

# NAIS

**AUTOMATIC SETTING TYPE  
OPTICAL FIBER  
PHOTOELECTRIC SENSORS**

# UZF1 Series

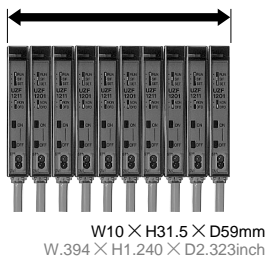
## COMPACT SIZE WITH ADVANCED SENSING TECHNOLOGY



### Thickness : 10mm .394inch

Just 10mm .394inch thick. Even a number of **UZF1** amplifiers save space.

Only 100mm wide with 10 units

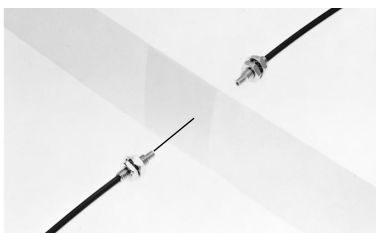


W10 × H31.5 × D59mm  
W.394 × H1.240 × D2.323inch

### Sensitivity : 8 Times Higher than conventional model

The **UZF1** amplifier performs precise and accurate sensing 8 times greater than a conventional model. It can be used not only to detect the presence of an object, but also to discriminate color, or find a thin film overlap. Complicated and sophisticated application needs are relied on the **UZF1**.

The **UZF1** series also provides the green LED amplifier that is eligible for applications much delicate.



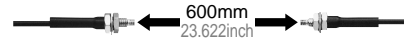
Easily detects translucent film overlap.

### Long Sensing Range

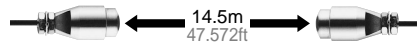
The standard M4 fiber offers the sensing range of 600mm 23.622inch.

#### Thru-beam mode

M4 standard • long sensing range fiber **UZFTB8**



With lens attachments (**UZFXLE2 + FT-FM10**)



#### Reflective mode

M6 standard • long sensing range fiber **UZFR8B**



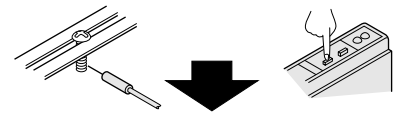
### Sensitivity Shift

If either one of the Light state or the Dark state is unstable but the other is stationary, the threshold level can be shifted from the center between the set ON and OFF levels to the stationary side.

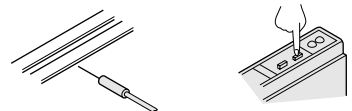
### Automatic Sensitivity Setting

Anyone can set on optimum sensitivity by just pressing buttons. Even if its power is turned off, the EEPROM memory saves your set sensitivity.

—Press the “ON” button with an object—



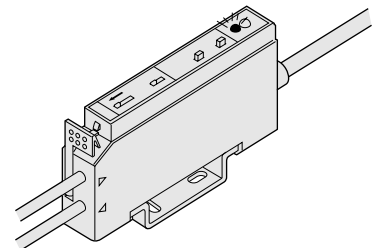
—Press the “OFF” button with no object—



### Stability Margin Indication

The number of blinks of the stability indicator represents the stability margin that you have set the sensitivity.

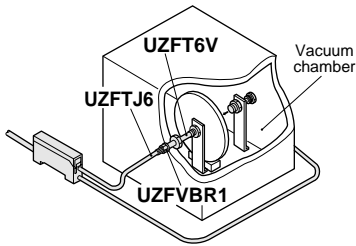
Number of blinks	0	1	2	3	4	5
Margin (%)		15 to 30	30 to 45	45 to 60	60 to 75	Over 75
Margin near by (threshold level)	Under 15					



## APPLICATIONS

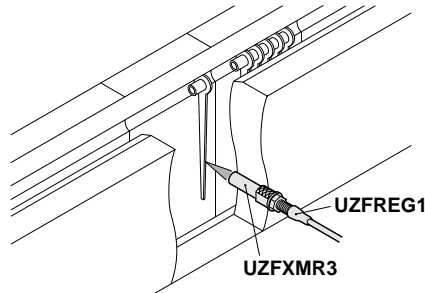
### Wafer in vacuum chamber

The vacuum fiber kit composed of the inner fiber, the joint fiber, and the outer fiber detects a wafer inside a vacuum chamber with air-tightness.



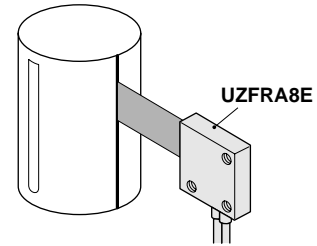
### Detecting clock hands

The **UZFREG1** fiber and the **UZFXMR3** spot lens produce the smallest projection area of 0.3mm .012inch diameter.



### Seam on can

The **UZFRA8E** array fiber accurately detects a seam on a can because of its line focusing.

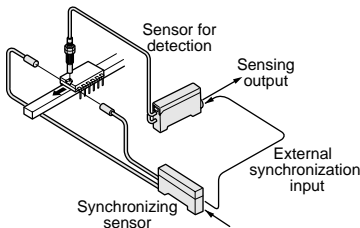


## External Synchronization (UZF1211 only)

The **UZF1211** is incorporated with the trigger function, either gate or edge trigger is available.

With only a synchronizing sensor directly connected to the **UZF1211**, the synchronous detection is realized without any other controller.

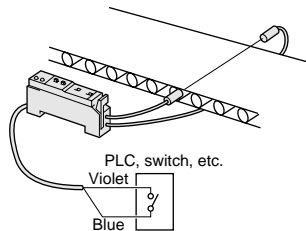
<For IC orientation detection>



## Test Input (UZF1211 only)

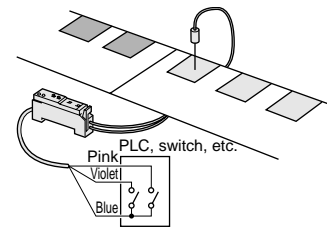
The **UZF1211** is incorporated with the test input that makes beam emission stop. It is useful to check for the operability before start-up.

<When using thru-beam fiber>



## Remote Sensitivity Adjustment (UZF1301 only)

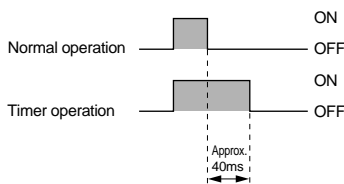
As the sensitivity can be set with two remote switches from the amplifier, your production change-over becomes smooth.



## Off-delay Timer (UZF1201 & UZF1301 only)

Each of the **UZF1201** and the **UZF1301** is incorporated with the OFF-delay timer, for approx. 40ms fixed.

It is useful when the output signals are so quick and short that a connected device can not take in, for example, by slow scanning time of a device or miniature object detection on a fast production line.



## Plug-in Connector Type

The **UZF1201** amplifier with the plug-in connector on the tail can be connected.

# 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 (*1) ■ : Red LED type □ : Green LED type	Min. sensing object [on optimum condition (*2)] ③ : Red LED type ⑥ : Green LED type	Features	Fiber optic cable length	Model No.
Standard	Lens applicable 	600mm 23.622inch 40mm 1.575inch	③ $\phi 0.16\text{mm } \phi.006\text{inch}$ opaque object ⑥ $\phi 0.16\text{mm } \phi.006\text{inch}$ opaque object	• Sensing range is about double of that of conventional model.	Freely cuttable 2m 6.562ft	UZFTB8
	Lens applicable 	320mm 12.598inch	③ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object ⑥ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object	• Freely cuttable type	Freely cuttable 2m 6.562ft	UZFTF8
	With sleeve 	25mm .984inch	③ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object ⑥ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object			UZFTF89 Sleeve 90mm 3.543inch UZFTF84 Sleeve 40mm 1.575inch UZFTS8
Small sensing probe	Lens applicable 	320mm 12.598inch 25mm .984inch	③ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object ⑥ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object	• Same sensing range as the standard with a smaller sensing probe	Freely cuttable 2m 6.562ft	UZFTT8
Small diameter	Lens applicable 	80mm 3.150inch	③ $\phi 0.05\text{mm } \phi.002\text{inch}$ opaque object ⑥ $\phi 0.03\text{mm } \phi.001\text{inch}$ opaque object	• Suitable for sensing in the intricate apparatus • Freely cuttable type	Freely cuttable 2m 6.562ft	UZFTF4
	With sleeve 	7mm .276inch	③ $\phi 0.05\text{mm } \phi.002\text{inch}$ opaque object ⑥ $\phi 0.03\text{mm } \phi.001\text{inch}$ opaque object			UZFTF49 Sleeve 90mm 3.543inch UZFTF44 Sleeve 40mm 1.575inch UZFTS4
	Lens applicable 	320mm 12.598inch	③ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object ⑥ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object			UZFTF8
Flexible	Lens applicable Small diameter 	90mm 3.543inch 6mm .236inch	③ $\phi 0.05\text{mm } \phi.002\text{inch}$ opaque object ⑥ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object	• Small diameter sensing probe coiled cable	2m 6.562ft	UZFTC4
	Lens applicable 	320mm 12.598inch	③ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object ⑥ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object	• Allowable bending radius : R4mm R.157inch • Bending durability : one million times min.	Freely cuttable 2m 6.562ft	UZFTP8
	Small diameter 	100mm 3.937inch 6mm .236inch	③ $\phi 0.05\text{mm } \phi.002\text{inch}$ opaque object ⑥ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object			UZFTP4
	Small diameter 	120mm 4.724inch 7mm .276inch	③ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object ⑥ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object			UZFTP2

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



	Shape of sensing probe (mm inch)	Sensing range (*1) ■ : Red LED type □ : Green LED type	Min. sensing object [on optimum condition (*2)] ③ : Red LED type ⑥ : Green LED type	Features	Fiber optic cable length	Model No.
Heat-resistant	Lens applicable 	270mm 10.630inch 20mm .787inch	③ $\phi 0.12\text{mm } \phi.005\text{inch}$ opaque object ⑥ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object	• Heat-resistant : 350°C 662°F Cold-resistant : -60°C -76°F	2m 6.562ft	UZFTH7
	Lens applicable 	320mm 12.598inch	③ $\phi 0.12\text{mm } \phi.005\text{inch}$ opaque object ⑥ $\phi 0.12\text{mm } \phi.005\text{inch}$ opaque object	• Silicon housing makes cable lead-around easy. • Heat-resistant : 200°C 392°F Cold-resistant : -60°C -76°F	1m 3.281ft	UZFTH6
	Lens applicable 	37mm 3.150inch	③ $\phi 0.12\text{mm } \phi.005\text{inch}$ opaque object ⑥ $\phi 0.12\text{mm } \phi.005\text{inch}$ opaque object	• Heat-resistant : 130°C 266°F Cold-resistant : -60°C -76°F • Freely cuttable type	Freely cuttable 2m 6.562ft	UZFTH8
Chemical-resistant		1,500mm 59.055inch	③ $\phi 1\text{mm } \phi.039\text{inch}$ opaque object	• For the application in liquid chemical • Heat-resistant specification (115°C 239°F) • Long sensing range type with lens	2m 6.562ft Bending R : 30mm (1.181inch)	UZFTL8Y
		300mm 11.811inch	③ $\phi 1\text{mm } \phi.039\text{inch}$ opaque object	• For the application in liquid chemical • Heat-resistant specification (115°C 239°F) • Side-view type	2m 6.562ft Bending R : 30mm (1.181inch)	UZFTV8Y
Vacuum-resistant	Lens applicable 	200mm 7.874inch	③ $\phi 0.1\text{mm } \phi.004\text{inch}$ opaque object	• For the application in vacuum area • Heat-resistant : 120°C 248°F	1m 3.281ft Bending R : 200mm 7.874inch	UZFT6V
		100mm 3.937inch	③ $\phi 0.1\text{mm } \phi.004\text{inch}$ opaque object		1m 3.281ft Bending R : 30mm (1.181inch)	UZFT60V

(\*1): The free-cut fibers may reduce the sensing ranges 20% lower than the above specified according to how they are cut off.

(\*2): The optimum condition is specified that the sensitivity is adjusted to have the operation indicator exactly light up at a certain distance in the Light-ON mode.

The vacuum fiber must be used with both the followings.  
 UZFTJ6 : Outer fibers in the atmosphere (One pair of two fibers a set)  
 UZFVBR1 : Terminal joints (One pair of two joints a set)

# ORDER GUIDE

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



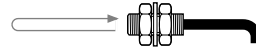
	Shape of sensing probe (mm inch)	Sensing range (*1) ■ : Red LED type □ : Green LED type	Min. sensing object [on optimum condition (*2)] ③ : Red LED type ⑥ : Green LED type	Features	Fiber optic cable length	Model No.
Long sensing range with lens		7,000mm 275.59inch 1,000mm 39.37inch	③ $\phi 0.5\text{mm } \phi.020\text{inch}$ opaque object ⑥ $\phi 0.5\text{mm } \phi.020\text{inch}$ opaque object	• By applying large diameter lens, a long sensing range is achieved. • Fiber optic cable length is 10m 32.808ft long	Freely cuttable 10m 32.808ft	UZFTL9
		600mm 23.622inch 60mm 2.362inch	③ $\phi 0.1\text{mm } \phi.004\text{inch}$ opaque object ⑥ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object	• A long sensing range is achieved with a very small sensing probe of $\phi 2.5\text{mm } \phi.098\text{inch}$ .	Freely cuttable 2m 6.562ft	UZFTL8
Array	Top sensing 	210mm 8.268inch 20mm .787inch	③ Vertical $\phi 0.3\text{mm } \phi.012\text{inch}$ opaque object Horizontal $\phi 0.05\text{mm } \phi.002\text{inch}$ opaque object ⑥ Vertical $\phi 0.3\text{mm } \phi.012\text{inch}$ opaque object Horizontal $\phi 0.03\text{mm } \phi.001\text{inch}$ opaque object	• Arrayed beam does not miss by detecting object regardless of its position.	Freely cuttable 2m 6.562ft	UZFTA8
	Side sensing 	180mm 7.087inch 20mm .787inch	③ Vertical $\phi 0.3\text{mm } \phi.012\text{inch}$ opaque object Horizontal $\phi 0.05\text{mm } \phi.002\text{inch}$ opaque object ⑥ Vertical $\phi 0.3\text{mm } \phi.012\text{inch}$ opaque object Horizontal $\phi 0.03\text{mm } \phi.001\text{inch}$ opaque object			UZFTA8E
Elbow	Lens applicable 	210mm 8.268inch 24mm .945inch	③ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object ⑥ $\phi 0.08\text{mm } \phi.003\text{inch}$ 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 	85mm 3.346inch 45mm 1.772inch	③ $\phi 0.05\text{mm } \phi.002\text{inch}$ opaque object ⑥ $\phi 0.05\text{mm } \phi.002\text{inch}$ opaque object	• Side sensing method saves installation space.	Freely cuttable 2m 6.562ft	UZFTV22
	Sleeve part cannot be bent. 	120mm 4.724inch 12mm .472inch	③ $\phi 0.05\text{mm } \phi.002\text{inch}$ opaque object ⑥ $\phi 0.08\text{mm } \phi.003\text{inch}$ opaque object			UZFTV41
Ultra-small diameter		5mm .197inch	③ $\phi 0.01\text{mm } \phi.0004\text{inch}$ opaque object	• Ultra-small diameter, and diameter of $\phi 0.125\text{mm } \phi.005\text{inch}$	500mm 19.685inch	UZFTE1
		24mm .945inch	③ $\phi 0.03\text{mm } \phi.001\text{inch}$ opaque object	• Ultra-small diameter, and diameter of $\phi 0.25\text{mm } \phi.010\text{inch}$	1m 3.281ft	UZFTE2
Narrow-view		120mm 4.724inch	③ $\phi 0.05\text{mm } \phi.002\text{inch}$ 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 free-cut fibers may reduce the sensing ranges 20% lower than the above specified according to how they are cut off.

