Photoelectric Sensors

Auto-tuning Fiber Optic Photoelectric Control with Remote-Tuning Feature and Fiber-Optic Cables

HPX-T Series

FEATURES

- Built in auto-tuning
- Digital display indicates adjustment steps, results, and scanning conditions
- Three sensitivity settings can be selected: Contrast, Positioning, High Power
- Mutual interference protection to minimize sensor cross talk
- OFF delay can be set
- Low profile (10mm); attachable on DIN rail at a single touch
- Ease of installation with single-touch, snap action lever
- Furnished cable adapter allows ease of use with small diameter cables
- Remote tuning
- Various fiber/optic cables/ lenses/tips
- Non-volatile memory

TYPICAL INDUSTRIES

- Electronics assembly
- Semiconductor equipment
- Packaging OEMs

TYPICAL APPLICATIONS

- Detecting presence or absence of IC chips
- Detecting a dot mark on a wafer
- Detecting the markings on packaging film
- Detecting thin parts

MODES OF OPERATION

Dark Operate (D.O.): the output (load) is energized when the light beam is not detected by the receiver.

Light Operate (L.O.): the output (load) is energized when the light beam is detected by the receiver.

The HPX-T Series, an exciting addition to our HPX product family, offers you the following quick and simple auto-tuning capabilities:

- Contrast setting
  Detects the difference in reflectivity between two targets
- Positioning setting
  Detects the edge or position of a target

No time consuming adjustment is required to set up the sensor – the microprocessor does the work. The sensor features a seven segment LED which displays light and margin levels, as well as diagnostic error indication.

These sensors automatically shift their LED pulse phase to minimize interference between as many as three closely mounted units. HPX Sensors use synchronous detection – when the LED is pulsed, the receiver is activated.

Before the output is switched, there are between four and six pulses required for detection. The pulse interval remains T=1 when light is received. After the first two LED pulses are blocked, the pulse interval is changed to T=3/4 every fourth pulse. This action is repeated. Again, when light is received while in the dark condition, the pulse interval is changed again every third and fourth pulse to T=5/4.

Sensors are susceptible to crosstalk from adjacent sensors when light is blocked. (One unit's synchronous phase could be the same as another.) However, automatic phase shifting makes it impossible for three sensors in the same area to interfere with each other.

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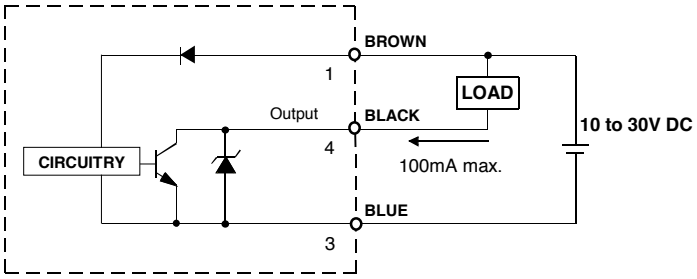
SPECIFICATIONS		Auto-Tuning		Remote Auto-Tuning	
		Pre-leaded	**Connector**	**Pre-leaded**	**Pre-leaded**
Catalog Listing	NPN	HPX-T1-H	HPX-T1-HC	HPX-T3-H	HPX-TV3-H
	PNP	HPX-T2-H	HPX-T2-HC	HPX-T4-H	HPX-TV4-H
Scanning Distance	Thru	290 mm (11.4 in) w/HPF-T003-H (Note 1)			20mm with HPF-T003-H
	Diffuse	110 mm (4.3 in) w/HPF-D002-H (Note 1)			7mm with HPF-D002-H
Supply Voltage		10 - 30 VDC (10% Ripple max.)			
Current Consumption		50 mA max.			
Output Mode, NPN or PNP		L.O./D.O. selectable			
Load Current		100 mA max. resistive			
Saturation Voltage		1 VDC max.			
Short Circuit Protection		30 VDC max.			
Response Time		500 μs max.			
Off Delay		40 ms ± 10% selectable			
Light Source		Red LED			Green LED
Ambient Light Resistance		Incandescent: 5000 Lux Sun Light: 20,000 Lux			
Operating Temperature Range		-20 to +55°C (-4 to +131°F), (Note 2)			
Humidity		35 to 85% RH (w/o condensation)			
Sealing		IP 40 (IEC Standard)			

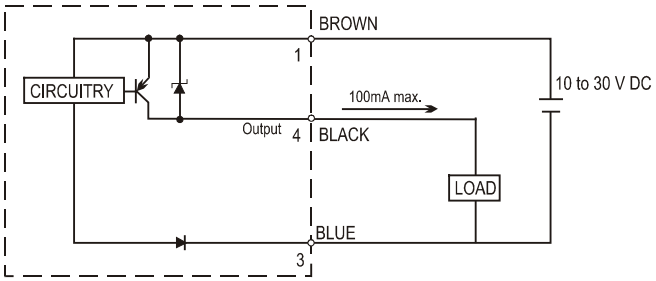
Note 1: Improper connection or termination can decrease scan distance up to 20%.
Note 2: Gang mounted sensors: derate supply voltage to 26.4 VDC. Operating temperature must not exceed 45°C.

