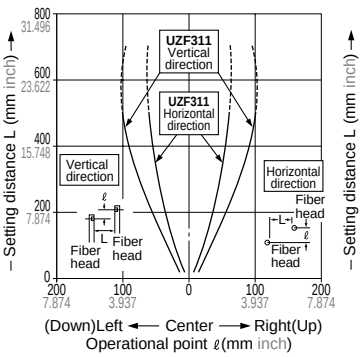
**UZF301**



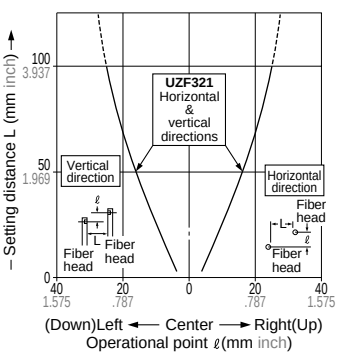

**UZF312**




**UZF311**

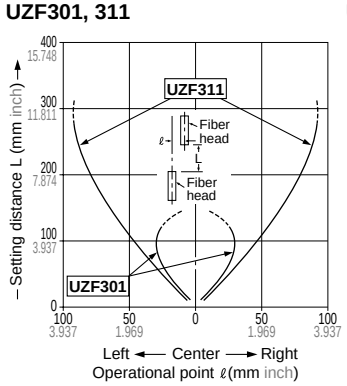



**UZF321**

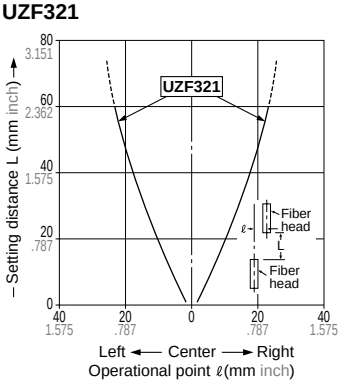



#### UZFT6V Thru-beam

**UZF301, 311**

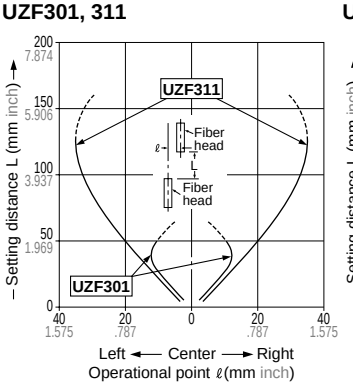



**UZF321**

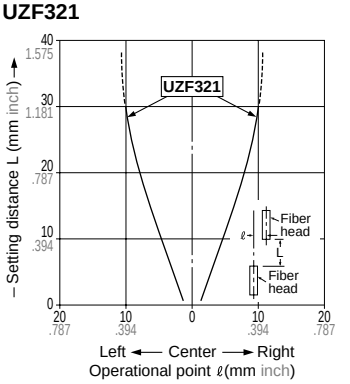



#### UZFT60V Thru-beam

**UZF301, 311**




**UZF321**

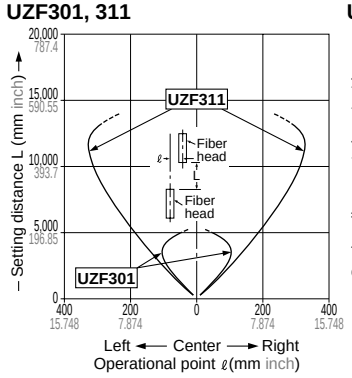


## SENSING FIELDS (TYPICAL)

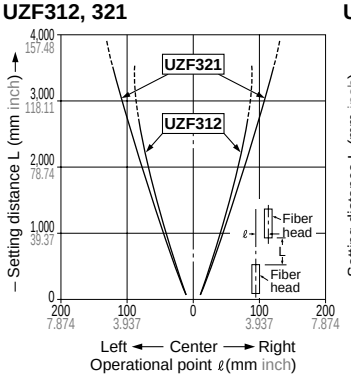
### Parallel deviations

## UZFTL9 Thru-beam

**UZF301, 311**

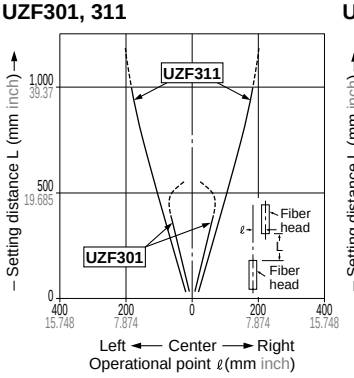



**UZF312, 321**

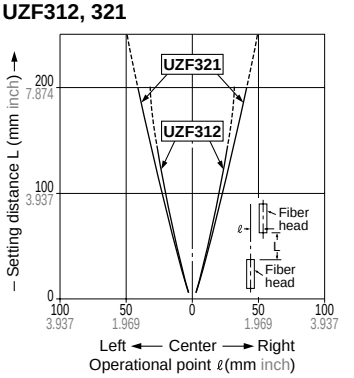



## UZFTL8 Thru-beam

**UZF301, 311**

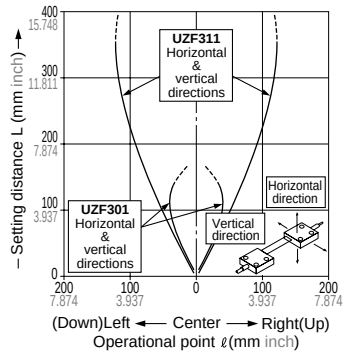



**UZF312, 321**

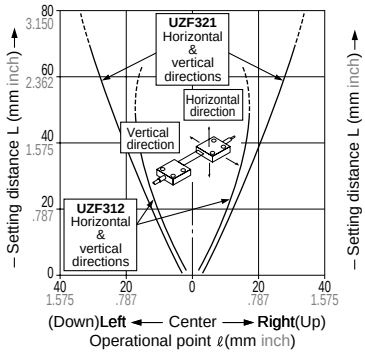



## UZFTA8 Thru-beam

**UZF301, 311**

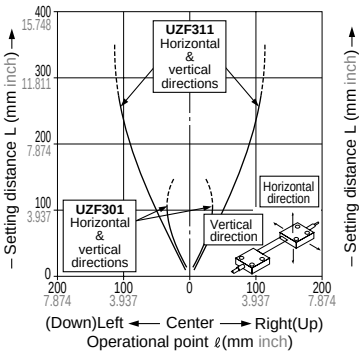



**UZF312, 321**

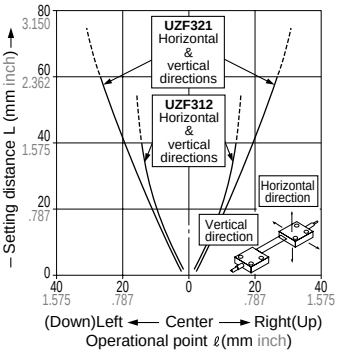



## UZFTA8E Thru-beam

**UZF301, 311**

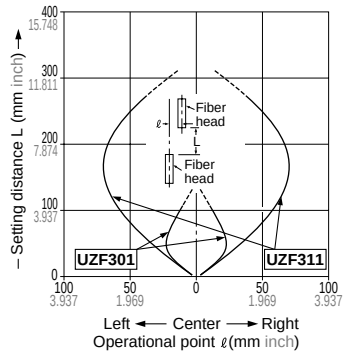



**UZF312, 321**

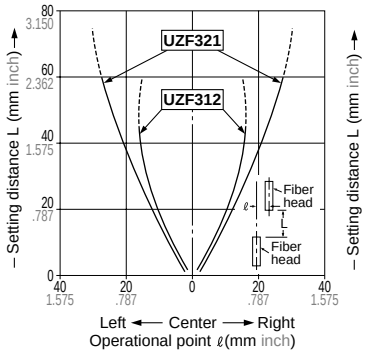



## UZFTR8 Thru-beam

**UZF301, 311**

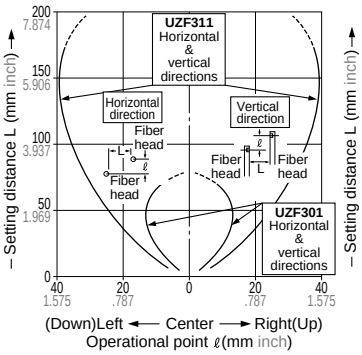



**UZF312, 321**

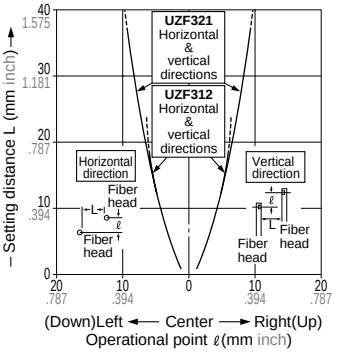



## UZFTV22 Thru-beam

**UZF301, 311**

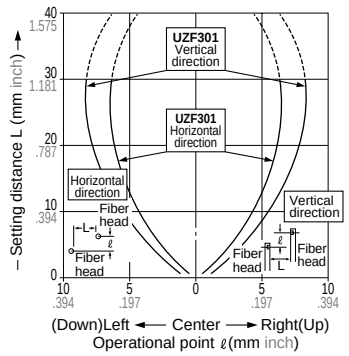



**UZF312, 321**

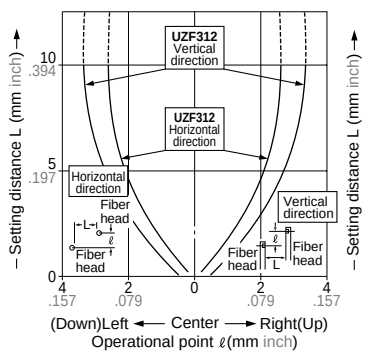