(\*2): The optimum condition is specified that the sensitivity is adjusted to have the operation indicator exactly light up at a certain distance in the Light-ON mode.

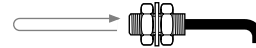
# ORDER GUIDE

## For general use fiber optic cable (reflective type)



	Shape of sensing probe (mm inch)	Sensing range (*1) (*2)	Min. sensing object [at the maximum sensitivity (*3)]	Features	Fiber optic cable length	Model No.
Long sensing range		160mm 6.299inch 14mm .551inch	③ $\phi 0.01\text{mm } \phi .0004\text{inch}$ gold wire ⑥ $\phi 0.16\text{mm } \phi .006\text{inch}$ copper wire	<ul style="list-style-type: none"> <li>Long sensing range</li> <li>Freely cuttable type</li> </ul>	Freely cuttable 2m 6.562ft	<b>UZFR8B</b>
Standard	Coaxial		③ $\phi 0.01\text{mm } \phi .0004\text{inch}$ gold wire ⑥ $\phi 0.08\text{mm } \phi .003\text{inch}$ copper wire	<ul style="list-style-type: none"> <li>Suitable for green LED type</li> </ul>	500mm 19.685inch	<b>UZFRF5</b>
	With sleeve		③ $\phi 0.01\text{mm } \phi .0004\text{inch}$ gold wire ⑥ $\phi 0.08\text{mm } \phi .003\text{inch}$ copper wire	<ul style="list-style-type: none"> <li>Freely cuttable type</li> </ul>	Freely cuttable 2m 6.562ft	<b>UZFRF8</b> <b>UZFRF89</b> Sleeve 90mm 3.543inch <b>UZFRF84</b> Sleeve 40mm 1.575inch
Small sensing probe		130mm 2.362inch 8mm .906inch	③ $\phi 0.01\text{mm } \phi .0004\text{inch}$ gold wire ⑥ $\phi 0.4\text{mm } \phi .016\text{inch}$ copper wire	<ul style="list-style-type: none"> <li>Same sensing range as the standard with small sensing probe</li> </ul>	Freely cuttable 2m 6.562ft	<b>UZFRF8</b>
	Small diameter		③ $\phi 0.01\text{mm } \phi .0004\text{inch}$ gold wire ⑥ $\phi 0.4\text{mm } \phi .016\text{inch}$ copper wire			<b>UZFRF4</b>
		③ $\phi 0.01\text{mm } \phi .0004\text{inch}$ gold wire ⑥ $\phi 0.4\text{mm } \phi .016\text{inch}$ copper wire	<b>UZFRS8</b>			
Small diameter		130mm 2.362inch 30mm 1.181inch 2mm .079inch	③ $\phi 0.01\text{mm } \phi .0004\text{inch}$ gold wire ⑥ $\phi 0.4\text{mm } \phi .016\text{inch}$ copper wire	<ul style="list-style-type: none"> <li>Suitable for sensing in the intricate apparatus</li> <li>Freely cuttable type</li> </ul>	Freely cuttable 2m 6.562ft	<b>UZFRF4</b>
	With sleeve		③ $\phi 0.01\text{mm } \phi .0004\text{inch}$ gold wire ⑥ $\phi 0.4\text{mm } \phi .016\text{inch}$ copper wire			<b>UZFRF49</b> Sleeve 90mm 3.543inch <b>UZFRF44</b> Sleeve 40mm 1.575inch
		③ $\phi 0.01\text{mm } \phi .0004\text{inch}$ gold wire ⑥ $\phi 0.4\text{mm } \phi .016\text{inch}$ copper wire	<b>UZFRS4</b>			
Flexible		80mm 3.150inch 6mm .236inch	③ $\phi 0.01\text{mm } \phi .0004\text{inch}$ gold wire ⑥ $\phi 2.1\text{mm } \phi .083\text{inch}$	<ul style="list-style-type: none"> <li>Allowable bending radius : R4mm R.157inch</li> <li>Bending durability : one million times min.</li> </ul>	Freely cuttable 2m 6.562ft	<b>UZFRP8</b>
	Small diameter		③ $\phi 0.01\text{mm } \phi .0004\text{inch}$ gold wire			<b>UZFRP4</b>
	Small diameter		③ $\phi 0.01\text{mm } \phi .0004\text{inch}$ gold wire ⑥ $\phi 0.4\text{mm } \phi .016\text{inch}$ copper wire			<b>UZFRP2</b>

## For environmental-resistant use fiber optic cable (reflective type)



	Shape of sensing probe (mm inch)	Sensing range (*1) (*2)	Min. sensing object [at the maximum sensitivity (*3)]	Features	Fiber optic cable length	Model No.
Heat-resistant	Coaxial		③ $\phi 0.01\text{mm } \phi .0004\text{inch}$ gold wire ⑥ $\phi 0.025\text{mm } \phi .001\text{inch}$ gold wire	<ul style="list-style-type: none"> <li>Heat-resistant : 350°C 662°F</li> <li>Cold-resistant : -60°C -76°F</li> </ul>	2m 6.562ft	<b>UZFRH7</b>
	With sleeve					<b>UZFRH76</b> Sleeve 60mm 2.362inch
	Coaxial			<ul style="list-style-type: none"> <li>Silicon housing makes cable lead-around easy.</li> <li>Heat-resistant : 200°C 392°F</li> <li>Cold-resistant : -60°C -76°F</li> </ul>	1m 3.281ft	<b>UZFRH6</b>
Vacuum-resistant		88mm 3.465inch 11mm .433inch	③ $\phi 0.01\text{mm } \phi .0004\text{inch}$ gold wire ⑥ $\phi 1.45\text{mm } \phi .057\text{inch}$ stainless steel bar	<ul style="list-style-type: none"> <li>Heat-resistant : 130°C 266°F</li> <li>Cold-resistant : -60°C -76°F</li> <li>Freely cuttable type</li> </ul>	Freely cuttable 2m 6.562ft	<b>UZFRH8</b>
		50mm 1.969inch	③ $\phi 0.1\text{mm } \phi .004\text{inch}$ copper wire	<ul style="list-style-type: none"> <li>For the application in vacuum area</li> <li>Heat-resistant : 120°C 248°F</li> </ul>	1m 3.281ft	<b>UZFR6V</b>

(\*1): The sensing range is specified with using white non-glossy paper (50×50mm 1.969×1.969inch). (**UZFR8B**: 100×100mm 3.937×3.937inch, **UZFRV82**: 30×30mm 1.181×1.181inch, **UZFRK22**: 10×10mm .394×.394inch)

(\*2): The free-cut fibers may reduce the sensing ranges 20% lower than the above specified according to how they are cut off.

(\*3): The minimum sensing object is obtainable with the maximum sensitivity, but at the ideal sensing distance within the rated sensing range.

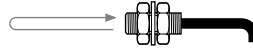
The vacuum fiber must be used with both the followings.

**UZFTJ6** : Outer fibers in the atmosphere (One pair of two fibers a set)

**UZFVBR1** : Terminal joints (One pair of two joints a set)

# ORDER GUIDE

For special applications use fiber optic cable (reflective type)




	Shape of sensing probe (mm inch)	Sensing range (*1) (*2) ■ : Red LED type □ : Green LED type	Min. sensing object [at the maximum sensitivity (*3)] ③ : Red LED type ⑥ : Green LED type	Features	Fiber optic cable length	Model No.
Fixed-focus		4.5 to 8mm .177 to .315inch (Center: 6mm .236inch)	③ $\phi 0.01\text{mm}$ $\phi 0.0004\text{inch}$ gold wire	• Sensing performance is not affected by color or surface condition of the object.	Freely cuttable 2m 6.562ft	<b>UZFR4</b>
High precision (Coaxial)	Lens applicable Coaxial 	44mm 1.732inch	③ $\phi 0.01\text{mm}$ $\phi 0.0004\text{inch}$ gold wire	• A highly precise positioning is possible with coaxial reflective mode.	Freely cuttable 2m 6.562ft	<b>UZFRG4</b>
	Lens applicable Coaxial • Small diameter 	13mm .512inch	③ $\phi 0.01\text{mm}$ $\phi 0.0004\text{inch}$ gold wire	• Approx. $\phi 0.3\text{mm}$ $\phi 0.12\text{inch}$ is achieved by means of combining with ultra-small spot lens <b>UZFXMR3</b> .	500mm 19.685inch	<b>UZFRG1</b>
Array	Top sensing 	66mm 2.598inch	③ Vertical $\phi 0.05\text{mm}$ $\phi 0.002\text{inch}$ copper wire Horizontal $\phi 0.01\text{mm}$ $\phi 0.0004\text{inch}$ gold wire	• Arrayed beams meet various sensing demand.	Freely cuttable 2m 6.562ft	<b>UZFRA8</b>
	Side sensing 	4mm .157inch	⑥ Vertical $\phi 1.45\text{mm}$ $\phi 0.057\text{inch}$ stainless steel bar Horizontal $\phi 0.08\text{mm}$ $\phi 0.003\text{inch}$ copper wire			<b>UZFRA8E</b>
Elbow		66mm 2.598inch 5mm .197inch	③ $\phi 0.01\text{mm}$ $\phi 0.0004\text{inch}$ gold wire ⑥ $\phi 2.1\text{mm}$ $\phi 0.083\text{inch}$ stainless steel bar	• Installation is simple as sensing probe is bent 90 degrees and has 5mm .197inch radius.	Freely cuttable 2m 6.562ft	<b>UZFRR8</b>
Side-view	Small diameter 	15mm .591inch	③ $\phi 0.02\text{mm}$ $\phi 0.001\text{inch}$ gold wire	• Side sensing method saves installation space.	Freely cuttable 2m 6.562ft	<b>UZFRV41</b>
		24mm .945inch 2mm .079inch	③ $\phi 0.02\text{mm}$ $\phi 0.001\text{inch}$ gold wire ⑥ $\phi 2.1\text{mm}$ $\phi 0.083\text{inch}$ stainless steel bar			<b>UZFRV82</b>
Ultra-small diameter		1.5mm .059inch	③ $\phi 0.01\text{mm}$ $\phi 0.0004\text{inch}$ gold wire	• Suitable for sensing in the intricate apparatus	500mm 19.685inch	<b>UZFRE11</b>
	Coaxial 	13mm .512inch	③ $\phi 0.01\text{mm}$ $\phi 0.0004\text{inch}$ gold wire	• A highly precise positioning is possible with coaxial reflective type.	1m 3.281ft	<b>UZFRE21</b>
Narrow-view	Coaxial 	9mm .354inch	③ $\phi 0.02\text{mm}$ $\phi 0.001\text{inch}$ 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	<b>UZFRK22</b>

(\*1): The sensing range is specified with using white non-glossy paper (50×50mm 1.969×1.969inch). (**UZFR8B**: 100×100mm 3.937×3.937inch, **UZFRV82**: 30×30mm 1.181×1.181inch, **UZFRK22**: 10×10mm .394×.394inch)

(\*2): The free-cut fibers may reduce the sensing ranges 20% lower than the above specified according to how they are cut off.

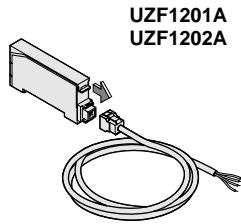
(\*3): The minimum sensing object is obtainable with the maximum sensitivity, but at the ideal sensing distance within the rated sensing range.

## Amplifier

	Appearance	Model No.	Main functions (● : equipped)							Emitting element	Output
			Sensitivity shift	Sensitivity margin indicating	External synchronizing	Test input	Remote sensitivity adjustment	OFF-delay timer	Crosstalk prevention		
Standard type		<b>UZF1201</b>								Red LED	NPN open-collector transistor
		<b>UZF12015</b>	●	●	—	—	—	●	●		PNP open-collector transistor
		<b>UZF1202</b>								Green LED	NPN open-collector transistor
		<b>UZF12025</b>									PNP open-collector transistor
External synchronization input type		<b>UZF1211</b>	●	●	●	●	—	—	●	Red LED	NPN open-collector transistor
Remote sensitivity adjustment type		<b>UZF1301</b>	●	●	—	—	●	●	●	Red LED	

### Connector type

Connector type is available for Red LED Standard type and Green LED Standard type.  
 When ordering this type, add suffix "A" at the end of model number (only for NPN output type).  
 Model No. : **UZF1201A** (Red LED Standard type), **UZF1202A** (Green LED Standard type)  
 Applicable with Cable with a connector **UZF851**, **UZF852**.



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

### Fiber cutter

Fiber cutter is supplied together with freely cuttable fiber cable.  
 For spare purpose, optionally available with the following part number.