OUTPUT CIRCUITS

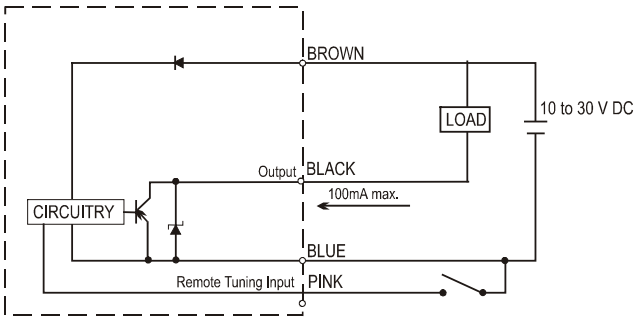
HPX-T1-H/-HC



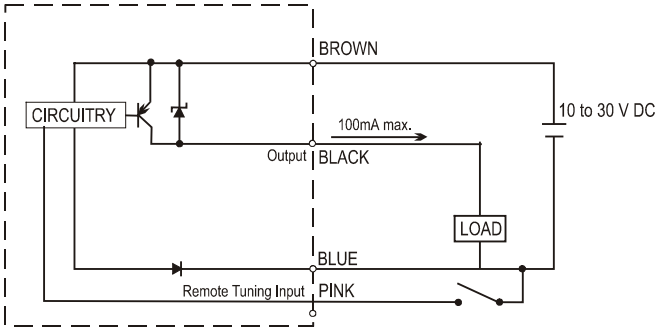
HPX-T2-H/HC



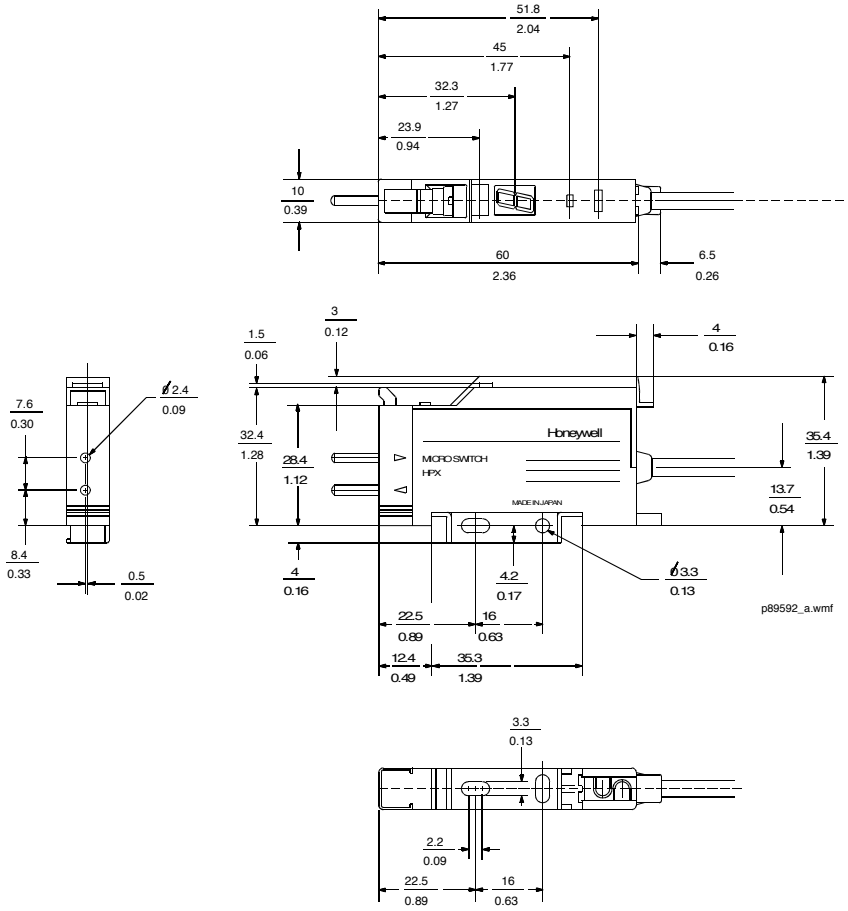
HPX-T3, HPX-TV3



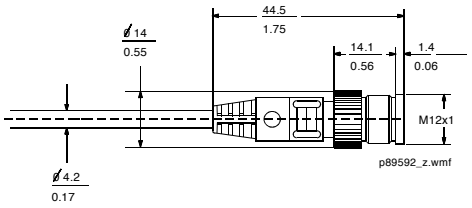
HPX-T4-H, HPX-TV4-H



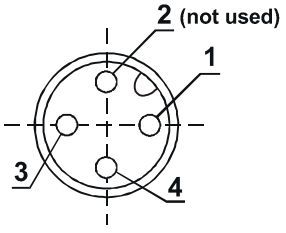
MOUNTING DIMENSIONS mm/in (for reference only)



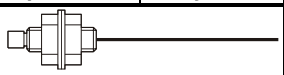
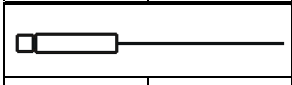
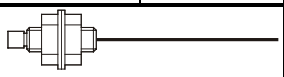
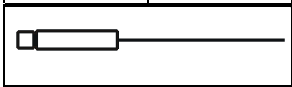
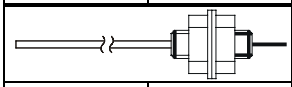
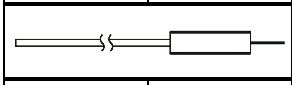
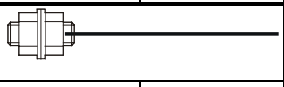
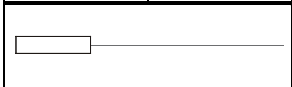
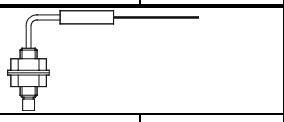
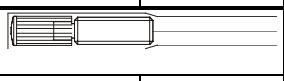
QUICK CONNECTOR DIMENSIONS



CONNECTOR PINOUT



THRU-SCAN FIBER OPTIC CABLE

Type	Shape		Core	Bending radius mm	Scanning distance (mm/in) HPX-T / HPX-TV	with lens	Features	Model No.
	Tips mm	Body mm	mm	Note 1				
Long Distance				20	540(21.26) 40(1.57)	n/a	Long scanning distance without lens	HPF-T001-H
	M2.6 thread	M4 thread	dia 1.4					
				20	540(21.26) 40(1.57)	n/a	Long scanning distance without lens	HPF-T002-H
	M2.6 thread	dia 3	dia 1.4					
				25	2000(78.74)	n/a	Ultra long distance without lens	FEF-PLT1-L2
		M8 thread	dia 6.35					
Standard				20	290(11.42) 20(0.79)	1740 (68.50)	Standard, for most applications	HPF-T003-H
	M2.6 thread	M4 thread	dia 1					
				20	290(11.42) 20(0.79)	1740 (68.5)	Standard, for most applications	HPF-T004-H
	M2.6 thread	dia 3	dia 1					
				20	290(11.42) 20(0.79)	n/a	Sleeve, for narrow space	HPF-T005-H
	dia 1.2,65mm	M4 thread	dia 1					
				20	290(11.42) 20(0.79)	n/a	Sleeve, for narrow space	HPF-T006-H
	dia 1.2,65mm	dia 3mm	dia 1					
Small Side View			n/a	15	40(1.57) 2(0.08)	n/a	Side view, for small object detection, for narrow installation space	HPF-T007-H
	dia 1, 15mm	dia 2.5						
Elastic				4	45(1.77) 3(0.12)	n/a	Elastic, for at a moving part	HPF-T008-H
		M3 thread	dia 0.25 *4					
				4	45(1.77) 3(0.12)	n/a	Elastic, for at a moving part	HPF-T009-H
		dia 1.5	dia 0.25*4					
Elbow				25	210(8.27) 14(0.55)	1260 (49.6)	Elbow, R5 90°, for narrow space	HPF-T010-H
	M2.6 thread	M4 thread	dia 1					
Chemical Proof			n/a	80	1000(39.37) 75(2.95)	n/a	Fluorine Fiber, Chemical Proof, built-in lens, for chemical atmosphere	HPF-T013-H
	dia 5	dia 4						

Note 1: Bending radius is the radius which will maintain 100% of sensing range

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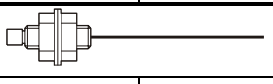
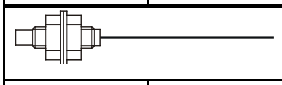
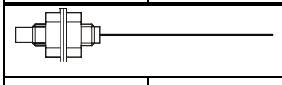
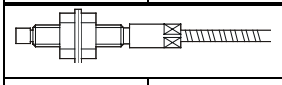
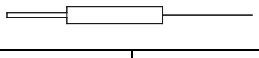
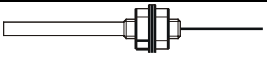
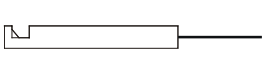
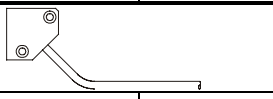
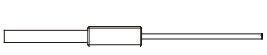
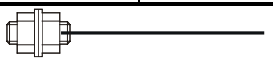
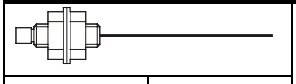
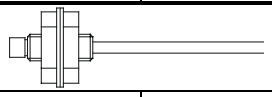
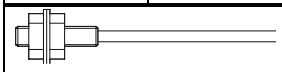
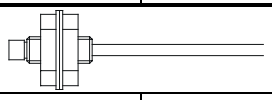
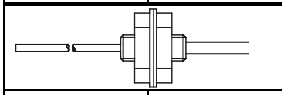
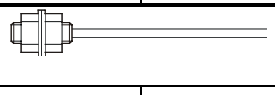
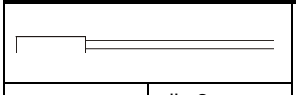
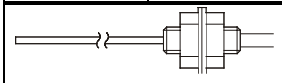
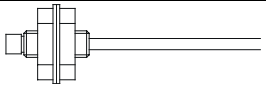
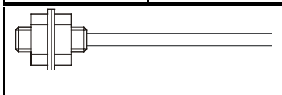
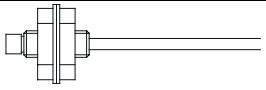
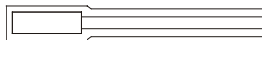
HPX-T Series

THRU SCAN FIBER OPTIC CABLE

Type	Shape		Core	Bending radius mm	Scanning distance (mm/in) HPX-T	with	Features	Model No.
	Tips mm	Body mm	mm	Note 1	HPX-TV	lens		
High Temp				25	170(6.69) 10(0.39)	680 (26.77)	Heat resistance 105°C	HPF-T012-H
	M2.6 thread	M4 thread	dia 1					
				35	290(11.42) 20(0.79)	n/a	Heat resistance 105°C short term 180°C	HPF-T017-H (new)
	dia 2.85mm	M4 thread	dia 1.5					
				15	150(5.9) 10(0.39)	640 (25.20)	Heat resistance 200°C, not cuttable	HPF-T018-H
	M2.6 thread	M4 thread	dia 1					
				50	160(6.30) 10(0.39)	n/a	Heat resistance -40° to 307°C, glass, not cuttable	HPF-T052 (1m) /T053 (0.5) /T054 (2m) -H
	M2.6 thread	M4 thread	dia 1					
Sleeve				4	9(.35)	n/a	Sleeve, for small object detection	HPF-T015-H (new)
	dia 0.5, 5mm	dia 3	dia 0.25					
Narrow Beam				30	1000(39.37) 70(2.76)	n/a	Parallel light, around 2°, top view, eliminates the influence of reflections from the periphery	HPF-T019-H
	dia 2.8, 17mm	M4 thread	dia 1					
Side View				30	1100(43.41) 80(3.15)	n/a	Parallel light, side view, eliminates the influence of reflections from the periphery	HPF-T020-H
	dia 4	dia 4	dia 1					
Array				25	190(7.48) 10(0.39)	n/a	Array fiber, 15mm (0.59) band, for zone detection (i.e. unstable position)	HPF-T021-H
	Array		dia 0.25*16					
Vane	Elbow Assembly	Block		n/a	10.7(.42)	n/a	Elbow, block assembly, for narrow space	HPF-T022-H
	n/a	n/a	dia 1					
Narrow beam				15	870(34.25) 60(2.36)	n/a	Ultra narrow beam, around 1° light angle, eliminates the influence	HPF-T023-H (new)
	dia 2.5	M4 thread	Lens 1.7					
Small bending				1	35(1.38)	n/a	Small bending R1, for narrow space installation	HPF-T024-H (new)
		M3 thread	dia 0.5					
				2	220(8.66)	1320 (51.97)	Small bending R2, for narrow space installation	HPF-T025-H (new)
	M2.6 thread	M4 thread	dia 1					