## UZFTV41 Thru-beam

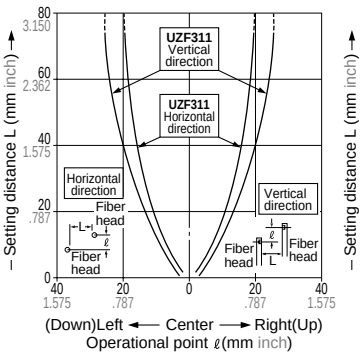
**UZF301**



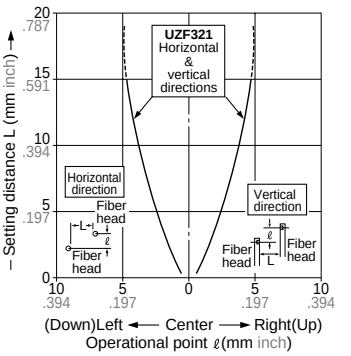

**UZF312**




**UZF311**




**UZF321**

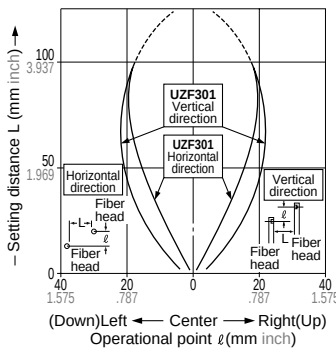


## SENSING FIELDS (TYPICAL)

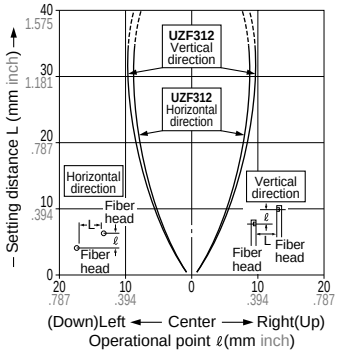
### Parallel deviations

#### UZFTV82 Thru-beam

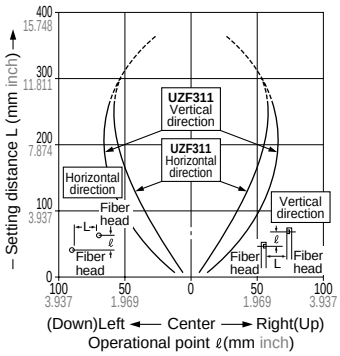
**UZF301**



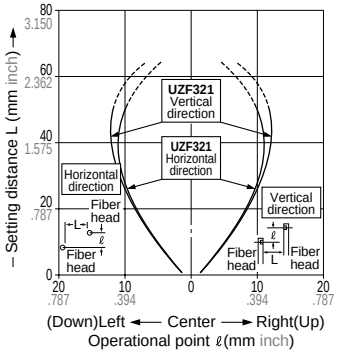

**UZF312**




**UZF311**

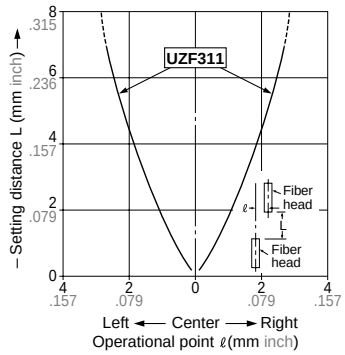



**UZF321**



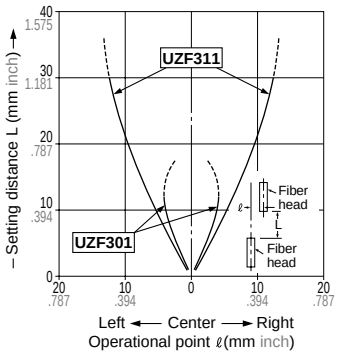

#### UZFTE1 Thru-beam

**UZF311**

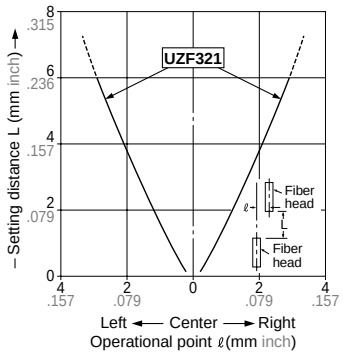



#### UZFTE2 Thru-beam

**UZF301, 311**

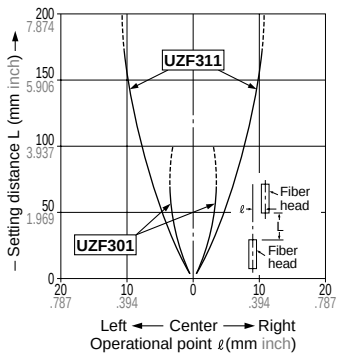



**UZF321**

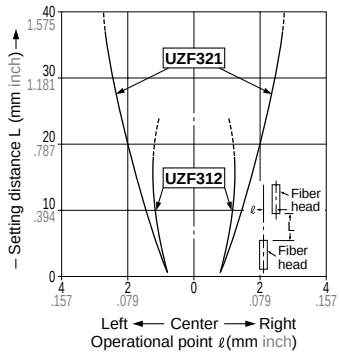



#### UZFTK22 Thru-beam

**UZF301, 311**



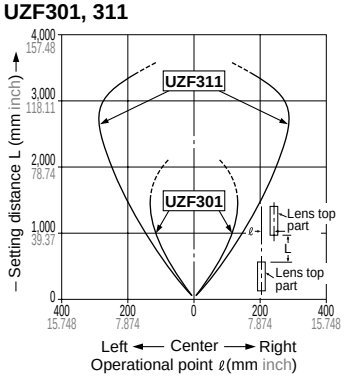

**UZF312, 321**



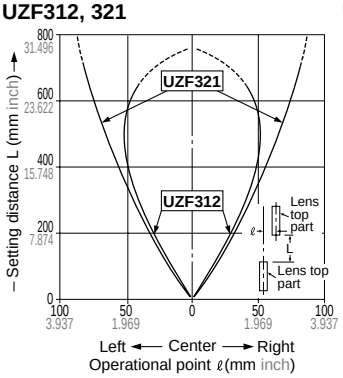

### Parallel deviations with UZFXLE1 (Expansion lens) applied on both sides

#### UZFTB8 Thru-beam

**UZF301, 311**

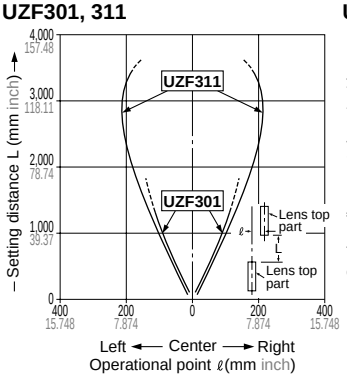



**UZF312, 321**

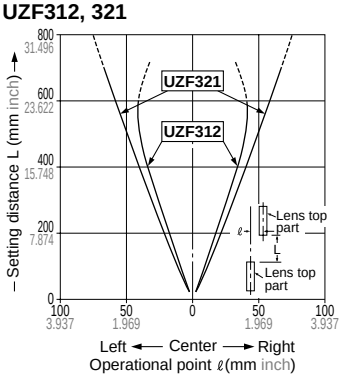



#### UZFTF8 UZFTT8 Thru-beam

**UZF301, 311**




**UZF312, 321**

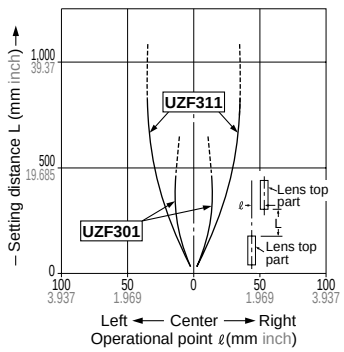


## SENSING FIELDS (TYPICAL)

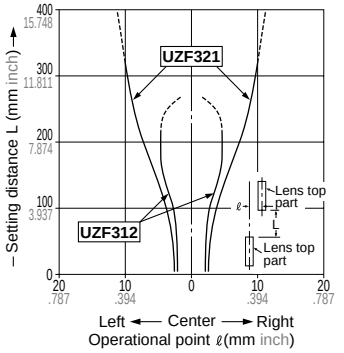
### Parallel deviations with UZFXLE1 (Expansion lens) applied on both sides