**UZFXCT1**

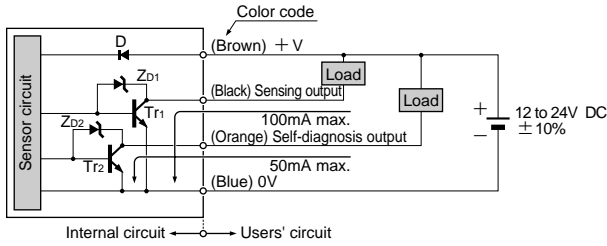




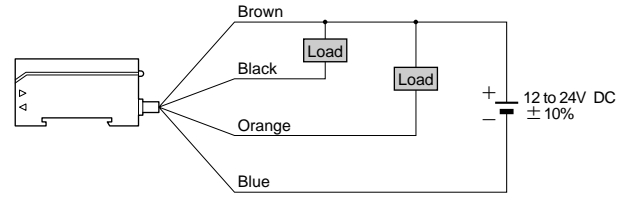
# I/O CIRCUIT AND WIRING DIAGRAMS

**UZF1201, UZF1202**  
**UZF1201A, UZF1202A** Standard type-NPN output

## I/O circuit diagram



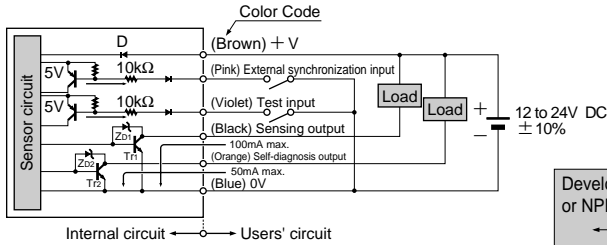
## Wiring diagram



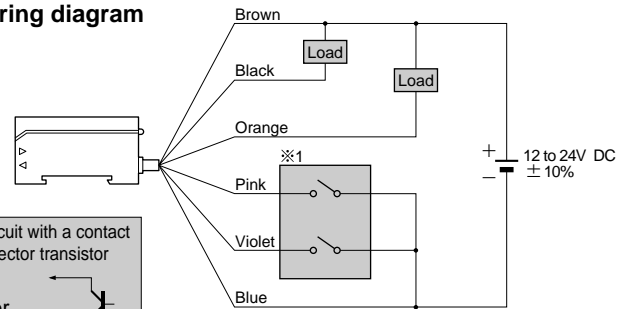
Symbol... D : Reverse polarity protection diode  
 ZD1, ZD2 : Surge absorption zener diode  
 Tr1, Tr2 : NPN output transistor

**UZF1211** External synchronization input type

## I/O circuit diagram



## Wiring diagram



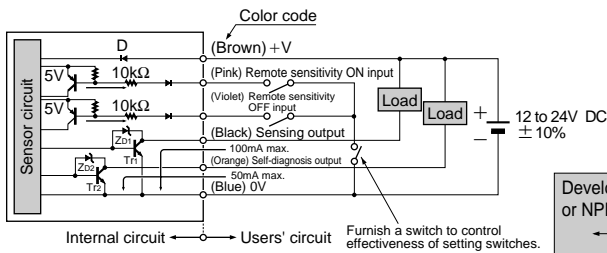
Symbol... D : Reverse polarity protection diode  
 ZD1, ZD2 : Surge absorption zener diode  
 Tr1, Tr2 : NPN output transistor

Develop short-circuit with a contact or NPN open-collector transistor

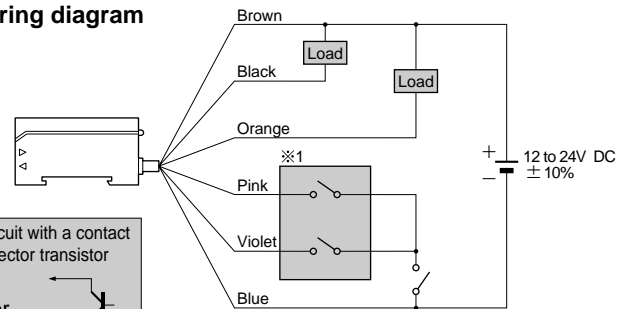
Low : 0 to 1V  
 High : 4.5 to 30V or Open

**UZF1301** Remote sensitivity adjustment type

## I/O circuit diagram



## Wiring diagram



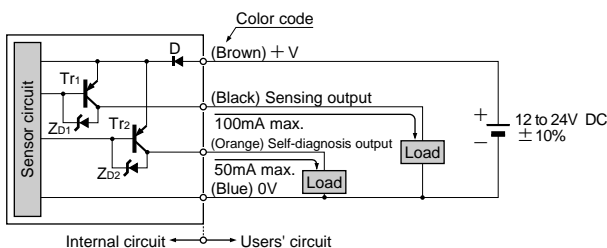
Symbol... D : Reverse polarity protection diode  
 ZD1, ZD2 : Surge absorption zener diode  
 Tr1, Tr2 : NPN output transistor

Develop short-circuit with a contact or NPN open-collector transistor

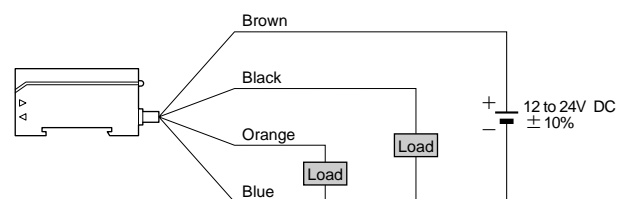
Low : 0 to 1V  
 High : 4.5 to 30V or Open

**UZF12015**  
**UZF12025** Standard type-PNP output

## I/O circuit diagram



## Wiring diagram

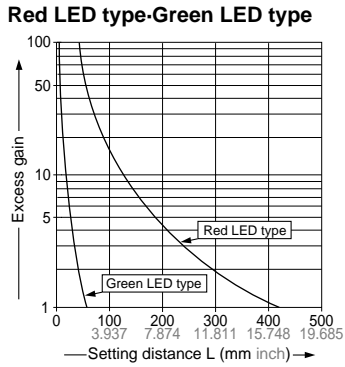


Symbol... D : Reverse polarity protection diode  
 ZD1, ZD2 : Surge absorption zener diode  
 Tr1, Tr2 : PNP output transistor

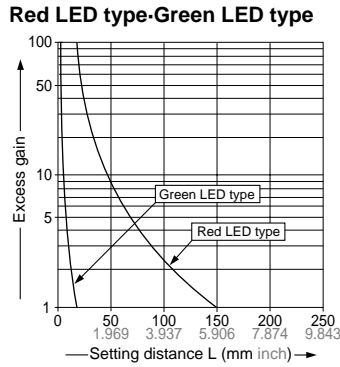
# SENSING FIELDS (TYPICAL)

## Correlation between setting distance and excess gain

**UZTF8** Thru-beam

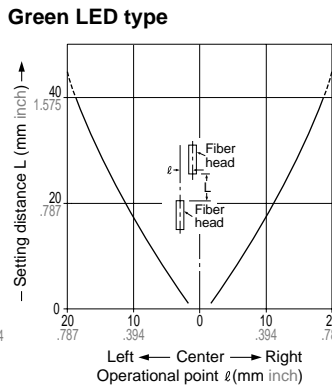
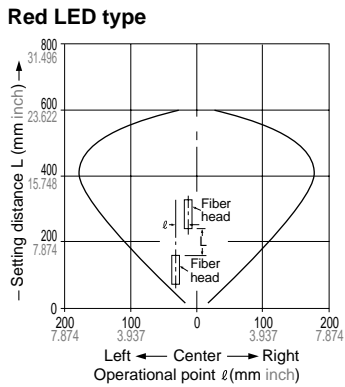


**UZFRF8** Reflective

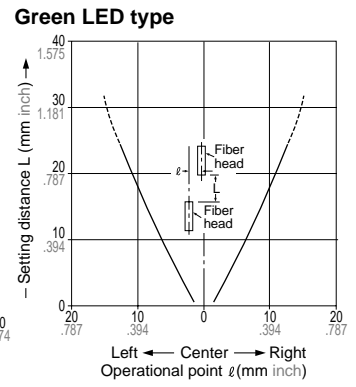
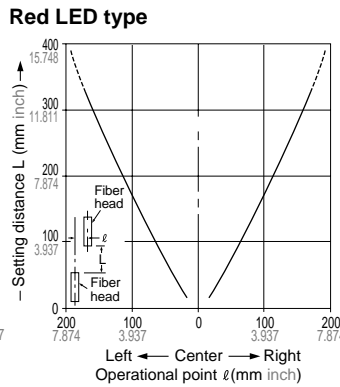


## Parallel deviations

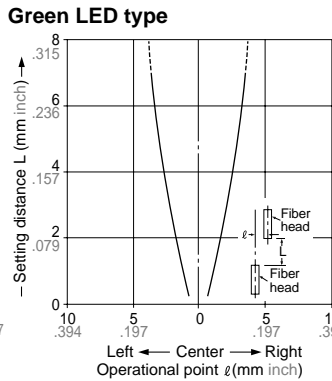
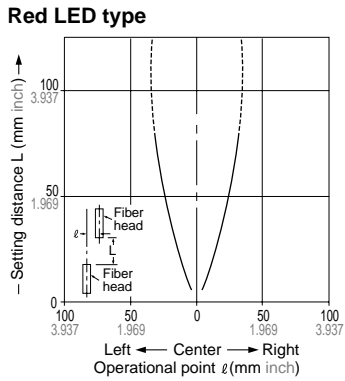
**UZFTB8** Thru-beam



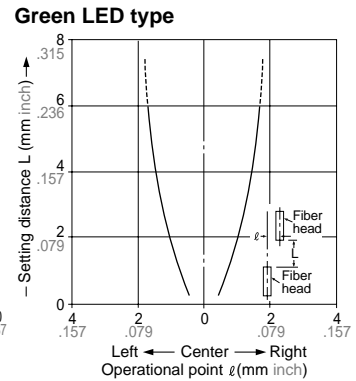
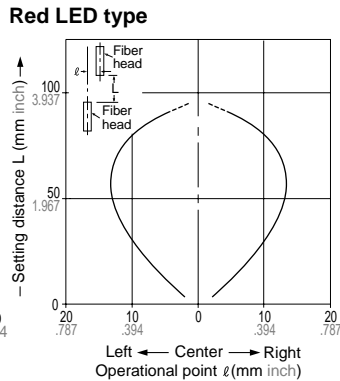
**UZFTF8, UZFTF89, UZFTF84, UZFTS8, UZFTT8** Thru-beam



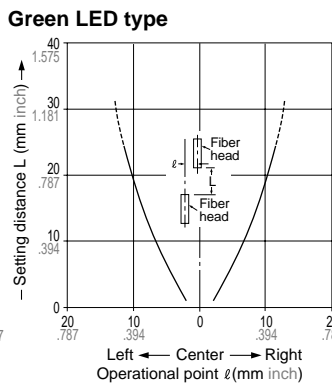
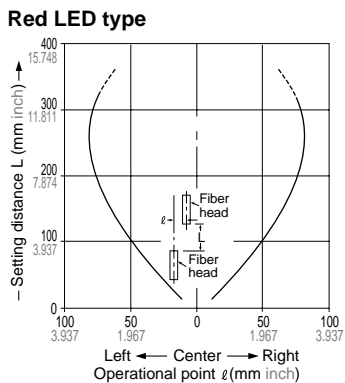
**UZFTF4, UZFTF49, UZFTF44, UZFTS4** Thru-beam



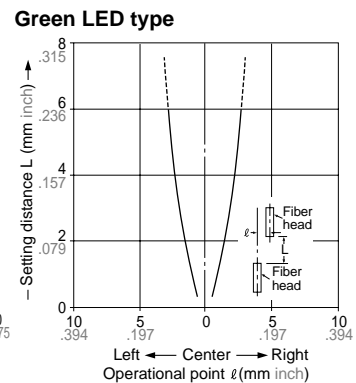
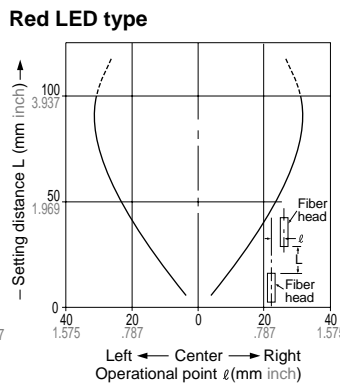
**UZFTC4** Thru-beam



