



# Ultra-small diameter fiber

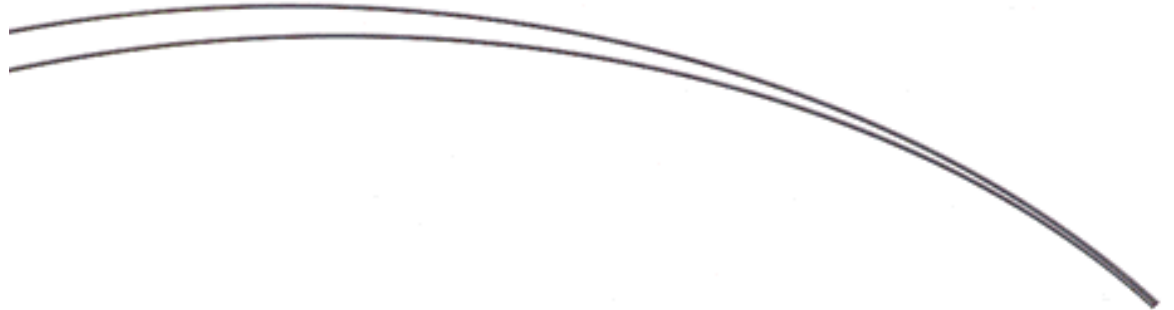
Thru-beam type

# FT-E

Reflective type

# FD-E

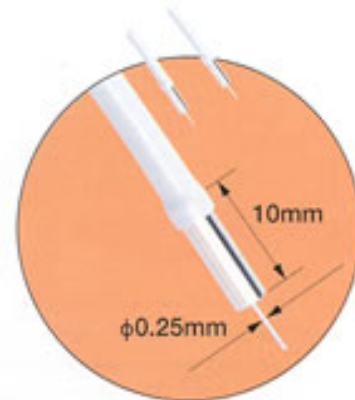
Smallest in the industry  
Sleeve head diameter of 0.25 mm!!



Thru-beam type FT-E12, FT-E22

The sleeve head diameter has been made smaller compared with our previous models (FT-E10: 0.4mm and FT-E20: 0.5mm) producing an ultra-small diameter size of 0.25mm (FT-E12), the smallest in the industry. This has improved the sensing capability for minute workpieces such as the 0603 chip.

# 0.25



**Thru-beam type ultra-small diameter fiber FT-E12, FT-E22**  
(The picture above shows FT-E12.)

Thru-beam type FT-E12, FT-E22

The mounting sleeve length has been made shorter (10mm) compared with our previous models (FT-E10: 15mm, FT-E20: 15mm). A compact mounting is available to work with advanced miniaturized equipment.

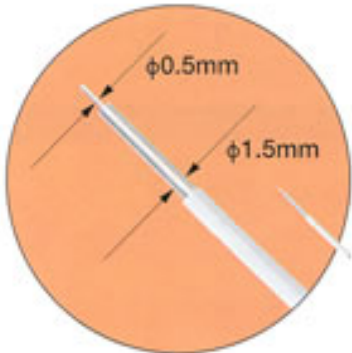
10

Reflective type FD-E12, FD-E22

Unlike the previous models, FD-EN500S1 and FDENM1S1 (both M3 threaded types), the 3 mm sleeve types have been lined up. These current models feature the ability to adjust mounting positions (FD-E22).

3

Applications

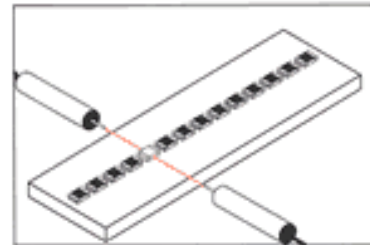


Reflective type ultra-small diameter fiber FD-E12, FD-E22 (The photograph shows FD-E12.)

Thru-beam type FT-E12, FT-E22

Sensing passage of minute workpieces such as chips, etc.

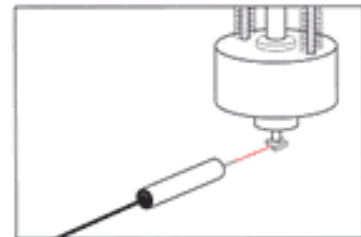
A sensing range as long as 40mm (FT-E22) is possible with an ultra-small diameter sleeve of 0.4mm.



Reflective type FD-E12, FD-E22

Confirmation of suction of minute workpieces such as chips, etc.

A sensing range of 20mm (FD-E22) is possible with an ultra-small diameter sleeve of 0.65mm.