#### UZFTC4 Thru-beam

**UZF301, 311**

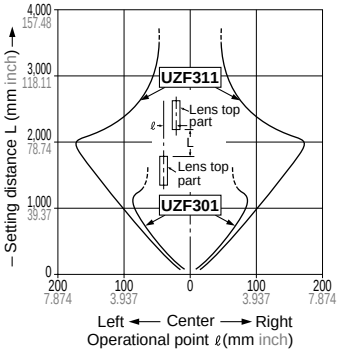



**UZF312, 321**

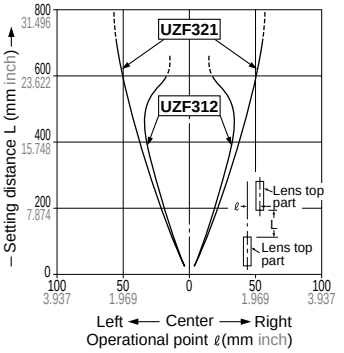



#### UZFTP8 Thru-beam

**UZF301, 311**

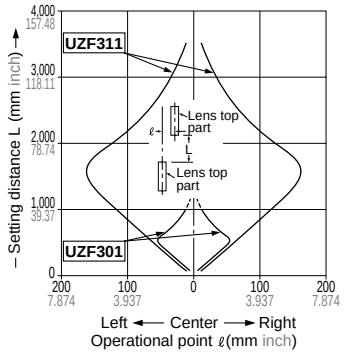



**UZF312, 321**

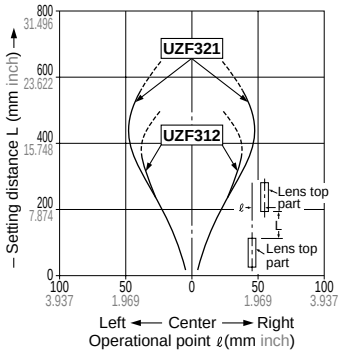



#### UZFTH7 Thru-beam

**UZF301, 311**

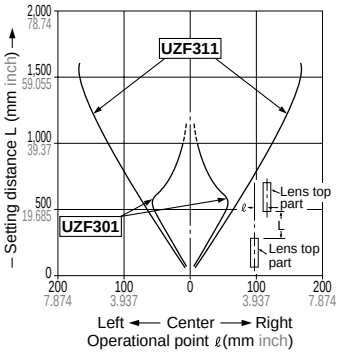



**UZF312, 321**

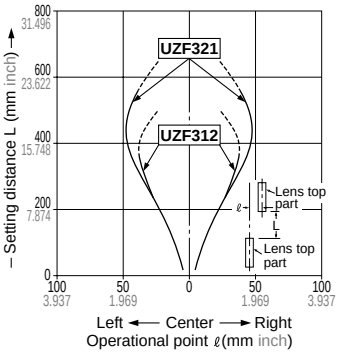



#### UZFTH6 Thru-beam

**UZF301, 311**

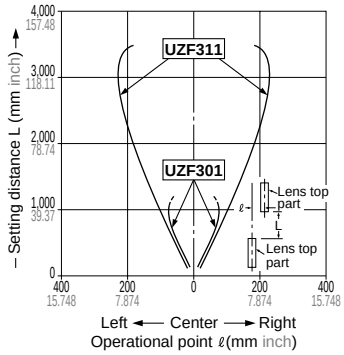



**UZF312, 321**

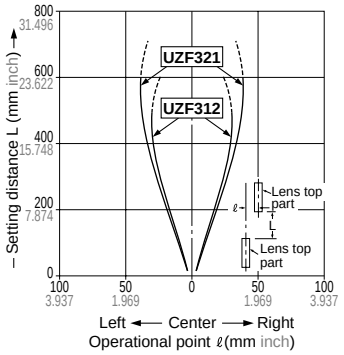



#### UZFTR8 Thru-beam

**UZF301, 311**



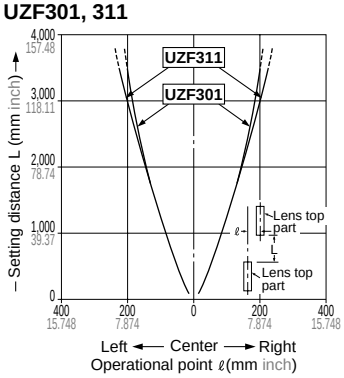

**UZF312, 321**



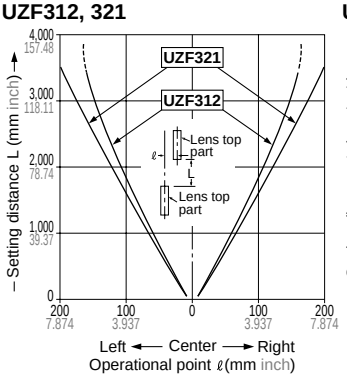

### Parallel deviations with UZFXLE2 (Super-expansion lens) applied on both sides

#### UZFTB8 Thru-beam

**UZF301, 311**

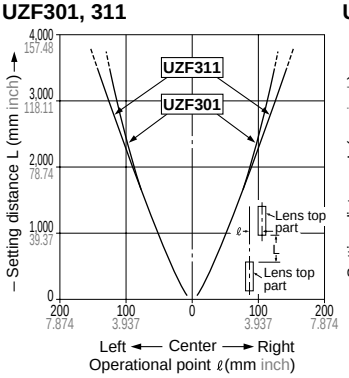



**UZF312, 321**

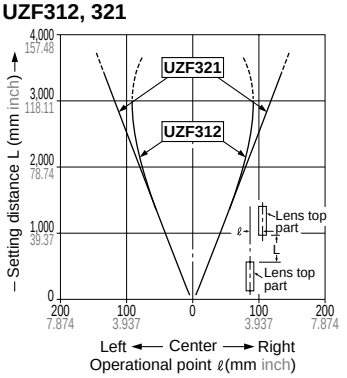



#### UZFTF8 Thru-beam

**UZF301, 311**




**UZF312, 321**

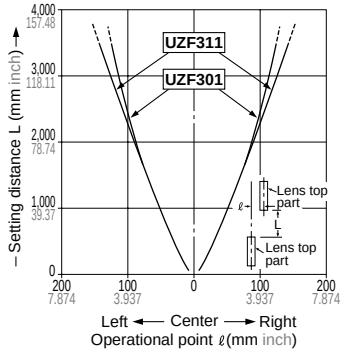


## SENSING FIELDS (TYPICAL)

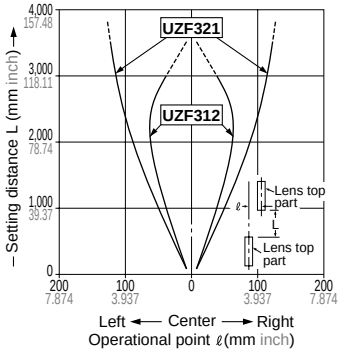
### Parallel deviations with UZFXLE2 (Expansion lens) applied on both sides

#### UZFTP8 Thru-beam

**UZF301, 311**

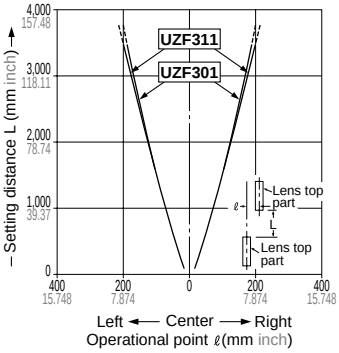



**UZF312, 321**

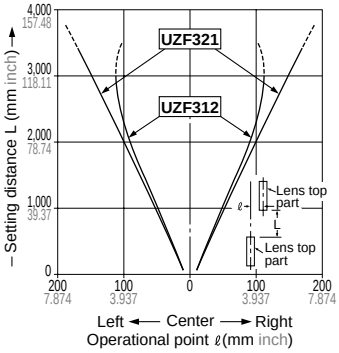



#### UZFTH7 Thru-beam

**UZF301, 311**

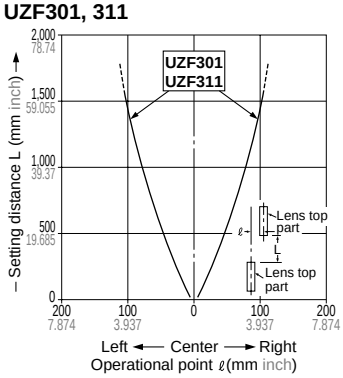



**UZF312, 321**

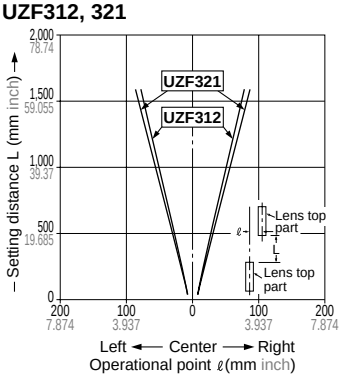



#### UZFTH6 Thru-beam

**UZF301, 311**

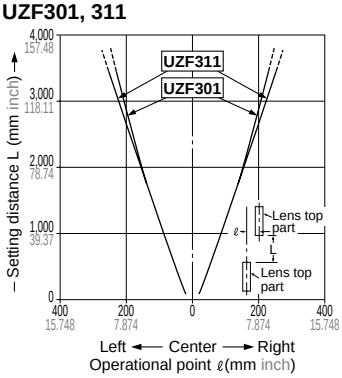



**UZF312, 321**

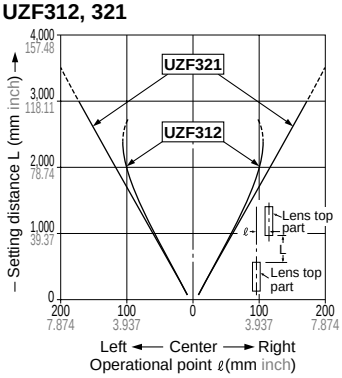



#### UZFTH8 Thru-beam

**UZF301, 311**

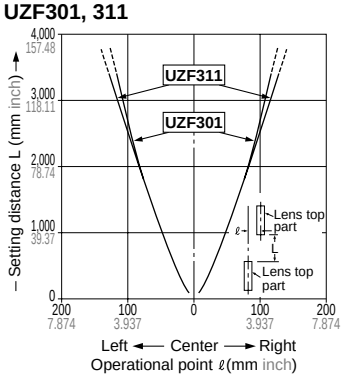



**UZF312, 321**

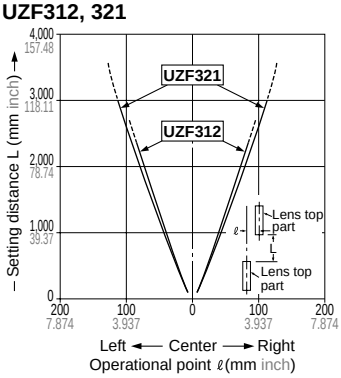



#### UZFTR8 Thru-beam

**UZF301, 311**



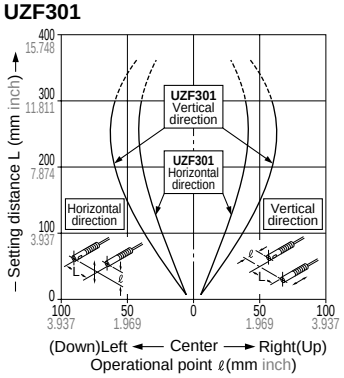

**UZF312, 321**



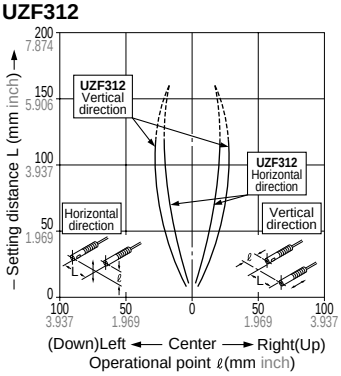

### Parallel deviations with UZFXSV1 (Side-view lens) applied on both sides

#### UZFTB8 Thru-beam

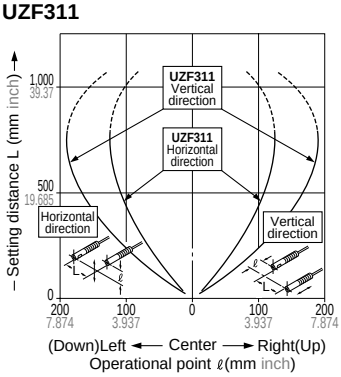
**UZF301**



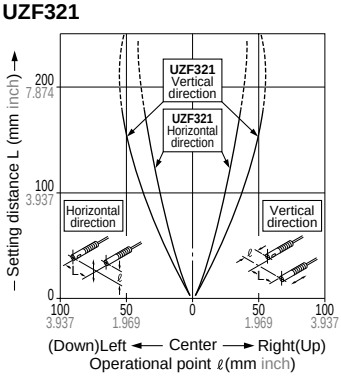

**UZF312**




**UZF311**




**UZF321**

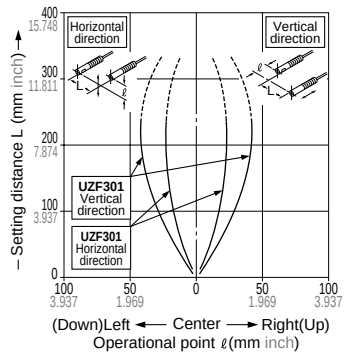


## SENSING FIELDS (TYPICAL)

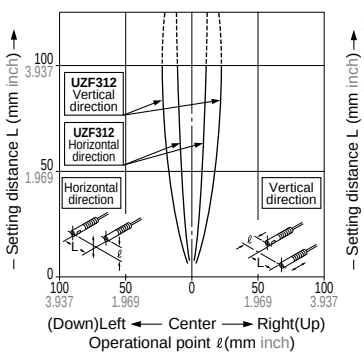
### Parallel deviations with UZFXSV1 (Side-view lens) applied on both sides