Note 1: Bending radius is the radius which will maintain 100% of sensing range

DIFFUSE SCAN FIBER OPTIC CABLE

Type	Shape		Core	Bending radius mm	Scan dist. (mm/in) HPX-T	Features	Model No.
	Tips mm	Body mm	mm	Note 1	HPX-TV		
Long Distance				20	150(5.91) 10(0.39)	Long scanning distance without lens	HPF-D001-H
	dia 4	M6 thread	dia 1.4*2				
				20	55(2.17) 3(0.12)	Long scanning range as small fiber tip	HPF-D018-H
	M4 thread	M4 thread	dia 0.75*2				
Standard				20	110(4.33) 7(0.28)	Standard, for most applications	HPF-D002-H
	dia 4	M6 thread	dia 1*2				
				20	110(4.33) 7(0.28)	Sleeve, for narrow space	HPF-D003-H
	dia 2.5,65mm	M6 thread	dia 1*2				
Small Dia.				15	30(1.18) 2(0.08)	Standard, for most applications	HPF-D004-H
		M3 thread	dia 0.5*2				
				15	30(1.18) 2(0.08)	Standard, for most applications	HPF-D005-H
		dia 3	dia 0.5*2				
				15	30(1.18) 2(0.08)	Sleeve, for narrow space	HPF-D006-H
	dia 1.2,65mm	M3 thread	dia 0.5*2				
Coaxial				25	110(4.422) 7(0.28)	Coaxial, for positioning	HPF-D009-H
		M6 thread	E-dia 1, R-0.25*16				
				15	25(0.98) 2(0.08)	Coaxial, for small object detection and positioning	HPF-D010-H
		M3 thread	E-dia 1, R-0.24*4				
Small Side View			n/a	15	12(0.47)	Side view, for narrow space	HPF-D011-H
	dia 2, 40mm	dia3					
Elastic				4	70(2.76) 3(0.12)	Elastic, for at moving equipment	HPF-D012-H
		M6 thread	E-0.25*16, R-0.25*16				
Chemical Proof				80	50(1.97) 3(0.12)	Fluorine Fiber, Chemical Proof, for chemical environment	HPF-D014-H
	dia 6	dia 5	dia 1*2				

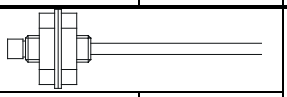
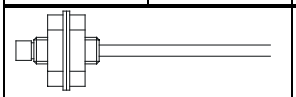
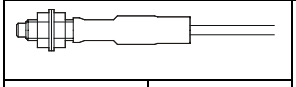
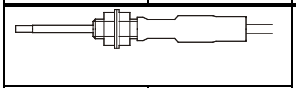
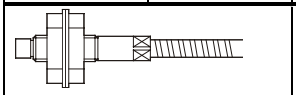
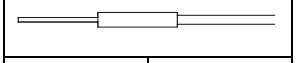
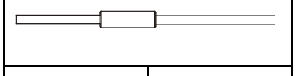
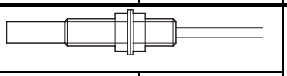
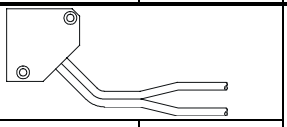
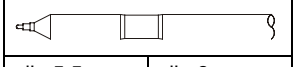
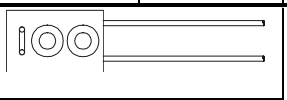
Note 1: Bending radius is the radius which will maintain 100% of sensing range

Photoelectric Sensors

Auto-tuning Fiber Optic Photoelectric Control with Remote-Tuning Feature and Fiber-Optic Cables

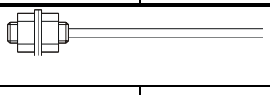
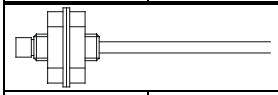
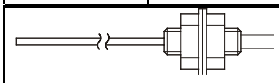
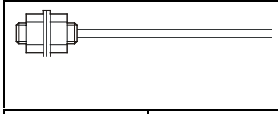
HPX-T Series

DIFFUSE SCAN FIBER OPTIC CABLE

Type	Shape		Core	Bending radius mm (Note 1)	Scan Dist. mm(in.) HPX-T / HPX-TV	Features	Model No.
	Tips mm	Body mm					
Heat Resistant	 dia 4	M6 thread	 dia 1*2	25	70(2.76) 3(0.12)	Heat resistance 105°C, 221°F	HPF-D013-H
	 dia 4.9	M6 thread	 dia 1.5*2	35	110(4.33) 7(0.28)	Heat and cool resistance -60° to 150°C (-76° to 302°F)	HPF-D022-H (new)
	 dia 4	M6 thread	 dia 1.4*2	15	50(1.97) 4(0.16)	Heat resistance 200°C (392°F)	HPF-D023-H (new)
	 dia 1.85,70	M6 thread	 dia 1.4*2	15	50(1.97) 4(0.16)	Heat resistance 200°C (392°F), sleeve, for narrow space and high temp.	HPF-D024-H (new)
		M6 thread	 dia 1*2	n/a	30(1.18)	Heat resistance –40° to 307°C (-40° to 585°F), glass fiber	HPF-D050 (1m) /D051 (0.5m) /D052 (2m) -H
Ultra Small	 dia .82,15mm	dia 3	 dia 0.25*2	4	3(0.12)	Ultra slim sleeve, for small object detection and narrow space	HPF-D019-H
Small Dia.	 dia 1.5,15mm	dia 3	 dia 0.5*2	15	25(0.98)/ 2(0.08)	Short length, 10mm body sleeve, for small object detection and narrow space	HPF-D021-H
Parallel beam	 dia 4	M5 thread		20	20(0.79)	Parallel light, fine beam eliminates the influence of reflections	HPF-D025-H
Array		Array	dia 0.25*32	25	75(2.95)/ 4(0.16)	Array fibers, for zone detection (i.e. unstable position lead frame from side)	HPF-D026-H (new)
Liquid Level	 dia 5.5	dia 6		40		Fluorine liquid level fiber, Chemical proof, for level detection	HPF-D027-H (new)
Flat Convergnt. Beam	 12 x 19 x 3			15	2.5 (0.10)	Convergent beam for background suppression, for wafer detection	HPF-D028-H (new)

Note 1: Bending radius is the radius which will maintain 100% of sensing range

DIFFUSE SCAN FIBER OPTIC CABLE

Type	Shape		Core	Bending radius mm	Scan Dist. mm(in.) HPX-T	Features	Model No.
	Tips mm	Body mm	mm	(Note 1)	HPX-T/HPX-TV		
Small bending		M3 thread	 dia 0.5*2	1	7(0.28)	Small bending R1, for narrow space installation	HPF-D029-H (new)
	 dia 4	M6 thread	 dia 1*2	2	60(2.36)	Small bending R2, for narrow space installation	HPF-D030-H (new)
	 dia 1.2,40mm	M4 thread	 dia 0.5*2	1	7(0.28)	Small bending R1, for narrow space installation	HPF-D031-H (new)
		M3 thread	 E-0.5 R-0.25*4	1	13(0.51)	Small bending R1, for narrow space installation	HPF-D032-H (new)

Note 1: Bending radius is the radius which will maintain 100% of sensing range

FIBER SPECIFICATION

Protection	IP 67 (IEC Standard)
Operating Temperature Range (condensation not allowed)	-30°C to +70°C (-22° to +158°F) - most models (exceptions listed below) -30° to +105°C (-22° to +221°F) - HPF-T012-H, HPF-D013-H -60° to +150°C (-76° to +302°F) - HPF-T017-H, HPF-D022-H -40° to +200°C (-40° to +392°F) - HPF-T018-H, HPF-D023-H -40° to +307°C (-40° to +585°F) - HPF-T054-H, HPF-D052-H
Humidity Range	35% to 85% RH
Fiber Jacket Material	Black Polyethylene - most models (exceptions listed below) Fluorocarbon Resin (HPF-T013-H, HPF-T017-H, HPF-D014-H, HPF-D022-H, HPF-D027-H) Silicone (HPF-T018-H, HPF-D023-H) Stainless Steel (HPF-T054-H, HPF-D052-H)