**UZFTP8** Thru-beam

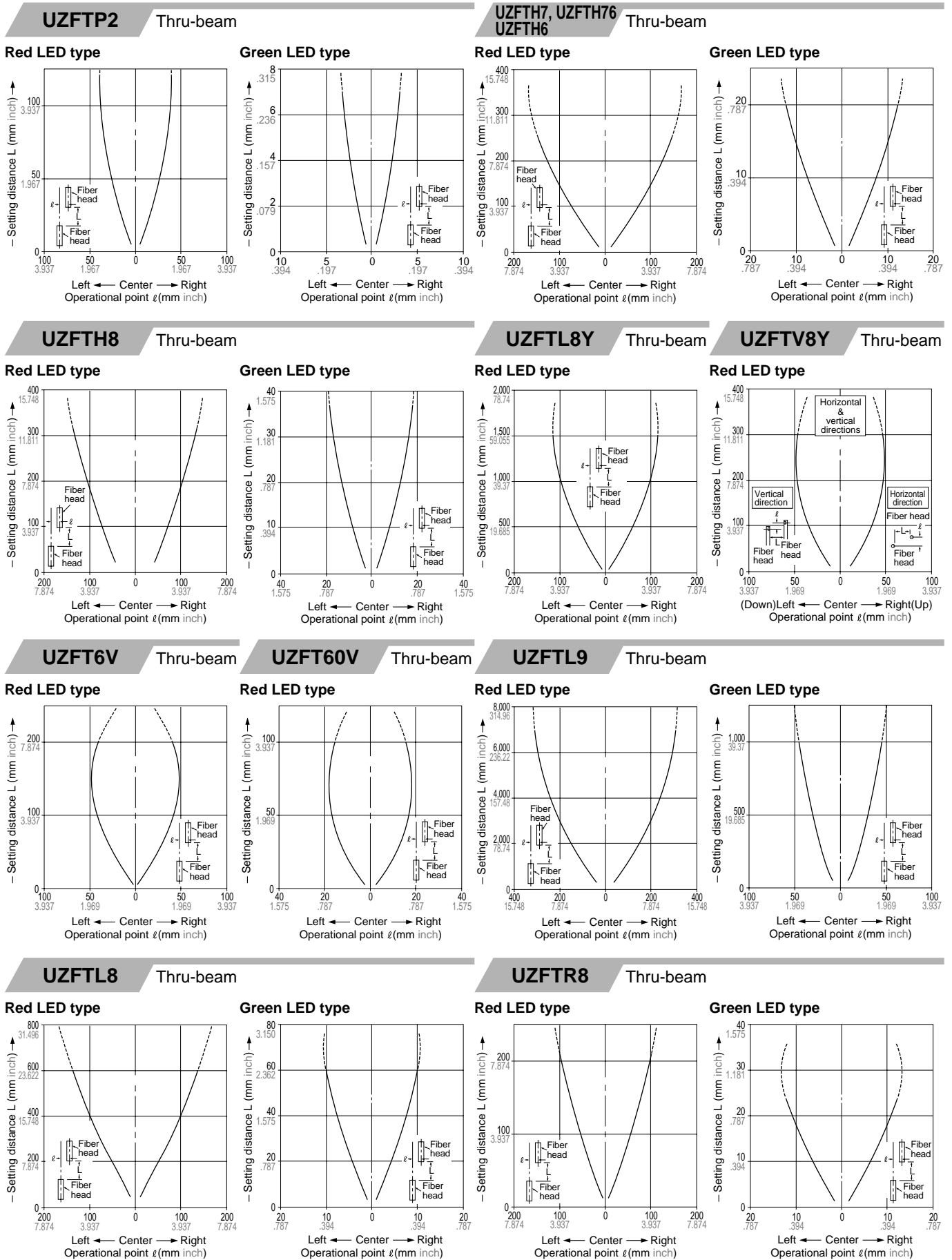


**UZFTP4** Thru-beam



# SENSING FIELDS (TYPICAL)

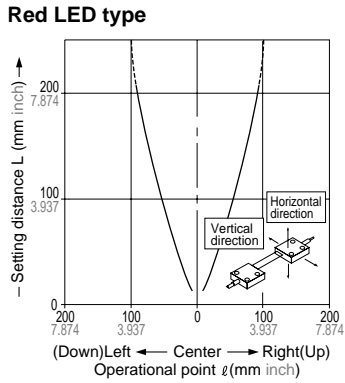
## Parallel deviations



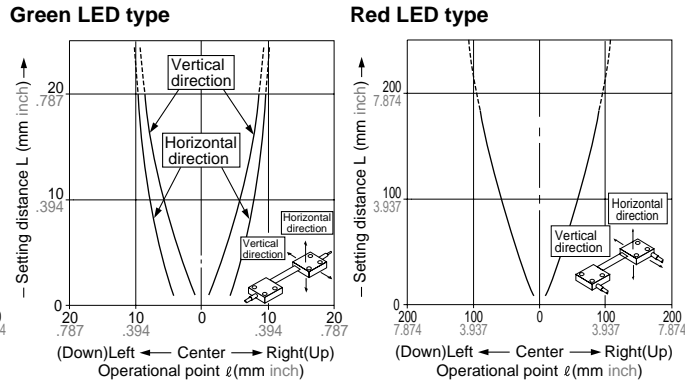
# SENSING FIELDS (TYPICAL)

## Parallel deviations

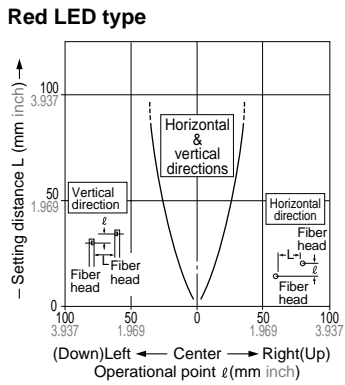
**UZFTA8** Thru-beam



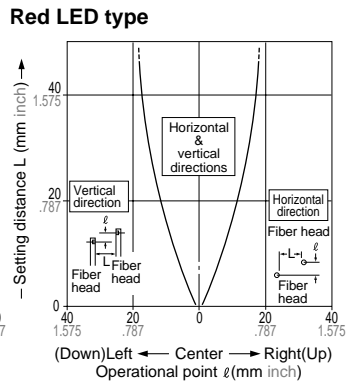
**UZFTA8E** Thru-beam



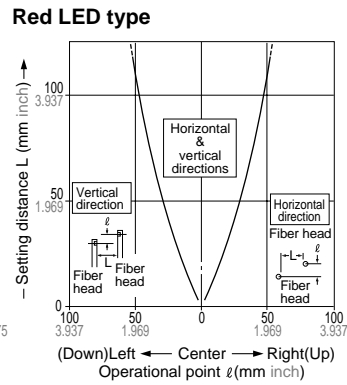
**UZFTV22** Thru-beam



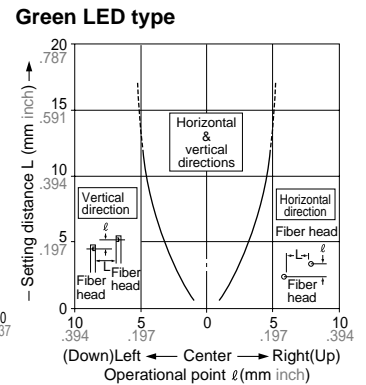
**UZFTV41** Thru-beam



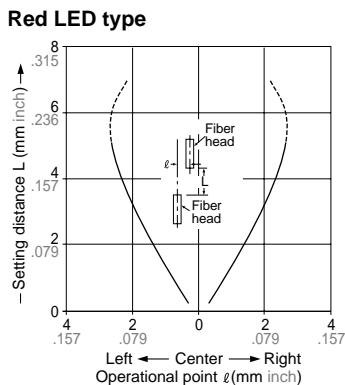
**UZFTV82** Thru-beam



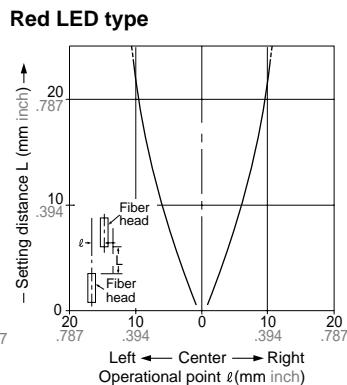
**UZFTV82** Thru-beam



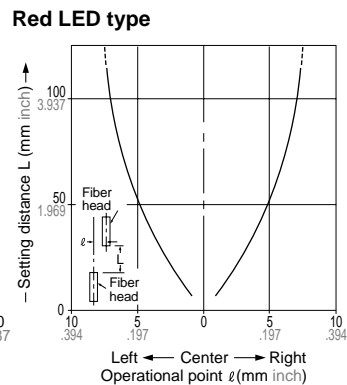
**UZFTE1** Thru-beam



**UZFTE2** Thru-beam

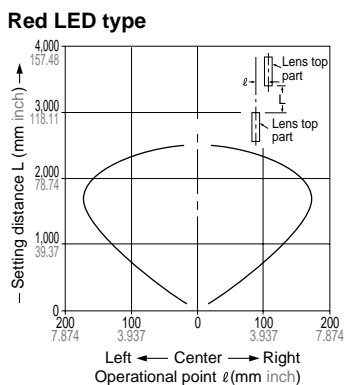


**UZFTK22** Thru-beam

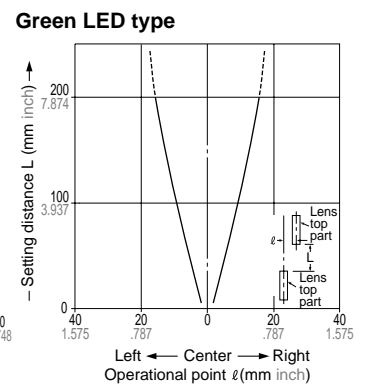
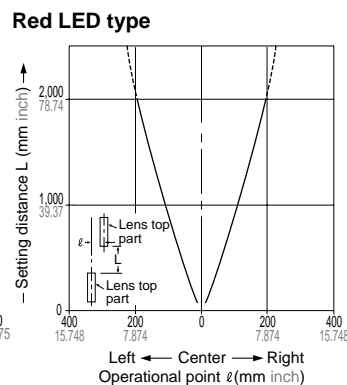


## Parallel deviations with UZFXLE1 (Expansion lens) applied on both sides

**UZFTB8** Thru-beam

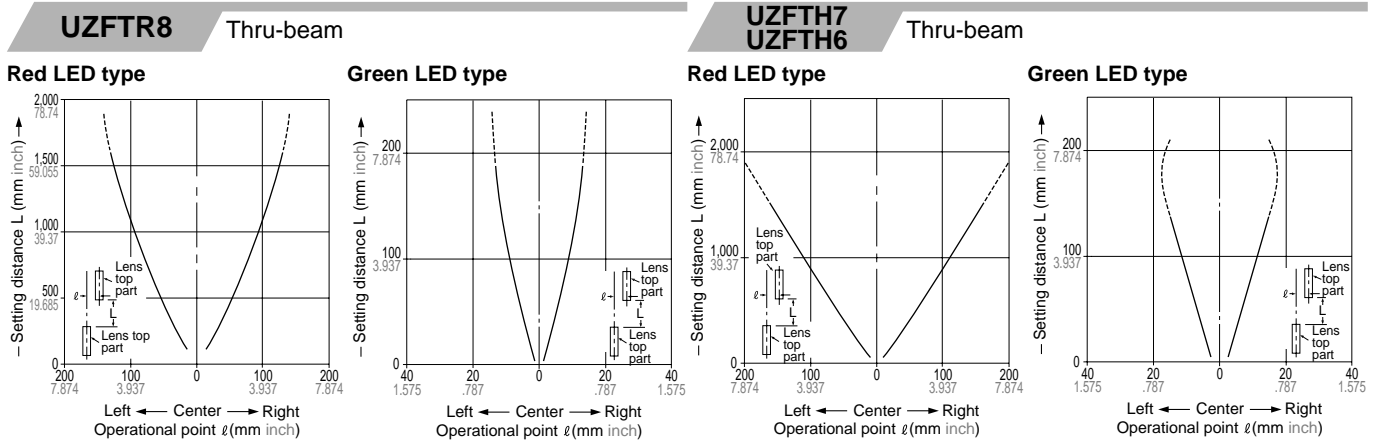
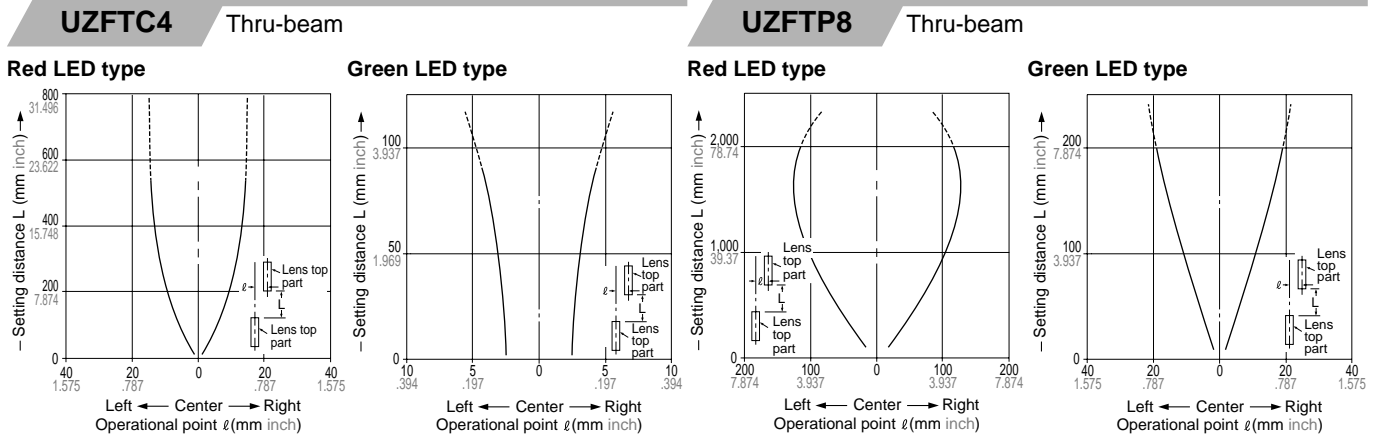


**UZFTF8**  
**UZFTT8** Thru-beam

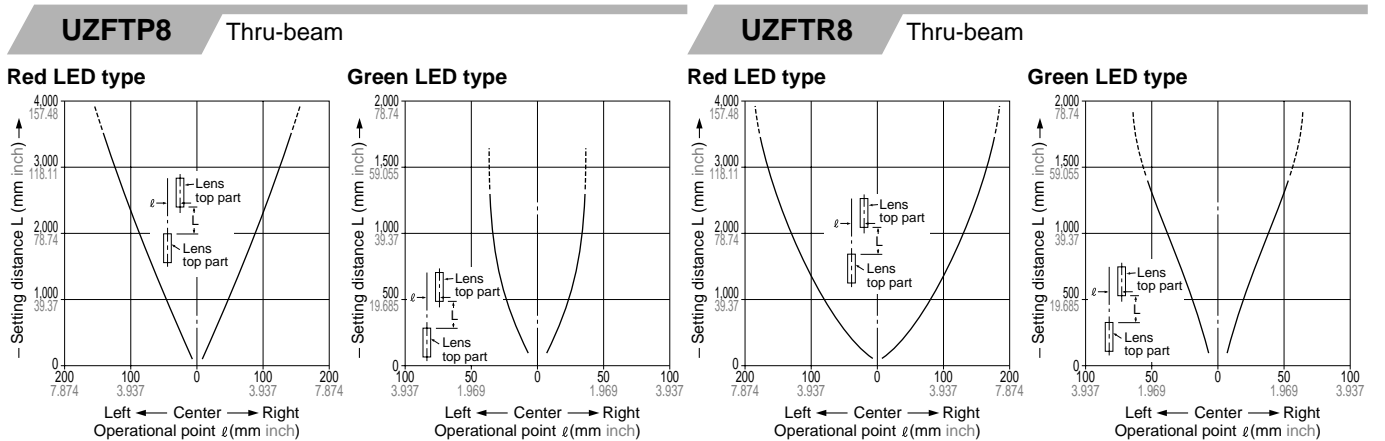
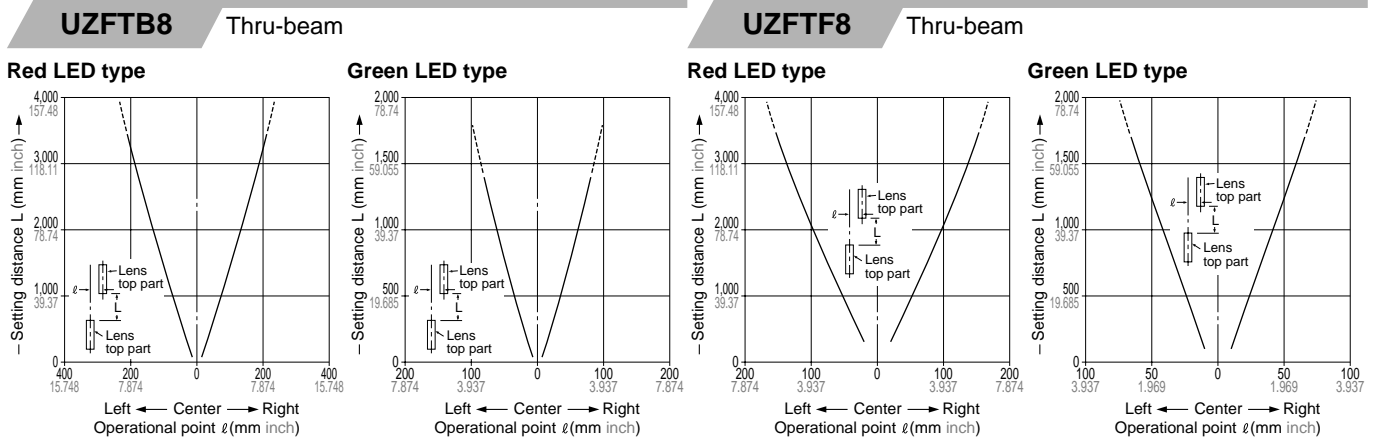