**UZFTF8**
**UZFTT8** Thru-beam

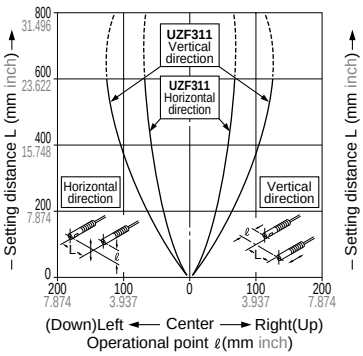
**UZF301**



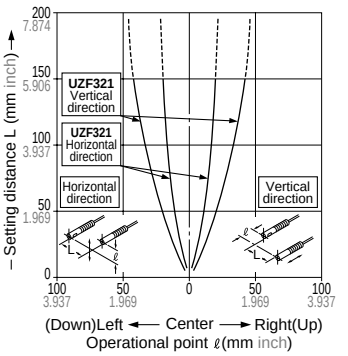

**UZF312**




**UZF311**

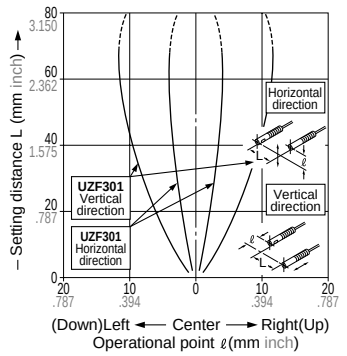



**UZF321**

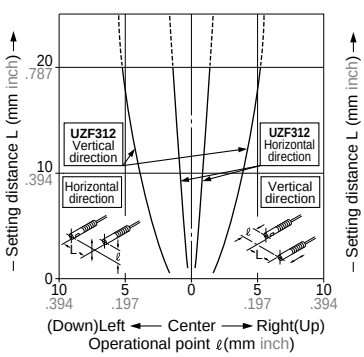



**UZFTC4** Thru-beam

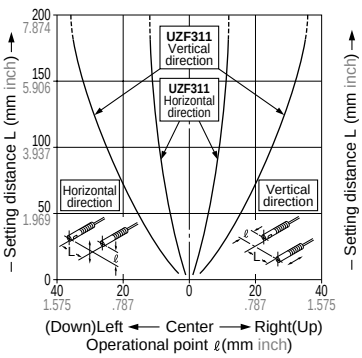
**UZF301**



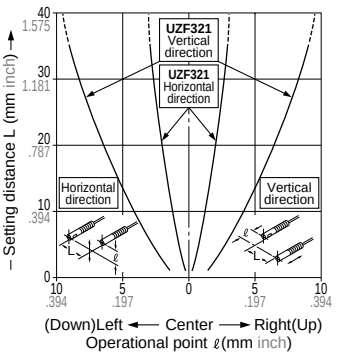

**UZF312**




**UZF311**

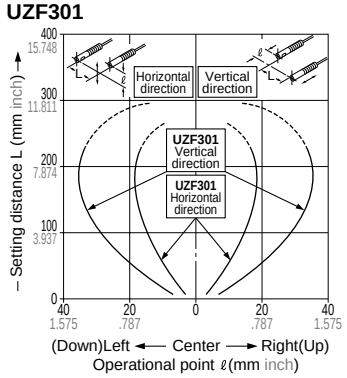



**UZF321**

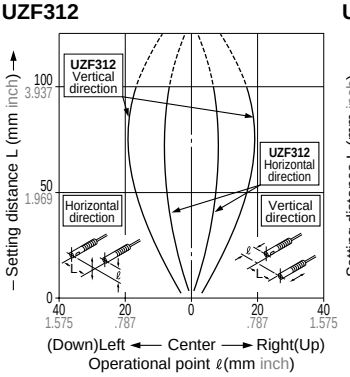



**UZFTP8** Thru-beam

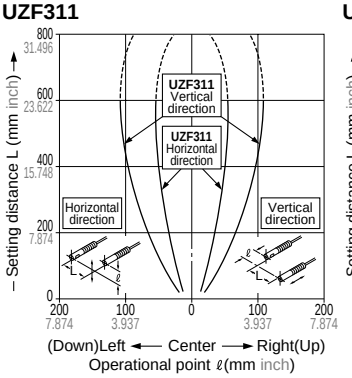
**UZF301**



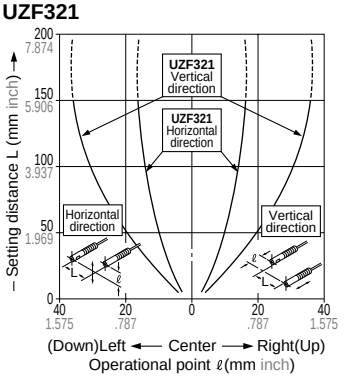

**UZF312**




**UZF311**

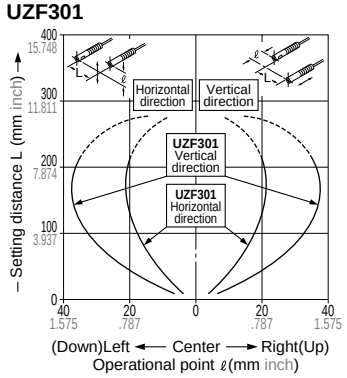



**UZF321**

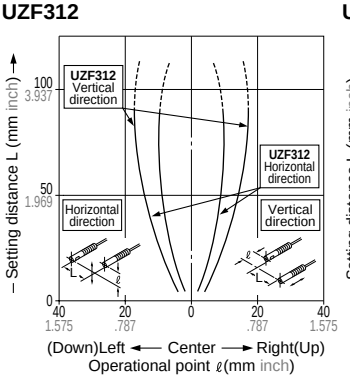



**UZFTH7**
**UZFTH6** Thru-beam

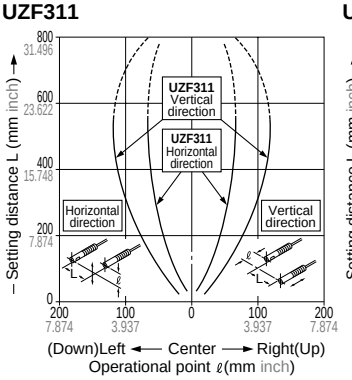
**UZF301**



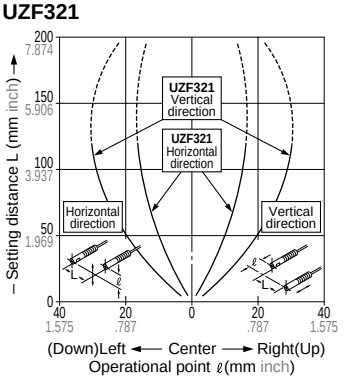

**UZF312**




**UZF311**




**UZF321**

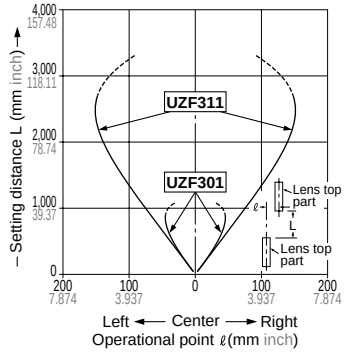


## SENSING FIELDS (TYPICAL)

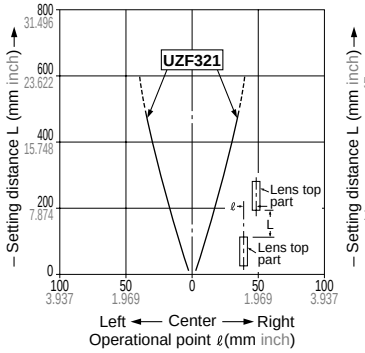
### Parallel deviations with UZFVLE1 (Vacuum • expansion lens) applied on both sides