ATTACHMENTS (Sold Separately)

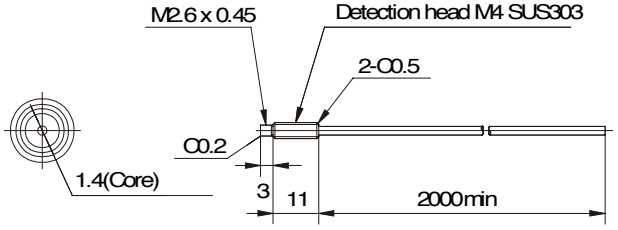
Name	Shape	Features And Applications	Applicable Fiber Unit	Model
Micro Spot Lens Unit		Light converges to a spot diameter of 0.4 mm (0.02 in) if this unit is attached to a diffuse scan fiber unit at a distance of 7 mm (0.28 in).	HPF-D010-H	HPF-LU01
Long Distance, Micro Spot Lens Unit		Light converges to a spot diameter of 2 mm (0.08 in) if this unit is attached to a diffuse scan fiber unit at a distance of 19 mm (0.75 in).	HPF-D010-H	HPF-LU02
Long Distance Lens Unit		The scanning distance is increased 6-fold if this unit is attached to the light emitter and receiver of a thru-scan fiber unit.	HPF-T003-H, HPF-T004-H HPF-T010-H, HPF-T012-H, HPF-T018-H, HPF-T054-H	FE-PA-L1
Side View Unit		The unit can be changed to a side view type by attaching this unit to the light emitter and receiver of a thru-scan fiber unit.	HPF-T003-H, HPF-T004-H HPF-T010-H, HPF-T012-H HPF-T018-H, HPF-T054-H,	FE-PA-S1
Fiber Head Mounting Bracket		Ideal for mounting fiber heads	Fiber head shape M3 Fiber head shape M4 Fiber head shape M6	FE-PA-FB1 FE-PA-FB2 FE-PA-FB4

Attachment	Side View Unit FE-PA-S1 Attached				
Fiber	HPF-T003-H	HPF-T004-H	HPF-T012-H	HPF-T018-H	HPF-T054-H
Scanning Distance (Standard Target Object)	290 mm (11.4 in)	290 mm (11.4 in)	140 mm (5.5 in)	115 mm (4.5 in)	120 mm (4.7 in)

MOUNTING DIMENSIONS mm (for reference only)

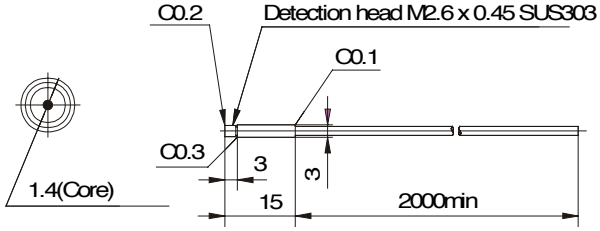
THRU SCAN FIBER OPTIC UNIT

HPF-T001-H

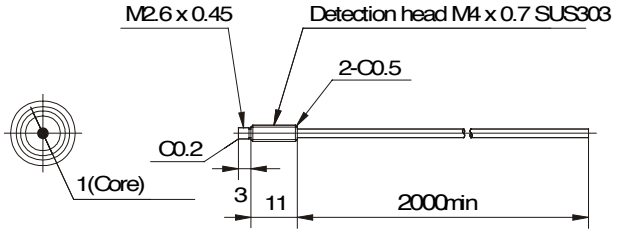


Nut and Washer: M4 Type

HPF-T002-H

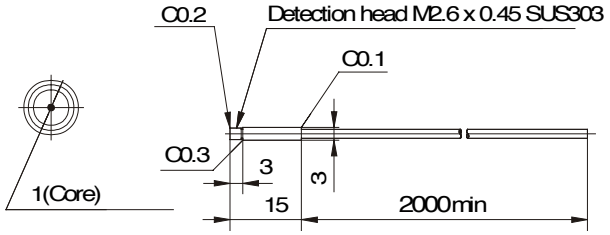


HPF-T003-H

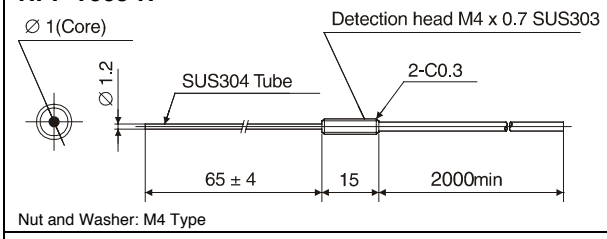


Nut and Washer: M4 Type

HPF-T004-H

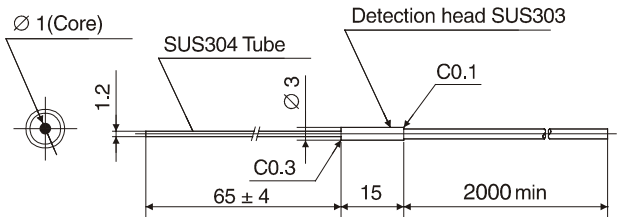


HPF-T005-H

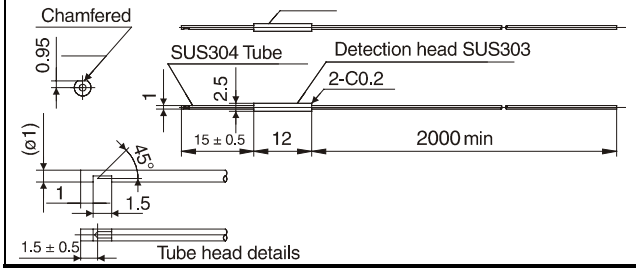


Nut and Washer: M4 Type

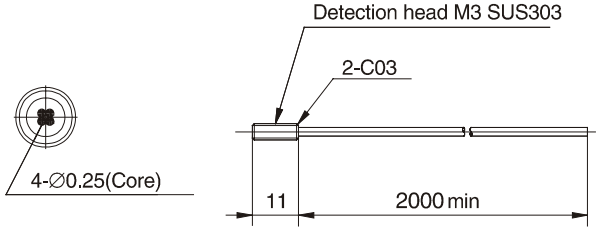
HPF-T006-H



HPF-T007-H



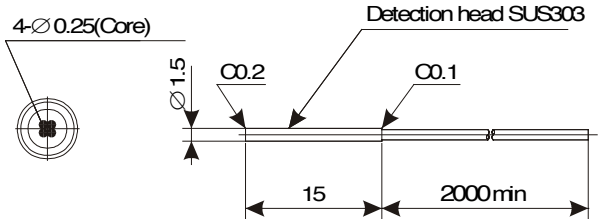
HPF-T008-H



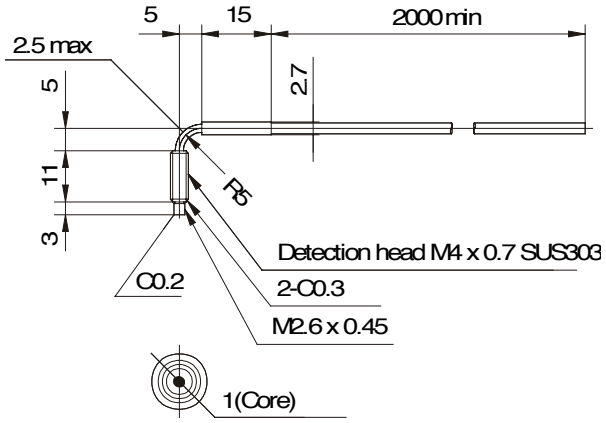
MOUNTING DIMENSIONS mm (for reference only)