# SENSING FIELDS (TYPICAL)

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

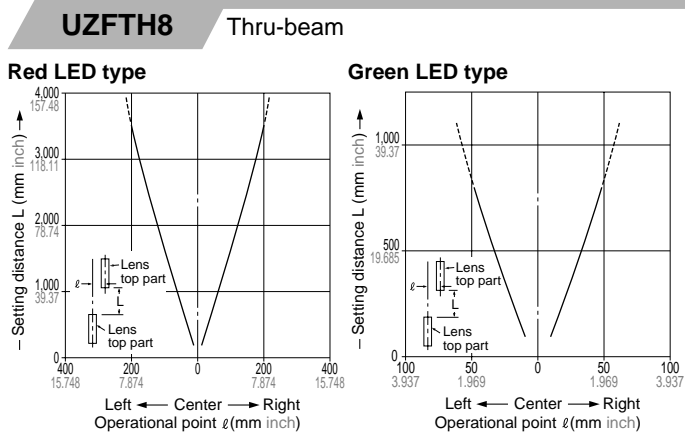
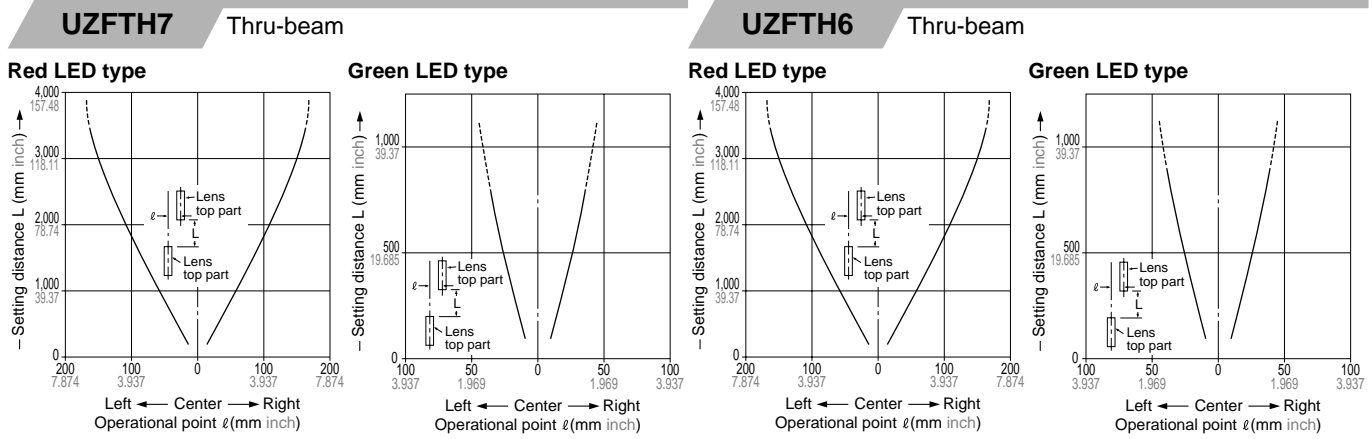


Parallel deviations with UZFXLE2 (Super-expansion lens) applied on both sides

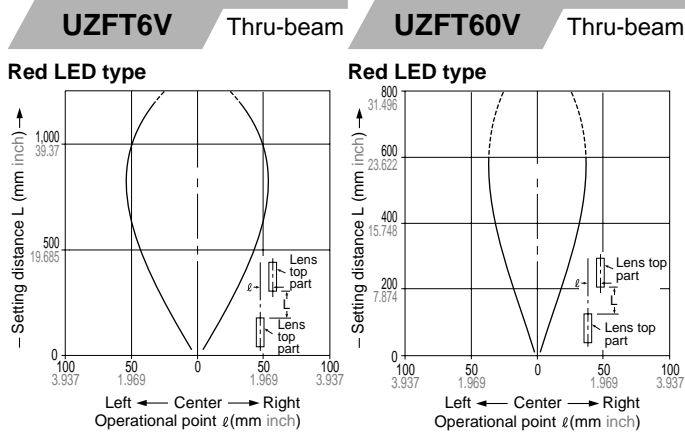


# SENSING FIELDS (TYPICAL)

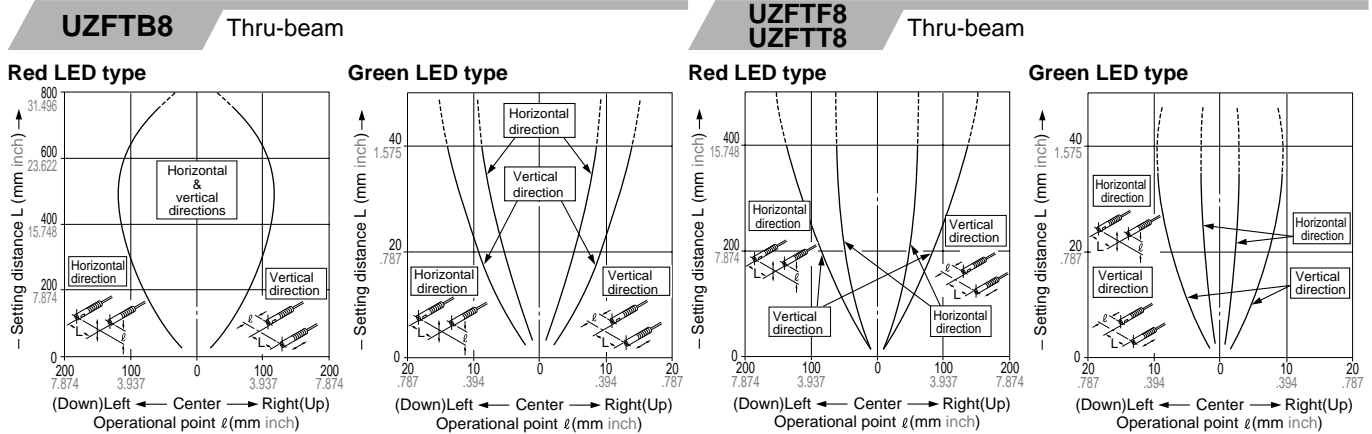
Parallel deviations with UZFXLE2 (Super-expansion lens) applied on both sides



Parallel deviations with UZVLE1 (Vacuum-expansion lens) applied on both sides



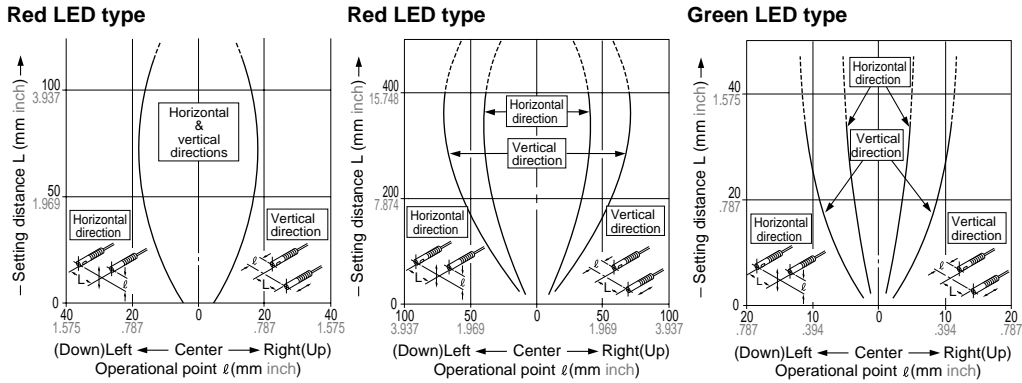
Parallel deviations with UZFXSV1 (Side-view lens) applied on both sides



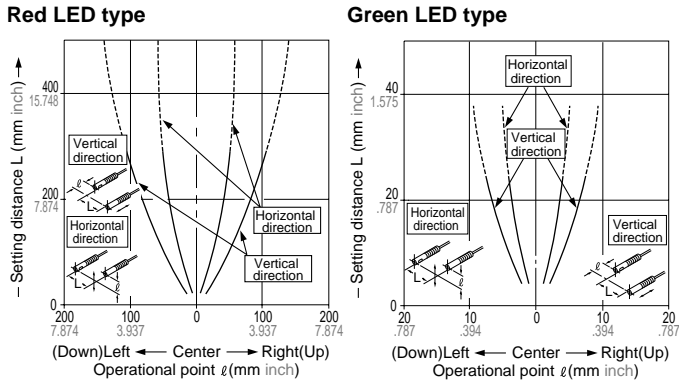
# SENSING FIELDS (TYPICAL)