#### UZFT6V Thru-beam

**UZF301, 311**

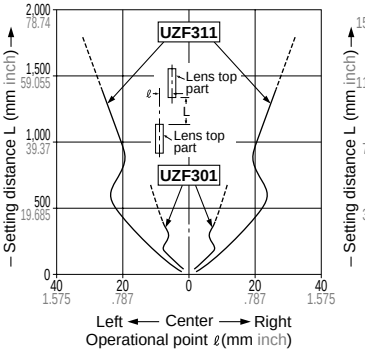



**UZF321**

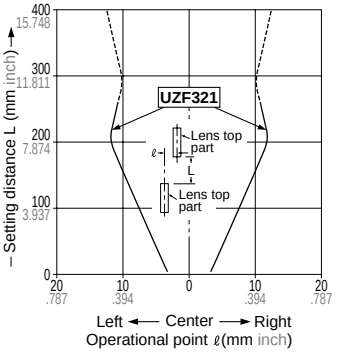



#### UZFT60V Thru-beam

**UZF301, 311**



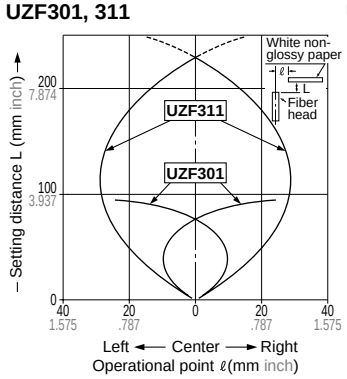

**UZF321**



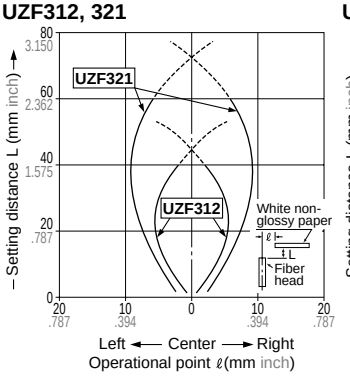

### Sensing fields

#### UZFR8B Reflective

**UZF301, 311**

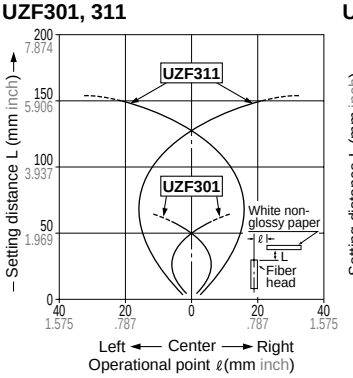



**UZF312, 321**

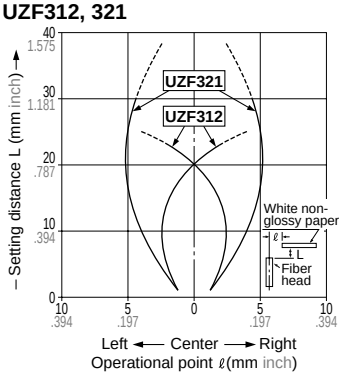



#### UZFRF8, UZFRF89, UZFRF84 UZFRT8, UZFRS8 Reflective

**UZF301, 311**

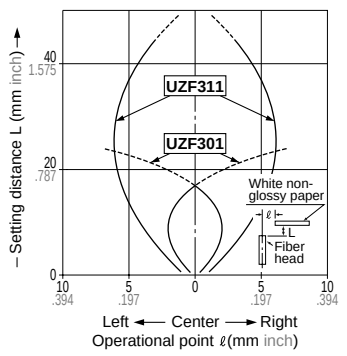



**UZF312, 321**

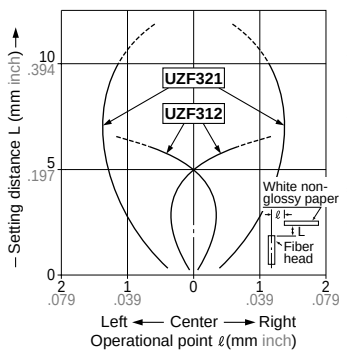



#### UZFRT4, UZFRF4, UZFRF49 UZFRF44, UZFRS4 Reflective

**UZF301, 311**

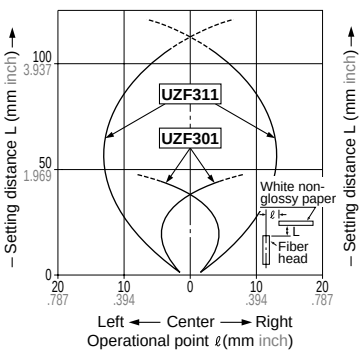



**UZF312, 321**

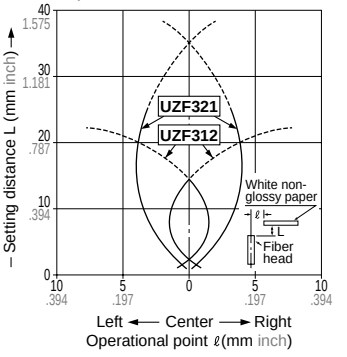



#### UZFRP8

**UZF301, 311**

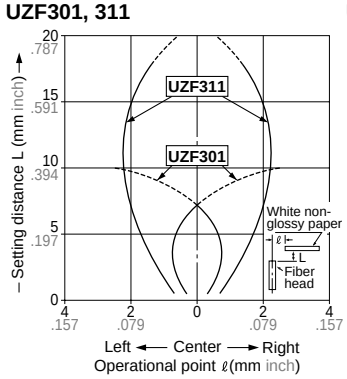



**UZF312, 321**

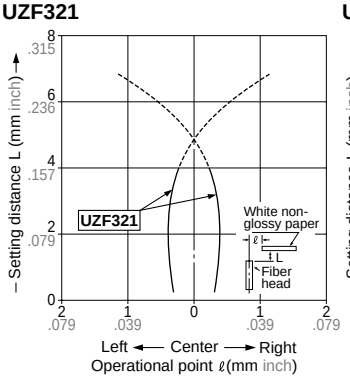



#### UZFRP4 Reflective

**UZF301, 311**

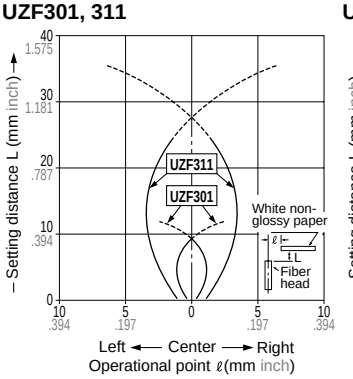



**UZF321**

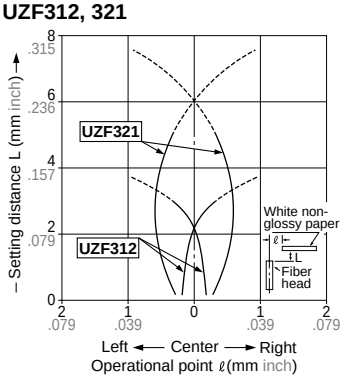



#### UZFRP2 Reflective

**UZF301, 311**




**UZF312, 321**

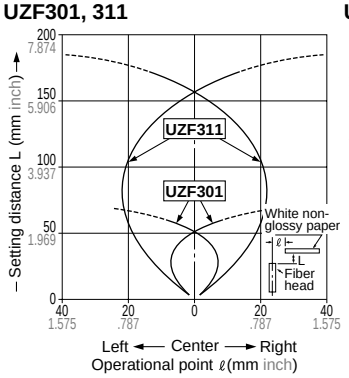


## SENSING FIELDS (TYPICAL)

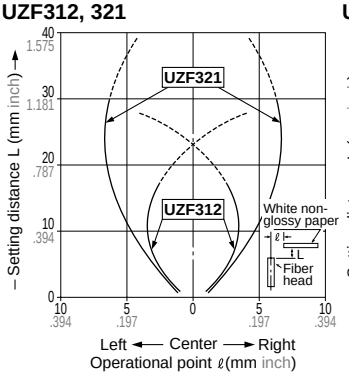
### Sensing fields

**UZFRH7, UZFRH76 UZFRH6** Reflective

**UZF301, 311**

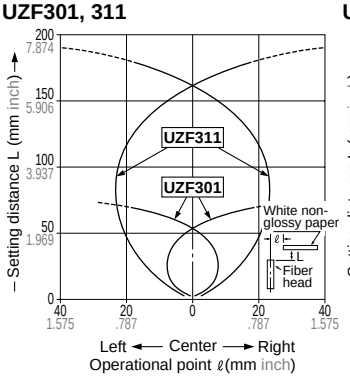



**UZF312, 321**

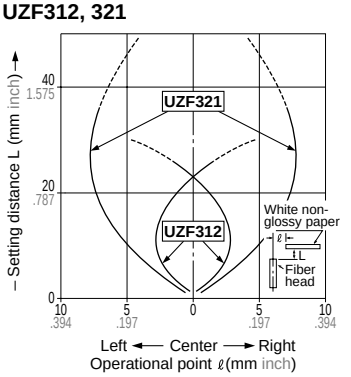



**UZFRH8** Reflective

**UZF301, 311**

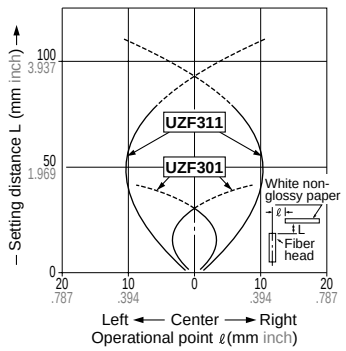



**UZF312, 321**

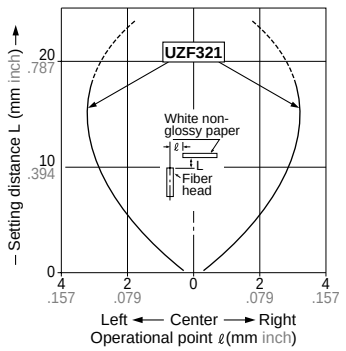



**UZFR6V** Reflective

**UZF301, 311**

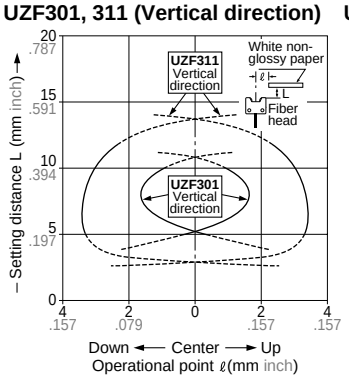



**UZF321**

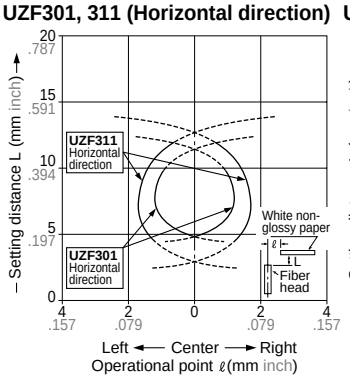



**UZFRL4** Reflective

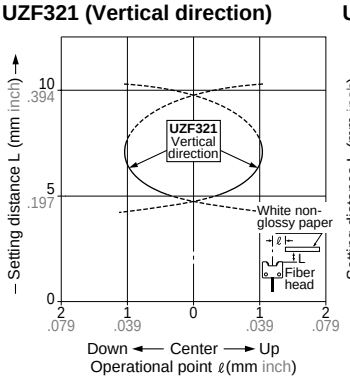
**UZF301, 311 (Vertical direction)**



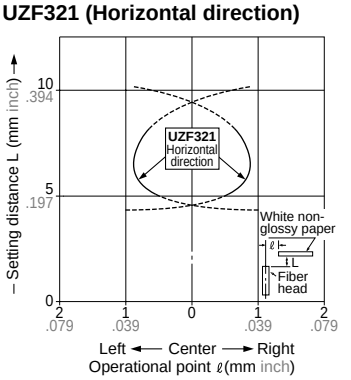

**UZF301, 311 (Horizontal direction)**




**UZF321 (Vertical direction)**

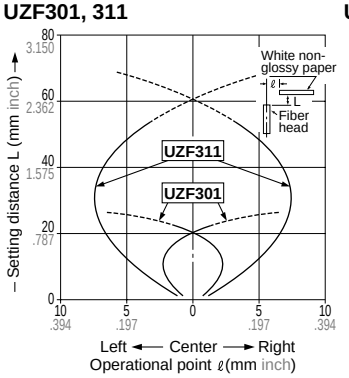



**UZF321 (Horizontal direction)**

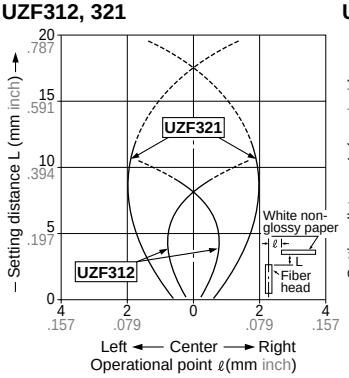



**UZFRG4** Reflective

**UZF301, 311**

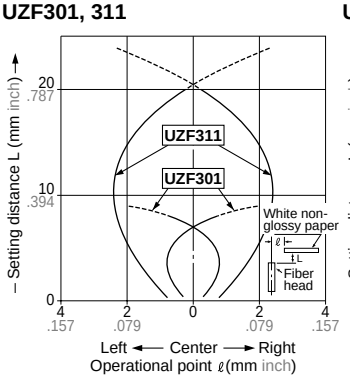