THRU SCAN FIBER OPTIC UNIT

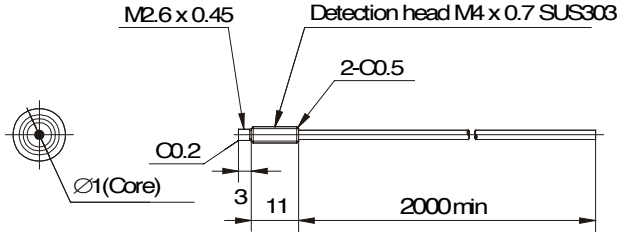
HPF-T009-H



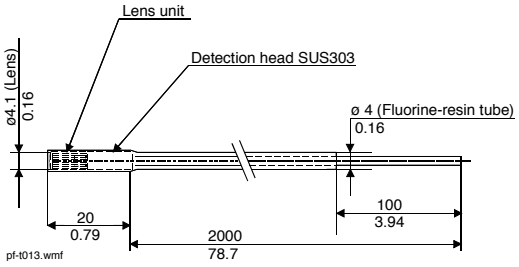
HPF-T010-H



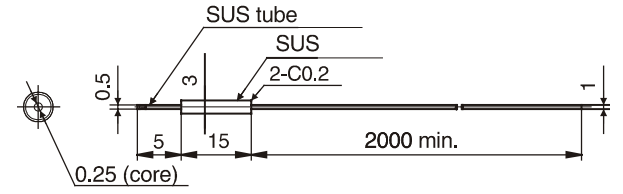
HPF-T012-H



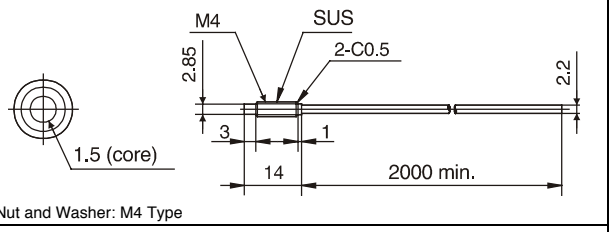
HPF-T013-H



HPF-T015-H

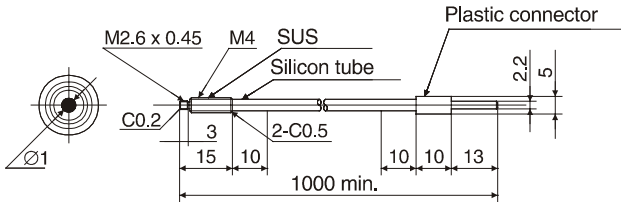


HPF-T017-H

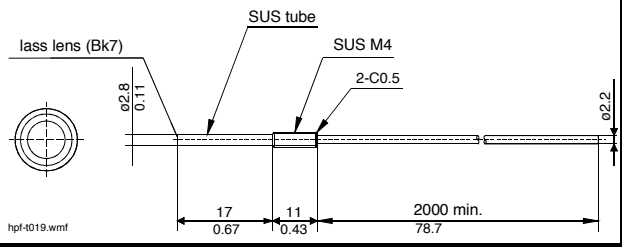


Nut and Washer: M4 Type

HPF-T018-H



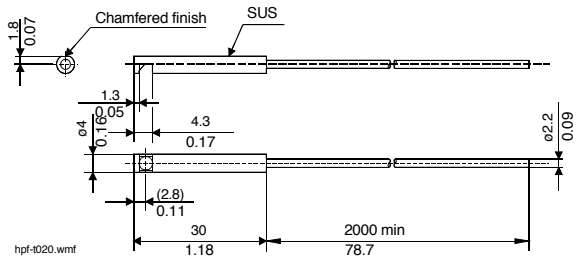
HPF-T019-H



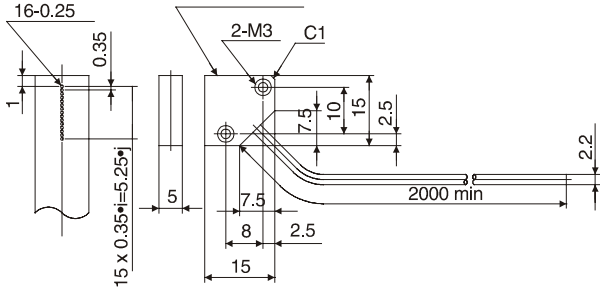
MOUNTING DIMENSIONS mm (for reference only)

THRU SCAN FIBER OPTIC UNIT

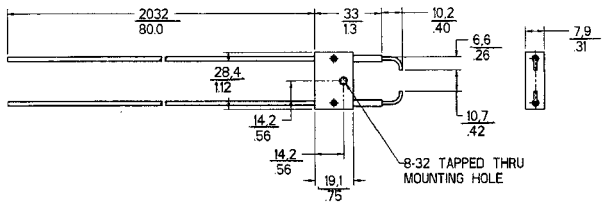
HPF-T020-H



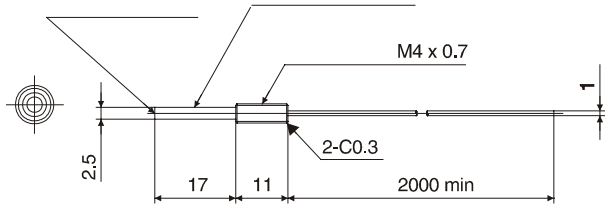
HPF-T021-H



HPF-T022-H

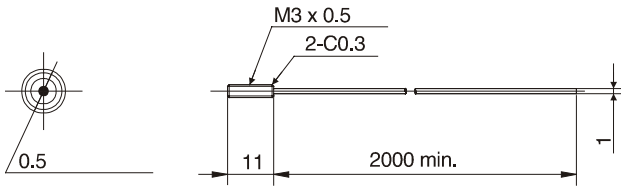


HPF-T023-H



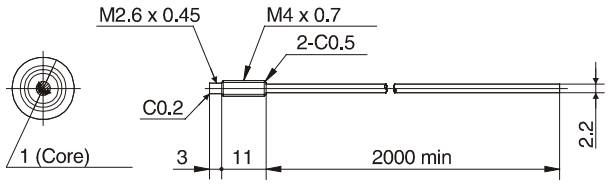
Nut and Washer: M4 Type

HPF-T024-H



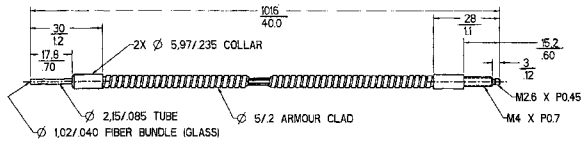
Nut and Washer: M3 Type

HPF-T025-H

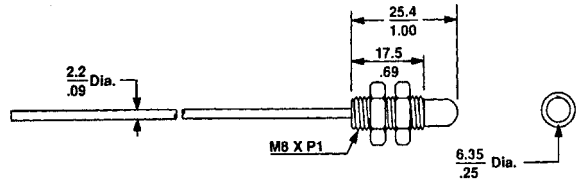


Nut and Washer: M4 Type

HPF-T054-H



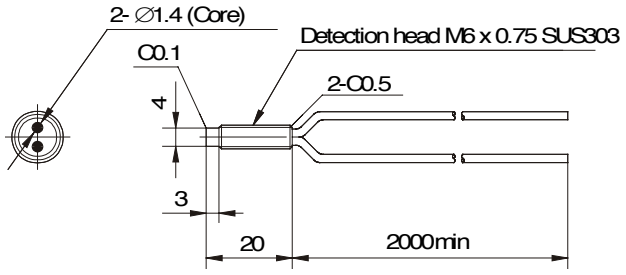
FET-PLT1



MOUNTING DIMENSIONS mm (for reference only)