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

## UZFTC4 Thru-beam UZFTP8 Thru-beam

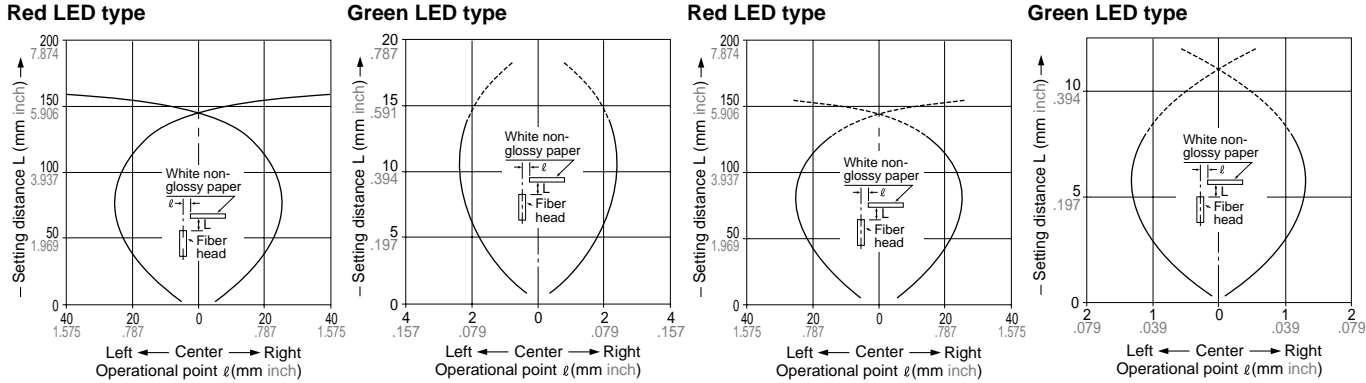


## UZFTH7 Thru-beam UZFTH6 Thru-beam

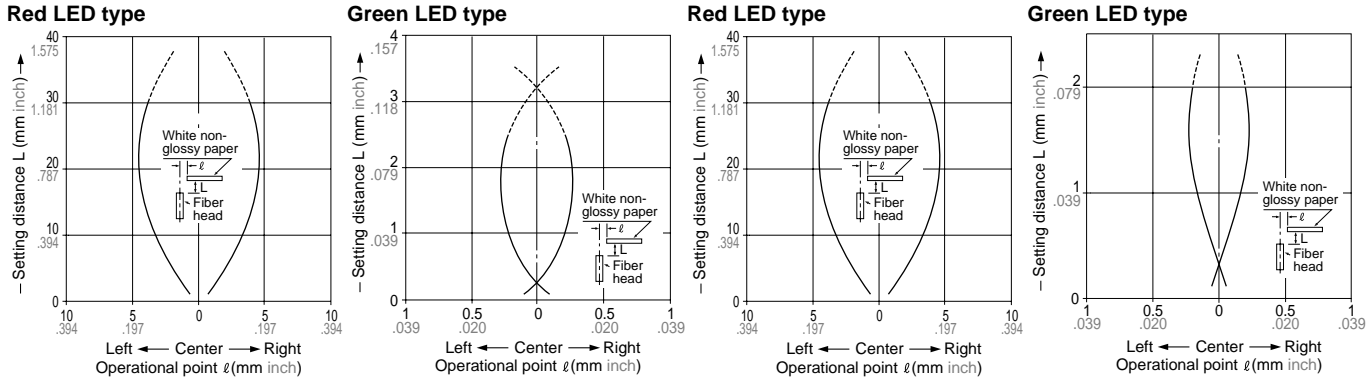


### Sensing fields

## UZFR8B Reflective UZFRF5, UZFRF8, UZFRF89, UZFRF84, UZFRF8, UZFRS8 Reflective



## UZFRF4, UZFRF49, UZFRF44, UZFRS4 Reflective

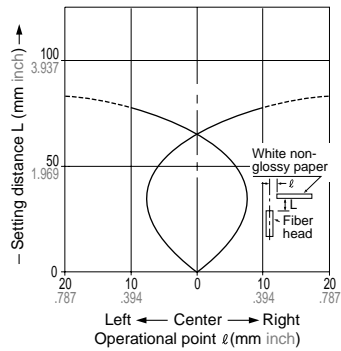


# SENSING FIELDS (TYPICAL)

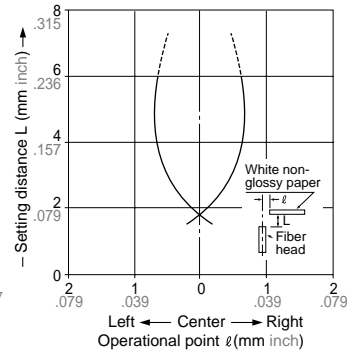
## Sensing fields

**UZFRP8** Reflective

Red LED type

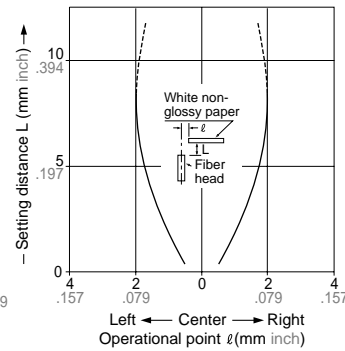


Green LED type



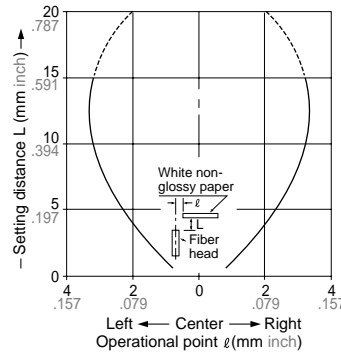
**UZFRP4** Reflective

Red LED type

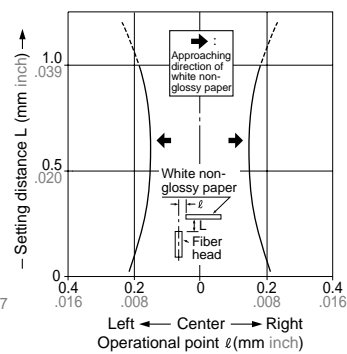


**UZFRP2** Reflective

Red LED type

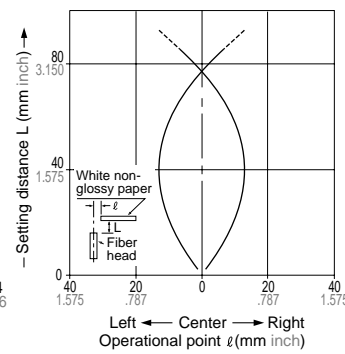


Green LED type

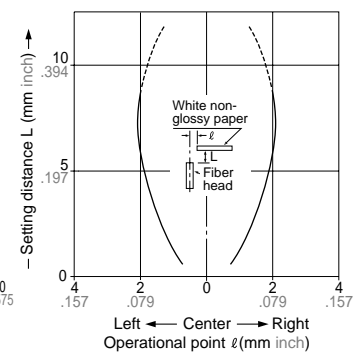


**UZFRH7, UZFRH6** Reflective

Red LED type

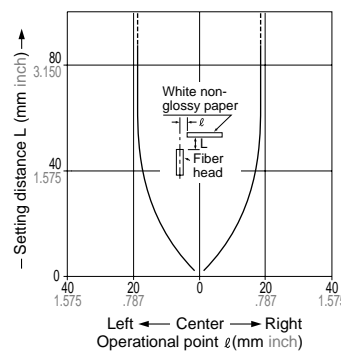


Green LED type

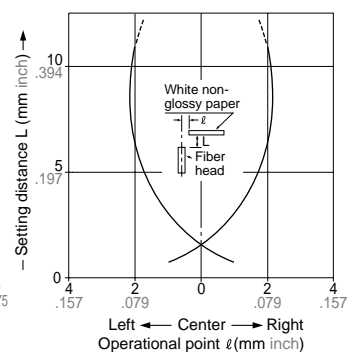


**UZFRH8** Reflective

Red LED type

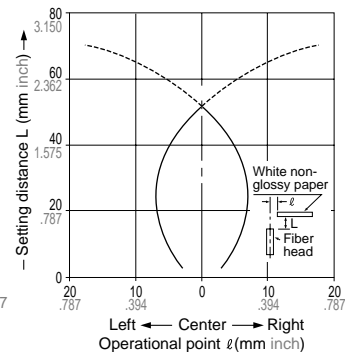


Green LED type



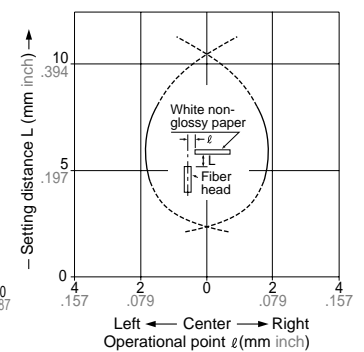
**UZFR6V** Reflective

Red LED type



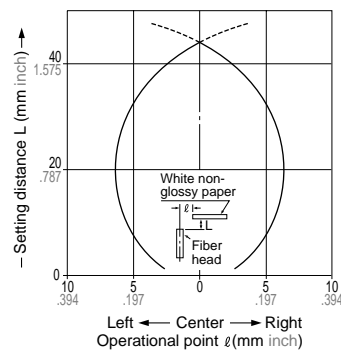
**UZFRL4** Reflective

Red LED type



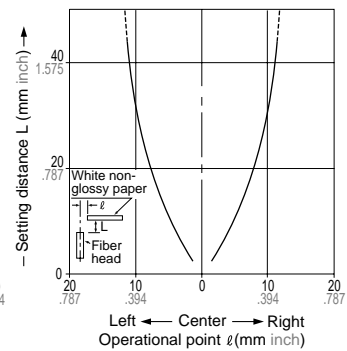
**UZFRG4** Reflective

Red LED type



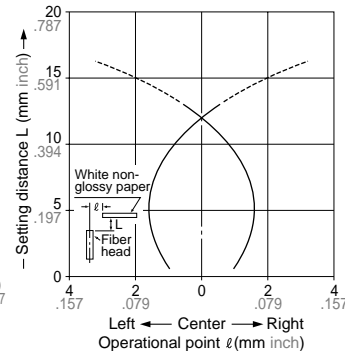
**UZFRG1** Reflective

Red LED type



**UZFREG1** Reflective

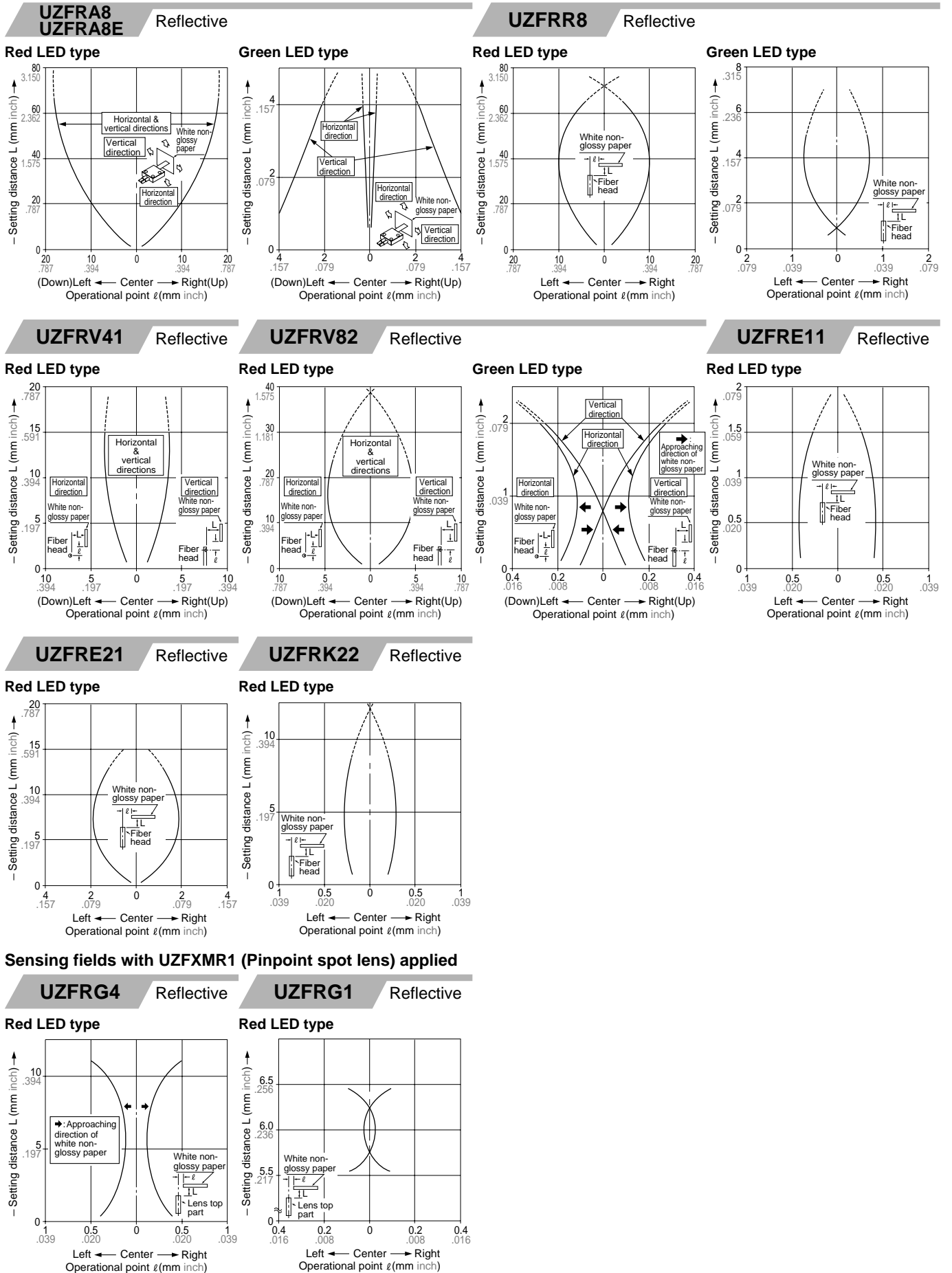
Red LED type





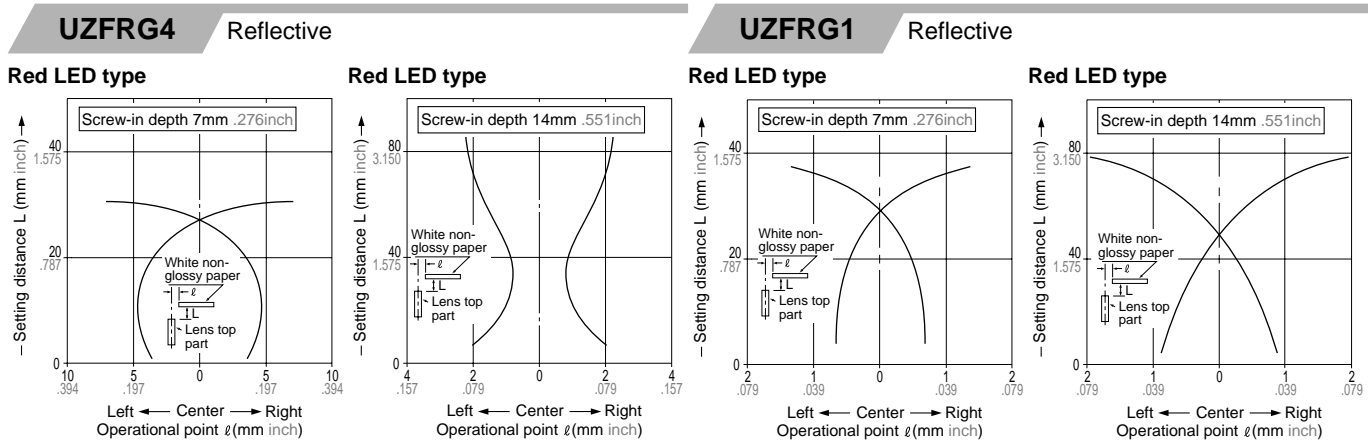
# SENSING FIELDS (TYPICAL)

## Sensing fields

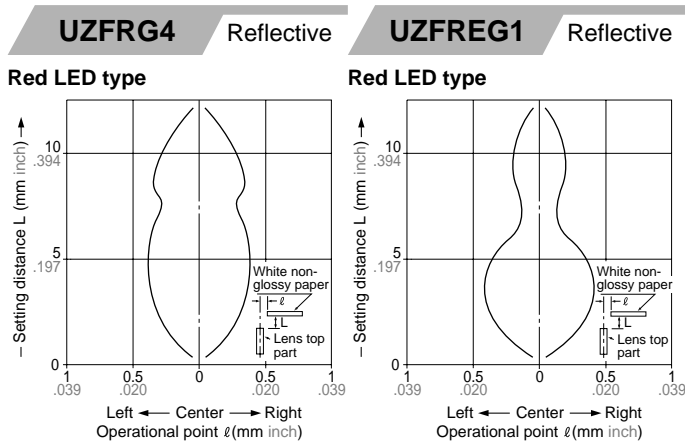


# SENSING FIELDS (TYPICAL)

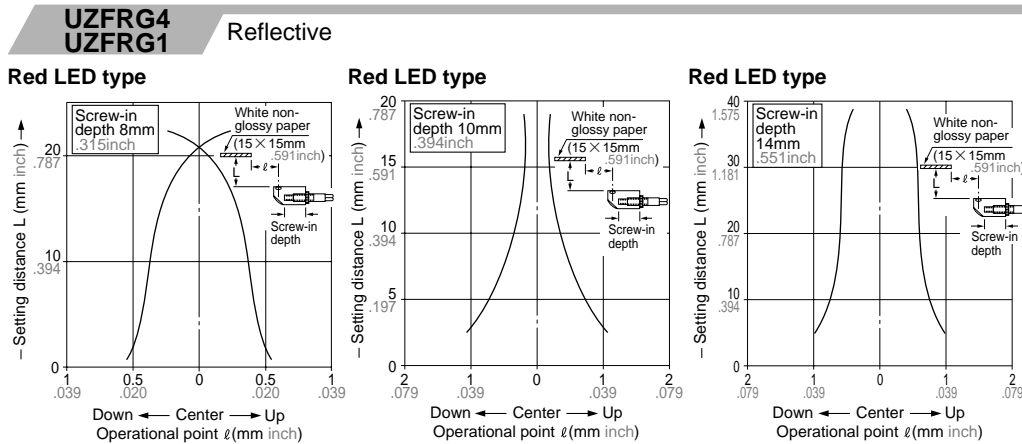
## Sensing fields with UZFXMR2 (Zoom lens) applied