**UZF312, 321**

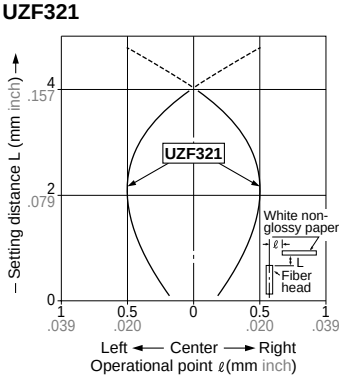



**UZFREG1** Reflective

**UZF301, 311**




**UZF321**

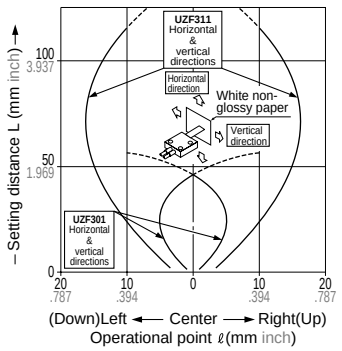


# SENSING FIELDS (TYPICAL)

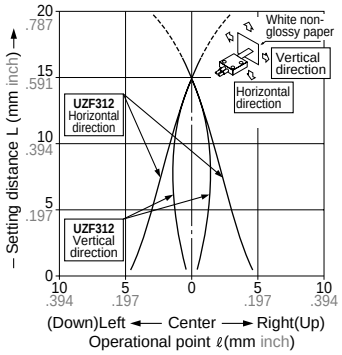
## Sensing fields

### UZFRA8 / UZFRA8E — Reflective

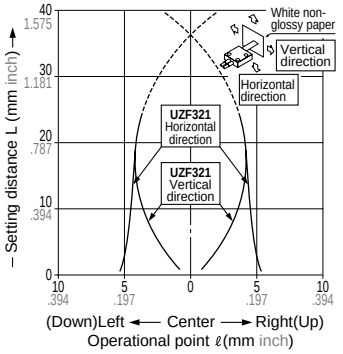
**UZF301, 311**




**UZF312**

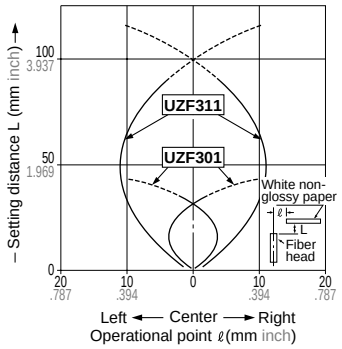



**UZF321**

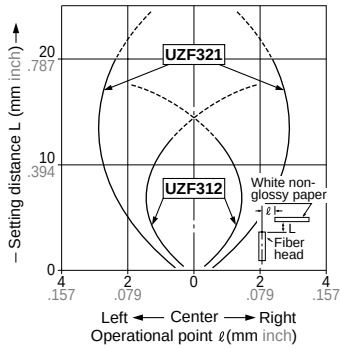



### UZFRR8 — Reflective

**UZF301, 311**

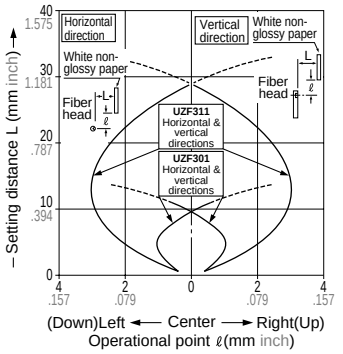



**UZF312, 321**

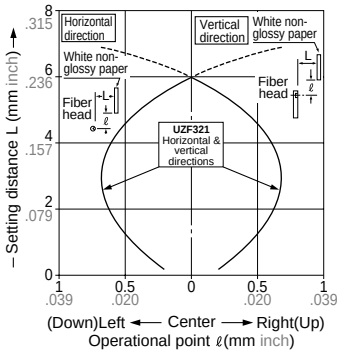



### UZFRV41 — Reflective

**UZF301, 311**

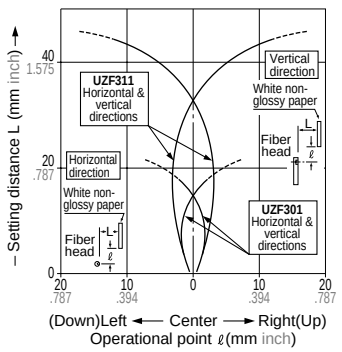



**UZF321**

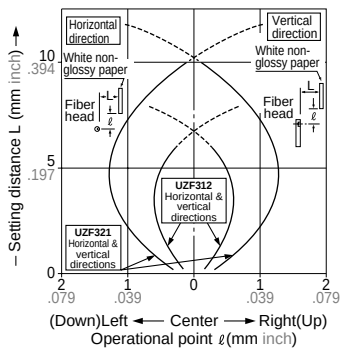



### UZFRV82 — Reflective

**UZF301, 311**

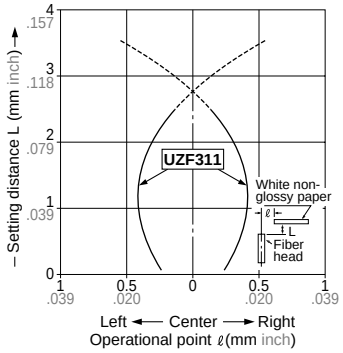



**UZF312, 321**



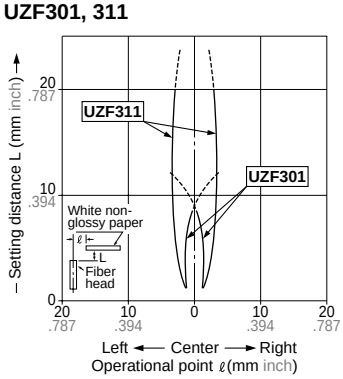

### UZFRE11 — Reflective

**UZF311**

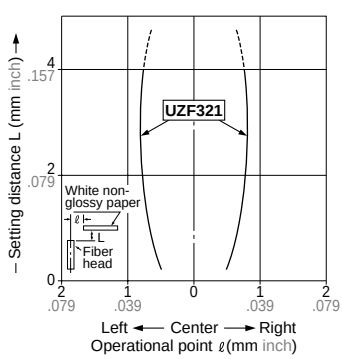



### UZFRE21 — Reflective

**UZF301, 311**

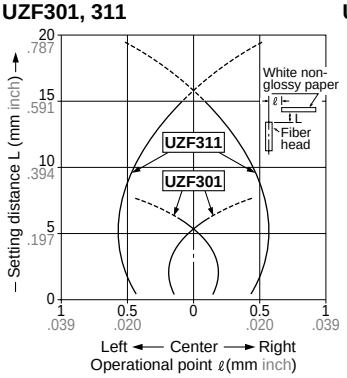



**UZF321**

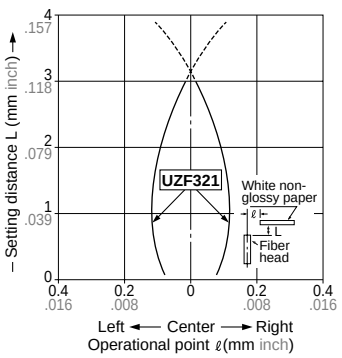



### UZFRK22 — Reflective

**UZF301, 311**



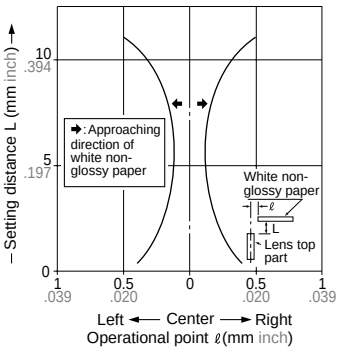

**UZF321**



## SENSING FIELDS (TYPICAL)

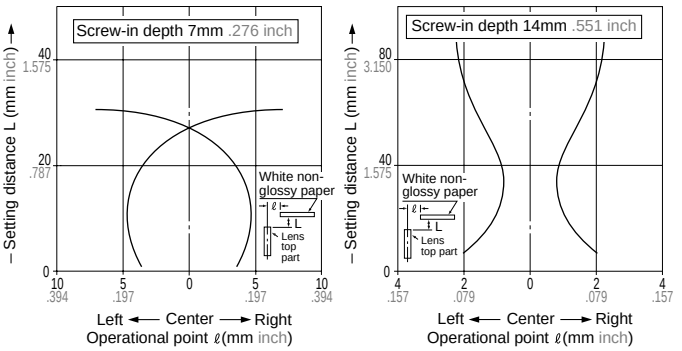
### Sensing field with UZFXMR1 (Pinpoint spot lens) applied

**UZFRG4** Reflective




### Sensing fields with UZFXMR2 (Zoom lens) applied

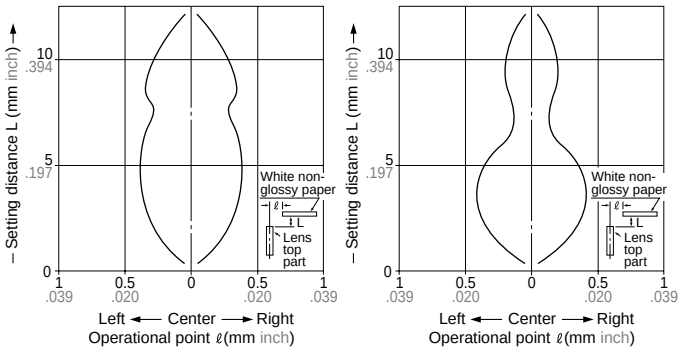
**UZFRG4** Reflective




### Sensing fields with UZFXMR3 (Finest spot lens) applied

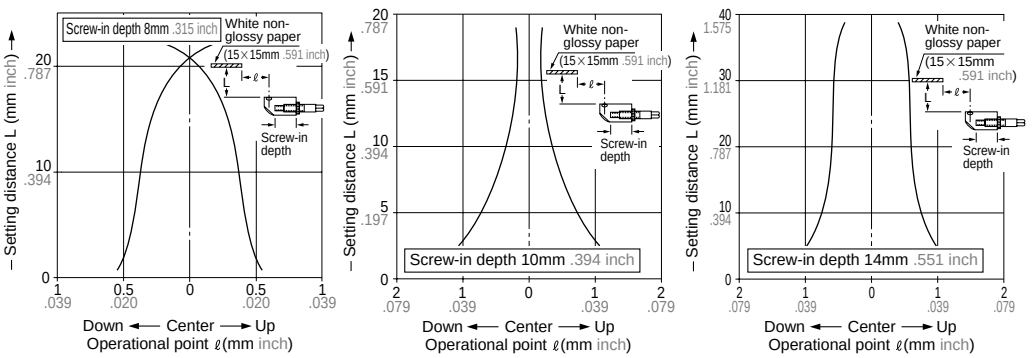
**UZFRG4** Reflective

**UZFREG1** Reflective




### Sensing fields with UZFXMR5 (Side-view type zoom lens) applied

**UZFRG4** Reflective

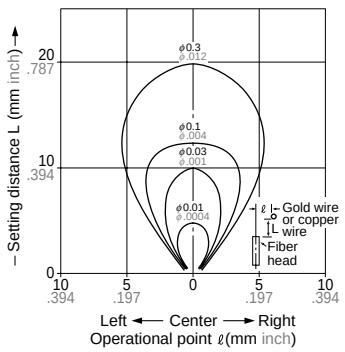


## SENSING FIELDS (TYPICAL)

### Correlation between diameter of an object and sensing fields

**UZFR8B** Reflective

**UZF301**

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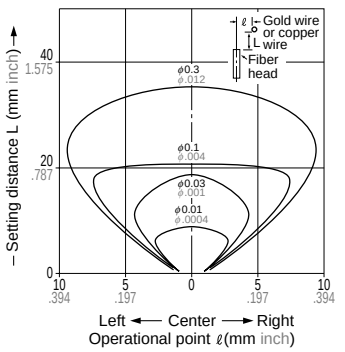


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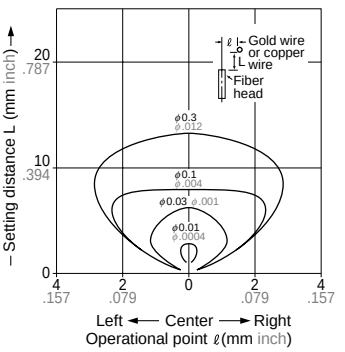
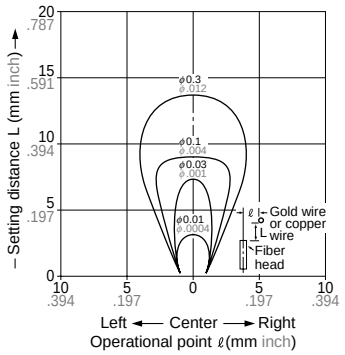