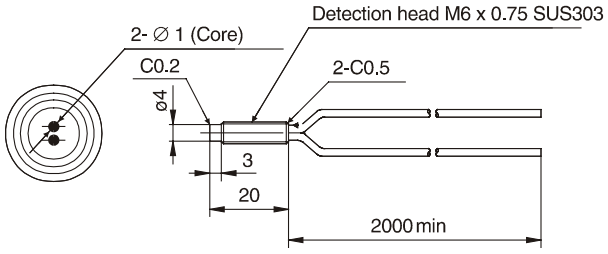
DIFFUSE SCAN FIBER OPTIC UNIT

HPF-D001-H



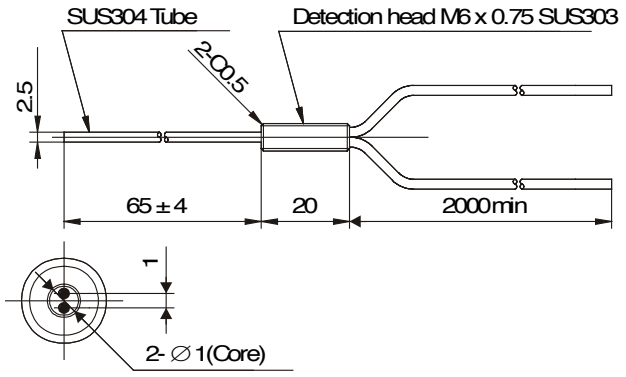
Nut and Washer: M6-1 Type

HPF-D002-H



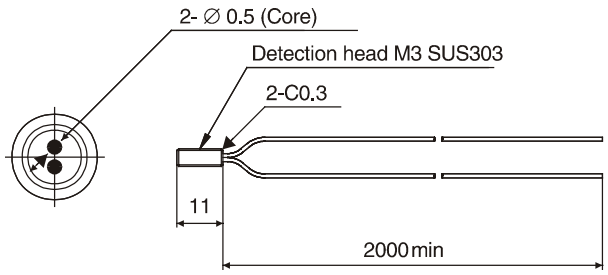
Nut and Washer: M6-1 Type

HPF-D003-H



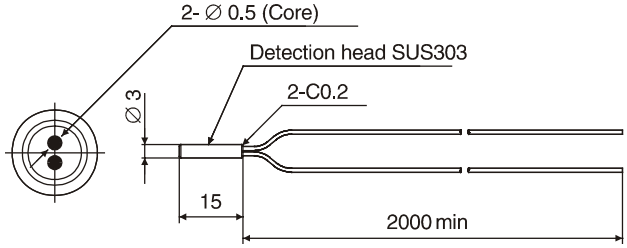
Nut and Washer: M6-1 Type

HPF-D004-H

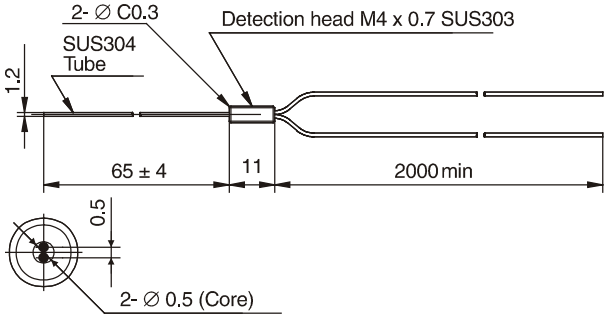


Nut and Washer: M3 Type

HPF-D005-H

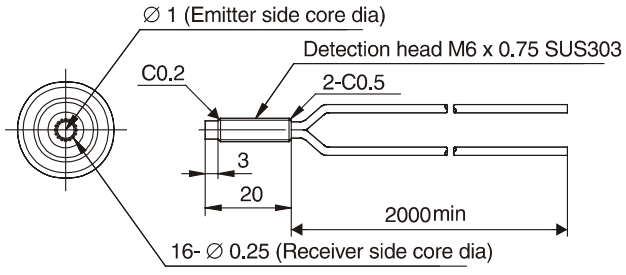


HPF-D006-H



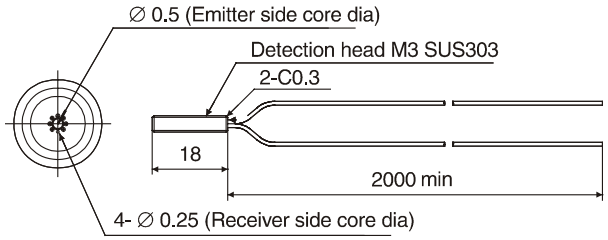
Nut and Washer: M4 Type

HPF-D009-H



Nut and Washer: M6-1 Type

HPF-D010-H

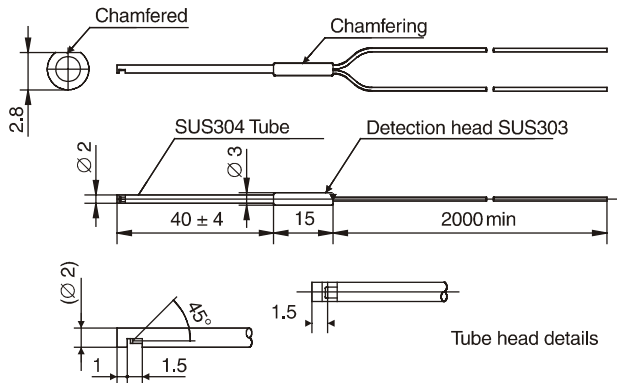


Nut and Washer: M3 Type

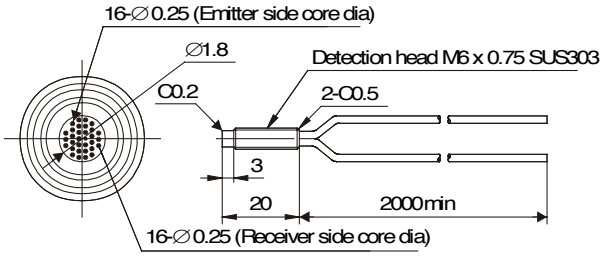
MOUNTING DIMENSIONS mm (for reference only)

DIFFUSE SCAN FIBER OPTIC UNIT

HPF-D011-H

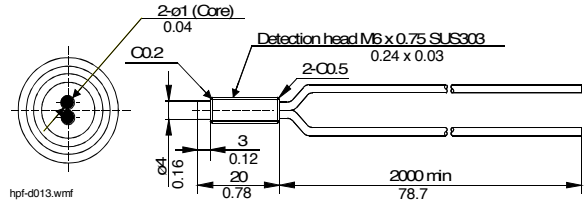


HPF-D012-H

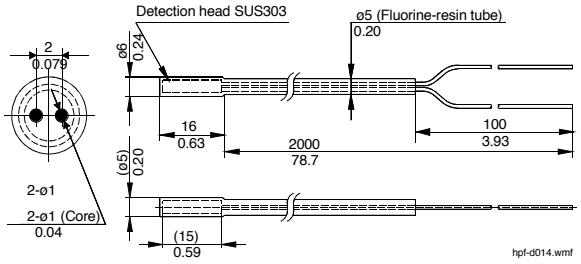


Nut and Washer: M6-1Type

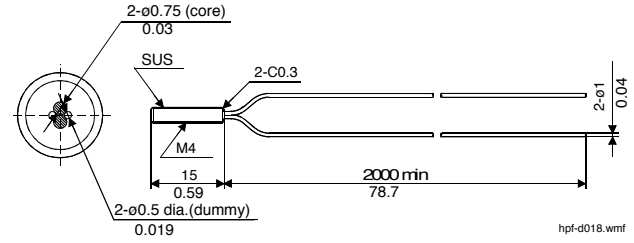
HPF-D013-H



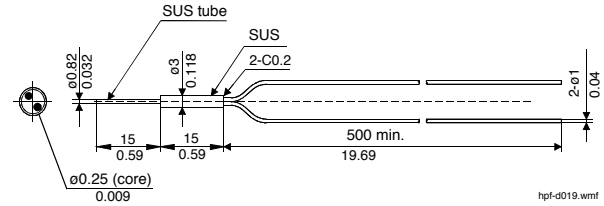
HPF-D014-H



HPF-D018-H



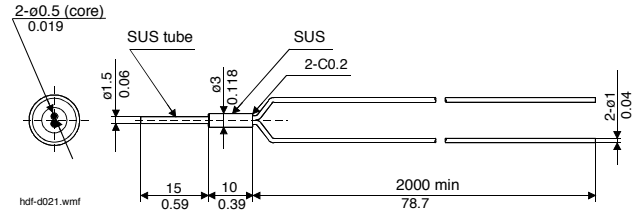
HPF-D019-H



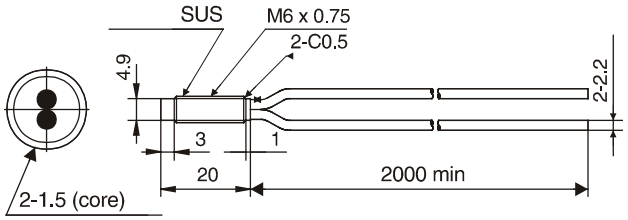
MOUNTING DIMENSIONS mm (for reference only)