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

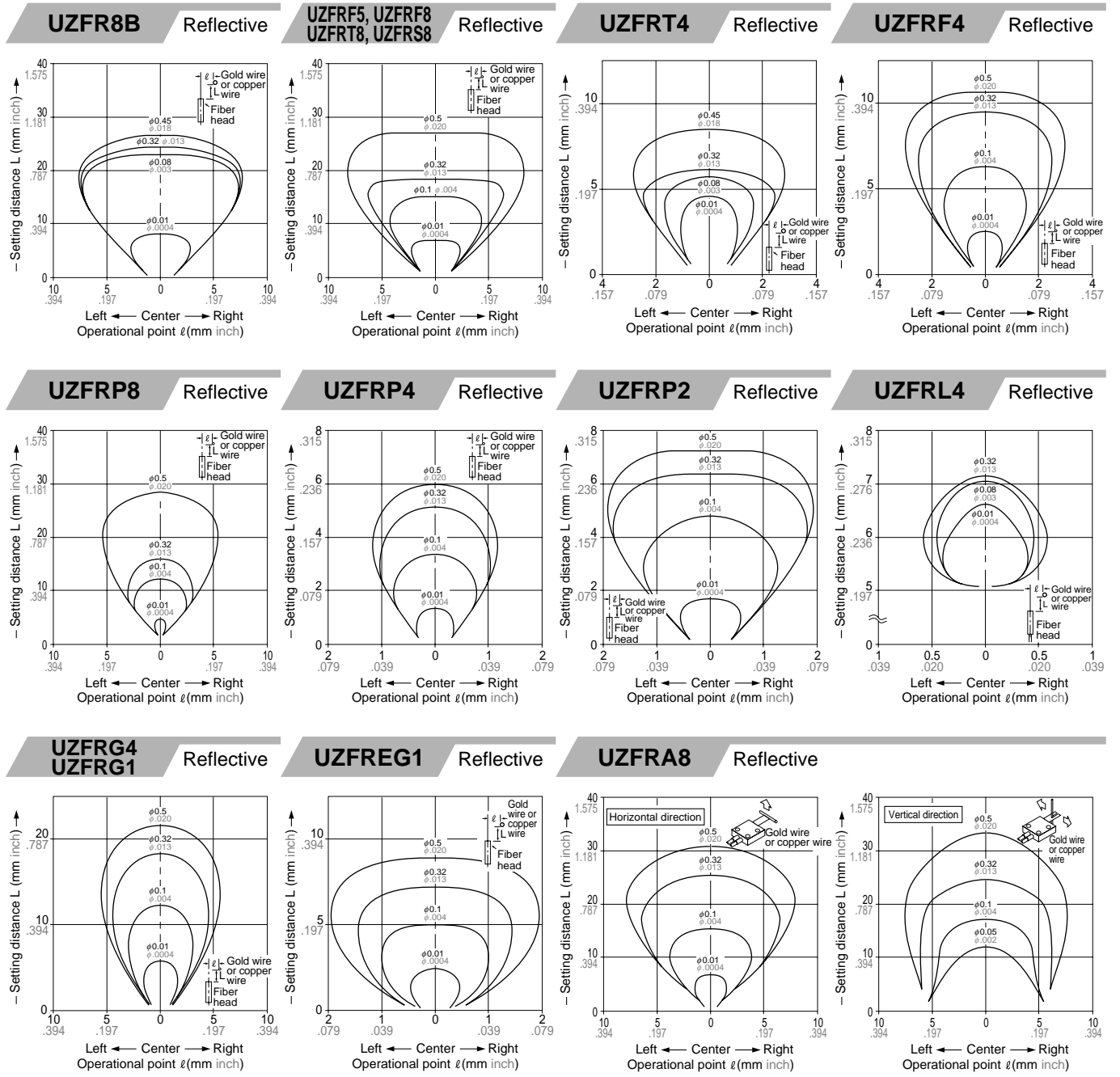


## Sensing fields with UZFXMR5 (Side-view type zoom lens) applied



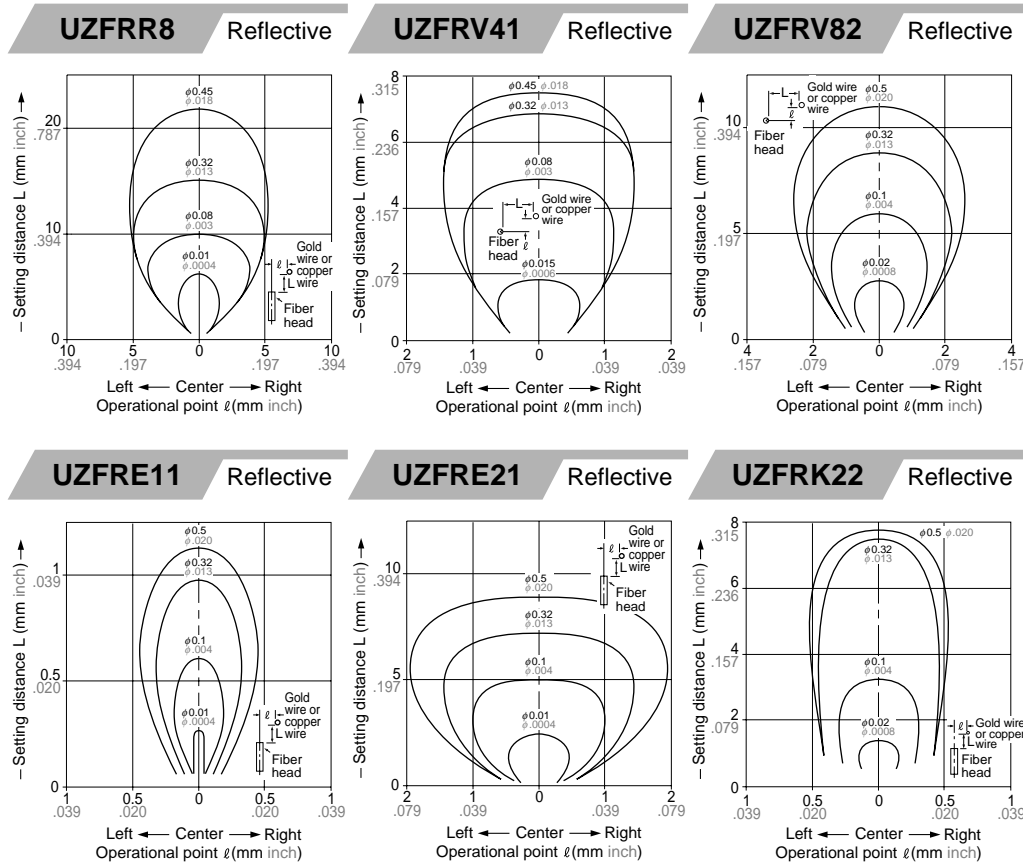
# SENSING FIELDS (TYPICAL)

Correlation between diameter of an object and sensing field (Red LED type)



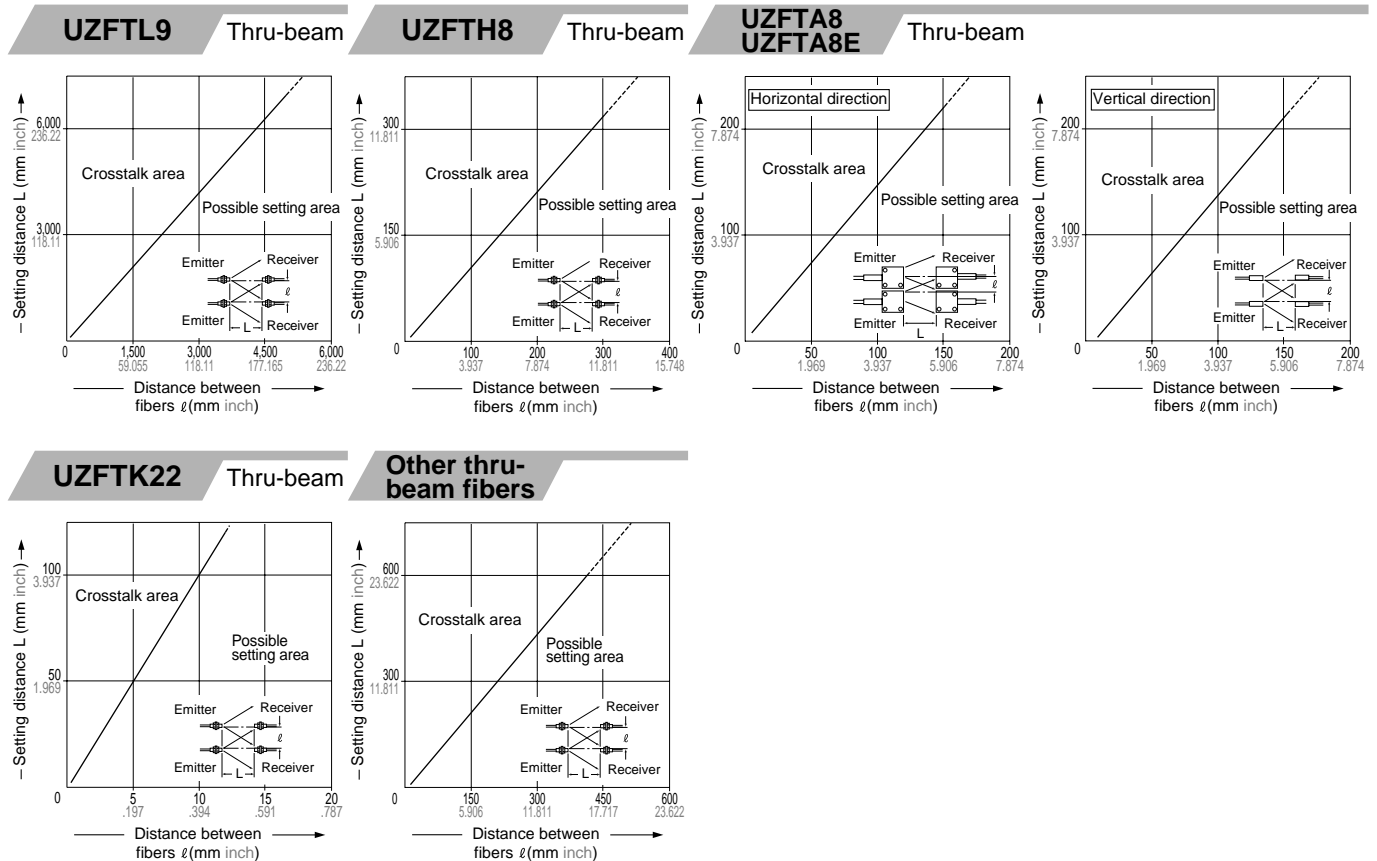
## SENSING FIELDS (TYPICAL)

Correlation between diameter of an object and sensing field (Red LED type)



## Crosstalk characteristics (Red LED type)

- The following graphs are specified that two sensors are set at the same emitting frequency. If they are set at the distinct frequencies, they can be mounted close together.

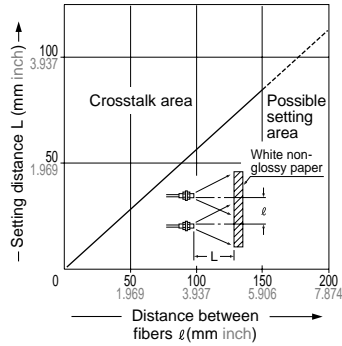


## SENSING FIELDS (TYPICAL)

### Crosstalk characteristics (Red LED type)

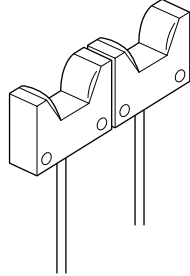
- The following graphs are specified that two sensors are set at the same emitting frequency. If they are set at the distinct frequencies, they can be mounted close together.

#### UZFRH8 Reflective



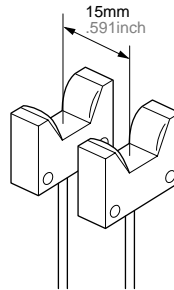
#### Horizontal direction

The fibers can be mounted closely.

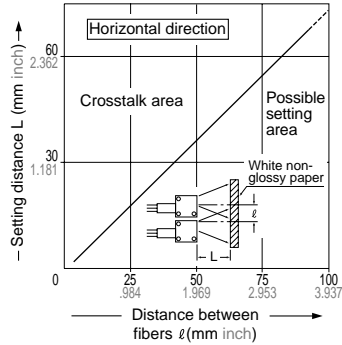


#### Vertical direction

Keep the distance of 15mm .591inch or more. These fibers can be mounted closely.

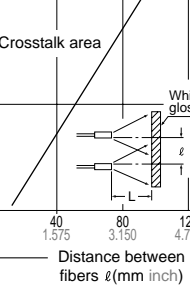


#### UZFRA8 Reflective UZFRA8E

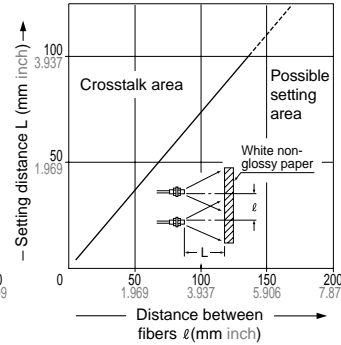


#### Horizontal direction

The fibers can be mounted closely.



#### Other reflective fibers



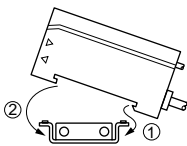
## PRECAUTIONS FOR PROPER USE

### 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.

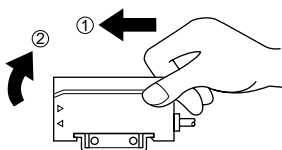
### Mounting



DIN rail or the attached mounting bracket

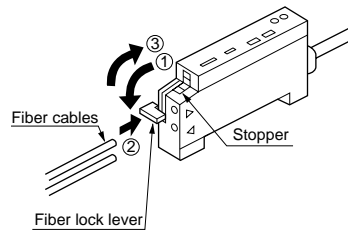
- Hook the rear part to the attached mounting bracket (UZF811) or DIN rail.
- Press the amplifier down on the bracket or DIN rail.

\* To remove the amplifier, push it forward and lift up the front side.



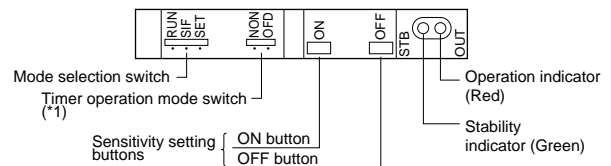
### How to connect fiber cables

- The set of fiber cables is connected at a touch.



- Snap the fiber lock lever down.
- Insert both fiber cables into the inlets slowly until fully deepend.
- Snap the fiber lock lever up until a "click" is heard.

### Designation



(\*1) : The external synchronization selection switch is substituted for it on UZF1301.


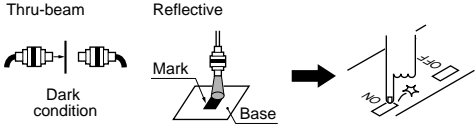

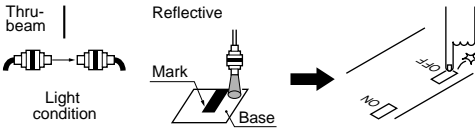

# PRECAUTIONS FOR PROPER USE

## Amplifier

### Sensitivity adjustment

#### • How to use the sensitivity setting buttons

##### Normally ON mode that the sensing output is turned ON with an object

Procedure	Operation
①	Settle the fiber within the sensing range.
②	Set the mode selection switch to "SET". 
③	Press the ON button with an object placed in front of the fiber. 
④	When the sensor accepts it, the stability indicator (green) blinks. 
⑤	Press the OFF button with the object set aside. 
⑥	<ul style="list-style-type: none"> <li>The stability indicator blinks twice when the difference between the ON level and the OFF level is so sufficient as to detect the object securely.</li> <li>The stability indicator blinks continuously if the difference is so diminutive as to detect the object. (*1)</li> </ul>
⑦	Set the mode selection switch to "RUN". Then, the set sensitivity is registered. Even if the buttons are pressed by mistake under the "RUN" mode, the registered sensitivity stays unchanged. 