# Ultra-small diameter fiber Thru-beam type **FT-E□** Reflective type **FD-E□**

## SPECIFICATIONS

Item	Type	Thru-beam type		Reflective type	
	Model No.	FT-E12	FT-E22	FD-E12	FD-E22
Applicable amplifiers		Red LED type of FX-D1/A1/M1 series (Note 1)			
Sleeve head		$\phi 0.25_{-0.06}^0$ mm	$\phi 0.4_{-0.06}^0$ mm	$\phi 0.5_{-0.04}^0$ mm	$\phi 0.65_{-0.04}^0$ mm
Sensing range		8.0mm	40.0mm	5.0mm (Note 2)	20.0mm (Note 2)
Repeatability		Perpendicular to sensing axis: 0.01mm or less		Along sensing axis: 0.03mm or less Perpendicular to sensing axis: 0.01mm or less	Along sensing axis: 0.05mm or less Perpendicular to sensing axis: 0.01mm or less
Allowable bending radius		R5mm or more (excepting sleeve part)		R10mm or more (excepting sleeve part)	R25mm or more (excepting sleeve part)
Fiber length		0.5m	1m	1m	1m
Ambient temperature		-40 to +70°C (No dew condensation or icing allowed), Storage: -40 to +70°C For FD-E12 only -40 to +60°C (No dew condensation or icing allowed), Storage: -40 to +60°C			
Ambient humidity		35 to 85% RH, Storage: 35 to 85% RH			
Material	Fiber core	Acrylic			
	Sheath	Polyolefin			
	Fiber head	Sleeve: Stainless steel (SUS304), Head fitting: Brass (Nickel plated)			
	Amplifier insertion plug part	Polyamide			
Weight		2g approx.	3g approx.	2g approx.	3g approx.

**Notes:**

- 1) Refer to the general catalog or FX series catalog for the details of the applicable amplifier.
- 2) The sensing range for the reflective type fiber is specified for white, non-glossy paper (100 X 100mm) as the object.

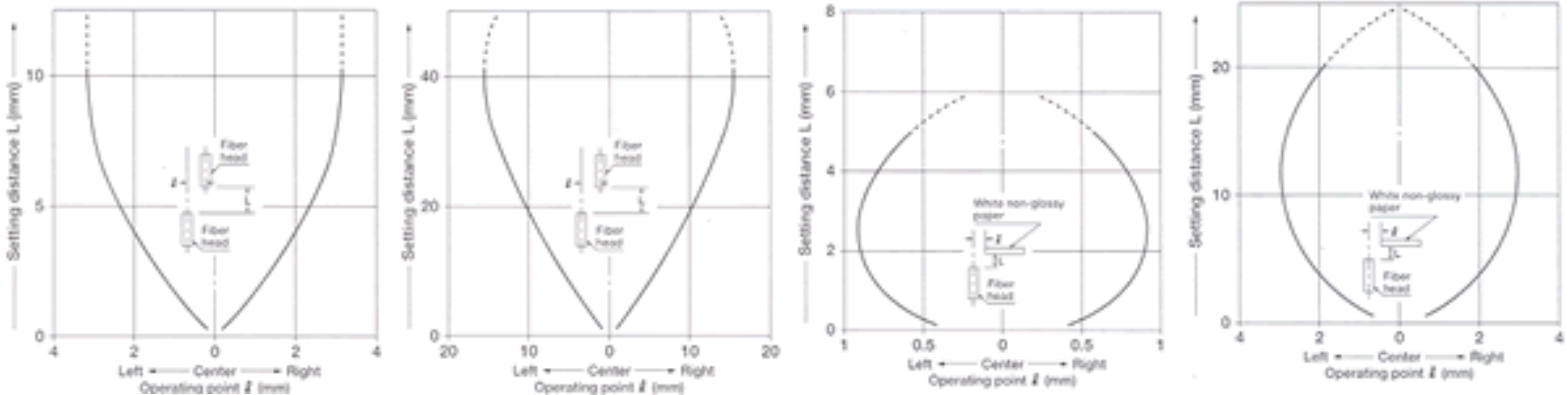
## SENSING CHARACTERISTICS (TYPICAL)

FT-E12 Thru-beam type

FT-E22 Thru-beam type

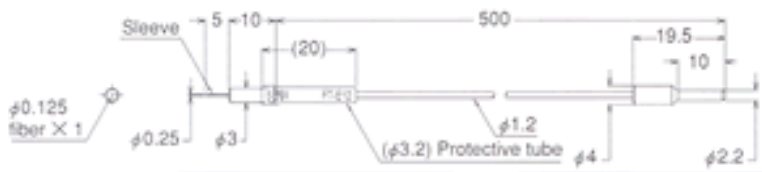
FD-E12 Reflective type

FD-E22 Reflective type

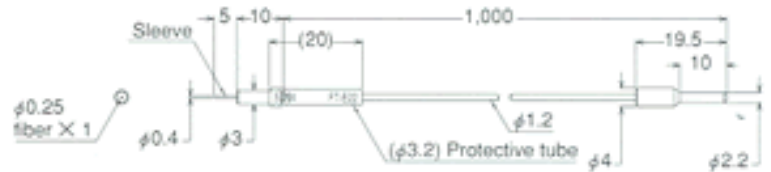


## DIMENSIONS (Unit: mm)

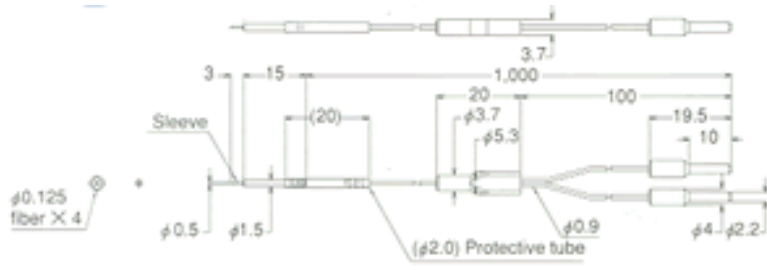
FT-E12 Thru-beam type



FT-E22 Thru Beam Type



### FD-E12 Reflective type



### FD-E22 Reflective type