DIFFUSE SCAN FIBER OPTIC UNIT

HPF-D021-H

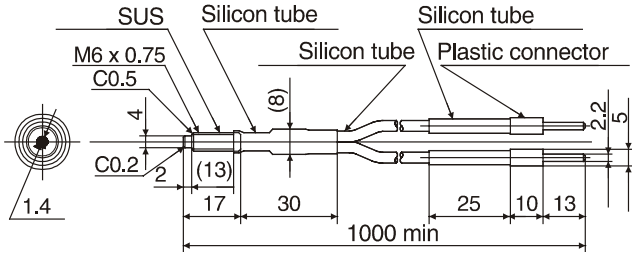


HPF-D022-H



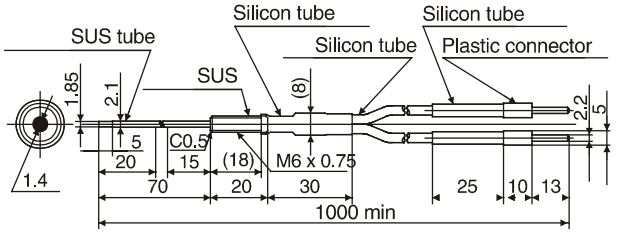
Nut and Washer: M6-1 Type

HPF-D023-H



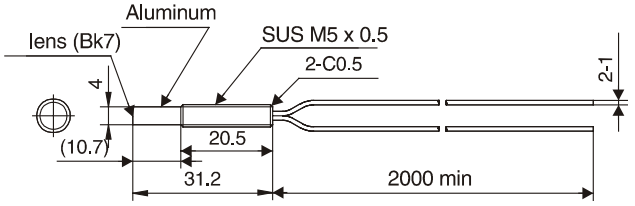
Nut and Washer: M6-2 Type

HPF-D024-H

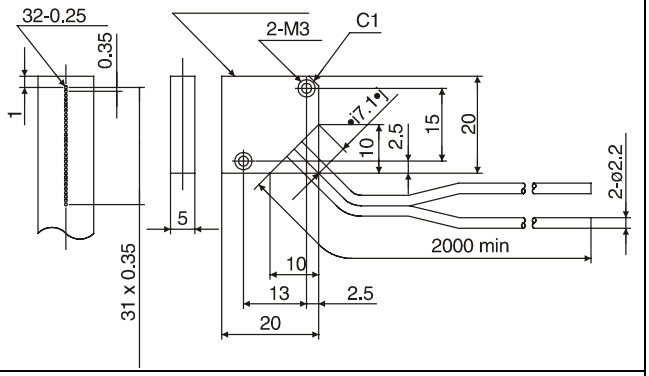


Nut and Washer: M6-2 Type

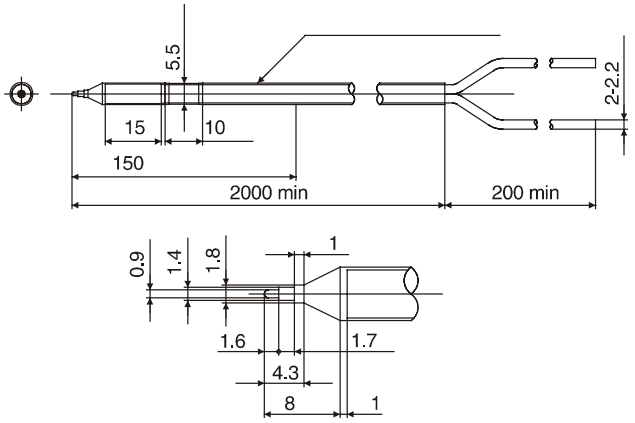
HPF-D025-H



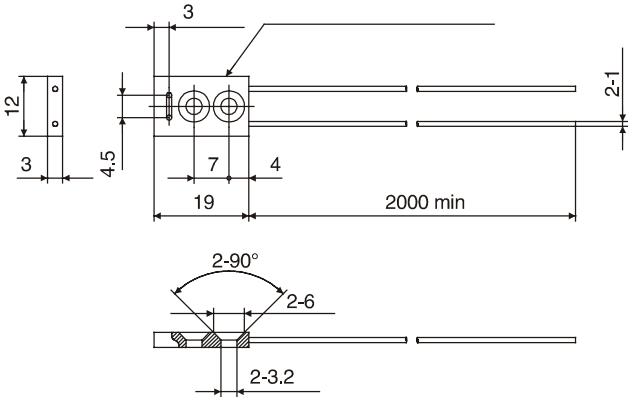
HPF-D026-H



HPF-D027-H



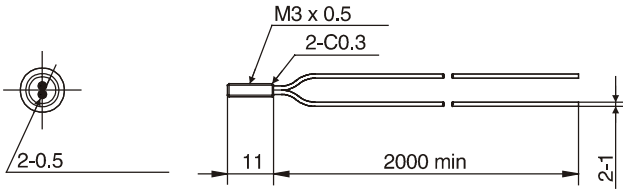
HPF-D028-H



MOUNTING DIMENSIONS mm (for reference only)

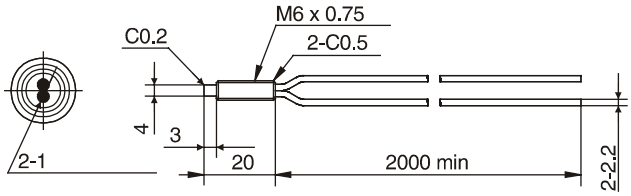
DIFFUSE SCAN FIBER OPTIC UNIT

HPF-D029-H



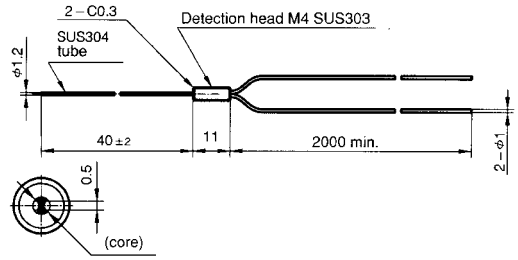
Nut and Washer: M3 Type

HPF-D030-H

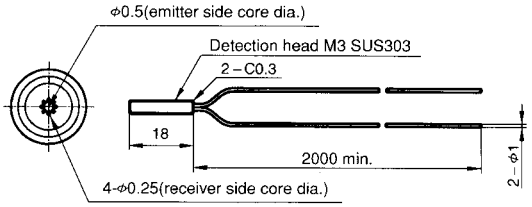


Nut and Washer: M6-2 Type

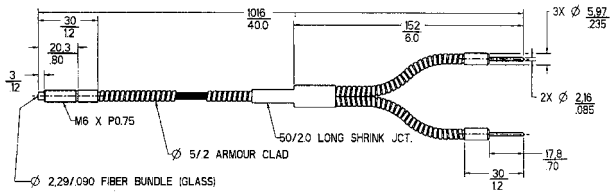
HPF-D031-H



HPF-D032-H



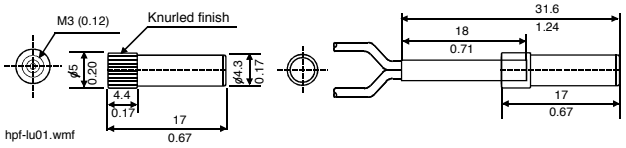
HPF-D052-H



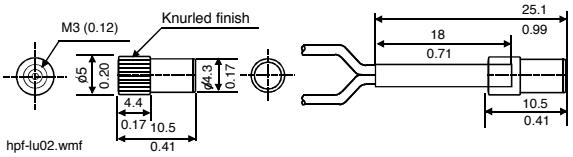
MOUNTING DIMENSIONS mm (for reference only)

FIBER OPTIC LENS UNITS

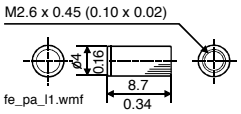
HPF-LU01



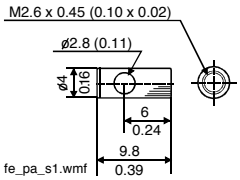
HPF-LU02



FE-PA-L1



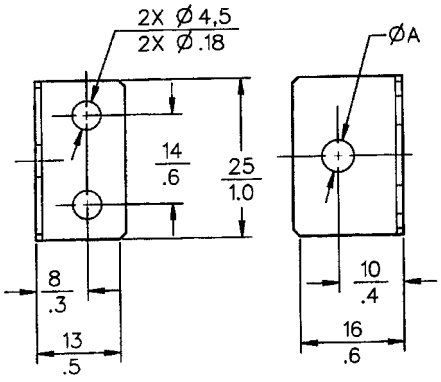
FE-PA-S1



MOUNTING DIMENSIONS mm (for reference only)

FIBER OPTIC HEAD - MOUNTING BRACKET

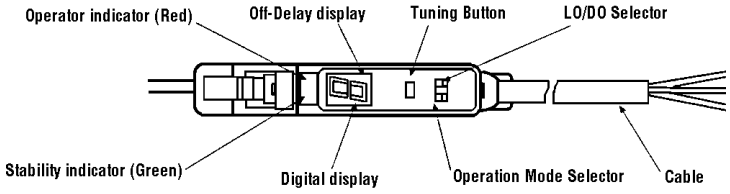
FE-PA-FB



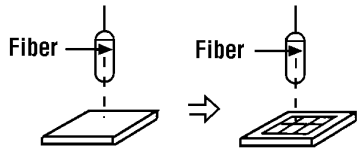
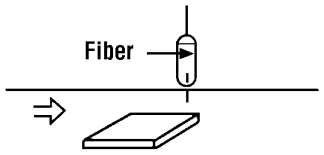
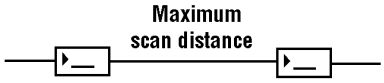
SENSITIVITY ADJUSTMENT INSTRUCTION

Each HPX-T is delivered on the following setting: “RUN” for operation mode selector, “LO” for LO/DO selector set at maximum scan sensitivity. Parameters are stored in a non-volatile, high reliability memory and are kept even without power supply.