**UZFRF8, UZFRT8 UZFRS8** Reflective

**UZF301**

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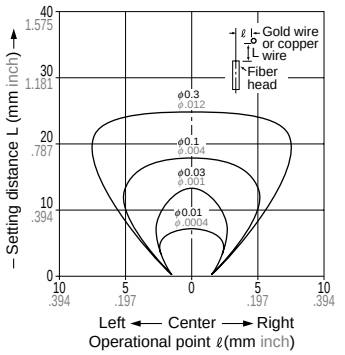


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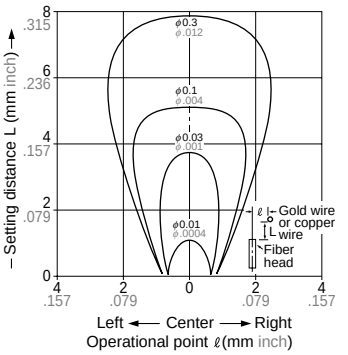
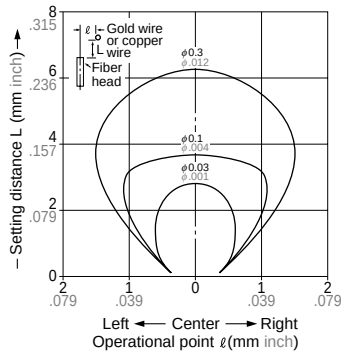
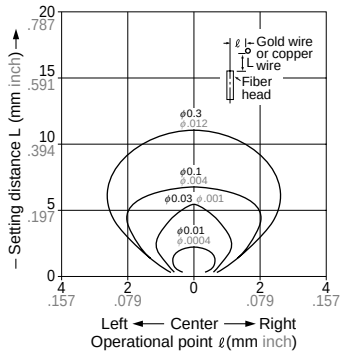



**UZFRT4 UZFRF4** Reflective

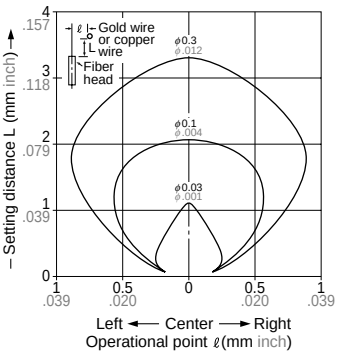
**UZF301**




**UZF311**

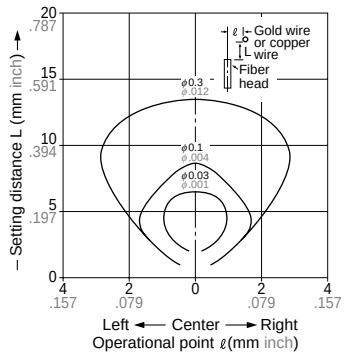



**UZF321**

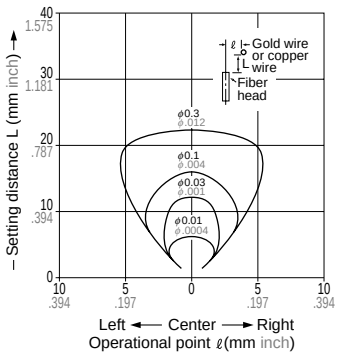



**UZFRP8** Reflective

**UZF301**




**UZF311**

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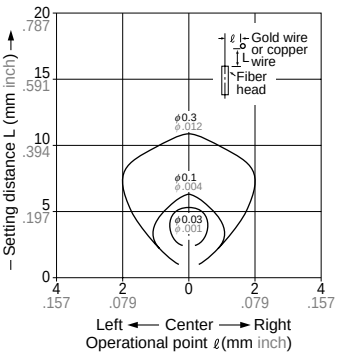
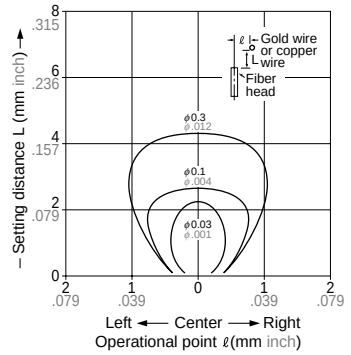


## SENSING FIELDS (TYPICAL)

### Correlation between diameter of an object and sensing fields

## UZFRP2 Reflective

**UZF301**

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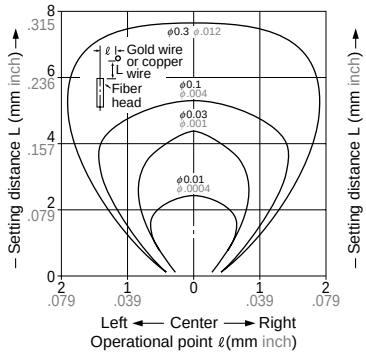
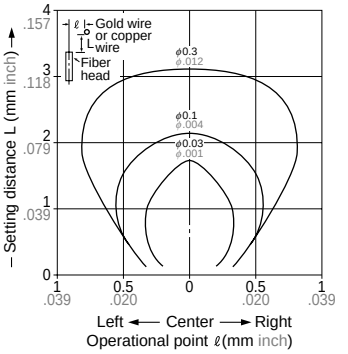
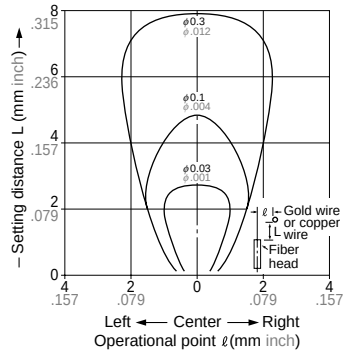



**UZF321**

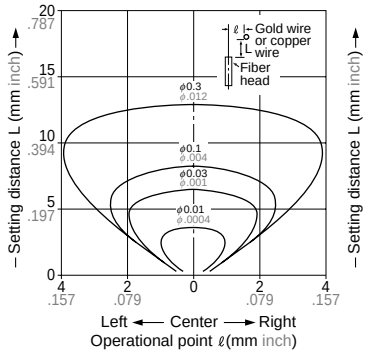



## UZFRG4 Reflective

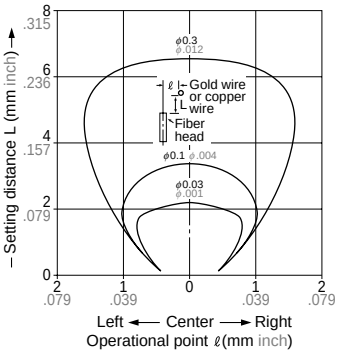
**UZF301**




**UZF311**

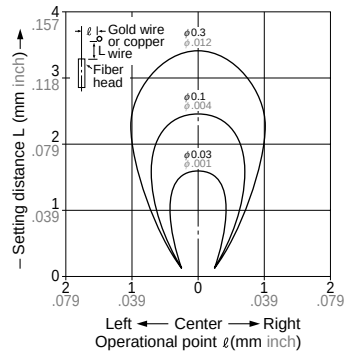



**UZF321**

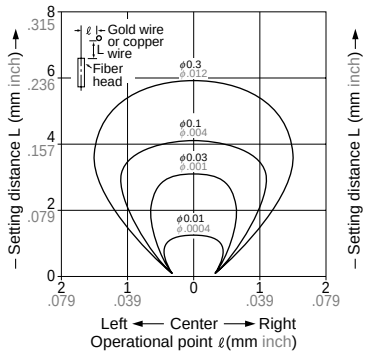



## UZFREG1 Reflective

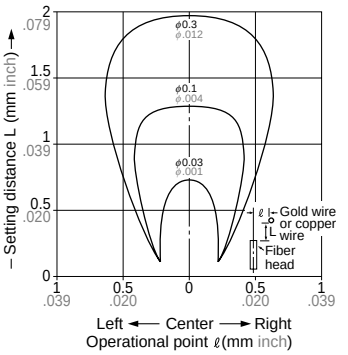
**UZF301**




**UZF311**

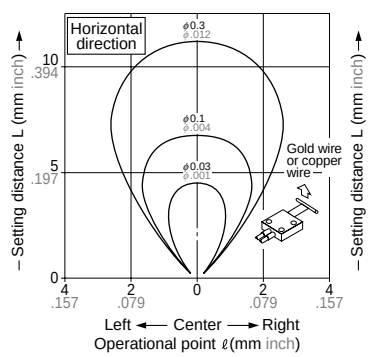



**UZF321**

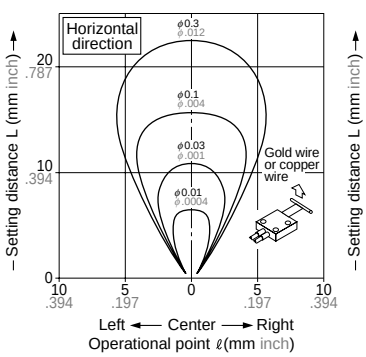



## UZFRA8 Reflective

**UZF301**




**UZF311**

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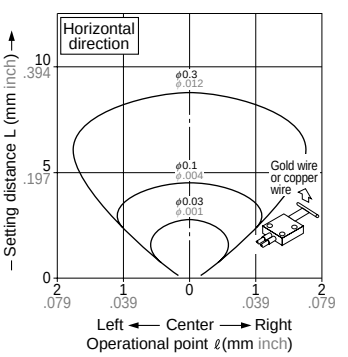
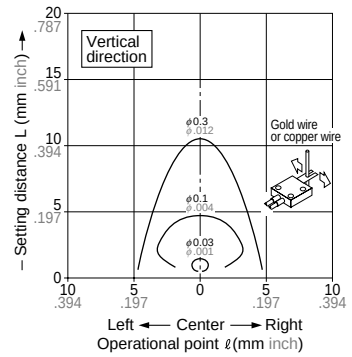


## SENSING FIELDS (TYPICAL)

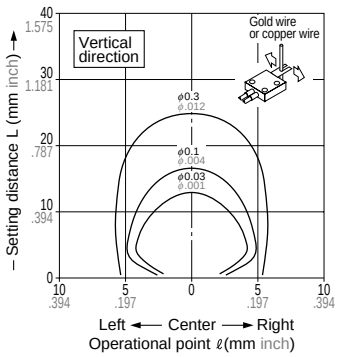
### Correlation between diameter of an object and sensing fields