(\*1) : Regardless of the indication that the detection is marginal, setting of the sensitivity can be perfected, but remember it is severe detection.  
 (\*2) : Your set sensitivity is stored in the EEPROM memory that has the limited lifetime. The sensitivity allows to be reset until 100,000 times.

##### Reverse ON mode that the sensing output is turned ON without an object

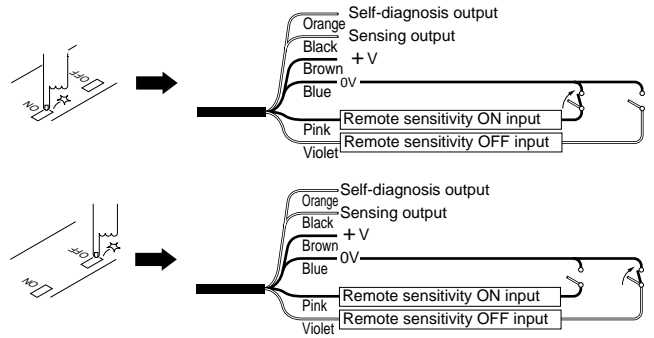
- Follow the same procedure as the above except for; Press the OFF button with an object placed in front of the fiber. Press the ON button with the object set aside.

##### How to obtain the maximum sensitivity

- Set the mode selection switch to "SET".
- For the Light-ON operation mode**  
Press the ON button followed by OFF button under the condition that beam is not received (or make the remote sensitivity ON input into Low as well as the OFF input).
  - For the Dark-ON operation mode**  
Press the OFF button followed by the ON button under the condition that beam is not received (or make the remote sensitivity OFF input into Low as well as the ON input).
- Set the mode selection switch to "RUN".  
 <Applications>
  - To obtain the longest sensing range with the reflective fiber.
  - To use the thru-beam fiber in a harsh environment.

#### • Remote sensitivity adjustment (Remote sensitivity adjustment type only)

The sensitivity adjustment using the remote sensitivity adjustment inputs takes the same procedure as the adjustment using the ON and the OFF buttons. Making the ON and the OFF inputs into Low substitutes for pressing the ON and the OFF buttons respectively.  
 (\*1) : This function is operable also in RUN mode.



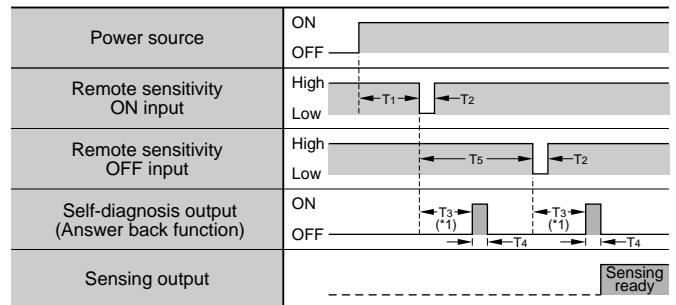
##### Signal condition

State	Signal condition
High	4.5 to 30V or Open
Low	0 to 1V

Input impedance: 10kΩ

- The self-diagnosis output stays ON for approx. 40ms after the ON input or the OFF input is recognized by the sensor. (Refer to "• Time chart".)  
 (If the difference between the ON level and the OFF level) is so small as to detect an object, it is not turned ON.)

##### • Time chart



$T_1 \geq 1,000\text{ms}$ ,  $T_2 \geq 5\text{ms}$ ,  $T_3 \approx 310\text{ms}$ ,  $T_4 \approx 40\text{ms}$ ,  $T_5 \geq 500\text{ms}$   
 (\*1) : Do not change the incident beam intensity during the  $T_3$ .

##### Stability margin indication function

- After your setting sensitivity, the **UZF1 series** amplifier reveals the margin of the stability. Slide the mode selection switch from "SET" to "SIF" or "RUN", and the stability indicator (green) blinks. The number of blinking represents the margin of the stability.

Number of blinks	0	1	2	3	4	5
Margin (%) (Margin near by threshold level)	Under 15	15 to 30	30 to 45	45 to 60	60 to 75	75 or more

The larger margin stability affirms the more secure detection.

# PRECAUTIONS FOR PROPER USE

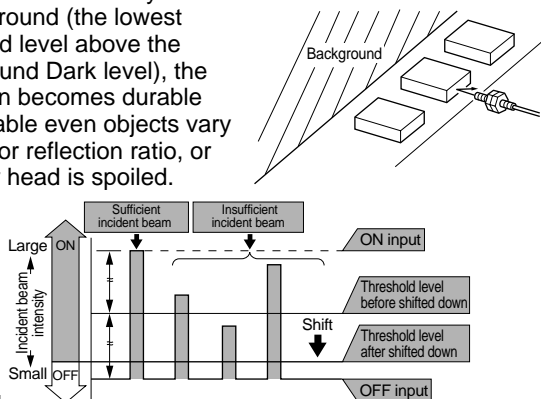
## Amplifier

### Sensitivity shift function

- If either one of the Light state or the Dark state is stationary, and the other is unsteady, the sensitivity shift function is useful to make your sensing secure by shifting the threshold level to the stationary side. For example, to obtain the maximum sensitivity less than the background level in reflective mode, or minimum sensitivity more than the complete Dark level not to be affected by dirt or dust in thru-beam mode.

### Reflective sensing with background

- Because the sensitivity is set at the maximum not to detect a background (the lowest threshold level above the background Dark level), the detection becomes durable and reliable even objects vary in color or reflection ratio, or the fiber head is spoiled.



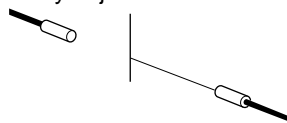
### Setting

Procedure	Operation
①	Set the sensitivity according to the general method described on the front page.
②	Set the mode selection switch to "SIF".
③	Press the sensitivity setting button that has been pressed under the Dark condition there is no object, but only a background. (With the above example, press the OFF button.)
④	Set the mode selection switch to "RUN". (The sensitivity shift function is perfected.)

(\*1) : The sensitivity shift function can not be effected by the remote sensitivity adjustment inputs on the **UZF1301**.

### Limit sensitivity to detect minute object in thru-beam mode

- It is useful to detect a tiny object like a fine thread with the thru-beam fiber. Any object is not needed to set the sensitivity.



### Setting

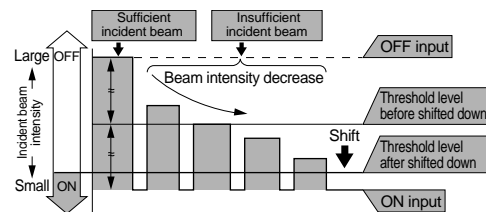
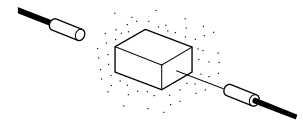
Procedure	Operation
①	Set the mode selection switch to "SET".
②	Press the OFF button (or the ON button) in the complete Light state. (There is no object between fiber heads.)
③	Press the ON button (or the OFF button) in the complete Dark state. (Shield the light-receiving part not to receive the beam.)
④	Set the mode selection switch to "SIF".
⑤	Press the button again that has been pressed in the Light state.
⑥	Set the mode selection switch to "RUN".

(\*1) : If your object can not be detected by the above sensitivity setting, try the general sensitivity setting with using the object or replace the set of the fiber cables with the small diameter fiber.

(\*2) : The sensitivity shift function can not be effected by the remote sensitivity adjustment inputs on the **UZF1301**.

### Thru-beam sensing in harsh environment

- Because the sensitivity is set at the maximum not to be affected by dirt or dust (the lowest threshold level above the Dark level), the detection becomes durable and reliable over the beam intensity comes down by dirt or dust.



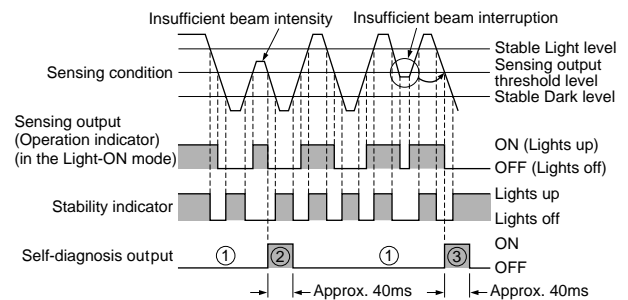
### Setting

Procedure	Operation
①	Set the sensitivity according to the general method described on the front page.
②	Set the mode selection switch to "SIF".
③	Press the sensitivity setting button that has been pressed under the Dark condition there is an object between the fiber heads. (With the above example, press the ON button.)
④	Set the mode selection switch to "RUN". (The sensitivity shift function is perfected.)

(\*1) : The sensitivity shift function can not be effected by the remote sensitivity adjustment inputs on the **UZF1301**.

### 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.


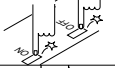




# PRECAUTIONS FOR PROPER USE

## Amplifier

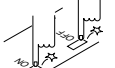
### Crosstalk prevention function

- Every **UZF1 series** amplifier is incorporated with the crosstalk prevention. Two sensors operating with the distinct frequencies occur no mutual-interference. Their fiber heads can be mounted close together or face to face.

### Setting

Procedure	Operation
①	Set the mode selection switch to "SET". 
②	Press both the "ON" and the "OFF" buttons simultaneously for 2 sec. or more. [The stability indicator (green) blinks.] 
③	Press the "ON" button. (The stability indicator blinks twice.) [Response time : 0.5ms or less (*1)] 
④	Set the mode selection switch to "RUN". (The first ends) 
⑤	Do the step ① and ② on the other sensor.
⑥	Press the "OFF" button. (The stability indicator blinks twice.) [Response time : 0.7ms or less (*1)] 
⑦	Set the mode selection switch to "RUN". (The second ends) 

### Cancel

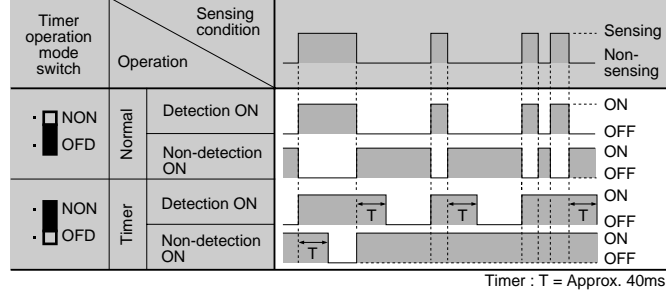
Procedure	Operation
①	Press both the "ON" and the "OFF" buttons simultaneously for the 2 sec. or more. [The stability indicator (green) blinks.] 
②	Press both the "ON" and the "OFF" buttons again. (The stability indicator blinks twice, then canceled.)

(\*1) : The crosstalk prevention function enlarges the hysteresis and prolongs the response time. After it is set, the operability must be checked.

### OFF-delay timer function

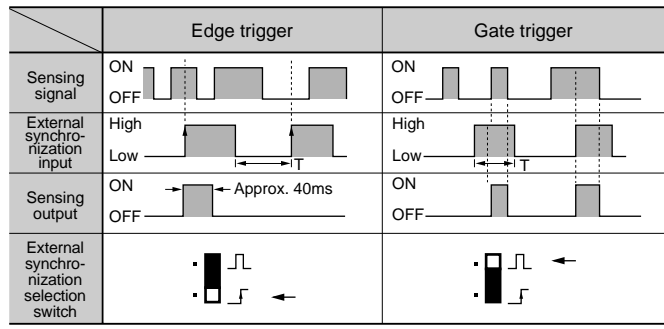
- Every amplifier in the series except for the **UZF1211** is incorporated with the OFF-delay timer fixed for approx. 40ms. The timer function is useful if the output signal responds so quickly that a connected device can not take in. To bring the timer in effect, set the timer operation mode switch to "OFD".

### <Time chart>



### External synchronization function (UZF1211)

- The external synchronization function controls the timing to sense. The edge trigger or the gate trigger is available.

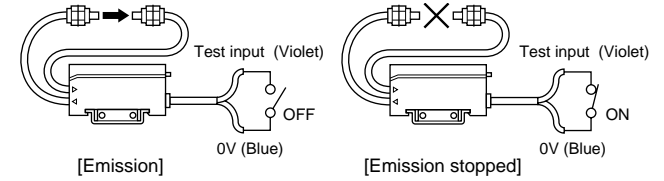


T ≧ 0.5ms (T ≧ 0.7ms when the crosstalk prevention function is used)

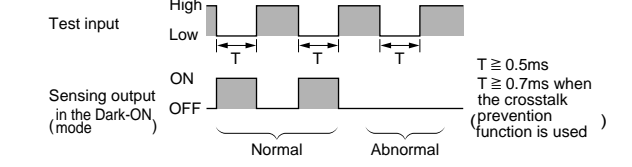
- (\*1) : To disable external synchronization, set the external synchronization selection switch to "Gate trigger" side and open the external synchronization input (from 0V).

### Test input (UZF1211 only)

- When the test input is short-circuited to 0V (Low), the beam emission is halted. This function is useful for your start-up test of the sensor operability with no object existing.



- Close and open the input to 0V repeatedly. If the sensing output responds it, the sensor is well operable. If not, the sensor is in an ill condition.



### Wiring

- The **UZF1 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

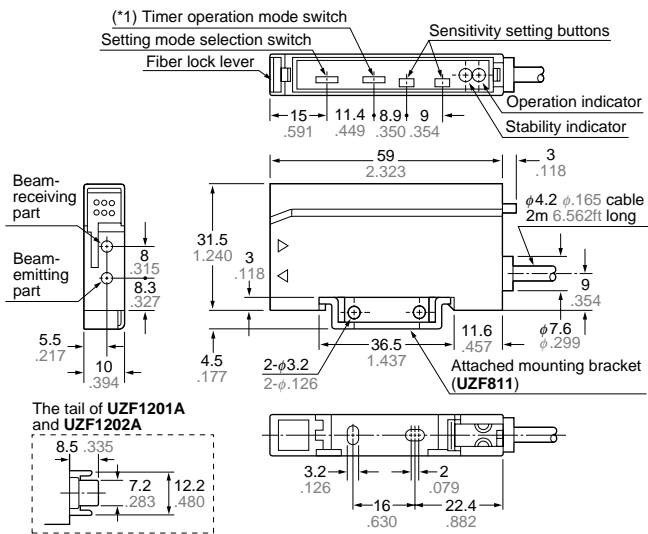
- The transient time duration is 0.5sec. after power-up.



## DIMENSIONS (Unit : mm inch)

### UZF1 Amplifier

#### Assembled dimensions with attached mounting bracket



(\*1) : It is substituted with the external synchronization selection switch on UZF1301.

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