COMPONENT DESCRIPTION



THREE TYPES OF SENSITIVITY ADJUSTMENT/DETECTION

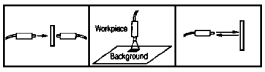
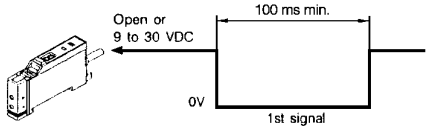
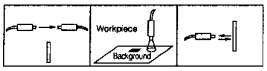
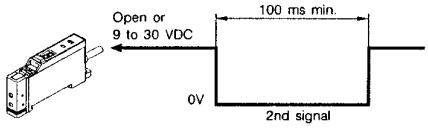
1. Distinction/contrast	2. Positioning	3. Maximum sensitivity
HPX-T distinguishes 2 targets of different material (reflectivity), color, or dimensions.  HPX-T memorizes the levels of light reflected by the targets	HPX-T determines the position of targets  HPX-T memorizes the postioning of the target.	A typical application is when you require maximum scan distance using Thru Scan fiber optics  HPX-T maximizes the light output and the sensitivity

DISTINCTION/CONTRAST SETTING

Step	Target position	Operation	Indicator status			Alarms for errors					
			Digital	Green LED	Red LED	Insufficient light			Insufficient contrast		
						Digital	Green LED	Red LED	Digital	Green LED	Red LED
1		SET / RUN Switch the operation mode selector to "SET"	"1" is indicated for step 1	OFF	OFF						
2	Place the first target "A" in position	Push the tuning button once (first teaching)	"2" is indicated for step 2	FLASH	OFF	"2"	FLASH	FLASH	—	—	—
3	Place the second target "B" in position	Push the tuning button once (second teaching)	"1" ~ "9" Margin level is displayed	ON	OFF	"E" for error will flash	OFF	FLASH	"E" for error will be ON	OFF	ON
4 Tuning completed	—	Set / Run Switch the operation mode selector to RUN	"0" ~ "9" Level of light reception is displayed	Should be ON for stable operation	Depends on LO/DO setting	"E" will continue to flash Output is locked	OFF	FLASH	"E" will continue to be ON. Output is locked	OFF	ON

SETTING THE SENSITIVITY USING REMOTE FUNCTION(-T3, -TV3, -T4, -TV4)

Set the hysteresis level according to the externally input auto-tuning signal instead of pressing the tuning button. (Note: that positioning and maximum sensitivity cannot be set).

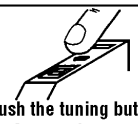
Step	Operation	If Error Occurs
1	Leave the mode selector switch at RUN.  Place the workpiece at the specified position. Input the 1st signal to the remote-tuning input. 	Same as indicator status shown on page 21 for Maximum Sensitivity
2	 Move the workpiece, and input the 2nd signal to the remote-tuning input. (Allow at least 200 ms between input of the 1st and 2nd signals.) 	
3	The scanning margin is displayed for about one second after the 2nd remote-tuning signal is input, and the display then returns to normal.	

When the remote sensitivity is not set, either cut the pink lead (remote tuning input lead) at the root of the cord, or connect it to + power supply terminal.

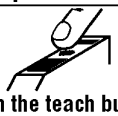
POSITIONING

Step	Target Position	Operation	Indicator Status					
			Digital	Green LED	Red LED	Alarms for Errors		
						Insufficient light		
						Digital	Green LED	Red LED
1		SET RUN Switch the operation mode selector to "SET"	"1" is indicated for step 1	OFF	OFF			
2	Place the first target "A" in position	Push the tuning button once (first teaching)	"2" is indicated for step 2	FLASH	OFF		FLASH	FLASH
3 Tuning Completed		SET RUN Switch the operation mode selector to "RUN"	0 ~ 9 Level of light reception is displayed	Should be ON for stable operation	Depends on LO/DO setting	"E" for error will flash	OFF	FLASH

MAXIMUM SENSITIVITY

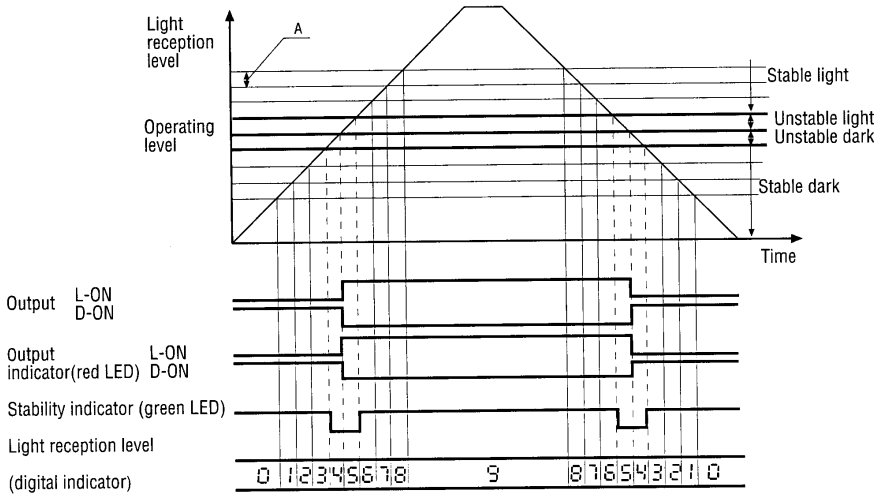
Step	Operation	Indicator Status		
		Digital	Green LED	Red LED
1	SET □ ↑ RUN Switch the operation mode selector to "SET"	"1" is indicated for step 1	OFF	OFF
↓ 2	 Push the tuning button for 3 seconds	"H" is displayed	ON	ON
↓ 3 Tuning Completed	SET ↓ □ RUN Switch the operation mode selector to "RUN"	0 ~ 9 Level of light reception is displayed	Should be ON for stable operation	Depends on LO/DO setting

OFF-DELAY SETTING

Off-delay timer status	Operation	Digital display
To activate →	 Push the teach button for 10 seconds	 Off-delay "ON"
To de-activate →	 Push the teach button for 10 seconds	 Off-delay "OFF"

EXPLANATION OF NUMERICS IN THE DIGITAL INDICATOR

Light reception level definition and the operation chart of output/LED indicators



Note: The point of operation is always set between 4 and 5 of light reception level.
A is equal to twice the hysteresis automatically set during sensitivity adjustment.

MARGIN DISPLAY

The digital display usually shows the amount of light received. However, it can also show the contrast margin, provided the sensor is programmed for Distinction/Contrast setting:

- At the end of Distinction/Contrast setting, before putting the switch back to “Run”.
- With the switch in <run> mode, by pressing the “tuning” button. If the sensor is programmed for Positioning, the display will show “-“. If the sensor is programmed for Maximum Sensitivity, the display will show “H”.

Margin level indication	1	2	3	4	5	6	7	8	9
Secured margin level	≥ x1	≥ x1.2	≥ x1.5	≥ x2	≥ x3	≥ x4	≥ x5	≥ x6	≥ x7

ORDER GUIDE

	Remote	Red LED	Green LED	NPN	PNP	Preleaded	Connector
HPX-T1-H		●		●		●	
HPX-T2-H		●			●	●	
HPX-T1-HC		●		●			●
HPX-T2-HC		●			●		●
HPX-T3-H	●	●		●		●	
HPX-TV3-H	●		●	●		●	
HPX-T4-H	●	●			●	●	
HPX-TV4-H	●		●		●	●	

CABLE ORDER GUIDE

Catalog Listing	Description		
	Straight	Right Angle	Cable Length
80456-A	●		2m (6.6 ft)
80459-A	●		5m (16.4 ft)
80496-A		●	2m (6.6 ft)
80499-A		●	5m (16.4 ft)

Photoelectric Controls

Auto-tuning Fiber Optic Photoelectric Control with Remote-Tuning Feature and Fiber-Optic Cables

HPX-T Series

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose**.

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