## UZFRA8 Reflective

**UZF301**




**UZF311**

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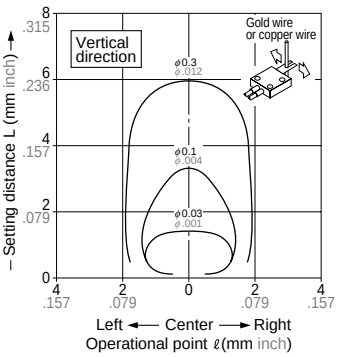
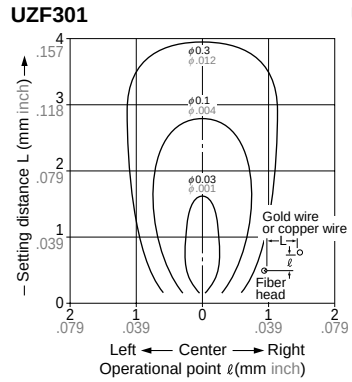
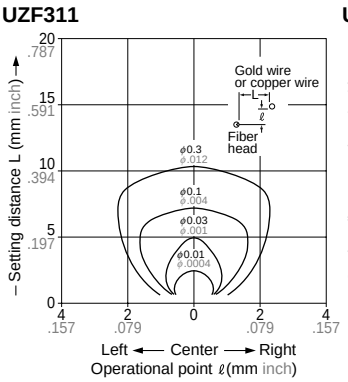



## UZFRV82 Reflective

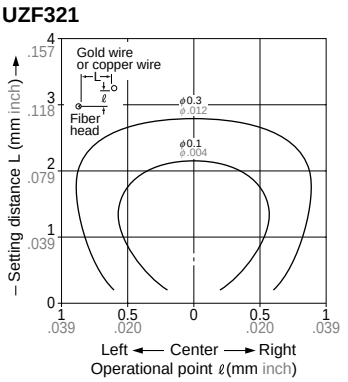
**UZF301**




**UZF311**

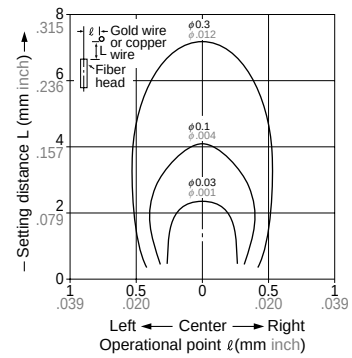



**UZF321**

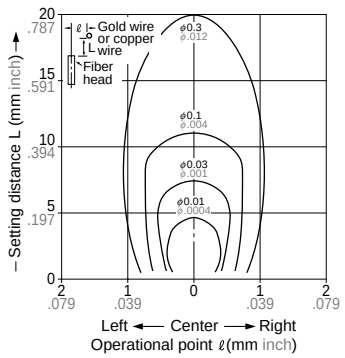



## UZFRK22 Reflective

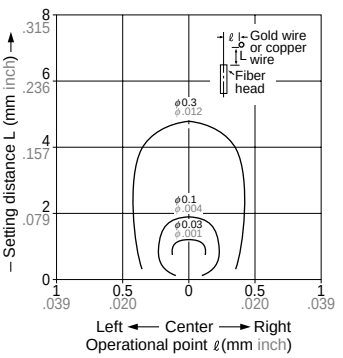
**UZF301**




**UZF311**




**UZF321**



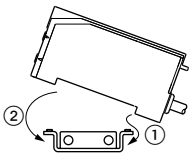
## Amplifier

These products are **not** safety sensors and are **not** designed or intended to be used to protect life and prevent bodily injury or property damage.

### Mounting

#### How to mount the amplifier

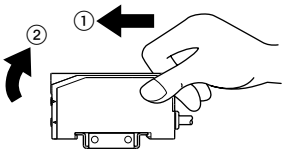
① Hook the rear part to the attached mounting bracket (**UZF811**) or DIN rail.
② Press the amplifier down on the bracket or DIN rail.



DIN rail or the attached mounting bracket

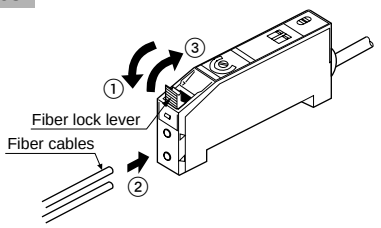
#### How to remove the amplifier

① Push the amplifier front-ward.
② With keeping on it, lift up the front part of the amplifier.

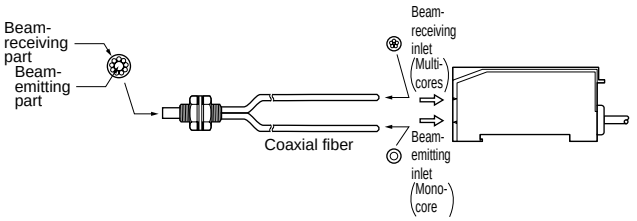



#### How to connect fiber cables

① Unlock the fiber lock lever upright.
② Insert fiber cables into the inlets slowly until fully deepened.
③ Lock the fiber lock lever on the original position.



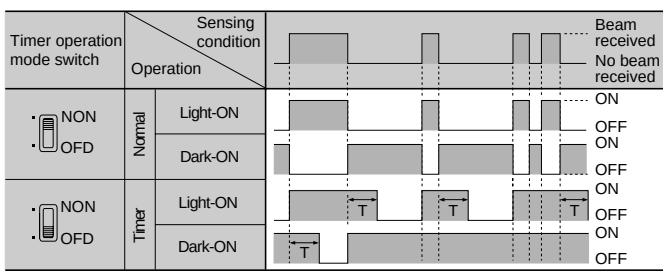

(*1) : With the coaxial diffuse fiber such as the **UZFRG4** or the **UZFRF8**, insert the mono-core fiber cable into the beam-emitting inlet and the multi-core fiber cable into the beam-receiving inlet. If they are inserted in opposition, the repeatability will deteriorate.




### OFF-delay timer function

- The **UZF3** series is incorporated with the OFF-delay timer fixed for approx. 40ms. The timer function is useful if the output signal responds so quickly that a connected device can not take in.
  To bring the timer in effect condition set the timer operation mode switch to “OFD”.

**< Time chart >**




Timer : T = Approx. 40ms

### Wiring

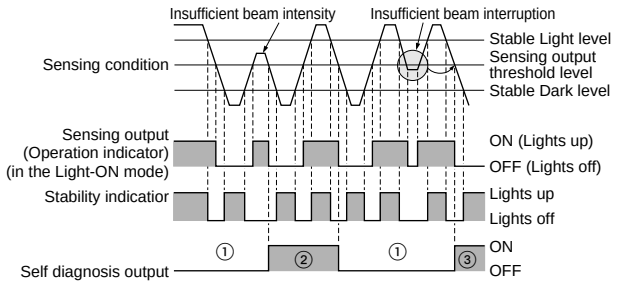
- The **UZF3** series does not incorporate a short-circuit protection at the self-diagnosis output. Do not connect it directly to a power source or a capacitive load.

### Others

- The transient time duration is 50ms after power-up.

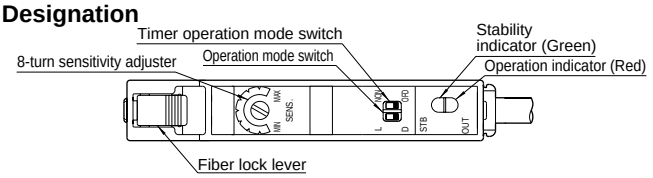
### Self-diagnosis function

The sensor diagnosis itself in the incident beam intensity. If the lens is foiled with dirt or dust, or the beam alignment is displaced, the output is generated.




① The self-diagnosis output transistor stays in the “OFF” state during the stable sensing.
② If the incident beam intensity does not reach the stable Light or Dark level, the self-diagnosis output is turned ON at the same time as the sensor goes from the Light state to the Dark state. It is automatically restored after approx. 40ms. (The sensing output does not relate to it.)
③ The incomplete Light state introduces to generate the self-diagnosis output at the same time as the sensor changes the states.
However, the incomplete Dark state introduces to generate the self-diagnosis output half-cycle behind.

### Designation



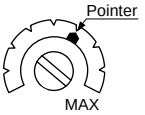

### Sensitivity adjustment

☼: Lights up ●: Lights off

| Mode | Sensing condition | Operation indicator |
|---|---|---|
| D-ON (Dark-ON) | Light state | ● |
| | Dark state | ☼ |
| L-ON (Light-ON) | Light state | ☼ |
| | Dark state | ● |

#### Normal usage

- Adjust the sensitivity with observing the operation indicator.
  Which state it lights up depends on the mode set with the operation mode switch.
- The sensitivity adjuster is the 8-turn trimmer. The maximum sensitivity can be obtained by fully turned clockwise.
- The pointer shows where you set the sensitivity.



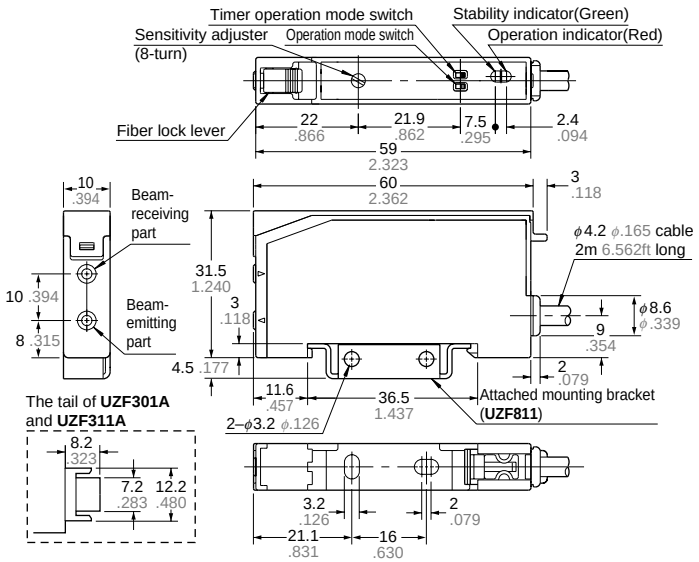

| Procedure | Sensing condition: Reflective | Sensing condition: Thru-beam | Operation | Setting adjuster |
|---|---|---|---|---|
| ① | Set the operation mode switch in Light-ON mode. (Initialization) | | Turn the sensitivity adjuster counter-clockwise fully. (The minimum sensitivity) |  |
| ② |  Beam received |  Beam received | On condition that beam is received, turn the adjuster clockwise and find the position Ⓐ where the sensor is switched ON. |  |
| ③ |  No Beam received |  No Beam received | On condition that beam is not received, turn the adjuster further clockwise until the sensor goes into the ON state again. Once it is switched on, turn the adjuster backwards a little and find the position Ⓑ where it is switched OFF. [If the sensor does not go into the ON state (normally in the thru-beam mode), the position Ⓑ is designated at the maximum point (MAX.).] |  |
| ④ | —— | —— | Set the adjuster at the center between Ⓐ and Ⓑ. It is regarded as the optimum sensitivity point. |  |
| ⑤ | Select the mode either Light-ON or Dark-ON according to your application. (L-ON: ON when the beam is received, D-ON: ON when the beam is not received) | | | |

(*1) : In order to protect the mechanism, the sensitivity adjuster idles even over turned.

## DIMENSIONS (Unit : mm inch)

### UZF3□□ Amplifier

Assembled dimensions with attached mounting bracket




### UZF811 Amplifier mounting bracket (Accessory for amplifier)